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THE EFFECT OF MAJOR ROADS UPON THE LOCAL ECONOMY

A study of industrial location and its effects

JEREMY FRANCIS VANKE

Doctor of Philosophy

THE UNIVERSITY OF ASTON IN BIRMINGHAM

September 1989

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Submitted for the degree of Doctor of Philosophy

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THESIS SUMMARY

The economic effects of road building (beyond those accounted for in cost-benefit analysis) are not well understood. This thesis examines the issues surrounding those effects and attempts to clarify the relationship between road building and industrial location and to identify the effect on employment of that location.

The literature reviewed leads to some doubt as to the efficacy of roads as an economic tool on three counts:

1. the role of transport costs in business is less than one might expect and changes in those costs are not of sufficient magnitude to bring about industrial regeneration;
2. roads as an instrument of regional policy are a 'hit and miss' affair and may act counter to regional policy;
3. the link between road building and employment is unproven: much of the reviewed research suggests that roads are a highly inefficient means of employment creation.

A series of interviews with representatives of business and property professionals in three areas adjacent to motorways is carried out. The conclusions drawn echo the above statements based on reviewed literature:

1. there was a general lack of knowledge of transport within a firm despite subjects' good understanding of the rest of the firms' operations.
2. The importance of major roads to the business location decision and its perceived importance to the operations of the firms was low. Property professionals see roads as an effective marketing tools.
3. Firms have a tendency to shed labour upon relocation although this does not necessarily constitute a net loss of employment but a redistribution.

KEY WORDS: BUSINESS LOCATION, LOCAL ECONOMY, ROADS, TRANSPORT.

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Special thanks are due to my supervisory team at Aston: John White, David van Rest and Alasdair Traill for their frank and valuable support and advice throughout the project.

Friends of the Earth provided me with immense support and invaluable experience. Don Mathew set up this project and acted as external supervisor throughout: his enthusiasm and dedication were an example to follow. Others at FoE provided personal support and friendship (as did Don). They are too many to mention here, but particular thanks are due to Andy Clarke and Roger Higman and those who tolerated me during the writing-up.

My family have been an unfailing source of support and encouragement for which I thank them.

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CHAPTER ONE: INTRODUCTION

- 1.1 THE IHD SCHEME
- 1.2 IHD METHODOLOGY
- 1.3 THE COLLABORATOR: FRIENDS OF THE EARTH
- 1.4 PROJECT ORIGINS
- 1.5 THESIS OUTLINE

Chapter Outline

The organisations involved in the research project are introduced and an explanation of the origins of the project is given. The nature of research within IHD is described as it is unlike that of a conventional doctoral project. The processes by which the focus of the research was defined is outlined and, finally, the structure of the thesis itself is set out.

1.1 THE IHD SCHEME

The Swann Report of 1968 called for greater collaboration between industry and universities, a cry which has been echoed ever since. As a direct result of that report the Interdisciplinary Higher Degree Scheme at Aston University was launched. The principal aim then, as now, was to provide applied academic training to graduates working within industry and public service such that they were prepared for interdisciplinary careers.

The essence of IHD is that students undertake research projects in collaboration with an external organisation, in this case Friends of the Earth Limited, in order to study a topic which is of direct importance to that organisation. The collaborating organisation thus benefits from high quality state of the art research whilst the student benefits from being able to study a problem of immediate practical importance.

The project has a supervisory team made up of a main academic supervisor, an IHD tutor, a supervisor from the collaborating organisation and one or more associate academic supervisors. There may also be,

as in this case, an adviser to the main supervisor. Responsibility for the academic standards and project management lie with the main supervisor whilst the IHD tutor maintains the balance between the academic and collaborative interests - a potential source of conflict. This role takes on particular importance in the light of the significant differences between an IHD PhD and others within the university with which the main supervisor may not be familiar.

The supervisor appointed by the collaborating organisation is responsible for ensuring that the project remains of practical value to that organisation whilst associate supervisors are chosen in order to provide the perspectives of different academic disciplines. Thus the supervisory process involves a certain continuing level of negotiation between the academic and professional interests over the direction of the project, whilst allowing an input of views from those with different academic and applied perspectives.

The supervisory team for this project was as follows:

Main Academic Supervisor - John White, Transport Studies Group;

Associate Academic Supervisor - Mike Harris,
Transport Studies Group, (first year only);

Collaborating Supervisor - Don Mathew, Friends of the
Earth Ltd.;

IHD Tutor - Dr. David van Rest, IHD Scheme;

Project Adviser - Alasdair Traill, Transport Studies
Group.

1.2 IHD METHODOLOGY

IHD projects adopt a methodology of interdisciplinary action research. Typically, at the outset of the project the problems to be examined are not fully understood nor are they properly defined. The original title of the project was 'The Social and Economic Impact of Major Road Schemes'. Inevitably such a multi-faceted title demands an interdisciplinary approach particularly in the formative stages of the project.

Action research, as Curle stated in 1949, demands that the researcher "aims not only to discover the facts, but to help in altering certain conditions

experienced by the community as unsatisfactory" (1). The research is thus designed to be of practical use to the sponsoring organisation.

Such an approach, as has been said, inevitably leads to the possibility of conflict between the academic elements of the PhD and the pragmatic needs of the sponsoring organisation. Whilst the *potential* for that conflict has been great in this project, the research has been handled with a degree of sensitivity by all involved and such problems did not arise. Indeed Friends of the Earth rightly demand that all of their research be of the highest academic standards as any research that it publishes must be able to stand up to scrutiny from organisations opposed to FoE's general aims.

The student's role within the collaborating organisation tends to be somewhat confused as he or she is expected to act as consultant to the organisation and to learn the skills necessary for employment within that organisation whilst also fulfilling the role of research student. Thus the student is expected to provide guidance to the collaborating organisation throughout the period of research whilst still trying to get to grips with a new discipline.

Nonetheless this joint role brings distinct advantages to the student: in my own case I attained a wide range of experience in political lobbying and campaigning and in using the media to further the aims of Friends of the Earth. In the first six months of the project I was responsible for coordinating the reaction of non-governmental organisations to the Channel Tunnel proposals involving a high level of media contact including a press conference in Paris in conjunction with Les Amis de la Terre, FoE's French counterpart. This training, together with the academic skills gained through IHD, have led to a senior full-time position within the organisation.

This approach to a research project does, however, demand a degree of commitment to the aims and values of the collaborating organisation, especially in a case such as this where the work demands long, unsociable hours in a relatively poor working environment as well as an understanding of what can, at times, be a controversial field.

Rapoport suggested that the action researcher

"sacrifices a degree of detachment and independence (but gains) a sense of sympathy and identification which may produce more

valid information than that which might have been gathered from a more detached vantage point." (2)

It must therefore be recognised that, in the context of an IHD PhD, the researcher needs to identify with the collaborating organisation. This does not, however, imply that the student should take on board everything that the organisation might say without question. Indeed the student must be satisfied that the policies and actions of that organisation satisfy his or her own intellectual criteria. To work for an organisation like Friends of the Earth and not to question actions which one does not accept as valid would be to fail that organisation and one's own intellectual credibility. Further, as I have already stated, a biased report would be of little value to Friends of the Earth.

1.3 THE COLLABORATOR: FRIENDS OF THE EARTH.

1.3.1 Origins and Aims

Friends of the Earth is an international campaigning organisation which campaigns for the rational use and conservation of the environment. It campaigns on a

range of environmental issues which now include air pollution, energy, tropical rainforests, water and toxics, countryside and agriculture, recycling and its 'Cities for People Campaign' through which this project was sponsored.

The organisation has American origins, being founded in Britain in 1971 and currently has approximately 180,000 registered supporters following a dramatic upsurge in membership in 1989. During the last 18 years it has become widely respected across the political spectrum and is used as a source of advice by politicians, media and public. It has no party political affiliations.

1.3.2 Organisational Structure

The organisation in Britain centres on Friends of the Earth Ltd., the national office. This is, in turn a member of, and secretariat to, Friends of the Earth International, an affiliation of some 35 national environmental organisations. FoE also has around 280 licensed local groups in England and Wales each of which is autonomous although they tend to take a lead from FoE Ltd. on campaigning issues.

FoE Ltd. staff consist of six campaign teams working on specific areas of interest as outlined above, but with recycling being an element of the 'Cities for People' campaign. Each campaign is headed by a senior campaigner who works with an assistant campaigner, a campaign assistant (whose duties are primarily administrative) and numerous voluntary workers. The campaigns are managed by the Campaigns Coordinator who, in turn, is directly responsible to the Director. Administrative support, fundraising and membership services are also carried out by staff at FoE Ltd. In addition there are externally funded projects which are based at FoE Ltd. which include its London Information Unit and a range of smaller projects funded by UK2000. The role of voluntary workers within the organisation cannot be underestimated: FoE is fortunate in having a large number of well-qualified volunteers without whom the organisation simply could not function.

Executive authority lies with the Board of Directors which is made up of members elected by local groups and others appointed by the Board. It has a Strategy Committee which considers detailed campaign-specific matters, a Personnel Committee and a Finance Committee. Day to day campaign management, however, is delegated to a management committee made up of

senior staff including the Director, Campaigns Coordinator and the Local Groups Manager as well as personnel, administrative and fundraising managers.

1.3.3 The Transport and Cities for People Campaigns

Historically transport issues have always been a focus of FoE's campaigning activities. The environmental consequences of transport provision are numerous and include effects on land-use, air pollution, energy consumption and urban design. Bicycles have always featured in its activities and are generally associated with Friends of the Earth by the public. Some years after the UK launch of the organisation it became clear that cycling was too narrow a topic of concern and the growing realisation of the environmental importance of transport led to the formation of a Transport Campaign within FoE.

Central to this campaign has been the notion of a rational integrated transport policy which was set out by Don Mathew in 1987 (3). In short, the aims are to achieve a transport system which takes adequately into account its environmental impact. Increased car use may be seen as being in direct

conflict with environmental improvement (or even maintenance), especially with regard to increased vehicle emissions and energy use. FoE's policy therefore centres on a reduction in traffic by a number of means which include traffic restraint and better public transport together with improved facilities for pedestrians and cyclists.

It is based on a series of nine policy objectives set out in fig 1.1 and the recommendations given by the report can be summarised under those headings thus:

Access

- i. The goal of transport planning should be 'access', not 'mobility'.

As trips made are predominantly of short distances (85% under ten miles, 76% under five) modes best suited to those distances should be better catered for hence:

- ii. Britain's pedestrian environment needs to be completely reshaped and
- iii. an investment of £200 million per year for the next five years is required to make cycle facilities adequate.

Democracy

- i. The Department of Transport should be restructured. All main road building should be devolved down to local level;
- ii. the public inquiry system for roads needs drastic reform;
- iii. consumers should have greatly enhanced influence over transport decision-making.

Efficiency

- i. Transport projects should be assessed under new, broader criteria that incorporate policy objectives;
- ii. all major road building should be halted and reassessed under the new standards;
- iii. Britain's rail system needs wholesale expansion;

- iv. bus services should be stabilised, then expanded;
- v. fiscal and other policies should be used to improve freight efficiency. Road pricing for lorries should be introduced.

Employment

- i. Expenditure should be lessened on new road construction, increased on road maintenance and on improving the urban environment;
- ii. expanding public transport will create jobs in its manufacturing and service sectors;
- iii. the car industry should switch its attention to the manufacture of longer-lasting, more environmentally acceptable vehicles;
- iv. the Department of Transport should cease to claim employment creation as one of the results of road-building.

Energy

- i. Energy conservation in transport should be planned now in order to avoid crisis measures in the future;
- ii. the demand for movement should be reduced by better planning and tighter development controls;
- iii. travel modes should be more fuel-efficient and have higher load factors.

Environment

- i. Britain's inner cities should be restored by positive measures of traffic restraint and environmental improvement;
- ii. an urgent programme of control measures is necessary to cope with the threat to health and the environment posed by vehicle emissions;
- iii. traffic noise and vibration levels should be cut;

- iv. development sprawl should be curbed;
- v. Sites of Special Scientific Interest and Areas of Outstanding Natural Beauty should statutorily be protected against road developments.

Equality

- i. Vulnerable road users must be given a much higher priority in transport planning;
- ii. the different needs of women and disadvantage groups must be recognised in assessing priorities;
- iii. a large-scale programme is needed in all areas of transport planning to cater for the needs of people with disabilities.

Equity

- i. Company car subsidies should be ended;
- ii. Vehicle Excise Duty should be scrapped and incorporated into petrol tax;

- iii. the wider costs imposed by lorries should be reflected in their taxation;
- iv. differing values of time for transport users should be ended in cost-benefit analysis.

Safety

Current casualty rates are horrendously high and must be reduced by a comprehensive package of measures:

- i. random breath testing should be introduced to curb drink-driving. It should be an offence to drive with detectable levels of alcohol in the blood;
- ii. lower speed limits are necessary in residential areas, with physically self-enforcing measures (such as road humps) a priority;
- iii. the enforcement of road traffic laws should be more effective. Sentencing of traffic offenders should be less lenient;

- iv. central government must play a leading role in fostering a more positive attitude towards road safety.

The political context within which FoE's transport work takes place is one which is dominated by the road lobby: the British Road Federation is one of the most powerful interest groups in Britain today. Its members include the Automobile Association, the Royal Automobile Club, the Society of Motor Manufacturers and Traders, firms in the construction industry, motor parts industry and all related sectors. The history and workings of the road lobby were set out by Hamer in 1987 (4). Much of FoE's transport work has entailed responding to various road lobby initiatives in an attempt to counteract their influence. The lobby is, however, far better resourced than the environment movement and whilst the arguments which they promote might not to be intellectually sound their political machinery has, in the past, made them accepted wisdom.

In 1986 the Greater London Council (GLC) gave FoE's Transport Campaign a sizeable grant to run a short-term, high-profile information campaign called 'Cities for People' which was aimed at informing the

public of the then current threats to the Capital from the Department of Transport's road building proposals . The emphasis of this initiative was upon the effects that large scale road construction would have upon *people* and upon the urban environment.

In response to the reaction to this campaign it was decided that the national Transport Campaign should become the 'Cities for People' Campaign. This was intended to develop further the 'Cities for People' concept and to put all of FoE's campaigns into an urban context. This campaign was to retain the transport elements of FoE's work albeit on a slightly smaller scale than before.

1.4 PROJECT ORIGINS

1.4.1 The Issues

During 1984 it became clear to the then Transport Campaigner, Don Mathew, and to his group of advisers that there were two set of arguments coming from the road lobby with which FoE were ill-equipped to deal: the first of these was that new roads were essential to a healthy economy and to the creation of employment and the second that new roads relieved

congestion. Research carried out by the GLC (5) suggested that the latter was not the case with new road space in itself generating new traffic.

At the time FoE were already sponsoring one PhD through Aston's IHD Scheme in which Liz Speed was researching drivers' attitudes towards, and perceptions of, cyclists. At an advisory group meeting it was decided that a second such project should be sponsored to examine the issues outlined above. At the time there were no specific terms of reference for the project and it was therefore given the broad ranging title 'The Social and Economic Impact of Major Road Schemes' upon which work commenced in October of 1985.

1.4.2 Narrowing the field

Whilst the title could conceivably lead to a wide range of topics for study ranging from health impacts of road schemes through to effects upon communities or international economic impacts, the fact that FoE already had in mind the two areas of economic and employment impacts and of traffic generation meant that those became the starting points of the research. It is evident that these are two very different topics of concern: the two basic questions

which FoE were asking 'are new roads good for the economy' and 'do new roads generate new traffic' require very different knowledge and skills in order to provide satisfactory answers. Through IHD I was thus required to undertake training in highway engineering and transport planning and in econometrics which, as intended in the *Interdisciplinary Higher Degree Scheme*, was to broaden my existing knowledge and outlook, namely that of a social scientist.

However, even when restricted to the two areas above, the project was still without adequate focus. The link between roads and the economy in particular is highly complex and multi-faceted; the effect of road building on traffic is also highly complex. At this initial stage in the project it was necessary to narrow down the field of investigation to one or other of these topics before concentrating still further upon a specific area of that topic.

This process centred around consultation with experts in the field of transport from within other non-governmental organisations, local government and academia, as well as with the supervisory team. Whilst both would clearly have made interesting topics of research, these discussions were to

determine which would be of the most benefit to FoE. A list of those consulted is at Appendix 1.1. This process of consultation was to continue throughout the project and should not be regarded as a one-off event but as a continuing review. At each stage in the project appropriate people were consulted for their views on the progress and future of the research.

As a result of these discussions it soon became clear that the interest lay in the economic impacts of road building. Whilst traffic generation was (and still is) not well understood, it was felt that the phenomenon itself was becoming widely accepted. The previously quoted work of John Elliot and Gillian Beardwood for the Greater London Council in particular had, for London at least, largely put the seal on the arguments (although such effects remain to be clarified outside the capital).

The question of the economic impacts of road building beyond those measured in cost-benefit analysis (which consist primarily of theoretical time-savings to drivers to which a money value is applied) was undoubtedly the prime area of concern. The British Road Federation were making much of claims of the economic benefits of road building and of road

building as a means of employment creation. The experts consulted were particularly enthusiastic that they should be investigated.

FoE's position at this stage was that an examination of the economic impacts of roads was more appropriate given a political climate whereby economic arguments were seen as more persuasive by those in authority. It was therefore agreed that this should be the general line of investigation, although it remained for the exact focus of the research to be made clear. Hence it was necessary to continue the process of consultation after the literature review which is presented in Chapter 2.

1.4.3 The Issues

Investment (or indeed disinvestment) in new roads will have impacts at the level of the individual firm, the local economy and thus the national economy as a whole. The first will include, for example, changes in vehicle utilisation or the incorporation of the road into the firm's own productive infrastructure. The other levels will include factors such as the relationship between levels of investment and GDP, employment, labour productivity

and so forth. Clearly the impacts at the level of the firm will not only effect the local economy but will contribute to a broader national macroeconomic change. This range of impacts represents a wide number of possible areas of investigation for this study the main components of which are set out below. The headings are often interlinked -with, for example, transport and accessibility variables often being indistinguishable.

Transport variables changes in transport costs leading to contribution to national economy and GDP; changes in vehicle utilisation and driver productivity (and thus to levels of employment).

Accessibility variables Changes in employment catchment areas, market and supply areas; contribution to regional policy.

Location variables Attractiveness to locating business; incentive for business emigration; changes in employment levels resulting from above.

Property variables Changes in property values and costs; increased activity of property markets.

Operational variables Relocation of business
providing opportunity for operational changes to
increase productivity;
incorporation of road by non-relocating firms into
existing private infrastructure;
changes in operating costs resulting from all of the
above factors

These areas will be re-presented in tabular form in
the final chapter by way of explanation of the areas
of research covered by this thesis.

Whilst the actual measurement of these factors is
possible there remains one specific problem: the
temporal bounds within which each is affected by a
road scheme. The location of a company in the
vicinity of a major road (for example) may occur when
the probability of the road at some future date
arises; when the road is being built; at its
completion or well after its opening. The
attractiveness of the road may be exerted (if at all)
at any of these stages. Similarly other variables
such as GDP or business restructuring may be subject
to a time lag or even occur in advance of
construction.

Clearly, in the formation of the study methodology account must be taken of these possible effects. There are two prime means of doing so: first, a series of studies of the same location(s) at different stages of a road scheme's preparation and construction, or the simultaneous examination of different areas where the appropriate road is at different stages of completion. As will be seen in later chapters, the latter was the method chosen.

1.5 THESIS STRUCTURE

The subjects covered in this thesis are presented in their logical order rather than in chronological order. This is for reasons of clarity and because the research process in an IHD project is cyclical by nature with the elements of problem definition, investigation, feedback and survey design often occurring simultaneously.

Chapter 2 reviews the literature pertaining to the relation between road building and the economy. Academic literature in this field is sparse, hence the review draws largely on literature from sources of a non-academic nature.

Chapter 3 draws together the first two chapters and sets out the hypotheses to be investigated and the methodology by which this process was to be carried out. The reasoning behind the case-study approach adopted and the survey design are discussed in this chapter.

In Chapter 4 an account of the data gathering process is given and includes a critical discussion of the method employed and the survey design. The analysis of the key data collected is given in Chapter 5 along with the micro-conclusions from this analysis. Tabulations of the full results are appended

Chapter 6 discusses the broad implications of the findings for transport policy. Finally, conclusions and areas for further research are identified.

CHAPTER TWO: LITERATURE REVIEW

- 2.1 INTRODUCTION
- 2.2 LOCATION THEORY
- 2.3 TRANSPORT COSTS
- 2.4 REGIONAL EFFECTS
- 2.5 THE LONDON ASSESSMENT STUDIES.
- 2.6 ROADS AND EMPLOYMENT
- 2.7 THE ROAD LOBBY
- 2.8 CONCLUSION

2

Chapter Outline

An outline of the literature search processes is followed by an overview of location theory. Literature is then reviewed with regard to the role of transport costs in business operations, the regional effects of road building and its effect upon employment. Finally, relevant road lobby literature is reviewed.

2.1 INTRODUCTION

This chapter investigates the available literature which links roads and the economy. The initial approach was made by conducting an on-line search through the library's computer, using an American social science database and an engineering database. Such a search relies on 'key words' for which the computer searches. In this case the computer was asked to look for titles with roads/highways or infrastructure and economy/economic/economics (entered into the computer as "econ?") as key words.

References arising from the searches were ordered through the inter-library loan system and, although some of these took over a year to be located, were used to further the search in two ways:

- i. the titles were checked in a citations index. This index lists other publications where the article or book in question has been listed as a reference. Further references found in this manner were ordered

and themselves checked in the index. So the reference list was built up until the process ceased to bring up new references.

- ii. Articles obtained through the above searches themselves had lists of references. This was the most fruitful extension of the initial search.

The results of the on-line searches were disappointing with only six useful references arising from a lengthy and expensive process. Nonetheless, these proved an adequate starting point upon which to build using the procedures above. However that initial result was found to be indicative of the extent of the literature and of previous research in this field.

It has to be stated at this stage that the literature in existence is disappointingly sparse, the lack of academic literature was of particular note. Hence this chapter is slightly unusual for a PhD thesis in that much of the literature reviewed is of a commercial or political (rather than academic) nature. The academic literature reviewed is predominantly from the 1970s and early 1980s.

In some ways this was to make the ensuing task of hypothesis formulation more difficult than it might have been in that the lack of literature identified large gaps in existing knowledge which, in themselves, represented broad and unspecific research questions. On the other hand, the lack of previous research was to give me a freer hand in choosing the specific nature of the project without danger of duplication of existing research.

2.12 CONTEXT

The 1989 Department of Transport policy document ('Roads for Prosperity') states:

"Roads are built to assist economic recovery by reducing transport costs.

New roads schemes, including bypasses, bring substantial economic, environmental and safety benefits." (1)

There are essentially two types of benefit or cost arising from road construction: the primary user benefit, measured primarily as time-savings to users to which a financial value is applied through cost-benefit analysis, and the secondary

development impacts. It is with the latter that this review is concerned.

When it set out on its motorway construction programme the Department of Transport, through the Transport and Roads Research Laboratory, had specifically intended to carry out detailed scientific research in to the impacts that this programme might have:

"Even before the construction of the first motorways in Britain, some road planning and highway engineering research had been consciously directed towards the special problems which a motorway would pose. Some research...has been carried out to devise methods of assessing the impact of individual motorways and the motorway network as a whole. The emphasis has been on broader transport, economic and social effects, including those on regional development."
(2)

However the paper continues:

"When we come to consider the broader transport, economic and social impacts there is much less to report that is fruitful and positive. There are substantial and possibly basic difficulties, both theoretical and experimental, in the development of either evaluation or appraisal methods of this kind. Efforts will undoubtedly continue to devise an acceptable methodology since the subject is one of major public importance and interest."
(2)

From the outset then, it appears that quantification of the economic and social costs and benefits of highway construction are at least problematic. This literature review, therefore, attempts to bring together the (albeit sparse) literature on the secondary economic impacts of investment in highway infrastructure.

2.2 THEORY

The relevant body of theory underlying this review is that of business location, in particular that which links transport and location of economic activity. Three types of cost influence the choice of location: material location and transport, plant efficiency itself and the marketing of the product. As markets are not spread uniformly across a spatial area and because the costs of many factors of production vary from place to place, the location of a plant can have a crucial role to play in the profitability of a business. Transport has effects both on the procurement of inputs and on the marketing of outputs and therefore features prominently in early location theory.

2.2.1 Weber's least-cost theory of location

The foremost theorist in this area was Alfred Weber who first postulated his least-cost theory of location in 1909, although translation into English did not follow until twenty years later (3). Whilst Weber was by no means the first to write about business location it was he who first made the distinction between material- and market-oriented industries. In the former case he recognised that the materials required by a manufacturing plant might be located such that the costs of transporting them to the plant could be sufficient to attract the plant close to their source rather than they themselves being transported.

This tendency is determined by the nature of the materials which he categorised as *ubiquities* or *localised materials*: the former are found at similar cost everywhere whilst the latter are found only at specific locations. The localised materials are made up of *pure materials* of which the whole weight enters into the final product, and *gross materials* which lose part of their weight in production. Clearly the gross

localised materials are most likely to lead to materials-orientation as a means of minimising transport costs. Ubiquities, on the other hand, are likely to lead to market orientation, especially if the product is of greater weight.

Gross localised materials tend to be primary raw materials which even with increasing use of what were once 'waste' products, still lose sufficient weight to justify location in close proximity to their source. However, since Weber's time an increasing proportion of manufacturing plants work not from raw materials but from part-finished items or components which exhibit little or no weight loss in production and hence tend not to lead to material-orientation: In 1975 Norcliffe ⁽⁴⁾ proposed a distinction between different tiers of manufacturing industry in order to account for this change: processing industries utilise primary sector raw materials; fabricating plants use semi-finished materials; assembly operations combine components into a finished product.

Another important change since Weber's day is that few items can genuinely be referred to as ubiquitous in developed countries. There might

be industry-specific exceptions such as water in the case of, say, breweries or steel mills which use vast quantities in the production process. In developing countries, however, the situation is still such that virtually no factors of production can be considered as ubiquities.

The influence of transport is therefore seen by Weber as being determined primarily by changes in weight from input to product which determine the relative transport costs and is hence a major determinant of industrial location.

The discussion of Weber has not yet mentioned the costs associated with the manufacturing process itself. Weber focussed on labour costs as the prime determinant of such costs as he had noted geographical variations in wage level. By assuming that labour is centred on towns and its cost changes at a uniform rate with distance from those centres, and that it is immobile, he was able to compare savings at cheap labour locations with those obtained at the least-cost point in terms of transport. Taken together it is therefore possible, according to Weber's theory, to find an optimal location where the combined transport and labour costs are minimised.

There are clearly problems with Weber's theory, some of which have come about with historical change whilst others existed at the time of Weber's writing. He did not, for example, have a particularly realistic view of transport costs, assuming that costs were directly proportional to weight and distance carried. Hoover's 1948 overview (5) notes the advantages and disadvantages of competing transport modes and that transport costs go beyond the simple freighting costs to include items such as insurance and speed. Alexander, in 1958 (6) suggested that the expense of transport infrastructure confers particular benefits on specific locations whilst in 1972 Fales and Moses (7) demonstrated that during rapid economic growth of the nineteenth and early twentieth centuries, industrial development became concentrated in areas adjacent to canals, rivers and railway lines.

Whilst the strategic road network is treated almost as a ubiquity in developed countries, major road junctions may still be seen as cost-saving locations by some sectors particularly, as

McKinnon pointed out in 1983 ⁽⁸⁾, by those associated directly with distribution.

The previously mentioned non-uniformity of relation between transport costs and distance or weight is an important qualification which must be applied to Weber's theory. Transport costs entail terminal and other fixed costs which apply to all journeys irrespective of length. Hence costs per mile diminish with longer journeys which might encourage such journeys.

Chapman and Walker ⁽⁹⁾ point to two other factors in their discussion of Weberian theory: first, freight costs for finished products have risen faster than those for raw materials due to differences in market tolerance and economies of scale. Hence there is a tendency to locate near the market rather than material source. Second, transport costs as a proportion of total production costs have been declining (see Parkinson, Lester etc below for more detailed discussion) thus increasing the relative importance of other factors to the location decision.

2.2.2 Lösch and Greenhut

Developing Weber's influential work August Lösch went beyond costs to consider the effect that location has upon demand. In his 1944 paper (translated to English in 1954 (10)) he argued that the point of least-costs was not necessarily the same as that of maximum profit preferred by a producer. Demand, according to Lösch is centred upon the point of production which, by its nature, provides an element of spatial monopoly: the incorporation of transport costs into price increases the price of goods to distant customers and thus leads to decreasing demand with increasing distance. By assuming a homogenous spatial plain, uniformly settled with homogenous people, Lösch was able to construct a 'demand cone' around a point of production in order to define the market area and the quantity of product sold.

Theoretical writers since the mid-1950s have attempted to consider both cost and demand as independent determinants of location. The most significant attempts at such theory have probably been made by Melvin Greenhut based upon empirical work and developed theory. In 1956 Greenhut

identified three classes of location factor known as: demand, cost and purely personal (11). These are set out below:

DEMAND FACTORS

1. The shape of the demand curve for a given product
2. The location of competitors, which in turn partially determines
 - a) the magnitude of the demand
 - b) the cross-elasticity of demand at different places
3. The significance of proximity, type of service and speed of service; prejudices of consumer
4. The relationship between personal contact and sales
5. The extent of the market area, which itself is partially determined by cost factors and pricing policies
6. The competitiveness of the industry in location and price; certainty and uncertainty

COST FACTORS

1. The cost of land which includes
 - a) the rent of land
 - b) the tax on land
 - c) the availability of capital, which partially depend upon
 - (i) the banking facilities and financial resources
 - (ii) the type of climate
 - d) the cost of capital, which is also partially dependent upon
 - (i) the banking facilities and financial resources
 - (ii) the type of climate
 - f) the cost of fuel and power, which is partially dependent upon
 - (i) natural resources
 - (ii) topography
 - (iii) climate

- 2 The cost of labour and management, which is influenced by
 - a) the health of the community, the park and education facilities, housing facilities, wage differences etc
 - b) state laws
- 3 The cost of material and equipment, which is partially determined by
 - a) the location of competitors (sellers and buyers)
 - b) the price system in the supply area
 - c) the extent of the supply area, which in turn is partially dependent upon
 - (i) personal contact
 - (ii) price policy
- 4 The cost of transportation, which is partially determined by
 - a) the topography
 - b) the transport facilities
 - c) the characteristics of the product

PURELY PERSONAL FACTORS

- 1 The importance of psychic income
- 2 Environmental preferences
- 3 The security motive

As can be seen from the list above, demand factors include variables which will affect the character of demand such that account is given to the impact of competitors and the need for personal contact or services required by customers. Greenhut then splits cost factors into several subgroups which account for the buying and running of the factory itself; personnel, living and community conditions (which affect the productivity of the workforce); material costs and transport.

Greenhut recognised that not all location factors fitted into his economic categories and that manufacturers receive rewards other than those which are purely financial, hence the inclusion of 'psychic income' in his factors. Similarly he recognises the importance of an attractive environment or climate as important in its own right, but also recognises the economic importance of such factors through increased worker satisfaction and thus productivity.

Greenhut's categories are clearly useful in that they point to the multi-variate nature of business location - and because they show the distinct limitations of Weberian analysis. Further, they illustrate the difficulties inherent in quantification of the location decision with some variables being qualitative and few easily quantifiable.

It is within this context, then, that this review considers the role of transport in the operation of business (of all sectors rather than the manufacturing sector only as in the above theory). It will first consider the importance of transport costs, then regional effects of

investment in highway infrastructure and the effects upon employment.

2.3 TRANSPORT COSTS

The role of transport costs is central to the location theory outlined above. In principle a road may have two types of development effect: development which is a *net gain* to the economy or development which is *relocated*. A possible means to achieving a net gain is through the reduction of transport costs leading to a fall in the overall cost of production and hence to an increase in profitability which encourages an expansion of output. The increase in output may be produced either by existing firms expanding or by the introduction of new firms into the economy. As Parkinson pointed out in 1981, for this effect to be significant, the following conditions have to be met:

- "i. there have to be otherwise unemployed resources of the right kind to produce the increased output
- ii. transport costs have to be a significant element of the total production costs;

- iii. the change in transport costs brought about by the road has to be large;
- iv. the demand for the goods being produced has to be sensitive to a fall in price as a result of lower production costs" (12).

The current political importance is emphasised in the policy statement given earlier in this chapter, "Roads are built to assist economic recovery by reducing transport costs". This statement raises two questions: first, do new roads reduce transport costs, and second, does a reduction in transport costs assist economic recovery? It might seem that new roads will increase accessibility and reduce the actual distance between markets, thus reducing transport costs. This, however, assumes a *ceteris paribus* situation.

Roads do, however, bring about changes other than a simple reduction in transport costs. Whilst many firms will take advantage of a reduction in transport costs, others will choose to exploit different opportunities arising from a new road and in doing so may actually increase their transport costs. Saunders (13) found that the major effect of new roads on the brewing industry

was a centralising one: roads opened up land for development and allowed firms to concentrate their production into one large site, whereas it may have previously been in three or four smaller, widely dispersed, sites. By concentrating production firms are able to achieve economies of scale, often by a net reduction in the workforce, thereby reducing total costs. McKinnon (14) showed in his study of warehousing and physical distribution that firms were able to close smaller elements of their operations as a result of transport improvements - in effect roads became part of a firms own infrastructure. Massey (15) gives a detailed review of the restructuring of industry. Her analysis shows how firms can become more capital-intensive at the expense of employment, suggesting that a new road opens new restructuring options for employers through which employment can be lost.

The interests of business are not necessarily compatible with an increase in employment; indeed the opposite may be the case. Industrial benefit may not be consistent with social benefit. The firms in Saunders' survey experienced an increase in their transport costs, but this was

compensated for by the decrease in other costs, particularly labour costs. The survey did not, however, undertake any analysis of the role of the M4 in attracting the breweries hence no causal link can be drawn from this study between the road network and the savings brought about by relocation.

Brown (16) points out that firms may relocate to take advantage of labour availability or the relative cost of labour (particularly for firms leaving central London), lower rents and rates or other such incentives. This view was echoed by the 1977 Leitch Committee:

"Studies of the industrial location decision confirm the relative unimportance of transport costs as a determining factor. The most important factors appear to be the availability of labour with appropriate skills and a history of peaceful industrial relations, the price and availability of suitable sites and availability of Government grants. Only if all these conditions are satisfied will firms pay much attention to transport costs." (17)

The Government Economic Service looked at this same issue in 1981, Parkinson's report came to similar conclusions, namely:

- "i. Areas with low levels of development are seldom in the situation of lacking good accessibility only; they have disadvantages other than or in addition to transport inaccessibility eg. lack of sites or lack of skilled labour;
 - ii. transport costs are typically only 5-10% of total production costs;
 - iii. the decrease in transport costs brought about by a new road typically represents only a fraction of existing transport costs;
 - iv. it is implausible that the fall in price that could result from this small reduction in transport costs is likely to lead to a significant increase in demand and output."
- (18)

This leads on to the next stage in the argument: let us suppose that the only advantage of a new road felt by a firm is a reduction in transport costs. What effect will this have upon economic recovery? The answer possibly lies in the above quote from Parkinson: transport costs form a relatively small proportion of total production costs. Any reduction in transport costs is, therefore, unlikely to lead to a significant decrease in overall production costs. Lester (19) points out that more than half of transport costs are in the form of terminal costs which

would not be directly affected by an increase in accessibility. So with a nominal average of say 7.5% of total production costs being on transport, 3.75% will remain unaffected by a reduction in distance travelled. This leaves an effective transport cost in the region of 3.75% of the total; a relatively very large reduction of 10% in this would lead to an overall decrease in production costs of only 0.38%.

Now let us take the argument one step further: suppose that a new road brings about a significant increase in accessibility and hence a decrease in travel times. Does this lead to a reduction in transport costs? At first sight it might appear obvious that a shorter distance to travel and a general increase in accessibility would indeed reduce transport costs. In a recent paper, Mackie and Simon point out that the time savings gained by freight operators using the Humber Bridge can be used in several ways, depending largely on a firm's wage structure:

"This depends on whether or not travel time savings are usable, or whether constraints and indivisibilities prevent their use, and if so whether they accrue as leisure time to drivers rather than cost savings to firms." (20)

Mackie and Simon show that vehicle operators responded in a number of different ways - by increasing vehicle utilisation, improving market penetration, increasing market area, or by internal rationalisation. Some operators did indeed experience time savings on vehicle and driver which could be used productively, but this is by no means a certain response: firms may, for example, decide to reduce the labour force and maintain the existing level of business at a reduced cost. Mackie and Simon echo this uncertainty:

"In the end, it becomes impossible to trace all the adjustments through the system." (21)

There would appear to be no 'standard response' to a change in accessibility provided by a new road. A firm working on a piece-work basis will respond differently to one which employs its workers on a flat wage basis. One also has to remember that if one firm does become more competitive as a result of a new road, it may be at the expense of other firms who will lose business to the former.

In summary for this section, the literature reviewed suggests that a reduction of transport

costs in itself is usually insignificant, certainly being insufficient to generate economic recovery. Provision of a new road may perhaps increase the competitiveness of one firm at the expense of another, or a firm's competitors may benefit to a similar or greater degree, leading to no net benefit.

2.4 REGIONAL EFFECTS

The thesis that roads have a relocating effect on industry has led to roads being built into depressed areas in attempt to stimulate the regional economy. At a superficial level, examination of cities such as Liverpool and Newcastle-upon-Tyne, with their relatively well developed road networks, suggests that this does not necessarily follow. This appears to suggest that there are other considerations which play a greater role in attracting industry to a region than its communications.

The previously quoted research by TRRL reflects the uncertainty about the role of roads in regional policy:

"Those studies which have been made of the factors which influence industrial firms to locate new activities in particular areas, or to relocate existing activities, are not sufficiently precise to indicate the extent to which proximity to a motorway has a decisive effect on choice of region." (22)

It follows that the use of new roads as an instrument of regional policy is a highly uncertain, 'hit and miss' affair, as Leitch, Botham (see below) and Parkinson accept. This was the subject of discussion by the 1975 European Conference of Ministers of Transport, the report of which states:

"Infrastructure can induce economic development only if the areas have potential...While strategic infrastructures are a necessary condition for economic development, they are not by themselves sufficient for that purpose." (23)

Amongst examples discussed were the experiences in Sweden and Italy. The Swedes concluded that:

"It is clear that the decision to move to a particular area is motivated by factors of far greater weight than infrastructural considerations, particularly since infrastructures are already developed to a point." (24)

Discussion of the Italian situation bore particular relevance to Liverpool and the North-East of England:

"Connecting an economically strong region to a weak one does not necessarily help the latter. In the case of Italy the main effect of the motorways has been to encourage additional short and medium range migration of people to the more developed areas." (25)

Roads may provide the opportunity for people and businesses to leave depressed areas, whilst at the same time allowing firms from these economically stronger regions to exploit the markets in the weaker as Simon (op.cit.) suggests is the case for the Humber Bridge.

This is reflected in the research of Peaker:

"We have no reason to believe that transport improvements alone can have such effects and they may indeed have quite different and opposite ones. A transport improvement is after all symmetrical. We do not reduce the cost of transport out of a region without reducing the cost of transport into it. Whether the more developed or the less developed region benefits is still very much open to debate.

He continues:

"The higher the costs of transporting a good the more dispersed one expects to find the facilities of production...a reduction in transport costs will induce producers to concentrate their production facilities and to transport more goods

over longer distances. Such an effect is likely to increase regional disparities since enterprises have a very noticeable propensity to locate at the centre of things." (26)

In 1970 Kenneth Gwilliam pointed out the 'faith' element in roads as an instrument of regional policy:

"The case has frequently been argued that investment in roads is an effective instrument of regional policy. At the moment it appears that such decisions are taken as an act of faith rather than on any well established theoretical or empirical justification." (27)

An appropriate example here is the Kirkhamgate to Dishforth motorway, part of the Leeds network: at the Public Inquiry, the Inspector, Sir Michael Giddings, heard more than three days of evidence on the economic benefits of the proposed scheme. The core of Bradford City Council's case was that the new road would stimulate industrial development and thus improve employment prospects. The Inspector concluded "...I have to accept for the purpose of this report that the case has not been proved." (28)

Pressure for the new road was exerted by some of Bradford's councillors on the basis that it would encourage economic growth in Bradford:

"When discussing the proposed £90 million plan for the Kirkhamgate to Dishforth motorway Councillor John Senior said that Bradford was passing through an economic crisis and so the road assumed much more importance, "The M62 has not created the growth we thought it would do and it is this new route which will encourage growth." " (29)

This road was the subject of an investigation by the University of Bradford which concluded:

"The Local Authority would be better employed concentrating their efforts on trying to assist local firms, (especially small firms) and lobbying the government for more direct aid to firms rather than the implementation of road schemes costing millions of pounds and having negligible effect on local development." (30)

Patterson and May (31) concluded that transport factors are unlikely to effect the retention and attraction of industrial investment, and indeed that firms were unable to cost these factors.

2.5 THE LONDON ASSESSMENT STUDIES.

The views of Patterson and May were convincingly echoed by the 1986 'London Assessment Studies' stage one reports (32,33,34,35). These were four Department of Transport sponsored studies of

different road corridors in London, aimed at identifying transport problems and then solutions. The studies were unable to identify any link between transport and business success or failure. The following paragraphs from the East London study sum up the studies' relevant findings:

"For the majority of firms in the business survey there appeared to be no identifiable link between poor transport and poor performance. Recent economic performance was perceived to be due almost entirely to macroeconomic factors. It is unlikely that the limited amount of job growth that has occurred recently (mainly in the office services sector on the City fringe) can be explained by transport factors, although the presence of good public transport links will have been one of the enabling factors. By the same token, there was also no suggestion that those firms in the business survey that had declined over the last four years had a greater incidence of transport problems. The public response, however, perceived poor transport as depressing job growth and encouraging firms to move out of the inner city.

Some firms have moved out, and although not numerically great such losses have been important to the local economy because of the multiplier effects of large firms. The follow-up survey of firms leaving the area suggested that transport, whilst sometimes a contributory factor in the decision to move, was rarely critical.

"The most important transport related problems are seen to be parking and local access for businesses and shops/shoppers, congestion for distribution activities including road hauliers; and the perceived efficiency of the road system itself for property developers" (36).

In 1987 the London Chamber of Commerce published a report that appears to reiterate the findings of the Assessment Studies: it found that the one sector of business that was expanding faster than any other was the transport sector - thriving amidst the country's worst congestion (37).

2.6 ROADS AND EMPLOYMENT

One of the most frequently claimed benefits of new road building is an increase in employment brought about by changes in transport costs and regional effects reviewed above.

Work by Miles and Starkie for the National Association of Australian State Road Authorities (38) shows that there is a relatively high employment multiplier of 1.4 for jobs created in road construction. In other words, for each job created in construction, a further 0.4 jobs are created in activities such as aggregate extraction and transport, as well as in spending-induced employment. For example, in Australia in 1981, there were approximately 80,000 workers employed in road construction, leading to an

additional 32,000 jobs in the rest of the economy. Whilst this is an impressive figure, it is tempered by the fact that road construction is a capital-, not labour-, intensive activity. So although 0.4 additional jobs may be created for each worker employed, relatively few workers are employed in the first place.

Equivalent data for British road construction is not available. At the opening of the Swanley to Sevenoaks section of the M25, the Secretary of State for Transport claimed that by the time it is complete the M25 "will have provided employment for thousands" (39). I wrote to the Department asking them to qualify this statement. In reply it was stated that Mr. Ridley was referring solely to jobs created in construction. The Department has no record of secondary job creation, nor of the wider effects that roads have upon employment.

Hewing (40) found that jobs were created in the construction of the Rochester Way Relief Road at a cost of £39,000 per job per annum plus indirect labour requirements. As Hewing comments, this is a relatively very expensive means of job creation when compared, for example, with the Greater

London Enterprise Board's costs of £12,000 per job per annum.

Research by Botham (41) found that the main influence of the British Road Programme from 1957-72 was a centralising and redistributing one. It is perhaps surprising that studies of the Severn and Humber bridges (42,43) also find little evidence of a beneficial effect on employment or the economy in general: In a companion paper to Mackie and Simon's report on the Humber Bridge, Simon has the following to say about the employment aspects of the Bridge:

"Analysis of aggregate data trends reveals no amelioration of the upward spiral in unemployment since the bridge and its associated motorways opened. On the contrary, county and regional unemployment rates are now worse, both in themselves and in relation to the national average, than at any time since 1971...It is normally true that the overall benefit of road construction projects exceed their primary user benefits, but the available evidence suggests that promotion of such schemes in developed countries largely on the basis of substantial (sub-)regional or national economic growth and development is generally unjustified." (44)

The evidence is far from complete, but the balance appears to be quite heavily in favour of the thesis that new roads are not an efficient means of either primary or secondary employment

creation. Concluding from his assessment of the available evidence Whitelegg is blunt about the matter:

"Jobs are rarely created but frequently destroyed; they will be relocated and redefined." (45)

Parkinson reaches a similar, although more cautious conclusion:

"It is probable that improvements to the trunk road network as a whole over a long period of years has had a relatively small effect on the distribution of employment throughout the country, possibly in a centralising direction." (46)

Leitch also concluded that:

"The evidence suggests that in so far as road building creates development, the probability is of the national relocation type." (47).

2.7 THE ROAD LOBBY

Chapter one identified the central role played by the road lobby in Britain's transport provision. Not surprisingly, the bulk of the evidence supporting further investment in road construction comes from these bodies. The

influence of these groups (and of their literature) upon policy makers is such that their own literature warrants inclusion within this review.

The road lobby has a clear belief that road building has substantial positive economic consequences: in their recent publication "The Way Ahead" the BRF state that "...the economic benefits of good roads are clearly demonstrable" (48) but it fails to substantiate the statement.

The Society of Motor Manufacturers and Traders' 'Motor Manifesto' states:

"A continuing major road building programme is fundamental to our livelihoods and is one area of public expenditure which the Government could increase without damage to our economic recovery. In fact it would enhance it. It would mean lower operating costs for the whole of industry, more incentive to buy and use cars, and more bypasses to keep lorries and other traffic away from congested towns and villages, and of course more jobs for the construction industry." (49)

Here we hear of 'lower operating costs' (do they mean operating costs per se or vehicle operating costs?) being the major benefit to the economy, a theme which recurs throughout the literature. We are also told of the employment benefits to be

derived from investment in construction. These apparent justifications for the contribution of such investment to economic recovery are once again unqualified.

The British Road Federation addressed the issue of 'roads and the economy' in their 1979 publication 'Better Roads for a Better Economy'. Sadly, this too is lacking in empirical evidence and is based on hearsay. For example, one of the benefits of road construction quoted is as follows:

"It is now possible to bring pigs to market from Carlisle to Gloucestershire in a single five hour journey, where they arrive in better condition than local pigs, unbruised by bends and bumps!" (50)

Admittedly this is the most tenuous benefit quoted, but the publication consists almost entirely of anecdotal examples of one-off benefits of roads. The exception to this is the mention of the work of John Dodgson:

"In his study of the effects of the M62, the economist John Dodgson of the University of Liverpool estimated that most of the towns within the (liberal) catchment area of the route would see both an improvement in access costs and an increase in employment opportunities. He forecast that the M62 would generate over 14,000 jobs - not bad value for

money, bearing in mind the many other advantages the route brings to movements generated elsewhere in the country." (51)

This is a highly misleading, and indeed incorrect, statement: Dodgson wrote in terms of absolute maximum changes in employment and this has to be seen in the context of the rest of his report. He had the following to say about his results:

"...the figures do not appear large; a maximum additional increase in employment of about 2900 per annum in a region with a total employed population of 3,400,000 jobs does not appear very great."

He concludes:

"If we assume that the employment growth model is valid, the *maximum* increases in employment in the areas affected by the M62 do not appear to be very great." (52)

This is consistent with the earlier findings of Peaker (53) and also with a later study carried out by the same author (54).

So, in an attempt to show academic acceptance of its ideas, the BRF has been highly selective in its choice of evidence, even to the extent of taking findings completely out of their research

context, thus making them appear more impressive than they really are.

2.7.1 The CBI

The Confederation of British Industry is notable also for its statements about the importance of the road network to business. Their 1985 report 'The Fabric of the Nation' asserts that new roads increase a firm's competitiveness hence encouraging economic regeneration. The M4 corridor is an oft-quoted example which, according to the CBI, "proves the point with its thriving and expanding business community." (55)

The subject of transport costs has already been discussed, but in the follow-up to 'The Fabric of the Nation', the CBI state that "distribution costs are 15-20% of output costs and savings here help British competitiveness." They go on to say "the benefits to business from a faster road network are clear"(56). The figure of 15-20% appears to be in conflict with the literature reviewed in section 2.3 above which suggest an average in the order of 5%. This claim is taken from the evidence of the Freight Transport

Association to the House of Lords Select Committee on Science and Technology, which reads as follows:

"Distribution costs can represent up to 20% of a company's total expenditure and in some cases a good deal more. In the retail sector it is in the order of 18% made up as follows:

Transport	6.9%
Stock financing	2.8%
Warehouse establishment	2.7%
Warehouse handling	0.5%
Administration	2.0%
Order procedures	0.5%
Outer packaging	2.2%
<u>Total</u>	17.6%"

This continues with a discussion of the role of technology at the depots, and does not mention improvements to the road network. The section concludes:

"...the message must be to move data, not lorries" (57)

Hence the CBI (using FTA data) includes 'non-transport' items within its costings. The FTA states that the actual 'transport' element of the distribution costs is only 6.9%.

2.8 CONCLUSION

The previously quoted European Council of Ministers of Transport had this to say about the identification and measurement of the effects of road schemes:

"...it will always be difficult, particularly in the long term, to distinguish the effects attributable to transport infrastructures from those inherent in a changing environment." (58)

That quote in many ways sums up the impression with which one is left upon reviewing the literature: it leads one to believe that nobody knows for certain what the economic impacts of new road schemes are. Previous research is minimal and much of what has been written is now somewhat dated.

The next chapter will formulate the hypotheses for this project based upon this review, the theoretical background, FoE's campaigning and the aforementioned discussions with others in the field.

CHAPTER THREE: METHOD

- 3.1 INTRODUCTION
- 3.2 THE HYPOTHESES
- 3.3 THE RESEARCH APPROACH
- 3.4 THE STUDY METHOD
- 3.5 THE SAMPLE
- 3.6 SURVEY DESIGN
- 3.7 PILOT STUDY
- 3.8 SAMPLE SIZE
- 3.9 INTERVIEW SCHEDULE
- 3.10 COMPUTER ANALYSIS
- 3.11 PROPERTY PROFESSIONALS
- 3.12 PRESENTATION OF RESULTS

Chapter outline

The questions arising from the consultation and literature review processes are stated then formulated into hypotheses. The general approach and study method are then outlined and followed by an explanation of the choice of case study locations and of the interview schedule used in the survey.

3.1 INTRODUCTION

IHD is, as the name states, an interdisciplinary scheme. As was stated in Chapter one, it is not subject to the methodology of any one discipline but is based on multi-discipline action research. The prime purpose of IHD is to produce research which is of practical use to the collaborating body. In this particular case the research should provide new information germane to current debate within the sphere of transport policy and put this into the political context under which transport policy is formulated.

This chapter therefore brings together the different aspects of the topic area identified in chapter one and the literature review and formulates them into the research hypotheses. It then extends to the means through which the action research methods are applied to the real-world situation within which the research takes place.

3.2 THE HYPOTHESES

From the review of the existing literature and discussion with experts in the field a series of discussions with the supervisory team resulted. As a result of the tentative postulates discussed, it became clear that the following questions needed to be answered:

1. How important is the strategic road network to the business location decision?
2. Do new roads stimulate new business or do they simply aid the relocation of existing firms?
3. If the main effect is one of business relocation, what are the consequences for employment?

These questions lead to the following hypotheses:

1. The strategic road network is of no importance to the business location decision.

2. Any change in the economy of a region following its connection to a major road is due to the redistribution of economic activity rather than new activity.
3. Firms relocating to the vicinity of major roads achieve economies of scale by a concentration of their activities.

3.3 THE RESEARCH APPROACH

There were several possible ways of approaching these problems. Although it was clear that some form of business survey was required, the form that this should take was open to question. For example, it may be possible to construct a gravity model relating the distance of a firm away from the motorway junction with its Standard Industrial Classification, or on the other hand a descriptive study of attitudes towards major roads may be more appropriate.

At this stage of the research there appeared a conflict between two approaches to the problem namely the econometric and that which is essentially descriptive. There is, of course, a

strong pressure evident in transport-related research towards quantification and mathematical rigour.

This is perhaps more straightforward than a descriptive approach in that the aim of a mathematical model is to simplify the world and to produce a hard-and-fast answer to a problem. In the context of this research project I may have aimed, for example, to produce a model which said 'if one invests £X million in road construction, Y number of businesses will relocate and Z number of jobs will be created or destroyed'. Such a model may, however, be seen as desirable in order that economic impacts beyond the scope of cost-benefit analysis may be taken into account in the appraisal of a scheme.

There are, however, a number of reasons why this approach was rejected: first of all, as the literature has demonstrated, the state of knowledge in this field is remarkably low. We are still not certain how businesses react to a road, nor what processes arise from this reaction. The most important aim of this project, therefore, is to identify these

reactions; to be able to say, "yes, this process occurs when a road is built".

Second, it appears that there are many possible ways in which firms may utilise the opportunities opened to it by a road. Indeed, if the existing literature is correct, transport costs may not even enter into the equation. Further, Greenhut suggests that the location and relocation of business is based upon a complicated mixture of hard financial facts, and the perceptions and experience of the people making the location decision.

Third, the influence of a road scheme has no obvious spatial or temporal bounds. Whilst we can measure changes in accessibility and in rents, this is not the same as measuring the influence that this change has upon the perceptions of business. Nor is it possible to say when a road starts to influence the perceptions of the business community. Some firms may locate in an area due to the promise of a road in the future, others might wait until construction begins, others may wait until it has been completed for some time. The situation is further complicated by the fact that one road

scheme is only part of an immensely complex network and cannot be seen in isolation.

In brief, then, the effects that a road scheme has upon firms appear to be both variable and complicated, and only a part of a wider context in which business works. At this basic stage of the development of our knowledge in this field we have to set a foundation for later work, which may well involve a more econometric approach. This foundation involves the identification of the influences that a road has and is essentially qualitative in nature. One important qualification does, however, have to be made: that is, that if as a result of this qualitative investigation the data gathered appears to be suitable for modelling then this should be done. Indeed this is one of the advantages of interdisciplinary action research outlined in the first chapter and is part of the iterative (rather than linear) research design.

3.4 THE STUDY METHOD

In order to answer the questions above the following information is required:

1. The reasons for selecting the current location of the business and, complimentary to that, the reasons for leaving any previous location.
2. The number and location of any previous sites.
3. The role of transport within each business, including journey to work modes and client visits.
4. Data on the current number and type of employees and, in the case of relocated firms, such data previous to the move.

General data on the firms' activities, the timing of the location and advice taken about the location were also required so that the results could be disaggregated, for example, by activity.

3.5 THE SAMPLE

Having ascertained the type of information required, the most important problem was to decide from whom this information was to be collected. There were two obvious approaches to this: first, a study of two or three specific industrial sectors and second, of two or three geographical areas. This was the subject of much discussion amongst those involved in the project. The former is probably the simpler of the two and suggestions of worthwhile sectors were abounding: the most frequent being the brewing and stationery industries. In both of these cases there has appeared to be a marked trend of relocation and centralisation entailing an increase in transport costs and a loss of jobs (see literature review). This approach would lead to a relatively detailed account of specific industries. The geographical approach, on the other hand would be of more breadth but less depth in that it would cover the whole range of business within that area, rather than a specific sector.

This breadth, however, has obvious advantages. It is far more useful to FoE than the narrower

sector approach in that it is less specific and hence more open to generalisation (although with very real qualifications to be discussed later). From the academic point of view breadth is vital in that it allows the identification of trends common to different locations and industrial sectors and the disaggregation of disparities. Hence it was decided that the geographical approach was best suited to this project.

The differences between extensive and intensive research go beyond the distinction between breadth and depth. Ideally research should be both broad and deep. Whilst this is feasible the limitations of a research project such as this (particularly time) are such that a balance has to be drawn between the two. The distinctions made between extensive and intensive research, however, tend to make them appear complimentary but not directly compatible. A useful summary of the characteristics of these two types of research is given by Sayer and Morgan (1)

3.5.1 Case Studies

Having accepted the geographical approach, it was then necessary to decide on the case-study areas. The most important factor in the selection of these areas was the presence of a major road. Selection of the areas chosen relied very heavily on discussion with supervisors and advisers outside the supervisory team. Once again suggestions of interesting examples were abounding. One example above all others was almost always suggested: the M25 London Orbital.

At the conception of this research, the M25 was nearing completion and was the subject of strong media attention. At the same time claims of its economic importance by the Department of Transport, the business community, local authorities and so forth, were manifold. As the largest road building project in Britain (both financially and in terms of mileage), it has undoubted political importance yet has been the subject of the minimum of research. The economic impact of the M25 could quite easily form the whole of a thesis such as this. Whilst this has obvious appeal, FoE regarded this as too narrow a subject: it has local groups throughout the

country and is trying hard to shrug off the reputation of being too London orientated. It is also important to recognise that transport problems in London are very different from those elsewhere and that the M25 is, in many ways, unique.

It was decided, therefore, that one section of the M25 should be chosen for study. Selection of this area presented a problem in that the type and scale of development around that road varies around its periphery. The basic pattern is as follows: office and multi-use space is biased very much towards the eastern sector, where development along the M25 forms the eastern edge of the 'Golden Triangle'. Newby (2) suggests that this is largely because offices are already well established in this area, as are the services which offices require. The major growth sector in the west is the microelectronics and computer industry which accounts for between 40% and 50% of the demand for land in this area. There are, however, constraints on development in the west which, if the M25 serves one of its intended purpose, will cause a redistribution of development towards the east.

Hence it was not possible to study a 'representative' section of the M25. If only one location was to be chosen this qualification had to be made clear. The location chosen was Basildon in Essex on the north-eastern sector of the Motorway (approximately ten kilometres to the east of junction 29). Local councillors and officers have attributed Basildon's thriving economy almost entirely to the existence of the M25. The nearest section of M25 opened in 1979 and since that time the local economy has flourished. The link between the two appears at first sight to be strong and this has been echoed by researchers from Middlesex Polytechnic, local councillors and officers and local business people (3).

Basildon's economy consists primarily of a mixture of manufacturing and service industries which account for around 40% and 30% of the employment in the District respectively. Distribution and retail, followed by construction were the next largest sectors. Basildon therefore provided a location which was apparently feeling very strongly the developmental effects of the country's foremost

road scheme and had a wide variety of business activities.

The second study was to be Telford in Shropshire. The interest here lies in the fact that, as a New Town, the promise of the M54 motorway linking it to the M6 was considered a major selling point of the town. Its cruciality to the original sales ploy can be seen from the Development Corporation's promotional literature. Once again the importance of the road to the attraction of business was seen as high. Following the opening of the M54 the Telford Development Corporation felt confident enough to state in its annual employment survey that "the jobs boost was undoubtedly attributable in part to the completion in October 1983 of the M54 link to the national motorway network (4)". Despite this, the unemployment rate at the time of selection had been running at a level of 20% for some time. Like Basildon great things were being claimed for the 'local motorway'; unlike Basildon these claims were not reflected in a high rate of economic activity.

Telford was attracting a substantial number of high-tech businesses to its industrial estates

employing largely white-collar and lower-skilled manual workers. This increase in employment was largely negated by the accompanying decline in the indigenous industries which employed a high proportion of highly-skilled and semi-skilled manual workers.

After consideration of the time-scales involved in such surveys (based primarily on past experience of the team) it had been assumed that three studies would be appropriate. At the onset of the second (Telford) study it became apparent that this was a correct assessment, although completion of the third study was to continue well into the third year of the project.

FoE in particular favoured a more northern location for the third study, primarily to represent the balance of the distribution of FoE local groups. Cities such as Newcastle-upon-Tyne or Liverpool would have provided interesting examples insofar as they both have relatively highly developed road networks, yet have weak economies.

During discussion with those involved in the project an adviser to FoE suggested Nottingham as

a possibility. This was one of the first cities to be connected to the motorway network via the M1 and hence offered an opportunity to study a situation where (if anywhere) any reaction to the motorway had stabilised. It enables us to look at the question of whether any location tendencies towards major roads are short-term or whether their influences are indefinite. As with Telford, the strategic road network features very heavily in Nottingham's promotional literature.

There are certain problems with Nottingham for this study. First among these is the fact that Nottingham is not distinct from its neighbouring cities of Derby, Leicester and Lincoln. A firm choosing to locate in Nottingham could just as easily locate in any of these cities. Nottingham has no easily identifiable hinterland and all of the four have comparable access to the strategic road network. Although this was expressed as a real worry, it is not something that concerned me greatly: as has already been stated the spatial limits to the influence of a road are uncertain. The question to which the Nottingham study is addressed is whether a road continues to exert an influence in attracting firms some years after its completion. The information to be collected

is thus comparable to that from the other study areas in this project.

3.6 SURVEY DESIGN

The information required from the survey has already been outlined above, however before designing a questionnaire it was necessary to determine the universe from which the sample would be selected and whether the survey would be postal or in the form of personal interviews.

The latter of those two problems is easiest to deal with. Postal questionnaires have an advantage in terms of convenience: they would allow me to remain in London. At the same time there is the possibility of a larger sample size albeit that there is generally a very low response rate to such surveys. The big disadvantage is that they do not allow the researcher to go outside the realms of the questionnaire and that they impose a strict limit on the number of questions to be asked.

Personal interviews, on the other hand, are very time consuming and thus in practice reduce sample

size quite significantly. They do, however, allow a flexibility that permits the interviewer to delve far more deeply into the idiosyncrasies of each firm and to draw a better qualitative picture of a firm's operations. The technique of the interviewer is, of course crucial to this approach whereas the postal questionnaire relies very heavily on good questionnaire design.

As has already been stated, one of the main aims of this project is descriptive and to elicit the nature of the issues thought important by the subjects. The interactive technique is ideally suited to acquiring such information. Nonetheless I have already said that there are certain pieces of information that are required from all of the firms in the survey, the interviews cannot be completely unstructured. What was needed in this case was a semi-structured format during which a set of questions would be asked in such a way that they were worked into conversation. The technique does, however, place great demand on the skill and knowledge of the interviewer. This was the method chosen.

3.6.1 Interview technique

Many would argue that such a technique, because of its reliance on the researcher, introduces a high degree of subjectivity. It might be argued that a fixed questionnaire allows the same questions to be asked under controlled conditions, reducing observer bias and allowing controlled comparisons. Whilst there is some value in this point of view, Sayer and Morgan represent my view of the matter:

"...such ideas sacrifice explanatory penetration in the name of 'representativeness' and 'getting a large enough sample'. Extreme standardisation which disregards the different types of respondent can in fact make comparisons rather meaningless, because they fail to register the fact that different questions can have a vastly different significance for firms of different kinds (and not just according to sector). This not only runs the risk of boring interviewees so that they reveal the minimum, but is also likely to produce results which differentiate firms on criteria which are not necessarily relevant to them: ie. it allows them to be compared taxonomically but not causally" (5).

The semi-structured interview is an attempt to achieve the best compromise between two very different approaches. It attempts to achieve a balance between the rigidity of a fully

structured interview with closed questions, and the flexibility and adaptability of an unstructured approach. Whilst there are common questions which are asked of all subjects, in order to allow direct comparability, it is possible to follow up on responses outside the immediate scope of the questionnaire. It also makes the interview far more rewarding for the subject than in the case of a rigidly structured question and answer session.

Whilst this method somewhat reduced the cruciality of the questionnaire design the questions to be asked needed to be carefully thought out and the next section will go through these one by one, there being a full schedule (a list of the questions that were to serve as my reference during the interviews) at Appendix 3.1.

3.7 PILOT STUDY

The selection of the sample is to an extent dictated in that its geographical bounds are predetermined. Within those bounds there are, however, many different types of business, some of which may be totally unaffected by the road

network whilst others may be totally dependent on it. There is no obvious means of classification that will split the survey responses into easily identifiable categories. A pilot study was necessary not only to test the efficacy of the interview technique, but to attempt to identify such a system of classification. It was decided that the first study, that of Basildon, would serve as this pilot.

The selection of subjects in this pilot was by a random sample from Kelly's trade directory. The firms were selected using a simple random number generator, one for the page number and one for the number of the listings on that page. A total of 250 letters were sent out to those businesses requesting an interview, with an expected affirmative response rate of twenty percent. Also included were a pro-forma for reply and a stamped addressed envelope. Approximately forty interviews were expected from this appeal. In the event the Basildon sample size was 51.

The results of the Basildon pilot will be presented in chapter five, but no pattern of classification did emerge from that study. Hence the random sample remained the best method of

selecting subjects and was continued in the next two studies. This had the added advantage of making all three studies directly comparable. Further, the sample resulted in coherent data across the firms indicating that the sample size was sufficient.

3.8 SAMPLE SIZE

Those firms who responded positively to the request were on the whole very accommodating in their availability, allowing the interviews to be scheduled quite tightly. Due largely to travelling time between businesses and of course, the time restrictions of the interviewees, it was possible to conduct two or three interviews in a day. From start to finish the process of arranging interviews and conducting them had taken just over four months. This did not include an initial familiarisation period with the District, nor the interviews with developers: these added another three to four weeks. The next three to four weeks were spent entering the data obtained into the computer and labelling it.

The time constraints on the project therefore dictated that the same sort of sample size was appropriate to the next two studies, allowing approximately six months for each study, including computing time and familiarisation with both the area and with the computer package used for analysis of data.

3.9 INTERVIEW SCHEDULE

This section will examine the list of questions, explaining why each one was to be asked. The hypotheses led to there being five distinct sets of questions which are:

- i. the activities of the firm
- ii. the location decision
- iii. the costs and benefits of relocation (where applicable)
- iv. transport
- v. employment.

The questions were arranged in a manner to allow ease of analysis, with a 'multiple-choice' type numbering system for answers for computer coding. Each answer was given a reference number with an

extra number for the 'other' category where appropriate.

3.9.1 Introduction

Each questionnaire was headed by the name of the firm, its address, the name and position of the interviewee and the location (Basildon, Telford or Nottingham). The name of the firm and interviewee were to remain confidential. In the event this turned out to be important: some of the firms responding in a negative manner to the road network were affiliated to the British Road Federation or had been active members of the M54 Motorway Support Group. The first section consisted simply of the Standard Industrial Classification (6) of the firm in terms of its Division (the broadest base of classification in SIC) numbered 0-9. This information was necessary to determine any trends common to firms of the same Division. It might be reasonably expected, for example, that firms of Division 7, Transport and Communication, would be influenced by the road network to a greater extent than those in other Divisions.

3.9.2 The location decision

The first fact required was the time for which the firm had been at its current location. This would give some indication of the time differential between the opening of the road and its influence on the location decision.

Following on from that I was to ask who made the decision to locate in this area, the interviewee or someone else. There are difficulties in a study such as this, in finding the person responsible for that decision. It is quite possible that he or she will have left the firm, or was unavailable for interview. This leads to certain reservations about the responses in that in some cases answers in this section will be the perceptions of the subject or indeed a post-rationalised response which takes account of factors of which the respondent involved in the decision-making process was not aware at the time. This will be discussed in a later chapter. The important factor for the interviewee was that that person should have a good overview of the workings of the company. The survey was examining a broad range of the companies' activities and it was always unlikely that he or

she would have an in-depth knowledge of all aspects of the business. Again this will be discussed later.

Question 4 concerned the advice taken about the location. One would imagine that in the present financial climate, the advice of the financial institutions would be more evident than it was a few years ago. The question was included in order to determine where the advice, if any, came from and hence who helped to determine the priorities for the location.

The next questions concerned the location of any previous sites which may or may not have been closed and the number of sites currently in operation, hence determining whether the firm was relocated, a new business, expanding or contracting. The location of any sites that had been closed in deference to the new site were recorded in order to ascertain from where businesses were being relocated.

Questions 9 and 10 are the most important in this section. These asked the reasons for leaving any old sites and the reasons for choosing the current location. Respondents were asked to list

the main reasons for leaving the previous location (where applicable). First of all this allowed a check on the reasons for choosing the new site and second, it was of interest in itself as it gave an indication of why business was being lost to an area. The question was meant to determine whether lack of infrastructure was a cause of loss of business relocation. Respondents were not presented with the list as such, but simply asked why they left the previous site(s).

Question 10 was why that firm had chosen its current location. The factors were split into levels of importance to the decision; major, minor and no part.

3.9.3 Costs and benefits of relocation

This section was applicable only to those firms who were relocated (rather than new) businesses. Primarily it was to determine what difference had been made to the costs of the firm by relocation. Of particular interest here were any changes in transport and labour costs. It was also necessary to check that the primary product of

the firm had remained the same and to ask what change in the volume of output had come about (in the view of the subject) after relocation.

3.9.4 Transport

The questions in this section were designed to give a general picture of the transport requirements of each firm. As a general indicator, the first question was about the number of fleet vehicles at the site. In order to take account of externally contracted vehicles, the respondents were asked about the number of vehicle movements, in and out, each day and the types of vehicles used. They were also asked about the main origins and destinations of their supplies and products.

Next the subjects were asked specific questions first, about the operational importance of the road in question (M25, M54, M1) judged as 'very important' 'important' and 'unimportant'. Secondly they were asked what proportion of their total operating costs were accounted for by transport both now and, if relocated, previous to the move.

The last part of the transport section concerned personal movement of workers and clients: the distance from which most workers travelled and their main mode of transport and the approximate number of client visits per week, again with mode indicated.

3.9.5 Employment

The final section of each interview looked at the employment in each company. The first question asked for the number of employees currently employed at the site. This number was also split into skilled and unskilled as it seems likely that relocated firms take a selection of skilled workers with them and re-employ the less skilled at the new site. Relocated firms were asked for the same information for their previous location(s). The interview was concluded by asking those firms how many of its workers were relocated to the new site so as to identify any jobs gained or lost in the process of relocation.

3.10 COMPUTER ANALYSIS

The responses were to be entered into an SPSSPC+ package (Statistical Package for the Social Sciences). This is a relatively new product for IBM and compatible Personal Computers, based upon the mainframe SPSSX. Its functions are similar to the mainframe version, but the command structure has been simplified to allow quicker, more flexible operations on a PC.

In addition, an *'advanced statistics' option* for the package was later acquired in order to carry out a cluster analysis of the data acquired concerning the factors influencing the choice of location.

3.11 PROPERTY PROFESSIONALS

The people responsible for promoting a business location are primarily the property developers, estate agents and local authorities. Their perceptions of their clients' wishes are crucial to the success of a locality. A brief glimpse at some of their promotional literature would show the importance that they attach to the strategic

road network. Hence each study also included some interviews with developers to determine what they thought were the factors that businesses were looking for in a location and the extent to which they actually influenced what businesses thought they wanted. These interviews were of a much more unstructured form than those with the firms and were concerned with the ways in which each area was promoted. They will be discussed in chapter five.

3.12 PRESENTATION OF RESULTS

The next two chapters will present the results of the surveys. Chapter four will discuss changes in unemployment in the study areas and show how the method given in this chapter worked in practice. It will comment upon changes which, with the benefit of hindsight, might be made in future studies. Chapter five will then reproduce the substantive results of the surveys.

CHAPTER FOUR: SAMPLE STRUCTURE ANALYSIS AND
INITIAL RESULTS

- 4.1 THE SAMPLE
- 4.2 STUDY PROCEDURE
- 4.3 UNEMPLOYMENT
- 4.4 CONCLUSION

Chapter outline

The composition of firms in the sample is examined in relation to that of each area. A statistical bias is revealed and discussed. The survey procedure is introduced and the rates of unemployment in each area are discussed in relation to the opening of the motorways and to the firms in the survey.

4.1 THE SAMPLE

The firms in each of the surveys were selected at random from local Kelly's trade directories using random number tables to generate page numbers and the number of a firm on that page. This form of selection necessitates some form of comparison of the sample with the population from which it was drawn. In this case it is necessary to compare the distribution of firms by Standard Industrial Classification Divisions in the sample with those in each diistrict. These Divisions are as follows:

Division	Activity
0	Agriculture, forestry and fishing;
1	Energy and Water Supply industries;
2	Extraction of mineral ores other than fuels; Manufacture of metals, mineral products and chemicals;
3	Metal goods, engineering and vehicle industries;
4	Other manufacturing industries;
5	Construction;
6	Distribution, hotels and catering; repairs;
7	Transport and Communication;
8	Banking, finance, insurance, business services;

TABLE 4.1 Standard Industrial Classification Divisions.

SOURCE: Central Statistics Office (1986).

Standard Industrial Classification, London: HMSO.

In the discussion below the term 'sample' will be used to mean all of the firms resulting from the original sampling, whilst the term 'sub-sample' represents those who replied favourably to the request for interview, ie. those who were interviewed. The comparison is presented by location.

Whilst the distribution of types of firm within the sample provides an indication of the comparison, it is not comparing like with like: data from the Census is based upon numbers of people in employment within each SIC Division, rather than the number of firms. It is therefore necessary to calculate the number of people working in each division within the sub-sample itself, and to compare this with the overall structure for these areas.

Problems arise insofar as the employment structure for Basildon and Nottingham is based on the 1981 Employment census, but this is the most up-to-date set of figures available. Telford Development Corporation were able to offer figures for 1984, and these are used below. In

addition, the Telford figures disaggregate all of the Divisions whilst Census figures combine Divisions 2-4 and 7-8. Lists of the main activities of the firms surveyed are given at Appendices 4.1, 4.2 and 4.3 for Basildon, Telford and Nottingham respectively.

4.1.1 Basildon

Table 4.2 shows the breakdown of employment by SIC Division of the Basildon sub-sample, together with that of Basildon as a whole.

SIC Division	sub-sample (n)	Expected (n)
0	0.00	0.00
1	0.00	3.75
2-4	142.00	121.0
5	19.00	8.25
6	34.00	44.00
7-8	31.00	26.25
9	24.00	47.00

TABLE 4.2: Distribution of employment in firms by SIC Division in sample compared with actual distribution - Basildon.

Source: Primary data and 1981 Employment Census.

The table suggests that Divisions 6 and 9 are under-represented in the sub-sample whilst 7-8 is over-represented. A simple chi-squared test can be used to judge the extent of the relationship

between the actual and expected frequencies of the distributions of SIC Divisions. In the tables presented O is the observed value and E that expected. Where appropriate data has been aggregated such that frequencies for all groups exceed five.

This set of data has a chi-squared value of 30.78 which is significant at the 0.1% level with 4 degrees of freedom. The null hypothesis is therefore rejected and it is assumed that the observed and expected frequencies differ.

4.1.2 Telford

The major fault in the Telford sub-sample is the absence of any firms in Division 9, within which 23% of the population are employed. Table 4.3 shows the breakdown of the sub-sample employment compared to that of the whole area:

SIC Division	Sub-sample (n)	Expected (n)
0	0.00	0.40
1	0.00	2.00
2	10.00	5.60
3	64.00	57.80
4	21.00	69.00
5	10.00	13.00
6	48.00	36.80
7	17.00	7.00
8	23.00	12.60
9	7.00	46.00

TABLE 4.3: Distribution of employment in firms by SIC Division in sample compared with actual distribution - Telford.

Source: Primary data and Telford Development Corporation.

A chi-squared test applied to this data reveals a value of 61.41 which is again significant at the 0.1% level with 7 degrees of freedom.

4.1.3 Nottingham

As can be seen from Table 4.4, the sub-sample contains more employees within Divisions 2-4 than expected. This set of Divisions includes the textile industry which accounted for the bulk of the firms interviewed. In the event around twice as many firms as expected fell into this category.

SIC Division	Sub-sample (n)	Expected (n)
0	0.00	0.60
1	0.00	4.20
2-4	149.00	63.60
5	6.00	6.80
6	5.00	38.60
7-8	36.00	30.40
9	4.00	55.40

TABLE 4.4: Distribution of employment in firms by SIC Division in sample compared with actual distribution - Nottingham.

Source: Primary data and 1981 Census.

This gives rise to a very high chi-squared value of 173.04 which is significant at the against a 0.1% level with four degrees of freedom.

4.1.4 Comparison of sample and sub-sample

There are clearly considerable differences between the structure of the sub-samples and those of the areas as a whole hence there is a statistically demonstrated bias. The question therefore arises as to whether this difference is due to the sampling technique (or frame) or to the willingness of different types of firm to respond to the interview requests. The sample from which the sub-samples were drawn, (ie. those to whom letters requesting interviews were

written) can be compared to the resulting sub-samples in the same manner as the comparisons above, although the comparison is in terms of SIC Division of firm rather than numbers of employees. Thus it can be determined whether or not the difference arises from a differing propensity to offer time for an interview.

Tables 4.5, 4.6 and 4.7 below show the distribution of firms between SIC Divisions in the sample and sub-samples for Basildon, Telford and Nottingham respectively. The chi-squared values are given below each table:

SIC Division	Sub-sample (n)	Sample (n)
0	0.00	0.00
1	0.00	0.00
2	2.00	1.63
3	17.00	19.58
4	10.00	9.90
5	2.00	3.88
6	6.00	7.48
7	4.00	2.86
8	6.00	3.47
9	4.00	4.90

TABLE 4.5: Distribution of firms by SIC Division in sub-sample compared with sample - Basildon.
Source: Primary data.

Chi-squared=3.90 with 6 degrees of freedom.

SIC Division	Sub-sample (n)	Sample (n)
0	0.00	0.00
1	0.00	0.00
2	2.00	2.35
3	15.00	15.04
4	6.00	4.94
5	2.00	2.35
6	11.00	11.28
7	5.00	4.00
8	6.00	5.41
9	0.00	1.65

TABLE 4.6: Distribution of firms by SIC Division in sub-sample compared with sample - Telford.
Source: Primary data.

Chi-squared=0.27 with only 3 degrees of freedom due to the necessary aggregation of data.

SIC Division	Sub-sample (n)	Sample (n)
0	0.00	0.00
1	0.00	0.00
2	1.00	0.23
3	16.00	14.00
4	18.00	20.01
5	1.00	1.38
6	1.00	1.15
7	4.00	4.60
8	4.00	3.68
9	1.00	0.92

TABLE 4.7: Distribution of firms by SIC Division in sub-sample compared with sample - Nottingham.
Source: Primary data.

Chi-squared=4.94 with 4 degrees of freedom

In none of these cases is there sufficient evidence to reject the null hypothesis that the two sample are the same. Thus it appears that it is the sampling process itself that has resulted in the lack of representativeness rather than a biased willingness to offer interviews.

There are several possible explanations: first, some of the data is eight years old: the sample was taken in 1988 whilst the area figures are from 1981 (1984 for Telford). The industrial structure of the areas has inevitably changed. Productivity nationally has shown a dramatic increase during this period. If, for example, the textile industry had not experienced such large productivity increases as the other firms in Nottingham, the over-representation of that sector in the sample would be explained.

The second possible explanation lies in the size of the sample. Again problems arise due to the age of the data available. Basildon District Council estimate a total of 75,800 economically active people in 1989 (source: Basildon Trends) whilst the survey sub-sample interviewed

contained only 6,933 people, 43% of whom worked for one company.

Telford had 49,572 economically active people in 1985 whilst the sub-sample represented only 1.5% of this total (768 employees). In 1981 Nottingham had 160,900 economically active people whilst the sub-sample represented only 1,627 employees - 1% of the 1981 total.

This explanation would account for the fact that the Basildon sample is the most representative of the three with the sub-sample interviewed representing around 9% of the District's total.

The third, and most likely, explanation is that there is a frame error: in all three cases Kelly's directory was the sample frame. It seems likely that this represents an imperfect listing of the businesses in each area. Further, the geographical area covered by each directory approximates to, but is not identical to, the areas by which census data are disaggregated.

Combined with this is a difficulty in assigning firms to SIC Divisions: the classification was in terms of the *main activity* of the firm. Many

firms have more than one activity (according to SIC classifications) which are complimentary to one another. The SIC classification does not therefore give a true representation of the firms' operations.

In the event it was not possible to compare the employment distribution of the sample with those of each area for the simple reason that it was during the interviews that the number of employees in each firm was determined. In addition the earliest interviews in each location commenced prior to having received responses from all of the firms to whom the interview request had been made.

However, a rough guide as to the representativeness of each sub-sample was used at the earliest stages of each survey: *assuming a uniform distribution of size of workforce within Divisions*, the percentage of firms in each Division within the sample were compared with the percentage of the area workforce within each Division. Figures 4.1, 4.2 and 4.3 show that at this stage the sample appeared to be roughly representative of each area, with the exception of the over-representation of the textile

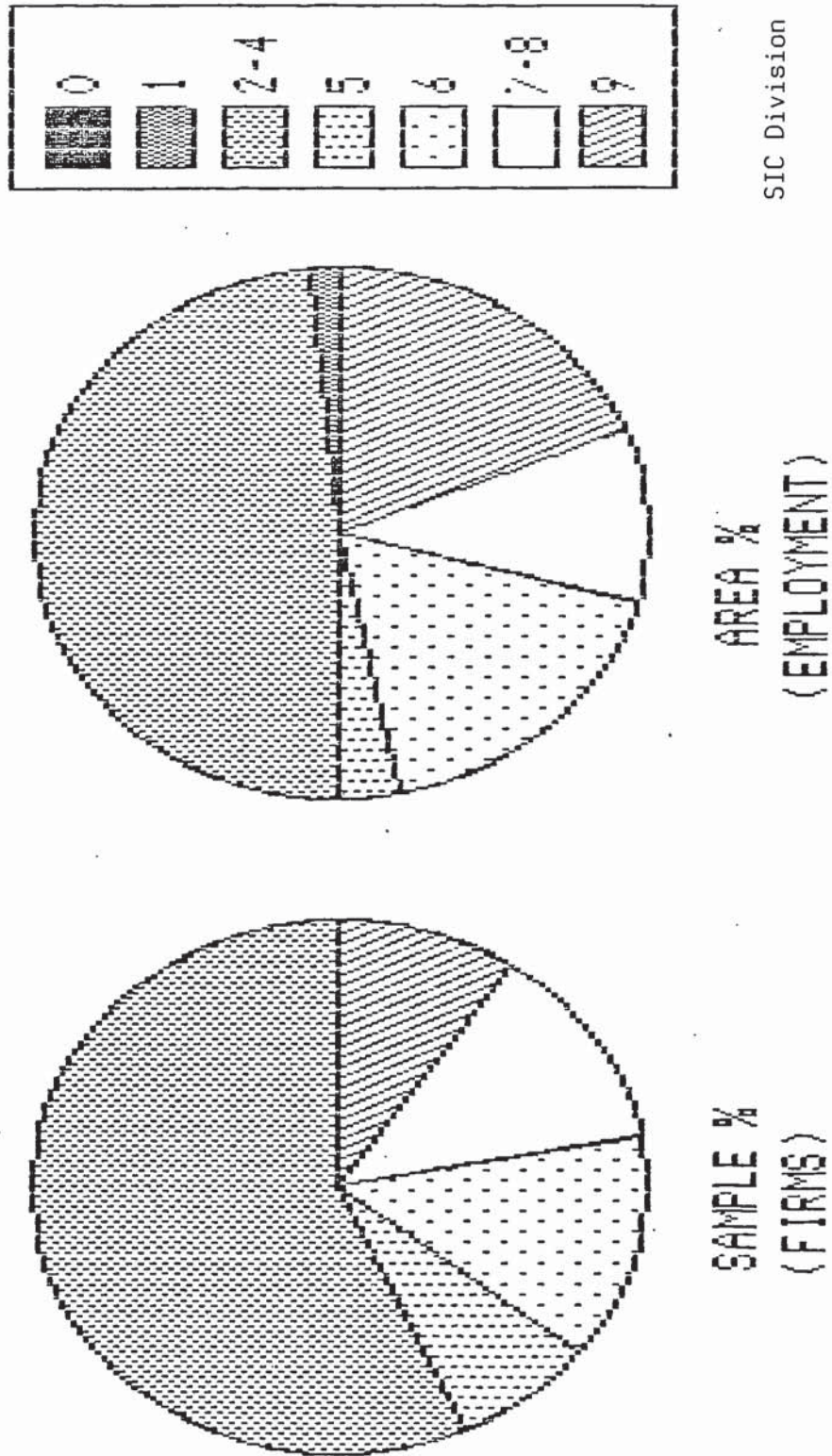


FIG 4.1 Comparison of sample firm structure with are employment structure - Basildon.

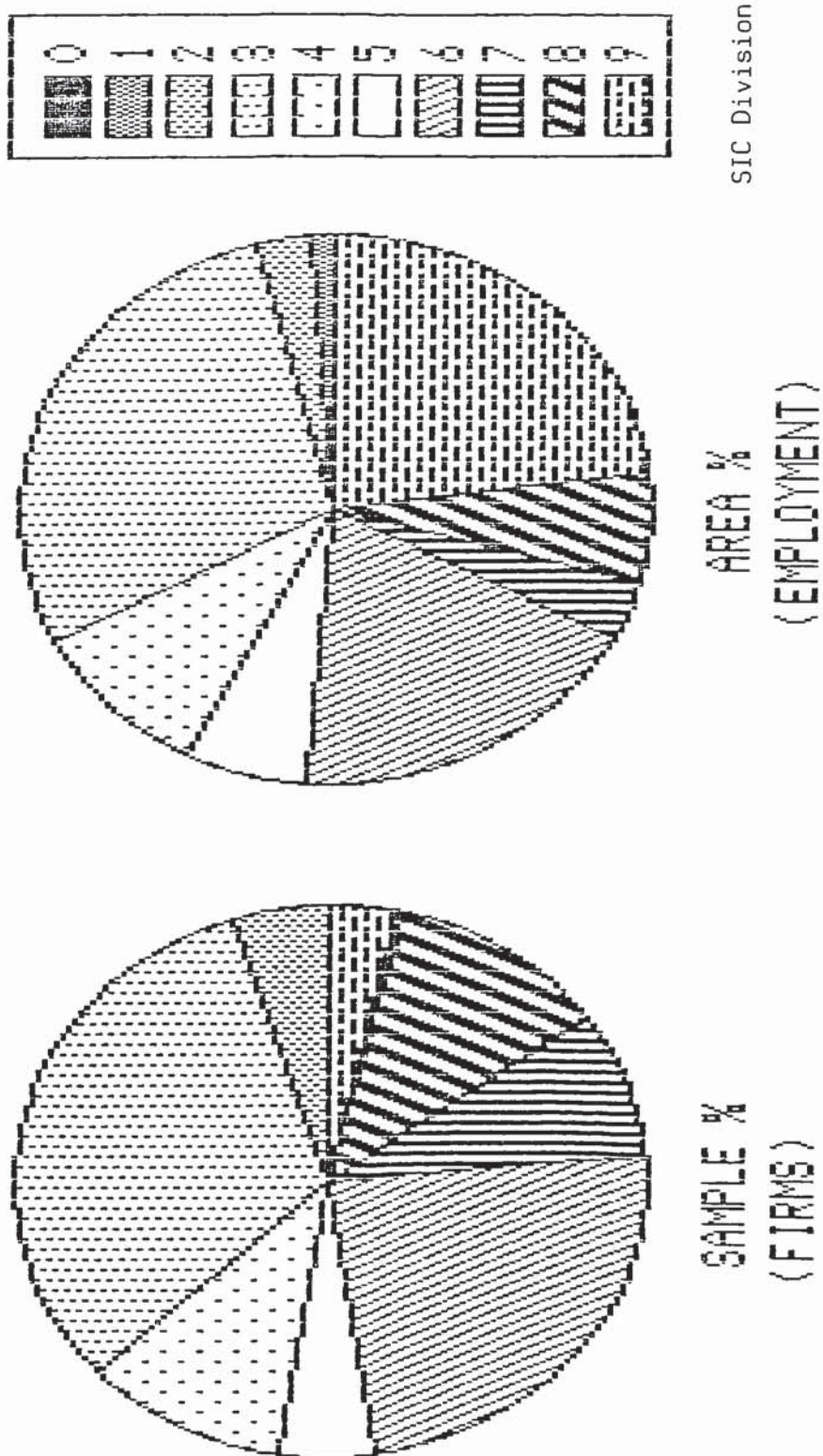
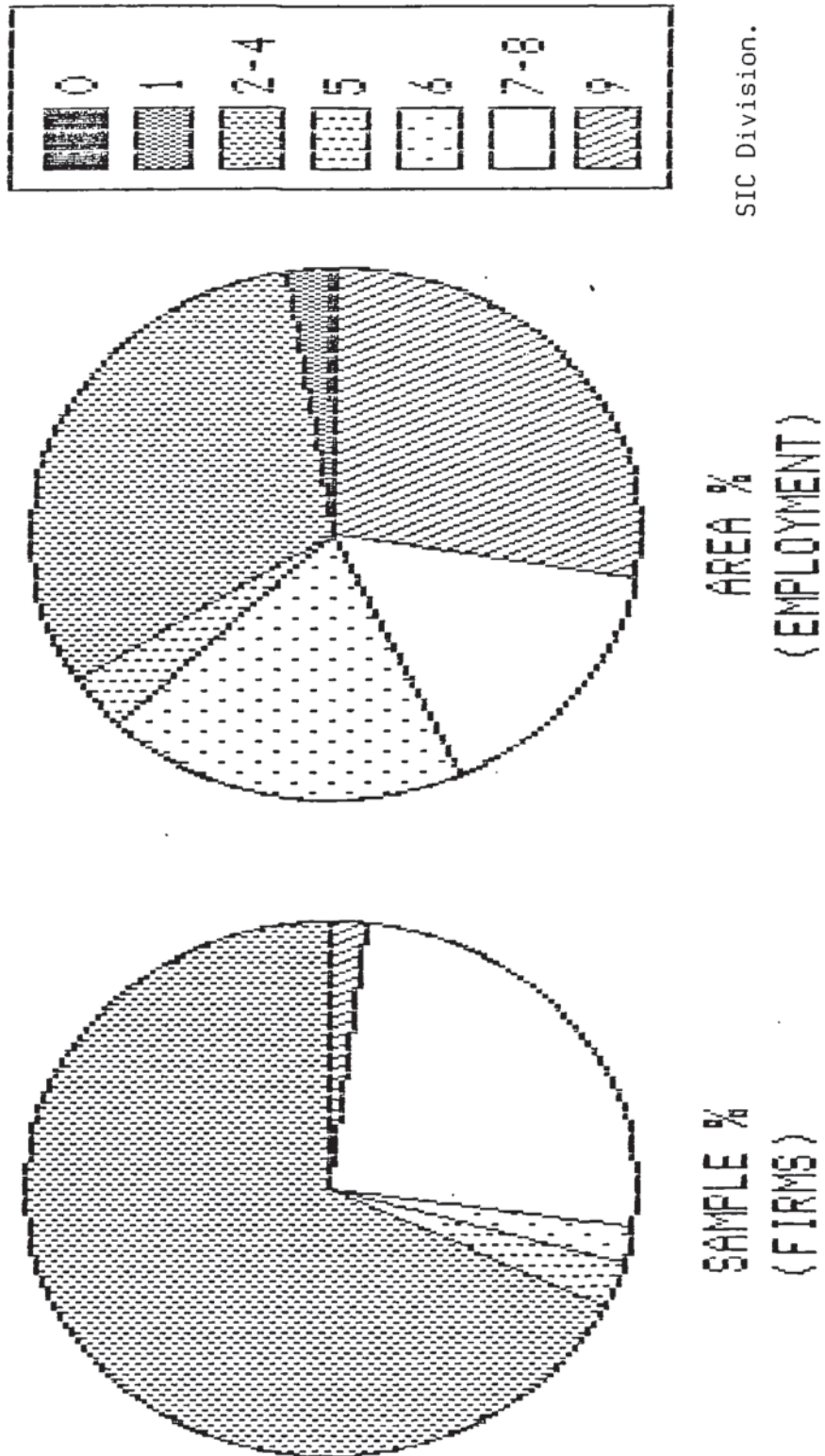


FIG 4.2 Comparison of sample firm structure with area employment structure by SIC Division - Telford.



SIC Division.

FIG 4.3 Comparison of sample firm structure with area employment structure by SIC Division - Nottingham

industry within the Nottingham sample. As has been noted, the above assumption proved to be invalid, but was necessary previous to determination of each firm's employment level and was the best possible attempt at ensuring representativeness that could be taken at this stage.

Two questions arise as a result of this discussion: first, with the benefit of hindsight are there any changes that should be made to the sampling method in a future study and, second, does it make any difference? The first of these is relatively easy to answer: the change would be to a stratified random sample to ensure a representative sample in relation to industrial structure, relating the sample frame area directly to that of the Census. Again, however, the difficulty of not knowing how many employees each firm has until the interview remains: as regional industrial compositions are given as employees per SIC Division there is still the possibility of divergence.

The second question must be discussed in relation to the results presented in the next chapter. Responses can be disaggregated by SIC Division

and compared using a chi-squared test for each variable. The two most important areas of the survey were the factors that determined location or relocation of the firm and the changes in employment upon relocation.

Whilst the full results will be presented in the next chapter, the chi-squared results linking SIC Division and each of the relevant variables is given below. Some explanation of these variables is however necessary: the first sixteen variables listed (from 'access to scarce skills' to 'other') are the factors given as reasons for choosing the firm's current location. Each factor has a rating of 1-3 indicating whether the factor played a major, minor or no part in the location decision. The final two variables are the rated importance of the motorway to the running of the business and the percentage change in the workforce post-relocation.

In each case two tables are given showing the observed and expected frequencies. Once again data are aggregated such that in no case is the expected frequency less than five. In five cases such aggregation was not possible, these being omitted from the calculations.

Access to scarce skills

Observed

SIC Division	rating			total
	1	2	3	
2+3	7	13	33	53
4+5	6	8	25	39
6+7+8+9	6	5	41	52
	19	26	99	144

Expected

SIC Division	rating		
	1	2	3
2+3	6.99	9.77	36.44
4+5	5.15	7.04	26.81
6+7+8+9	6.86	9.39	35.75

Labour availability

Observed

SIC Division	rating			total
	1	2	3	
2+3	22	23	8	53
4+5	16	14	9	39
6+7	5	14	12	31
8+9	8	8	5	21
	51	59	34	144

Expected

SIC Division	rating		
	1	2	3
2+3	18.77	21.72	12.51
4+5	13.81	15.98	9.21
6+7	10.98	12.70	7.32
8+9	7.44	8.60	4.96

Regional incentives

Observed

SIC Division	1	rating 2	3	total
2+3	8	11	34	53
4+5	6	4	29	39
6+7+8+9	6	4	32	52
	20	29	95	144

Expected

SIC Division	1	rating 2	3	
2+3	7.36	10.67	34.97	
4+5	5.42	7.85	25.73	
6+7+8+9	7.22	10.47	34.31	

Local authority aid

Observed

SIC Division	1	rating 2	3	total
2+3	10	13	30	53
4+5	6	9	24	39
6+7+8+9	6	19	27	52
	22	41	81	144

Expected

SIC Division	1	rating 2	3	
2+3	8.10	15.09	29.81	
4+5	5.96	11.10	21.94	
6+7+8+9	7.94	14.81	29.25	

Local road access

Observed

SIC Division	1	rating 2	3	total
2+3	8	34	22	53
4+5	8	19	12	39
6+7+8+9	18	12	22	52
	34	65	45	144

Expected

SIC Division	1	rating 2	3	
2+3	12.51	23.96	16.56	
4+5	9.21	17.60	12.19	
6+7+8+9	12.28	23.47	16.25	

Access to national roads

Observed

SIC Division	1	rating 2	3	total
2+3+4+5	2	32	58	92
6+7+8+9	12	14	26	52
	14	46	84	144

Expected

SIC Division	1	rating 2	3	
2+3+4+5	8.94	29.39	53.67	
6+7+8+9	5.06	16.61	30.33	

Access to local markets

Observed

SIC Division	1	rating 2	3	total
2+3	19	21	13	53
4+5	21	10	8	39
6+7+8+9	23	19	10	52
	63	50	31	144

Expected

SIC Division	1	rating 2	3	
2+3	23.19	18.40	11.41	
4+5	17.06	13.54	8.40	
6+7+8+9	22.75	18.06	11.19	

Access to supplies

Observed

SIC Division	1	rating 2	3	total
2+3	10	28	15	53
4+5	12	19	8	39
6+7+8+9	11	22	19	52
	33	69	42	144

Expected

SIC Division	1	rating 2	3	
2+3	12.15	25.40	15.46	
4+5	8.94	18.69	11.38	
6+7+8+9	11.92	24.92	15.17	

Large floorspace

Observed

SIC Division	1	rating 2	3	total
2+3	26	19	8	53
4+5	9	19	11	39
6+7+8+9	29	13	8	52
	64	53	27	144

Expected

SIC Division	1	rating 2	3
2+3	23.56	19.51	9.94
4+5	17.33	14.35	7.31
6+7+8+9	23.11	19.14	9.75

Access to services

Observed

SIC Division	1	rating 2	3	total
2+3	6	37	10	53
4+5	8	23	8	39
6+7+8+9	5	29	18	52
	19	89	36	144

Expected

SIC Division	1	rating 2	3
2+3	6.99	32.76	13.25
4+5	5.15	24.10	9.75
6+7+8+9	6.86	32.14	13.00

Rents/rates

Observed

SIC Division	1	rating 2	3	total
2+3+4+5	47	22	5	74
6+7+8+9	49	15	6	70
	96	37	11	144

Expected

SIC Division	1	rating 2	3
2+3+4+5	49.33	19.01	5.65
6+7+8+9	46.67	17.99	5.35

Variable	Chi-squared	Significant at (level)
access to scarce skills	4.72	>5%
labour availability	9.32	<5%
regional incentives	4.01	>5%
local authority aid	3.16	>5%
local road access	18.32	0.1%
access to national roads	16.52	>0.1%
access to local markets	3.38	>5%
access to supplies	4.10	>5%
large floorspace	11.80	<1%
access to services	6.16	<5%
rents/rates	1.35	>5%

TABLE 4.8 Relationship between SIC Division and responses in survey.

As can be seen from the range of chi-squared values generated, there appears to be little association between the Division by which a firm is classified and the responses given by the

representatives of those firms; a fact that came through clearly in the interviews themselves. It is therefore clear that although the sample is biased, this does not affect the results obtained.

4.2 STUDY PROCEDURE

All of the local authorities involved, including the Telford Development Corporation (TDC), were contacted by letter addressed to the appropriate departments. Basildon District Council and the TDC were quite forthcoming with information. Nottinghamshire County Council, however, sent back a standard information pack usually sent to businesses. When they were contacted by phone with a request for further information and a personal visit for a discussion of the areas business and economy, they replied that they only ever sent an information pack to students and did not have time to talk to them.

Further, when a reply-paid postcard (enclosed in the information pack) was returned requesting more information, no reply was received. Despite further written explanation of the project, NCC

were unwilling to discuss the matter further. Both Basildon and Telford were helpful and cooperative.

It was clear from the onset that the information held by these bodies was both disparate and incomplete. In Basildon, for example, there had been a gradual exchange of authority from the New Towns' Commission to the local authority as Basildon lost its 'New Town' status. The changeover was blamed, for example, for the council only having copies of the current trade directory and not having kept copies of those from previous years. Nor did they keep records of firms who had left the District - one of the categories originally intended to be in the survey. Problems in Basildon were further complicated by changes in the 'travel-to-work' area for which unemployment was measured. Nonetheless, their attitude was helpful and their publication 'Basildon Trends' (1) proved a useful guide to the area.

The Telford Development Corporation had much better records, with an in-house research department keeping track of businesses in the town. The Development Corporation itself is on

its last legs as Telford too loses its 'New Town' status. The research department is retained as a private company (Prism Research) and carries out many of the functions previously carried out for the Corporation. This includes the research and publication of the annual 'Employment in Telford' (2) on which most of the relevant information in this chapter is based.

Due to the lack of cooperation from the local authority in Nottingham, data was limited to commercial literature, the 1981 Employment Census and Employment Gazette, all of which were studied in relation to all three locations.

A general description of the study areas is given at Appendix 4.4 which includes data on population and employment by industrial classification. However, basic information on unemployment trends is given below and is related to initial survey results, the bulk of which are presented and analysed in chapter five.

4.2.1 Interview procedure

Before starting to present the results of the interviews themselves, it is necessary to give a brief overview of the procedures entailed in arranging and carrying them out.

Each firm that responded positively to the request for an interview was contacted by telephone in order to arrange an appointment. The length of time taken for a reply to be received varied from as little as a week to as much as two months with the bulk returned after about three weeks. Reply-paid envelopes and a pro-forma reply were sent with the original request. Appointments were usually made at between a fortnight and six weeks from this call and it was usually possible to arrange two or three interviews on the same day.

The subject was often the Managing Director of the company, although this varied, particularly in relation to the size of the firm: in larger firms it was more likely that the subject would be the public relations or personnel manager. The interviews were relatively relaxed and informal, taking between thirty minutes and an

hour to complete. As I became more familiar with the interview technique the time taken for each interview fell.

Each commenced with a short overview of the project in very general terms and then the subject was asked to give an overview of the firm's activities. This acted as the base of the conversation during which the questions in the schedule (Appendix 3.1) were introduced. At no stage was the link with Friends of the Earth mentioned as this might have affected the responses given. I always made a point of dressing smartly for similar reasons: the impression that the subject has of the interviewer influences the answers given. A transcript of an interview is appended by way of illustration of the technique (Appendix 4.5).

4.3 UNEMPLOYMENT

In section 4.3.1 figures will be given for unemployment in each of the areas and the United Kingdom for the last fifteen years. Also included will be the unemployment rates for Nottingham between 1954 and 1964, the time when

the M1 was being planned constructed and completed Section 4 2 2 will present rates of change in unemployment for each area with rates of change for the United Kingdom over the five years before and after completion of the motorways All figures are based on the appropriate travel-to-work areas Southend for Basildon Telford and Bridgnorth for Telford and Nottingham

4 3 1 Unemployment rates

There have been several changes in the ways in which unemployment has been measured both nationally and locally National changes are applied to all the regions in the study so do not make the figures incomparable The main local change has been in the case of Basildon when the change from employment exchange area to travel to work area as the frame within which unemployment is measured Officers at the District Council estimate however that the disparity between old and new measurements is of the order of 0.1% and for the comparative purposes of this study insignificant

Basildon's unemployment rate (fig 4.4) has shown a sharp incline from 1980, with a slight decline since 1985. Figures for Telford (fig 4.5) are somewhat higher than the national average, with unemployment rates of around 20% being the norm. The disparity between national and local averages has widened since 1980.

Nottingham's unemployment runs very much in line with the national average (fig 4.6) and has done so from at least the mid-1950's (fig 4.7).

4.3.2 Changes in unemployment rates

It is possible to plot changes in the rate of unemployment over time based upon the data for the above section. If a new road has an effect upon employment, and hence unemployment, there should be changes in the rates of increase or decrease of the unemployment rates. The data are at six month intervals and represent the percentage increase in the unemployment rate over the previous six month period. So an increase of say 50%, does not mean that the rate has risen from 10 to 60%, but that it has risen from 10 to 15%.

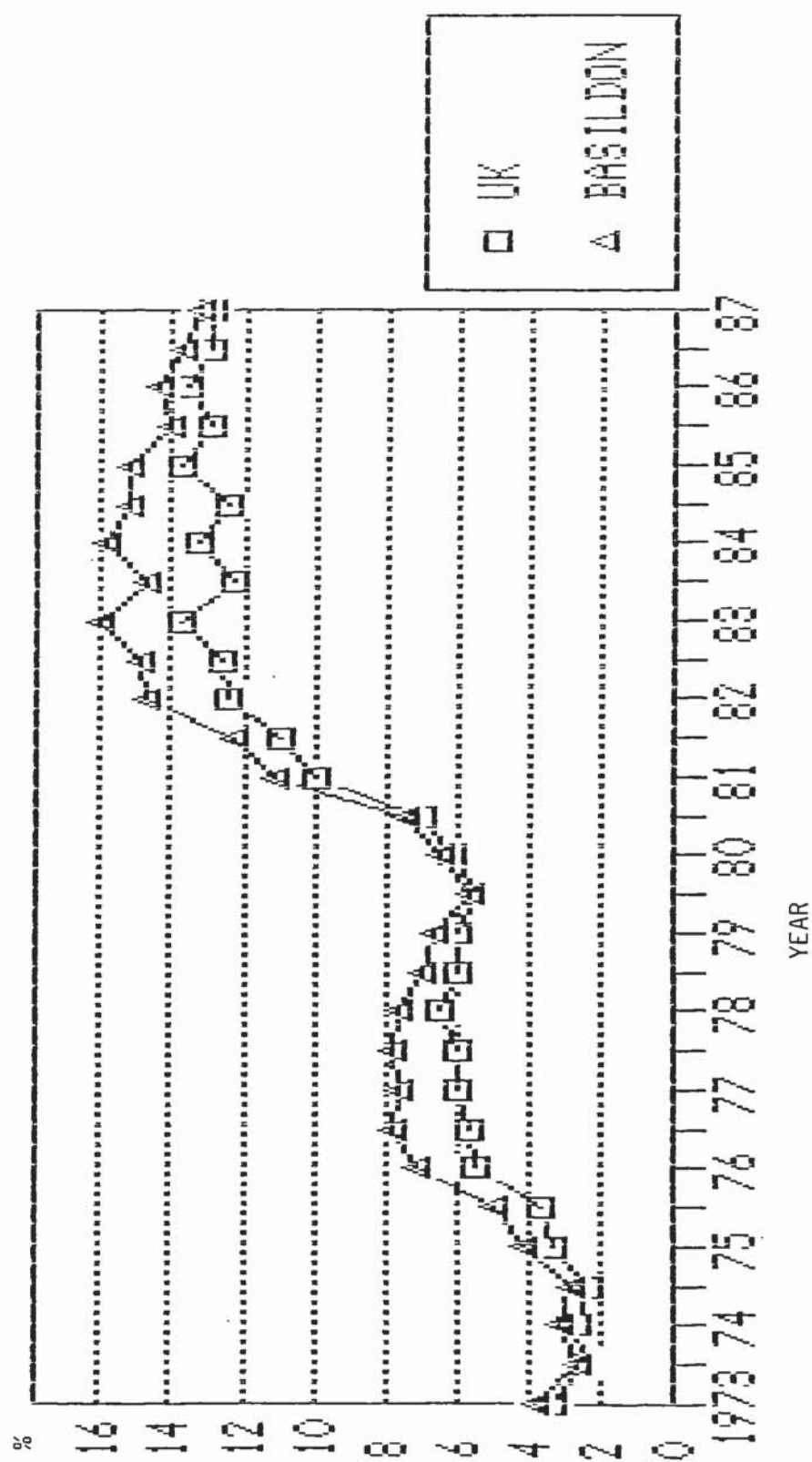


FIG 4.4 Unemployment rates: Basildon and United Kingdom
Source: Employment Gazette.

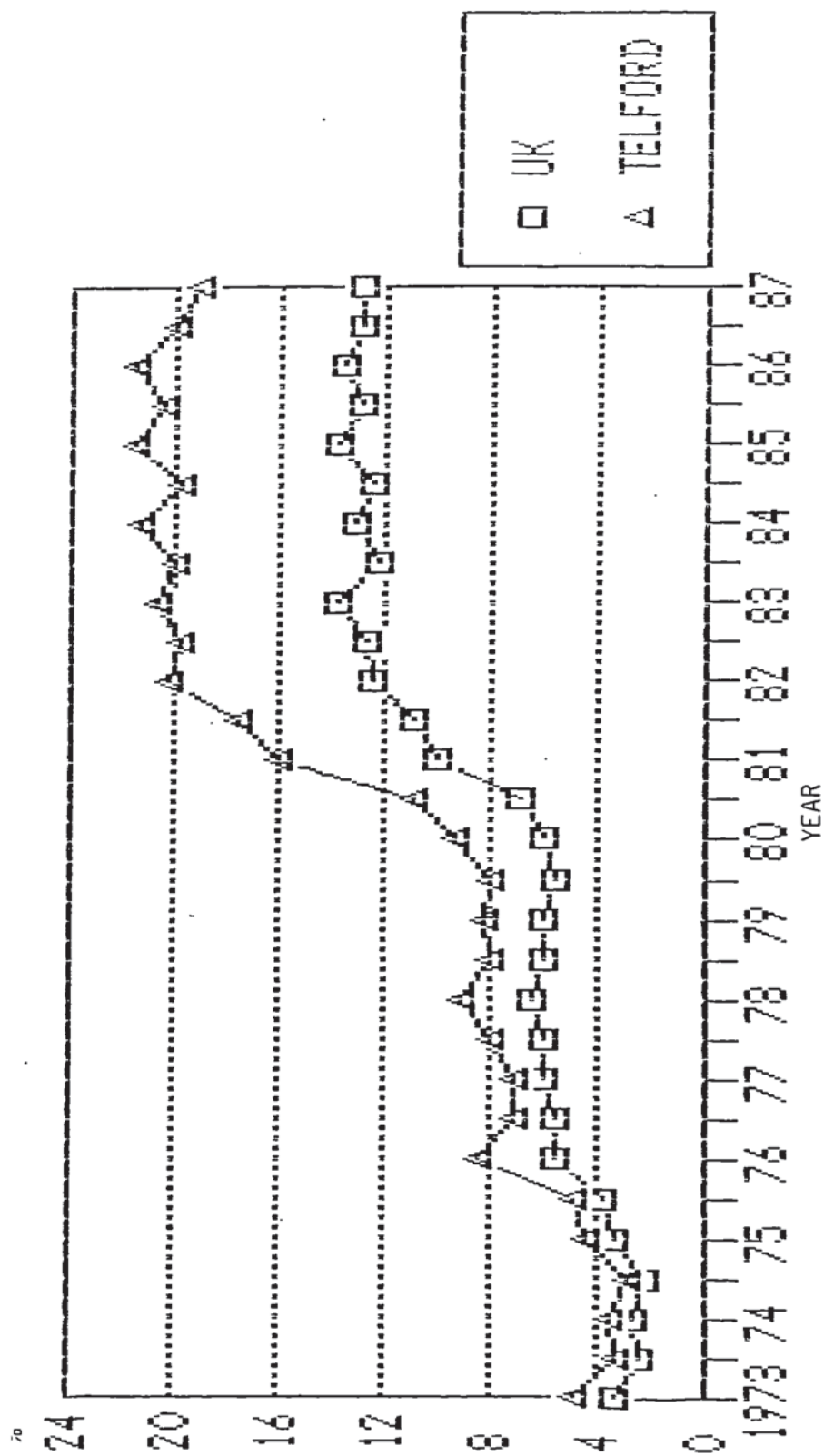


FIG 4.5 Unemployment rates: Telford and United Kingdom
Source: Employment Gazette.

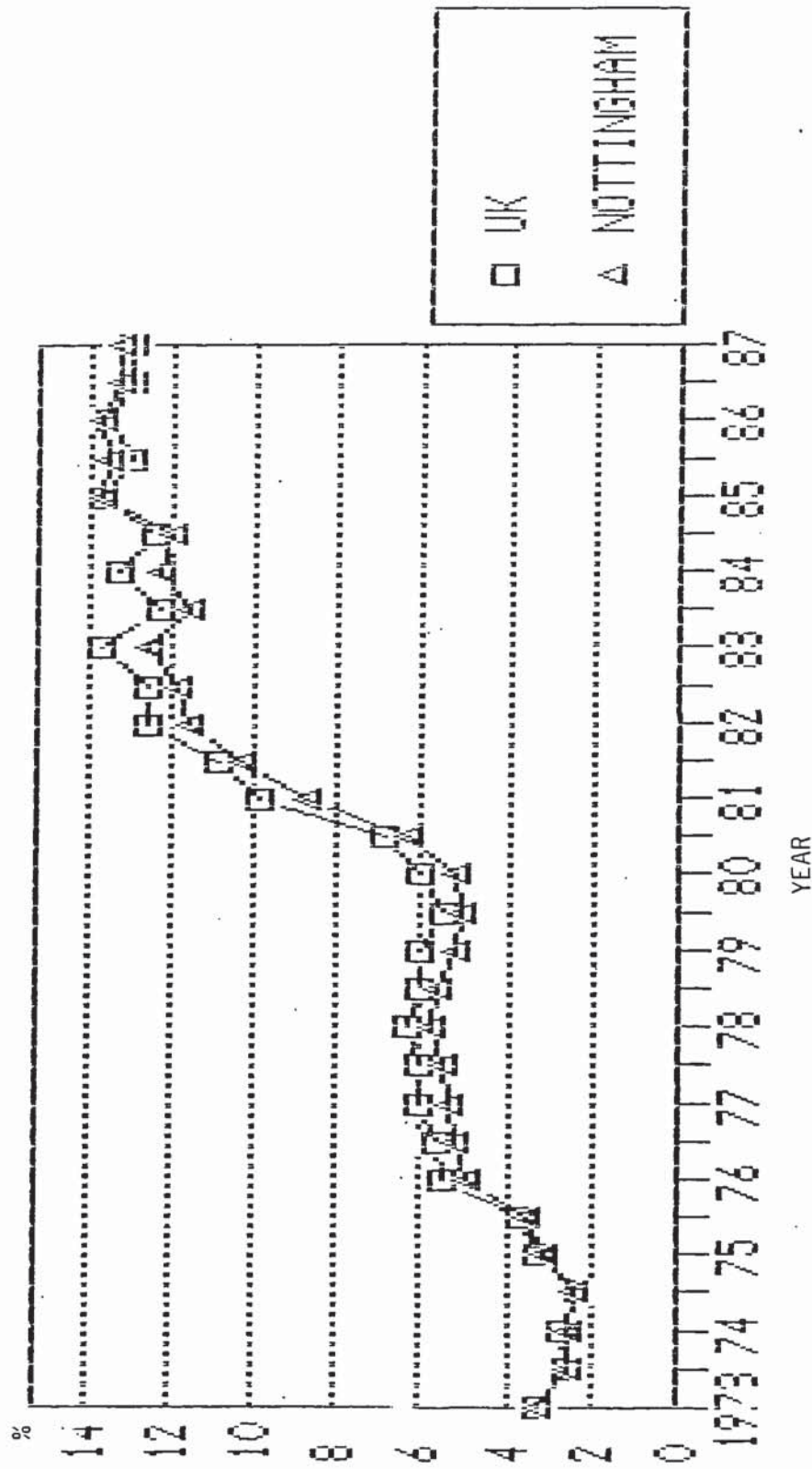
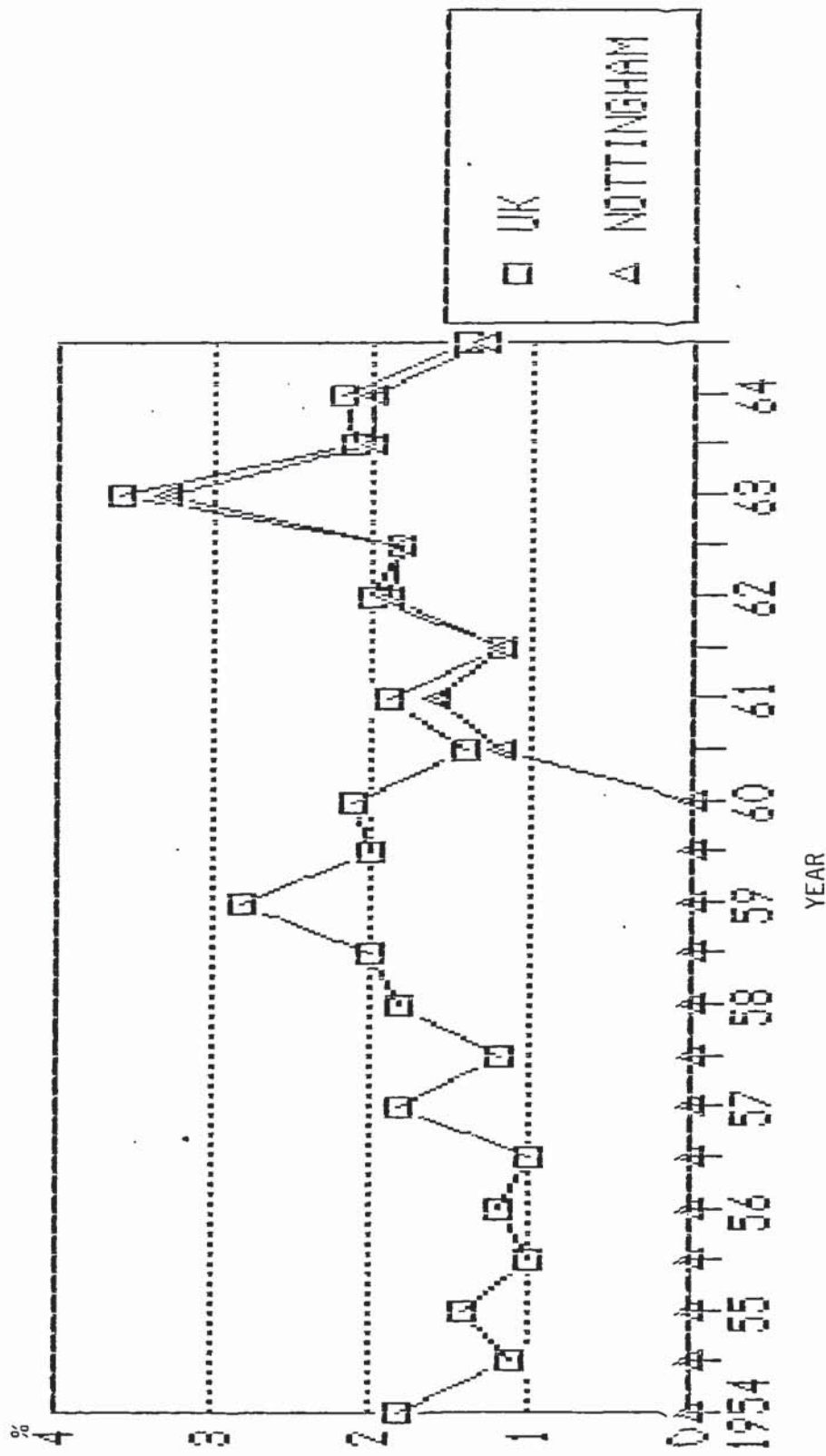


FIG 4.6 Unemployment rates: Nottingham and United Kingdom
Source: Employment Gazette.



Unemployment rates: Nottingham and United Kingdom, 1954-64
Source: Employment Gazette.

As can be seen from the graphs, there is no apparent divergence from the national changes in rate. The time period covers the planning and construction of the roads when one might expect 'anticipation' to attract business, the opening of the road itself, and a period of five years after opening.

Figures for Nottingham are missing for June 1960: 'The Ministry of Labour Gazette', from which the figures are taken only started publishing unemployment rates at this date. Previously the figures were given as actual numbers of the population. Hence it is possible (assuming a constant population of working age) to calculate rates of change in unemployment from these figures until 1960 and from the published unemployment rates after that date, but the change between the two methods of presentation does not permit changes to be calculated for the transition.

Changes of unemployment rate in Basildon (fig. 4.8) precede the national changes by six months but are of the same magnitude. The changes in Telford (fig. 4.9) and Nottingham (fig 4.10),

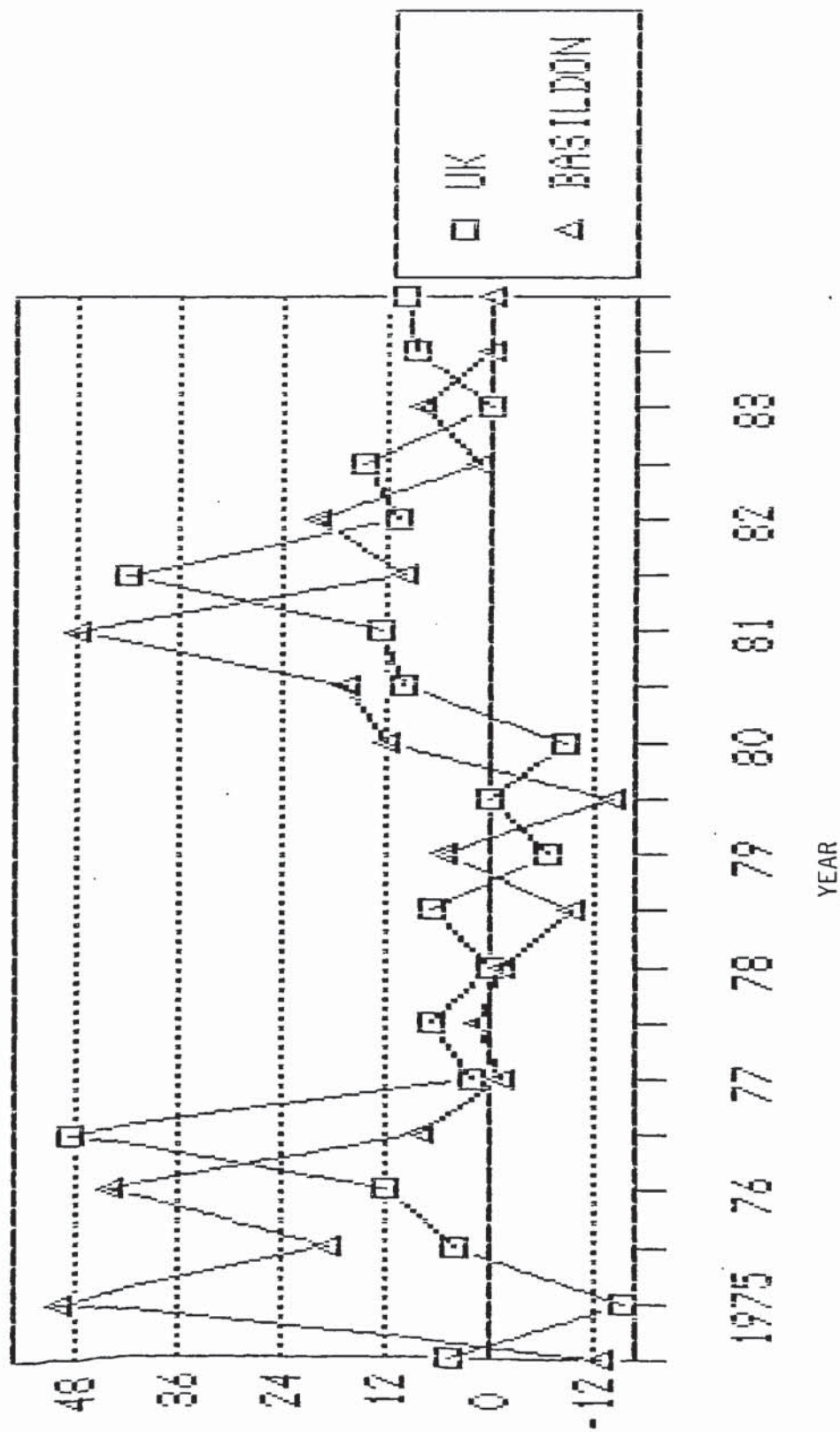


FIG 4.8 Changes in unemployment rates: Basildon and United Kingdom
Source: Employment Gazette.

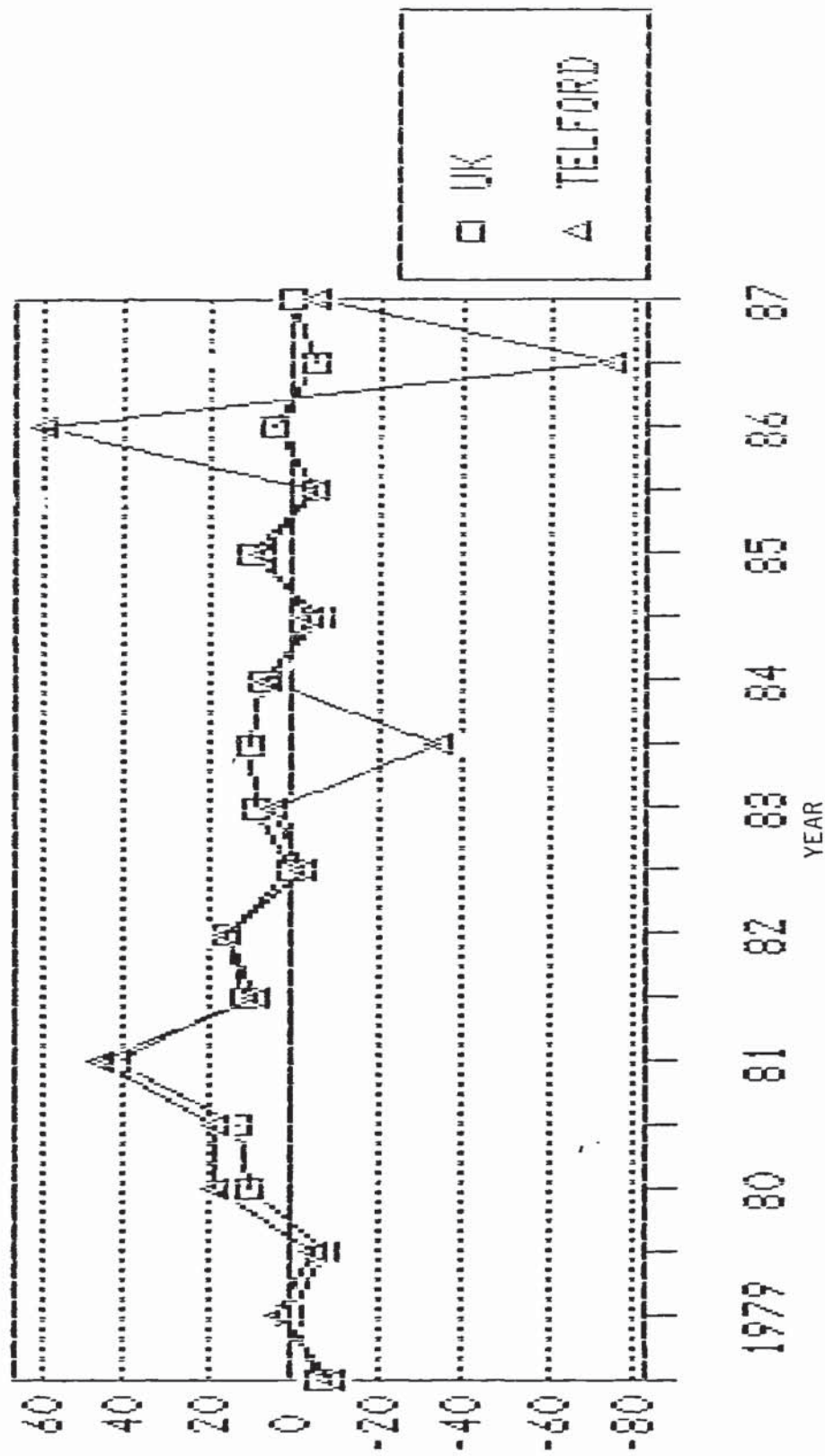


FIG 4.9 Changes in unemployment rates: Telford and United Kingdom
SOURCE: Employment Gazette.

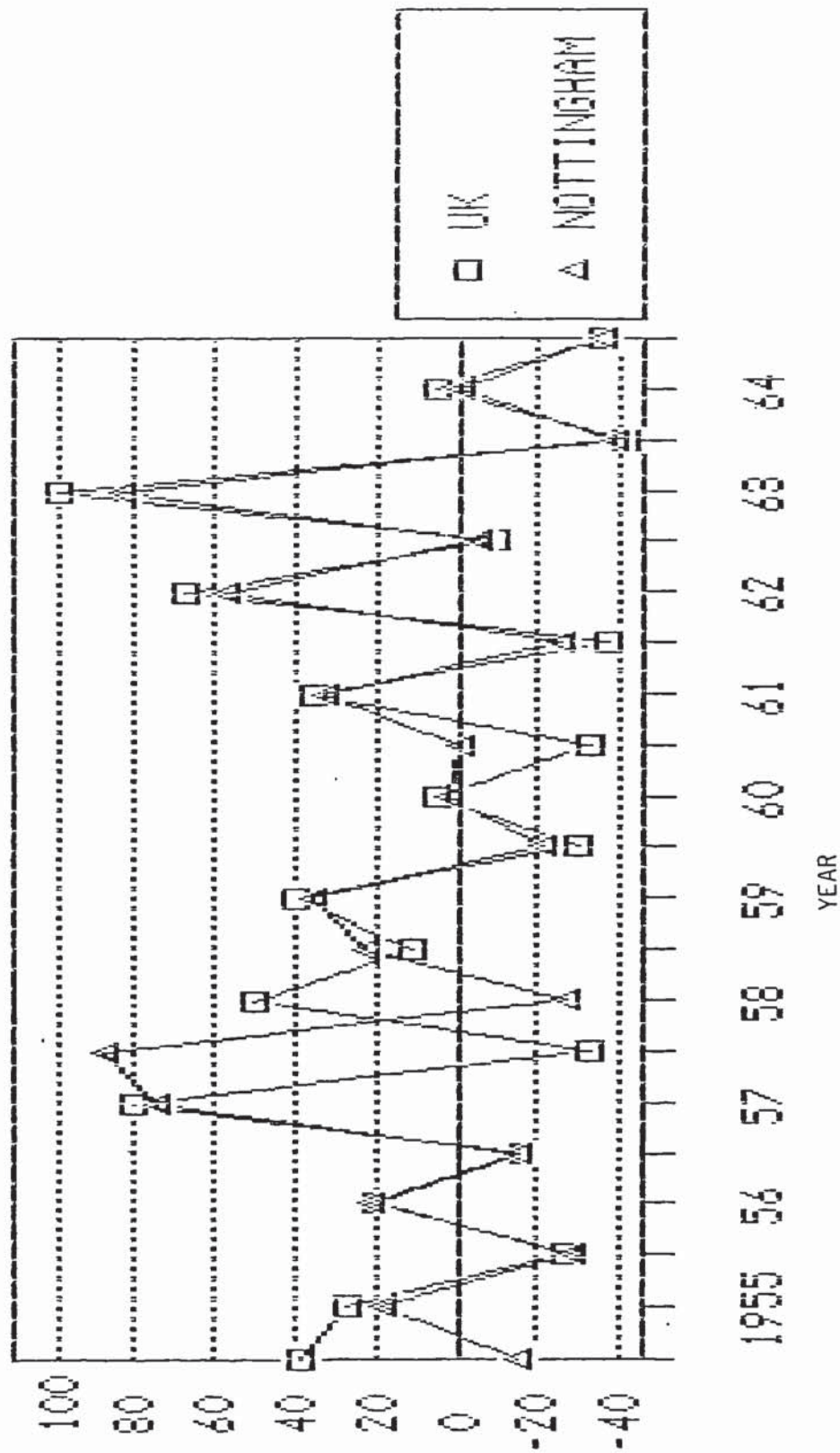


FIG 4.10 Changes in unemployment rates: Nottingham and United Kingdom
Source: Employment Gazette.

resemble the national figures very closely. The rates for Telford slow down markedly between January and June of 1983, just previous to the opening of the M54, but they then rise back to the same rate of change as nationally. Nottingham's change in unemployment rates are very close indeed to the national changes.

In none of the graphs is any divergence from the national picture which could be attributed to the construction of the M25, M54 or M1.

4.3.3 Temporal relationship between motorway opening and industrial location.

The above data reveals no clear changes in unemployment that can be related to the opening of each motorway. However, if these roads are assumed to have had an attracting influence upon business one would expect to see this reflected in the sample: each subject was asked when the business had located in the area. This allows the time of location to be related to the opening of the relevant motorway or section of motorway. Figures 4.11, 4.12 and 4.13 show this relationship, with '0' representing the year in

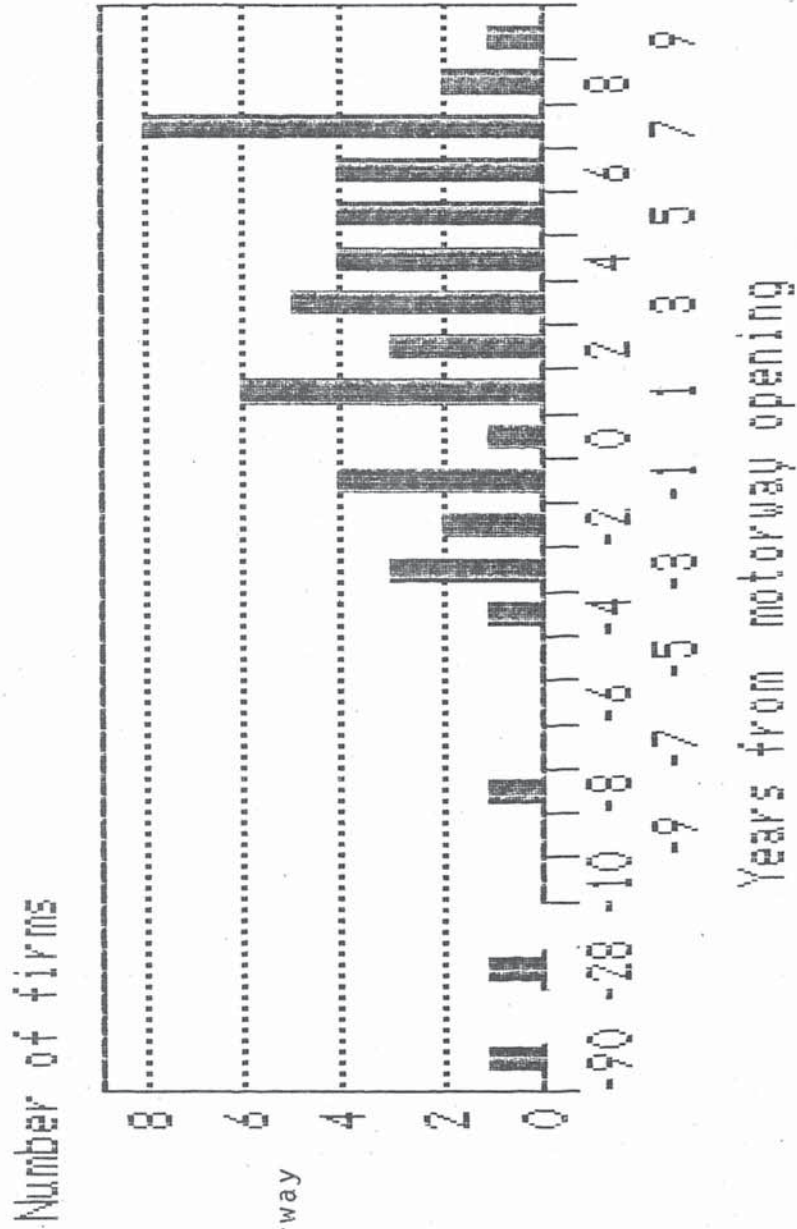


Figure 4.11 Years
between opening of motorway
and firm location:
Basildon

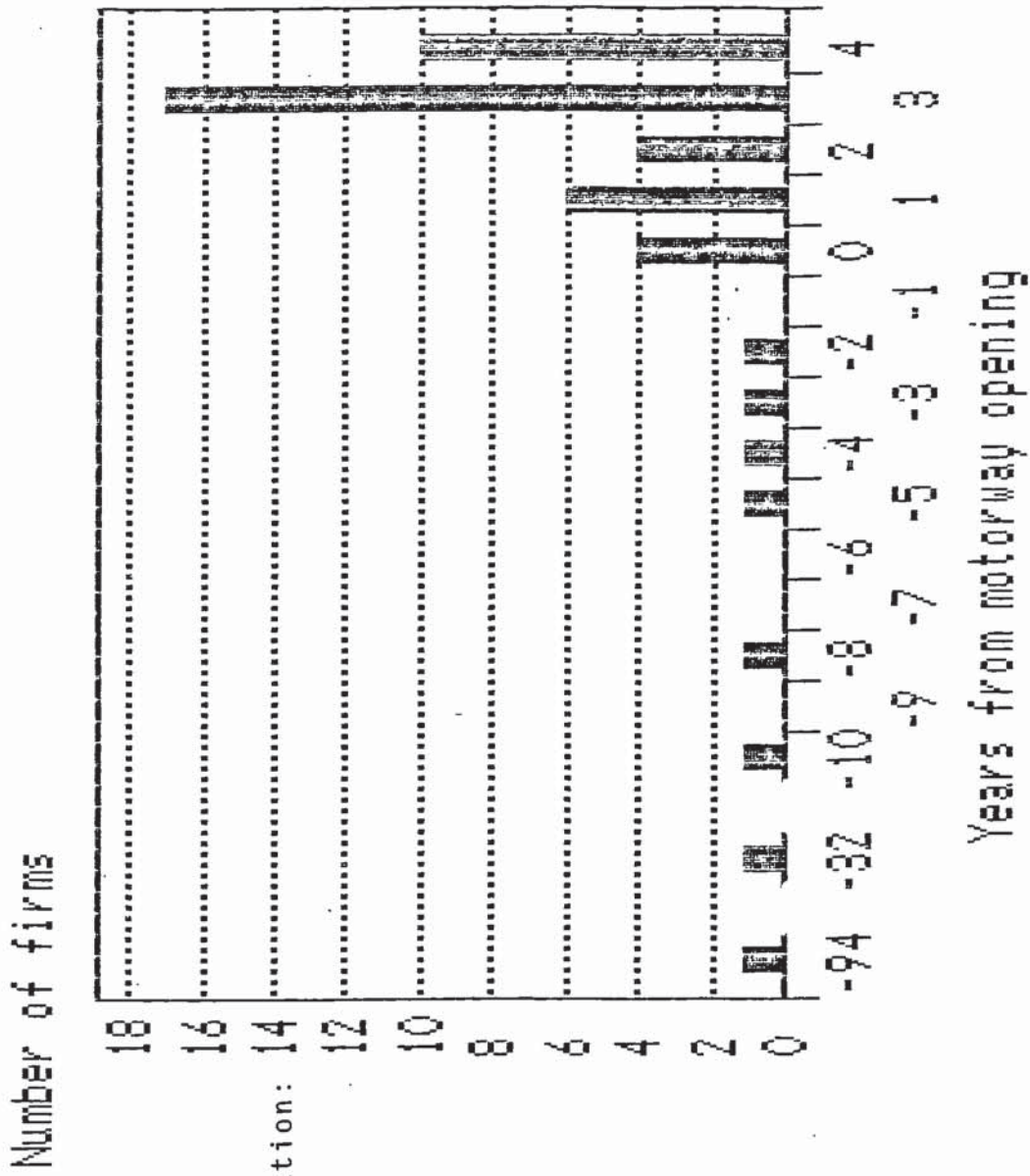


Figure 4.12 Years between
motorway opening and firm location:
Telford.

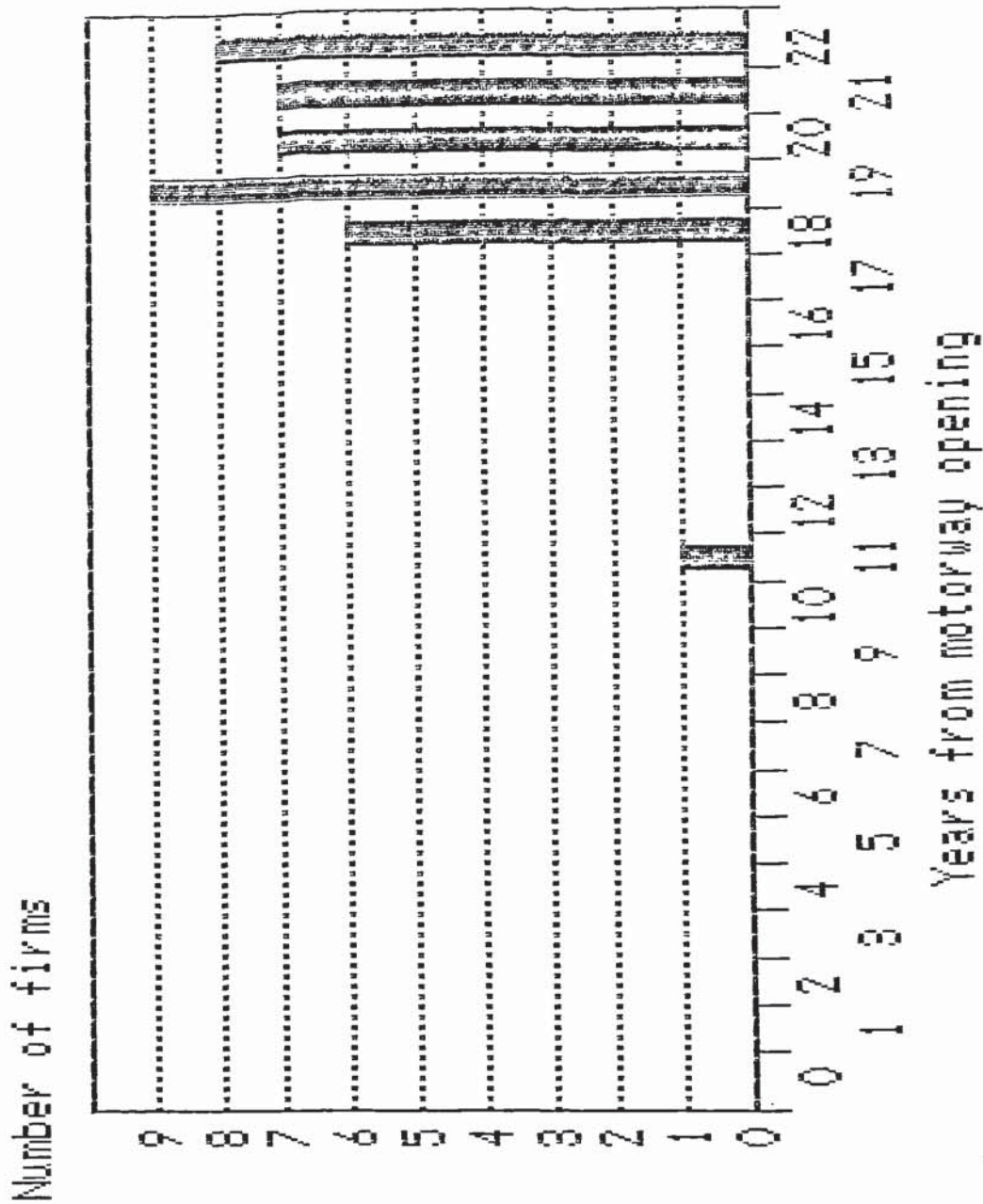


Figure 4.13 Years between
motorway opening and firm
location: Nottingham.

which the relevant road (or section of road) was completed.

As can be seen from the graphs, most of the firms located after the opening of the roads. In the case of Basildon there is a peak one year after opening of the nearest section of M25. The graph for Telford appears to support the assertion that the M54 has attracted business to the town with a dramatic rise in the number of firms in the sub-sample locating after the opening of the motorway.

The Nottingham sub-sample, primarily due to the length of time since the M1 reached the city (in 1966), does not give a picture of any changes immediately before or after that event. The oldest firm in the sub-sample, as can be seen in fig. 4.13, located some eleven years after 1966.

The survey does appear at first sight, therefore, to support the thesis that motorways attract business. Nonetheless, no causal link can be drawn at this stage. Further, no account is taken here of firms leaving the areas which, according to the literature reviewed in chapter two, may well be a significant factor. Indeed the lack of divergence from national unemployment

trends suggests that this effect may counterbalance the influx of firms. Data on firms leaving an area is notoriously difficult to obtain, with none of the relevant authorities having such records. During the course of the research I tried several different departments in each authority (including the rating departments) to obtain the data but met with no success.

4.4 CONCLUSION

The sample obtained proved to be statistically biased despite the fact that random sampling is usually a reliable technique. This bias is probably due to frame error. nonetheless, it has been shown that the SIC Division of a firm does not affect the responses given to the major questions.

Basildon and Nottingham have historically had rates of unemployment consistent with the national figures. Telford has, on the other hand, a history of high unemployment. An examination of local unemployment in relation to national trends shown no clear divergence that could be attributed to the motorways. However,

there was a tendency within the sample for firms to have located *after* the opening, although no causal link can be drawn.

The results of the interviews are presented in Chapter five

CHAPTER FIVE: RESULTS AND INITIAL CONCLUSIONS

- 5.1 INTRODUCTION
- 5.2 RELOCATION: ITS CAUSES AND EFFECTS
- 5.3 EMPLOYMENT CHANGE
- 5.4 TRANSPORT
- 5.5 THE ROLE OF MARKETING AND ADVICE IN LOCATION
CHOICE
- 5.6 FACTORS INFLUENCING THE LOCATION DECISION
- 5.7 SUMMARY AND CONCLUSIONS

Chapter outline

The results of the interview surveys are presented and initial conclusions drawn.

5.1 INTRODUCTION

This chapter presents an analysis of the data collected from the surveys in Basildon, Telford and Nottingham. The data on which this analysis and discussion is based is presented at Appendix 5.1. The results are not presented in the order of the schedule at Appendix 3.3 but in broad areas that emerged from the study as more appropriate frameworks for discussion. Indeed part of the survey has already been discussed in chapter four. The areas are: the reasons for and consequences of relocation; employment change; transport; marketing and advice taken on location choice and, finally, factors influencing the choice of the current location.

5.2 RELOCATION: ITS CAUSES AND EFFECTS

5.2.1 Changes in number of sites

One of the key questions pertaining to the regenerative and employment effects of major roads is the extent to which they attract new

business or simply relocate that which already exists. This will be discussed below, as will the reasons for relocation and the effects that this has upon output and costs.

Of the firms in the survey the numbers of relocated and new firms were almost equal, with 51.4% being relocated and 48.6% being new businesses. Of the 74 relocated firms, 64 had moved from one site to another single site. Of the remaining 12, the new site represented an addition to the number of sites already occupied in 6 cases, whilst the other 6 had closed sites.

In Basildon four companies had centralised from two sites to one; two firms had contracted from three to one and two respectively whilst one firm had expanded from one to two sites. In Telford all the changes in numbers of locations represented expansions of operations with two firms expanding from one to two sites whilst two others went from two to three. The only change in the Nottingham sub-sample was the expansion of one company from one site to two.

Only in the Basildon survey, therefore, was there any evidence of contraction and centralisation,

whilst the other two locations showed expansions of businesses (in terms of number of sites occupied).

5.2.2 Geographical origins of relocated firms

Relocation of the firms in the surveys is essentially intra-regional. Of the 34 firms relocated to Basildon, 11 had come from elsewhere in Essex and a further 11 had emigrated from Central London. In the Telford sub-sample a total of 28 firms were relocated of which 26 had moved from other locations in the West Midlands. The trend was further echoed in the Nottingham sub-sample where 18 out of 21 relocated businesses had moved from East Midlands sites.

This has distinct ramifications for regional policy: businesses are predominantly moving within regions, rather than from one to another. The aim of regional policy is primarily to redress the balance between regions, yet there appears to be little evidence of business moving from one to another.

5.2.3 Reasons for leaving previous sites

Relocation is clearly a significant factor but the actual reasons for relocation are unclear. Subjects were therefore asked to state the main reasons for leaving any previous locations. In all three locations the two most commonly mentioned factors were that the site was too small and that it was badly designed. The subjects made it clear that this was almost always due to an increase in business which entailed growth in the workforce and/or the introduction of new technology and machinery. This increase in turnover is reflected in the responses to a later question where subjects were asked about changes in volumes of output: 62.2% stated that they had experienced an 'increase' in output since relocation whilst a further 8.1% had experienced a 'large increase'.

In Basildon and Nottingham (37.0% and 19.0% respectively), high rents were given as the third most frequent reason for leaving, whilst for firms now in Telford the third most significant factor was that previous locations had been too far from the firms' markets.

Amongst the 'other' responses were a firm which was in a poor financial position and had to reduce costs in order to survive, and three which were in a healthy financial position but wished to reduce their labour forces in the light of increased productivity.

Traffic congestion was given as a reason by 22.2% of the subjects in the Basildon survey, all of whose firms had left *Central London*. A further 4.8% gave this reason in Nottingham.

The reasons for leaving previous locations can be ranked by the number of occasions on which they were given as factors (either major or minor) as follows:

FACTOR	LOCATION			
	<u>Basildon</u>	<u>Telford</u>	<u>Nott'm</u>	<u>all areas</u>
high rents	3	5	3	3
site too small	1	1	1	1
bad site design	2	2	2	2
lack of labour	9	6	8	9
too far from markets	5	3	4	4
too far from supplies	6	4	8	5
traffic congestion	4	8	7	6
other	7	8	4	7
don't know	8	7	4	8

TABLE 5.1 Ranking of reasons given for leaving previous location(s).

5.2.4 Post-relocation changes in product output

Figure 5.1 illustrates the changes in volumes of output experienced by firms after relocation. There is a strong trend for firms to increase their output with, overall, only 4.2% of the firms in the survey experiencing a decrease.

There is, however, no substantiation of a causal link between the two. As has been stated above,

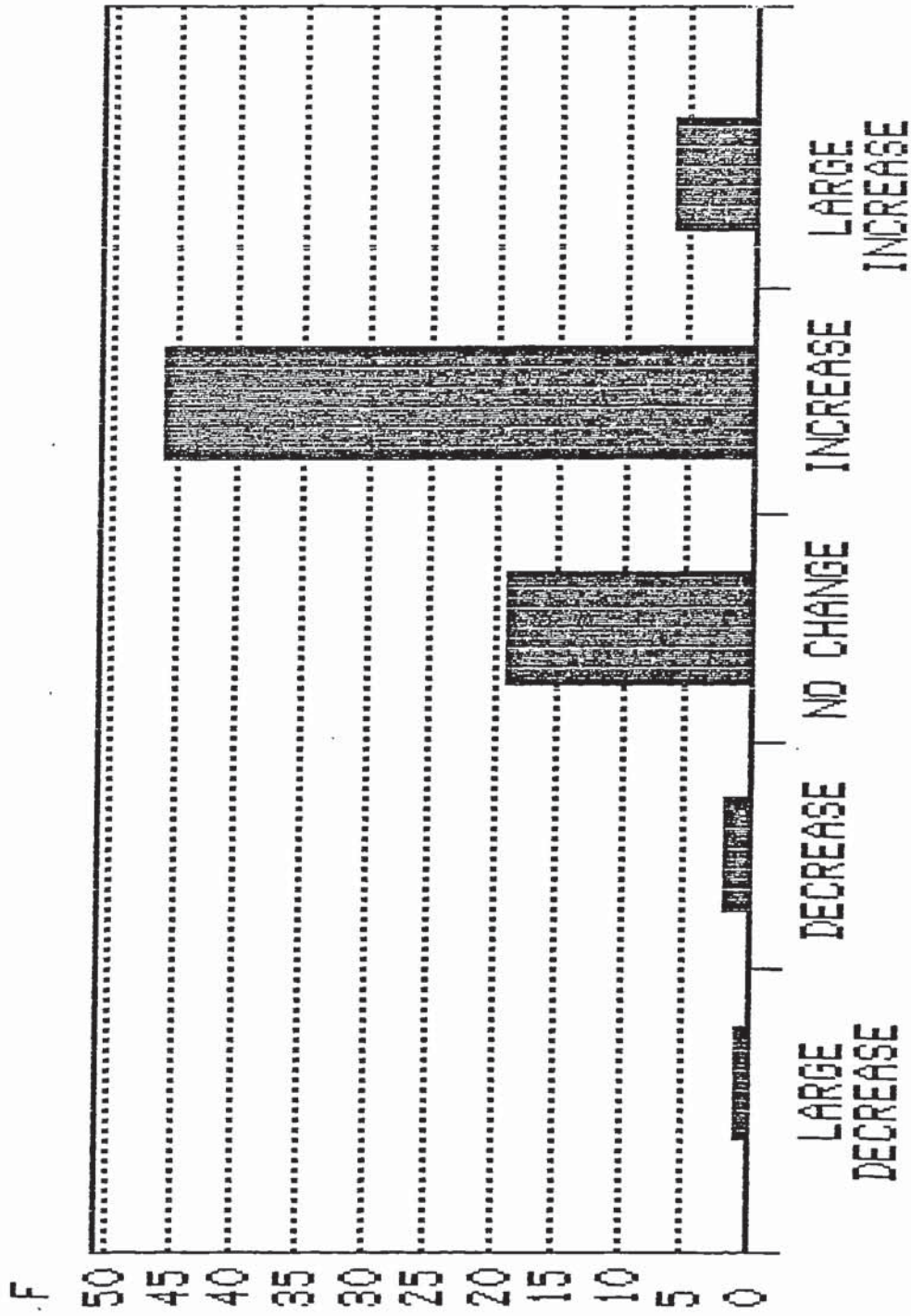


FIG 5.1 Change in product output following relocation

the primary reason for leaving a previous site was that output was already expanding at a rate such that new premises became essential.

Britain has seen a massive increase in productivity over the past decade for a number of reasons, including new technology and better management. One would, therefore, expect such rises in output to occur irrespective of relocation. However, it was clear from the interviews that many firms were able to bring about further productivity increases in the process of relocation by introducing new technology and also by enabling a better spatial arrangement of a production line.. So what relocation, combined with increased productivity, may allow is for a firm to maintain output with fewer workers, or to increase output with fewer extra workers than would have previously been necessary. It became evident in the course of many of the interviews that firms had taken the opportunity presented by relocation to introduce new technology and machinery and this was considered to be a major benefit of that relocation.

In none of the cases was there any change in the type of output upon relocation.

5.2.5 Changes in costs following relocation

The most substantial changes in costs post-relocation took the form of a decrease in rates. Overall, 32.4% experienced a 'large decrease' whilst a further 26.8% experienced a 'decrease'. 35.2% experienced no change, but this was predominantly combined with a larger site than that which they occupied previously.

Overall 1.4% of the subjects stated that their firm had 'experienced a 'large saving' in transport costs and 18.3% claimed a 'saving'. However, 12.7% experienced an 'increase' in transport costs whilst 2.8% experienced a 'large increase'. In Basildon, however, 29.1% of the firms studied had experienced an increase in transport costs (20.8% 'increase', 8.3% 'large increase') whilst 25% (20.8% 'saving', 4.2% large saving') experienced a reduction in transport costs.

The aggregate figures for all three areas show that 26.7% of the firms were able to achieve savings of some magnitude in labour costs. Conversely only 8.5% experienced an increase in labour costs. In the case of Basildon the contrast was more marked with exactly 50% experiencing a reduction in labour costs.

In Telford, however, more firms achieved savings in transport costs than increases. Further, 23% experienced a rise in their rents. In Nottingham no firms experienced transport cost increases. Hence it becomes apparent that in the process of relocation a firm redistributes its ratio of different types of costs. In some cases increased transport costs will be offset by decreased labour costs, in other cases increased labour costs, for example, may be offset by decreased rents or rates.

Data on transport costs must, however, be treated with a great deal of caution: as a check on the answers above, which all subjects gave, a later question asked what proportion of their total operating costs were accounted for by transport both currently and, where appropriate, before relocation. Of the 144 subjects, 66.0% were not

able to say what this figure was. Nor were 54.1% of the 'relocated' subjects able to state the proportion previous to the move.

There is clearly a large degree of uncertainty which is not reflected in other areas of the firms' activities. The subjects, as has been discussed previously, were primarily people within the firms who had the best overview of the company's operations. The one area about which they appeared to know least was transport.

5.3 EMPLOYMENT CHANGE

The concluding section of the interviews concerned the employment characteristics of the firm. Questions asked were the number of employees currently and , where appropriate, the number of employees previous to relocation. In each case the subjects were asked to distinguish between skilled and unskilled labour, albeit upon their own definitions of the terms, in order to ascertain whether or not there was any difference between the groups in terms of likelihood of being retained in employment post-relocation.

Data is presented by firm in appendix 5.1, but in summary, the employment characteristics by locality are as follows:

	<u>BASILDON</u>	<u>TELFORD</u>	<u>NOTT'M</u>	<u>ALL AREAS</u>
	n	n	n	n
<u>Total</u>				
Mean	135.0	16.3	49.8	69.0
std. dev.	433.6	13.7	99.5	269.1
<u>Skilled</u>				
Mean	32.6	9.1	17.6	19.9
std. dev.	53.2	7.1	20.0	34.9
<u>Unskilled</u>				
Mean	38.7	7.2	31.9	26.1
std. dev.	114.3	9.2	85.9	84.3

TABLE 5.2 Current numbers of employees in each sub-sample.

Basildon appears at first sight to have a relatively very large mean number of employees per firm. The explanation for this lies with firms no. 38 and 50 which employ 1000 and 3000 people respectively. Due to the relatively small sample size these two firms have a particularly distorting effect upon the rest of the sample. Without firm 50, the mean figure fall to an average of 77.4 employees (std.dev. 155.9) and without both 38 and 50 to 58.6 employees (std.dev 84.1). Whilst still higher than the figures

experienced in the other locations, these are more of the order to be expected.

This section is, however, concerned with the changes in employment following the relocation of business. Looking solely now at relocated firms the equivalent figures to those in table 5.2 before relocation are as follows:

	<u>BASILDON</u>	<u>TELFORD</u>	<u>NOTT'M</u>	<u>ALL AREAS</u>
	n	n	n	n
<u>Total</u>				
Mean	233.4	14.3	76.2	112.1
std. dev.	936.3	11.6	133.0	578.0
<u>Skilled</u>				
Mean	25.6	8.7	19.6	17.6
std. dev.	33.9	6.1	19.2	23.7
<u>Unskilled</u>				
Mean	18.1	6.5	50.1	22.9
std. dev.	21.8	8.7	118.7	68.3

TABLE 5.3 Number of employees in each sub-sample previous to relocation.

Once again the presence of firm 50 rather distorts the picture, its effect being magnified by the now smaller group of firms. Without firm 50, the mean number of employees falls from 233.4 (Std.dev. 936.3) to 50.0 (std.dev. 53.0).

Consequently, when one examines the changes in numbers of employees subsequent to relocation the 2000 person decrease in that firm's labour force has a further distorting effect. Other discrepancies arise due to the fact that the interviewee in firm 50 was unable to give a breakdown of skilled and unskilled labour.

Overall, taking the total numbers of employees within each sub-sample changes were as follows: in Basildon the total number of employees within relocated firms fell from 6241 to 4062 after relocation; a fall of 34.9%. However, when one takes firm 50 into account (which represents 2000 of the 2179 jobs lost, the fall is from 1301 to 1143 jobs; a fall of only 12.1%

In Telford there is an increase of 21.3% from 381 to 462 employees, whilst in Nottingham there is also an increase of 8.5% from 1552 to 1684 jobs.

Aggregating the data for all of the firms within the survey there is a 23.6% decrease post relocation which is transformed to a 1.7% increase when firm 50 is omitted.

Basildon provides an interesting exception to the trends of the other locations in that despite experiencing an overall decrease in the number of staff within relocated firms, the production output of those firms had increased to a similar extent to that of firms in the other locations. This points to there having been larger increases in productivity upon relocation than in the other locations. Looking back to the interviews, the most likely source of this differential stems from the type of premises that firms leaving London had left behind: a number of firms were in very cramped conditions, for example under railway arches in the case of one precision engineering company. Relocation offered the opportunity for very much more efficient use of space and thus to higher productivity. Further, the introduction of new technology at new sites was much more prevalent amongst the firms in Basildon. This in itself could account for the differences.

5.3.1 Relocation of staff

Whilst section 5.3 above examines net changes in employment in the relocated firms, subjects were asked the numbers of staff who were relocated to the new site. From this it is possible to determine the number of staff made redundant at the previous location or locations; even firms experiencing a net increase in their staff compliments may have experienced redundancies at their previous locations.

From the data (in appendix 5.1) it is possible to determine the mean percentage of workers relocated and hence the percentage made redundant. From the interviews themselves it became clear that firms were, almost without exception, keen to retain the services of their key skilled staff, but were prepared to take on new labour at the new location for less skilled posts. In some cases however, firms were able to retain their full labour force, although in one case the entire workforce was made redundant.

Overall the changes were as follows:

	<u>BASILDON</u>	<u>TELFORD</u>	<u>NOTT'M</u>	<u>ALL AREAS</u>
<u>Mean no.</u> <u>employees</u> <u>pre-</u> <u>relocation</u>	233.4	14.7	73.9	111.3
<u>% relocated</u>	61.6	79.8	81.7	73.7
<u>% redundant</u>	38.4	20.2	26.3	26.3

TABLE 5.4 Percentages of workforces relocated and made redundant at sites previously occupied by firms in survey.

From the above it becomes clear that in relocation there is a tendency to make staff redundant, although there is a net gain in employment when one takes into account the staff at the new site. A total of 16 (21.6%) out of 74 relocated firms in the survey took their entire workforce to the new site or sites.

5.4 TRANSPORT

5.4.1 Fleet vehicles

This section, together with those below, examines the importance of transport to the everyday operations of the firms in the survey. The initial indication of its importance came from a

question about the number of vehicles, be they cars, vans or lorries, that were used in the course of the firm's business.

The replies were banded at 0, 1-5, 6-10, 10-20 and >20 and are presented in fig. 5.2. In Basildon 68.6% of firms had at least one vehicle in use and in Telford that figure rose to 76.6%. In Nottingham however, over half (52.2%) operated no vehicles at all.

The type of vehicle in use was predominantly of the Ford Transit-type light van. Heavy goods vehicles were the main form of transport used in 27.8% of the firms, but these were largely externally contracted rather than own-account operated.

5.4.2 Vehicle use

The number of vehicles operated by a company is only an indication of the level of transport intensivity. Clearly firms rely on vehicles other than their own for both receiving and delivering goods. Each subject was therefore asked about the number of vehicle movements in

and out of the premises. The aggregated figures for all of the areas are presented in table 5.5. Despite the evident lack of knowledge of transport activity, subjects were extremely willing to take an 'educated guess' here. As can be seen, every company in the survey, with one exception, relies on vehicle movement to some extent. The bulk of the firms, however, had fewer than five vehicles in and five out per day. Only around 3% had over 20 such movements.

Number of movements	frequency in		frequency out	
	n	(%)	n	(%)
0	0	(0.0)	1	(0.7)
<5	93	(64.6)	90	(62.5)
5-10	28	(19.4)	31	(21.5)
11-20	18	(12.5)	17	(11.8)
>20	4	(2.8)	4	(2.8)
don't know	1	(0.7)	1	(0.7)
Total	144	(100.0)	144	(100.0)

Table 5.5 Daily numbers of vehicle movements in and out of premises - all areas.

5.4.3 Origins and destinations of inputs and outputs

Both goods coming in to businesses and products leaving come from, or are destined for, other locations. The spatial patterns of inputs differ

from those of outputs, especially insofar as a high proportion of outputs are distributed nationwide. Inputs come predominantly from the region in which the firm is located. In the case of Basildon, 72.6% of inputs come from elsewhere in the South East. East Anglia, West Midlands and the North West are all sources of inputs to firms in Basildon, but do not feature in the destinations of products. 29.4% of those questioned in Basildon stated that they distributed their products or services nationwide.

In the cases of Telford and Nottingham the contrast is more marked: the only destinations stated were the West Midlands and nationwide for Telford firms and East Midlands and nationwide for those in Nottingham.

The results imply that the most important highway infrastructure, in terms of receiving and distributing goods, are regional networks, but the nationwide strategic network *do* appear to be well used. This is somewhat in contrast with the ratings of importance of the motorways related in section 5.4.5 below.

5.4.4 Journeys to work and client visits

Overall 95.8% of journeys to work are of under ten miles in length. Nearly half (49.3) are under five miles.

The main modes of transport vary between locations as in table 5.6 below:

<u>MODE</u>	<u>BASILDON</u>	<u>TELFORD</u>	<u>NOTT'M</u>	<u>ALL AREAS</u>
	%	%	%	%
Car	100.0	59.6	23.9	62.5
Bus	0.0	38.3	76.1	36.8
Bike	0.0	2.1	0.0	0.7

TABLE 5.6 Main modes of journey to work.

The reliance upon private car transport is evident in Basildon. What the figures do not show, however, is that there is a high level of car-sharing amongst employees, exclusively organised informally amongst the workers themselves. Nottingham provides something of a contrast with a heavy reliance on public transport.

Visits to firms by clients proved to be surprisingly rare as can be seen in figure 5.2. This is largely because many of the companies in the survey had one main contract to fulfil at a time; they were dealing with one client. There was a strong tendency for company directors or sales staff to visit clients rather than the other way round.

The mode of travel for clients was predominantly car, although once again the picture was somewhat different in Nottingham:

<u>MODE</u>	<u>BASILDON</u>	<u>TELFORD</u>	<u>NOTT'M</u>	<u>ALL AREAS</u>
	%	%	%	%
Car	96.3	97.2	64.5	87.1
Foot	3.7	2.8	35.5	14.1
Bus	0.0	0.0	0.0	0.0
Bike	0.0	0.0	0.0	0.0

TABLE 5.7 Main modes of travel for clients visiting firms

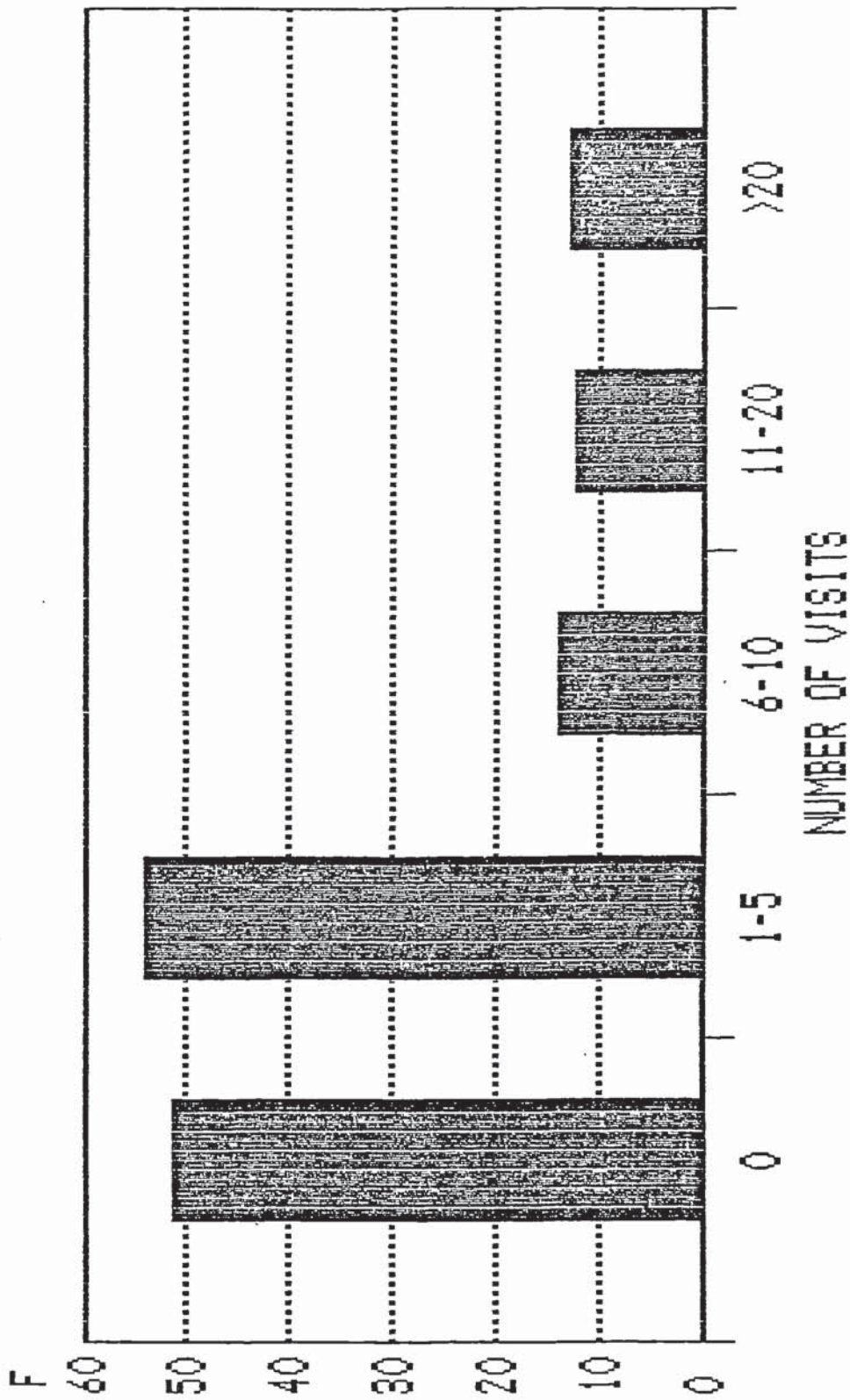


FIG 5.2 Weekly number of client visits: all areas

5.4.5 Importance of the motorway

As something of a check on the responses in this section, respondents were asked to rate the importance of the particular motorway to their business. Responses were 'very important', 'important' or 'unimportant'.

The results were as follows:

	<u>Basildon</u>	<u>Telford</u>	<u>Nott'm</u>	<u>All areas</u>
<u>RATING</u>	%	%	%	%
very important	11.8	10.6	8.7	10.4
important	31.4	25.5	45.7	34.0
unimportant	56.9	63.8	45.7	55.6

TABLE 5.8 Ratings of importance of motorways to subjects' firms.

The responses here were somewhat surprising, with perceived importance of the motorways to the everyday running of the firms being remarkably low.

Two points were raised in conversation which go some way towards explaining this apathy: first, a number of the declining firms had been victims

of a recession within their industries: one of these (in Basildon) had laid off 2000 workers, another was about to close. Some of these interviewees were quick to point out that no amount of road building could have saved their businesses. Second, there was an attitude towards the roads which was common to a great number of the subjects: the response "well the road isn't important to us...but of course it is to most other firms".

This response arose spontaneously in three out of the first five interviews, after which a further question was added to the interview schedule: "...so are motorways important to business as a whole?" The answer was 'yes' in 131 out of the remaining 139 interviews. This is important in itself in that it demonstrates the very strong perceived importance of the motorway system in spite of a (frequent) realisation and admission of its lack of importance to the subject's own firm. This 'faith' element in roads has already been identified by both Gwilliam and Thornton in the literature reviewed in chapter two.

5.5 THE ROLE OF MARKETING AND ADVICE IN LOCATION CHOICE

5.5.1 Property professionals

Business people are consumers, in this case of property, and are thus swayed by various marketing forces. Key actors here are property developers and estate agents. Each survey included a small number of interviews with these groups on a less structured informal basis. In Basildon four such representatives were spoken to, in Telford three (including the Development Corporation), and in Nottingham, three. The results of those discussions are presented here rather than in an appendix as the attitudes exhibited are germane to the conclusions presented in chapter six..

Much of what was said by the subjects in Basildon was also said by those in the other locations. Hence the discussion for Telford and Nottingham is shorter than the others to avoid repetition.

5.5.1.1 Basildon

In anticipation of the opening of each and every section of the M25 have come floods of planning applications and inquiries from property developers. For example, around the junction with the M1 at Watford there are a larger number of disused and closing mental hospitals. These are by nature large buildings with expansive grounds. Well before the opening of the nearest section of M25, the London press was full of stories of developers competing for the acquisition of these properties.

The motorway features very strongly in property advertising: the usual format for such an advertisement is a full page map of the M25 with the developer's sites illustrated. Whereas much development promotion in the South East has been accompanied by extolations of the electrified rail network, sites around the M25 have become associated almost entirely with easy road access and car commuting.

It appears that developers' willingness to develop land, and their ability to promote that land and its development, are influenced strongly

by the M25. With this in mind I decided to talk to the developers and estate agents in Basildon District. These firms were interviewed in the same way as the other firms in the survey to ascertain the operational importance of the road to themselves. However, I also spoke to them at greater length about the reasons why they are so active in the area.

The property professionals did not see any great operational importance of the M25 to businesses in the area. They accepted that for a few transport-intensive firms it might make a significant difference to costs, but on the whole its role was one of little more than convenience. They were keen, however, not to play down the role of 'convenience' particularly in relation to residential development. Despite the bias in their advertising, the role of the rail network was considered by the subjects to be of prime importance. The motorway gave residents and businesses alike the choice of travel mode. They pointed out that much of their residential development is sold to commuters to London who rely on easy access to the capital.

The single point that came across most strongly was that the M25 had opened up huge areas of cheap land within easy reach of London. There is a strong demand for property of all types at a price very much lower than similar properties in London.

The developers had no worries as far as planning consent was concerned: "we expect to get planning permission" said one. The demand for property referred to above comes almost exclusively from firms and individuals currently located or living in Inner London, and it is they at whom the estate agents aim their product.

There is a crucial difference between the way in which agents perceive the importance of the M25 to residential and business developments. As I have already stated, the presence of the road is perceived as a major selling point to those interested in residential property. Its importance to the sales of business property is much smaller. The big selling points for business are first and foremost that property prices, rents and rates are relatively cheap, second that premises can be built to the clients' exact specifications and third that the area

offers a large potential workforce. The M25 takes second place to all of these factors, although it is still, of course, a selling point insofar as it gives Basildon the edge over other areas which may also offer low rents and rates, purpose built premises and a good labour force.

To sum up, the M25 seems to have acted as a sort of 'catalyst' to development. The property developers interviewed saw its role as being to open up land which could offer facilities other than good road links to business and residents. The operational importance of the road was seen as "important but not crucial...a selling point rather than a necessity".

5.5.1.2 Telford

Unlike Basildon, Telford has an active Development Corporation who assume a large degree of responsibility for 'selling' Telford. This they do not just at a national level, but internationally as well, with representatives in the USA, Japan and Germany. People in business had already mentioned the effectiveness of the Development Corporation's promotion strategy.

The perceptions of the needs of industry given by the sample were very much akin to those above. A significant difference, however, was in the importance attached to the M54. Those in Telford rated its importance as crucial but in terms of 'convenience' or 'status' rather than in operational terms.

The road does feature very heavily in the promotional literature and much hope had been vested in the road; indeed much has been claimed of the palliative effects that it has had upon the local economy and on unemployment in particular.

In general then, the M54 was considered to be equally important to residential and business development and on an equal par with factors such as cheap labour for business.

5.5.1.3 Nottingham

For some years Nottingham has been in decline in terms of employment and its ability to attract business. There has been no body such as the

Telford Development Corporation to promote the area, so much has been left to the County Council.

The property professionals spoken to here were critical of the role that the Council had played over the years, but were noticing a change in style and attitude that they welcomed.

Without exception the subjects saw the electrification of the rail network to nearby Newark as being the saviour of the area - although more for residential than business development. The other factors considered important were Nottingham's labour force and the environment of the city (which the Council is striving to improve). This is a factor not mentioned by subjects in Basildon and Telford.

The attitude to the M1 was along the lines of "well, it's there" and little more. It appears that the road is so well established in people's minds that it is more or less taken for granted. Having said that, the Council in particular are promoting the city's road links heavily in their promotional literature. The estate agents use it as a publicity tool but were quite open about

their lack of faith in it, especially with the current emphasis on the rail electrification.

5.5.2 Advice taken on choice of location

Knowledge of the advice taken about the location decision is one variable that is affected by the role played by the subject in the location decision itself. On the whole those who had not been involved stated that they did not know what advice had been taken. A total of 41% of the subjects fell into this category, which included five respondents who claimed to know what advice was taken despite not being involved in the decision. This group aside, the next most frequent category was that of 'no advice taken' with 22.2% of the subjects giving that response. Advice from banks and financial institutions, from local authorities and from existing firms were at 14.6%, 11.1% and 9.7% respectively. Perhaps most surprising was the small heed paid to the advice of estate agents, with only 1.4% of those interviewed claiming this to be their main source of advice.

The results were consistent across all three locations, with 'no advice taken' being the most frequent response from subjects who answered the question. There is, however, one exception to this trend which appears in the Telford study: all the instances where the local authority was the main source of advice were in this location. In neither of the other areas was this source of advice mentioned once. Without exception, the term 'local authority' was taken to mean the Telford Development Corporation and this is indicative of the strong role that the Corporation has played in the promotion of the town to business.

Clarification of the 'no advice taken' responses revealed a consistent trend: those most involved in the location decision had a strong idea of the rough vicinity in which they wished to locate, based primarily on their existing knowledge. They invariably drove around the area looking for suitable sites, investigating further those which took their eye. In depth location studies were considered too expensive and sites which fitted certain specifications (to be discussed below) were selected.

The role played by banks and other financial institutions was surprisingly small, but does appear to be increasing, with such advice being taken predominantly by newer firms and discussion revealed that larger firms were more likely to undertake detailed analysis (often by consultants).

5.6 FACTORS INFLUENCING THE LOCATION DECISION

This section concerns the reasons given for the choice of current location. Factors germane to the location decision were rated as having played a 'major' or 'minor' part or 'no part' in the formulation of that decision. Full tabulated results are in the appendix. When the results are aggregated such that 'major' and 'minor' ratings are given the same weighting (ie. having played any part in the decision) the results indicate that building and site characteristics are the most influential, followed closely by low rents and rates, then a large floorspace.

When presented thus, the factors rank in importance (with 1 as the highest) as follows:

FACTOR	Basildon	Telford	Nottingham	All
access to				
scarce skills	11	12	12	13
labour	3	7	8	5
regional				
incentives	12	9	16	12
local authority				
aid	10	=4	15	10
local road				
access	5	10	8	8
national road				
network	9	13	10	11
access to local				
markets	8	3	=1	4
centralisation	=14	15	13	15
access to				
supplies	7	6	7	7
environment	13	14	11	14
large floor				
space	4	=4	6	3
building/site				
design	1	=1	=1	1
access to				
services	6	8	=4	6
low rents and				
rates	2	=1	=1	2
good public				
transport	=14	11	=4	9
other	16	16	13	16

TABLE 5.9 Ranking of reasons given for current location

In terms of transport factors, it is clear that local road access, including turning spaces, is considered the priority. Public transport is the next most important, whilst access to the national road network is ranked eleventh in the rankings. The importance of public transport is highest in Nottingham where its importance as a

means of getting workers to and from work is recognised (see below). In the case of Basildon, it is perhaps not surprising that the importance of public transport is rated so low: any firm considering good access by public transport as essential would simply not locate in Basildon, where bus services are poor. The argument becomes somewhat self-fulfilling.

The position of the national road network in the ratings did (as has been stated above) come as something of a surprise. It does, however, echo the perceived importance of the roads in day-to-day operations outlined above.

5.6.1 Cluster analysis

Superficial examination of the rankings above and the relevant data in Appendix 5.1 suggests the possibility of a 'clustering' of variables: for example, the first three variables in terms of importance all relate to the building or site, whilst the transport-related variables are quite closely ranked. It may well be, therefore, that the decisions are based on groups of variables such as 'property', 'transport' and 'local

facilities' rather than on specific factors identified above.

The appropriate statistical procedure for the identification of such groups of variables is 'cluster analysis' - a procedure available in the Advanced Statistics module of the SPSSPC+ package used in this study.

Cluster analysis is a highly complex procedure similar, in many ways, to discriminant analysis in that its aim is to classify objects or cases into categories. Cluster analysis works by measuring the 'distance' between variables, in effect, plotted on a three-dimensional axis. Clusters are formed by points near one another.

There are many different methods of measuring this distance and different ways of forming clusters the discussion of which is not appropriate here. However, the normal manner in which cluster analysis works is such that it gives clusters in terms of the 'case' rather than the variables measured. Hence in this case, clusters would normally be given of firms with similar characteristics. It is also possible to generate clusters between variables, but this is

more complex: it has to be based upon measures of *similarity* rather than of difference (both of which are valid ways of forming clusters). The procedure for variable clustering therefore entails the creation of a correlation matrix for the variables to be clustered; this is a relatively simple function for SPSSPC+. This correlation matrix is then fed into the cluster analysis along with instructions that tell SPSSPC+ that it has to read a matrix (rather than discrete data) and that the data consists of measures of similarity rather than distance. This data is then processed to produce numbers of clusters ranging from one (all variables) to the number of variables (each cluster consisting of one variable). This is represented as a 'vertical icicle plot' showing the compositions of each cluster.

The analysis does not impose any logical relationship between the variables and thus seemingly unrelated variables may be grouped together. The appropriate classification of the groups (ie. the number of clusters that 'makes sense') is at the discretion of the researcher.

The formation of four clusters leads to the groupings represented in table 5.10:

cluster	variables
1	centralisation of operations low rents and rates local authority assistance regional incentives
2	other public transport environment access to services access to supplies access to local markets
3	general site characteristics large floorspace national road network local road provision
4	labour availability labour skills

TABLE 5.10 Clustering of location variables:
four clusters

Whilst there are no clear categories here, there are some logical relationships beginning to emerge: cluster 1 contains local authority assistance and regional incentives; cluster 2 contains 'access' variables (excluding transport); cluster 3 contains two site-related variables and two transport whist cluster 4 consists solely of labour variables. There are, unfortunately, variables in clusters 1,2 and 3 that do not sit easily together.

It is not until the nine-cluster solution is reached that logical classifications start to emerge, as illustrated in table 5.11 below:

cluster	variables
1	centralisation of operations
2	low rents and rates
3	local authority assistance regional incentives
4	other public transport
5	environment
6	access to services access to supplies access to local markets
7	general site characteristics large floorspace
8	national road network local road provision
9	labour availability labour skills

TABLE 5.11 Clustering of location variables: nine clusters

Here patterns are more distinct although some of the clusters consist of single variables. Nonetheless clusters 3, 6, 7, 8 and 9 reveal pairs (or triplets) of variables that appear to be related: local incentives, access to facilities/markets, physical site

characteristics, road provision and labour factors.

In terms of the rankings given in table 5.11 above it appears that where clusters have been formed they are indeed of variables with similar rankings. There is, however, one exception: the labour variables. The availability of skilled labour ranked thirteenth whilst general availability of labour ranked 5th. This implies that the simple ranking, giving the same weight to factors of 'minor' and 'major' importance is not appropriate in this case. Nonetheless, it shows that subjects who identify one labour factor as important are also likely to do so for the other.

It should be noted, however, that the more clusters that are identified by the analysis, the larger the 'distance' grows between the variables in each cluster. At nine clusters, therefore, the distance is likely to be relatively large and the association between variables weaker than at smaller levels of cluster.

5.6.2 Role of the subject in the location
decision

One question remains to be resolved: all subjects were asked whether or not they had been involved in the choice of the current location of their firm. The data shows that 60% of those interviewed were indeed involved in the decision-making process, whilst the other 40% were not. The latter group are far more likely to have based their answers upon their personal *perceptions* rather than their own experience. It is therefore necessary to compare the two sets of responses.

An indication of the comparability of the two groups can be gained by a direct comparison of the reasons given for the choice of location.

FACTOR	MAJOR PART n (%)	MINOR PART n (%)	NO PART n (%)
access to scarce			
skills	11 (12.8)	16 (18.6)	59 (68.6)
labour	30 (34.9)	32 (37.2)	24 (27.9)
regional			
incentives	10 (11.6)	17 (19.8)	59 (68.6)
local authority			
aid	12 (14.0)	27 (31.4)	47 (54.7)
local road			
access	22 (25.6)	40 (46.5)	24 (27.9)
access to			
national roads	7 (8.1)	29 (33.7)	50 (58.1)
access to local			
markets	34 (39.5)	29 (33.7)	23 (26.7)
centralisation	8 (9.3)	1 (1.2)	77 (89.5)
access to			
supplies	18 (20.9)	48 (55.8)	20 (23.3)
environment	5 (5.8)	19 (22.1)	62 (72.1)
large floorspace	37 (43.0)	30 (34.9)	19 (22.1)
building/site	55 (64.0)	25 (29.1)	6 (7.0)
access to			
services	10 (11.6)	58 (66.4)	18 (20.9)
rents/rates	57 (66.3)	22 (25.6)	7 (8.1)
public transport	5 (5.8)	38 (44.2)	43 (50.0)
other	5 (5.8)	1 (1.2)	80 (93.0)

TABLE 5.12 Reasons given for choice of location by subjects involved in the location decision.

FACTOR	MAJOR PART n (%)	MINOR PART n (%)	NO PART n (%)
access to			
scarce skills	8 (13.8)	10 (17.2)	40 (69.0)
labour	21 (36.2)	27 (46.6)	10 (17.2)
regional			
incentives	10 (17.2)	12 (20.7)	36 (62.1)
local authority			
aid	10 (17.2)	14 (24.2)	34 (58.6)
local road			
access	12 (20.7)	25 (43.1)	21 (36.2)
access to			
national roads	7 (12.1)	17 (29.3)	34 (58.6)
access to local			
markets	29 (50.0)	21 (36.2)	8 (13.8)
centralisation	5 (8.6)	2 (3.4)	51 (87.9)
access to			
supplies	15 (25.9)	21 (36.2)	22 (37.9)
environment	3 (5.2)	15 (25.9)	40 (69.0)
large floorspace	27 (46.6)	23 (39.7)	8 (13.8)
building/site	35 (60.3)	21 (36.2)	2 (3.4)
access to			
services	9 (15.5)	31 (53.4)	18 (31.0)
rents/rates	39 (67.2)	15 (25.9)	4 (6.9)
public transport	5 (8.6)	24 (41.4)	29 (50.0)
other	7 (12.1)	1 (1.7)	50 (86.2)

TABLE 5.13 Reasons given for choice of location by subjects not involved in the location decision.

Each variable can be subjected to a chi-squared test and the distribution across the 'unimportant', 'important' and 'very important' responses compared. The results give an indication of whether or not there is a difference between the perceptions of those who did not make the location decision and the reasons given by those who did. Table 5.14 gives

the chi-squared values for each variable with the values obtained from subjects who took part in the location decision taken as 'expected values'.

FACTOR	chi-squared
access to scarce skills	0.19
labour availability	6.53
regional incentives	3.36
local authority aid	2.66
local road access	3.66
access to national roads	2.55
access to local markets	9.21
centralisation	4.11
access to supplies	17.23
environment	0.85
large floorspace	4.08
building/site	3.80
access to services	8.74
rents/rates	0.19
public transport	1.53
other	7.55

TABLE 5.14 Chi-squared values indicating the relationship between importance attached to location factors by subjects responsible for the location decision and those not involved.

The majority of the values are well within the 5% probability level of 5.8 (for two degrees of freedom) although some exceed this. Only one result (for 'access to supplies') is statistically improbable. Nonetheless, taken as a whole the two groups are remarkably similar. The implications of this will be discussed in chapter six.

5.7 SUMMARY AND CONCLUSIONS

The main points and inferences that can be drawn from the above are as follows:

- i) 51.4% of the surveyed firms were relocated businesses whilst the remaining 48.6% were new firms;
- ii) In Basildon there was evidence of centralisation of operations from more than one site to a single site - 7 out of 27 relocated firms in the Basildon survey had reduced the number of sites in operation;
- iii) in both Telford and Nottingham there was no evidence of contraction, indeed there was a tendency towards expansion;
- iv) relocation is essentially of an intra-regional nature;
- v) the predominant determining factors in the decision to leave previous sites were the small size and bad design of sites and the

consequences of those factors for increases in turnover or output;

vi) only in the case of firms leaving London was traffic congestion a significant factor, but the factors in v) above were still considered more important;

vii) There is a strong trend for firms to experience an increase in output following relocation, with only 4.2% experiencing a decrease of any form. There are a number of explanations for this, the first of which is that it is part of a national trend in productivity increases. Nonetheless it does appear that there is a large increase over and above that which one would expect from national increases immediately upon relocation. Many of the firms in the survey were unable to match the nation-wide increases within the constraints imposed by their previous sites; these were removed upon relocation. Firms took the opportunity to make their operations more capital-intensive by the introduction of new technology. Further more efficient use of

space in itself produced increases in productivity.

As has been outlined in iii) above firms were already experiencing increased demand and output before relocation. This process continued at a higher rate post-relocation due to the removal of the constraints in meeting that demand and increases in productivity as a result of relocation.

viii) In the Basildon survey there was a tendency towards increasing transport costs upon relocation but in the survey as a whole 15.5% of the firms experienced an increase in transport costs whilst 19.7% experienced a decrease;

ix) this data must, however, be treated with caution as in a later question 66% of the subjects were unable to state the proportion of their total operating costs accounted for by transport.

x) Aggregate figures for all three areas show that 26.7% of the relocated firms experienced a decrease in labour costs

following relocation and 8.5% experienced an increase. In the case of Basildon, exactly half of the relocated firms experienced a reduction in labour costs. The reason for this are twofold: first, the productivity increases already referred to mean that fewer workers can be employed to produce the same output; or indeed that output can be increased but the percentages of total production costs accounted for by labour can fall. Second, which probably accounts for the difference between Basildon and the other areas, is the lack of a London weighting payment in Essex. Whilst wages are at a higher level in the South East than the rest of the country, there is a significant difference between those in London and those in the Home Counties.

- xi) Only in Basildon is there a net decrease in the number of employees following relocation of business. In Telford and Nottingham there are net increases.
- xii) There is, however, a tendency to make workers redundant at one site and take on replacement labour at the new location.

Only 21.6% of the relocated firms in the survey retained their entire workforce.

xiii) In terms of transport factors, the most important is the existence of *local* road access in the form of estate roads, turning places and parking space. Public transport is considered more important than access to the national road network in the Telford and Nottingham surveys, but not in Basildon.

xiv) Although the ranking of the motorway network was low in relation to individual location decisions, this conflicts with the prevailing picture of motorway borders as popular sites for development. This conflict can be reconciled by reference to the property developers: new roads open up land that already has potential (ie. purpose-built sites, low rents and rates, available labour). They are a useful publicity tool for the developers and estate agents and hence those areas are subjected to high levels of promotion. In effect, the motorway attracts the developers, but the people looking for new locations require other factors to be satisfied.

- xv) Whilst subjects frequently stated that the motorways were of little importance to their own firms' operations, there was nonetheless a very strong perception of their importance to the operations of other companies.

- xvi) Firms were more likely to operate their own vehicles in Basildon and Telford than in Nottingham.

- xvii) Inputs are transported predominantly by road from the region in which the firm is located. Products, however, are distributed amongst a wider area with many firms distributing nationwide. This appears to be in conflict with the statements regarding the lack of importance of the motorways to the day-to-day operations of the companies, but that question referred to the local motorways (M25, M54, M1) rather than to the national network as a whole. With local distribution, which still accounts for the bulk, the motorways are of relatively minor importance. On nationwide distributions, however, the role of the local motorway is

only one part of a complex journey pattern. In relation to the whole journey times, the importance of the local motorway is low - although that of the strategic network is obviously high. This suggests that there is a 'threshold' network of roads necessary for the efficient operation of companies, but that the benefits from additions to that stock are increasingly marginal.

xviii) The predominant journey to work mode in Basildon is the car. Bearing in mind the poor public transport in that District this is not surprising. In Telford the importance of public transport increases, although the car is still the dominant mode whilst in Nottingham journeys to work are primarily by bus for 76.1% of the firms surveyed. These figures only give the main mode of transport for each firm and do not, therefore, represent the true modal split of such journeys. Further, the responses are based on the subjects' perceptions of their employees' journeys to work. It is possible that they automatically assume those modes to be the same as their own.

- xix) Journeys to work are of under ten miles in length, and in half of the firms of under five miles. Once again this figure is based on management's perceptions of those journeys.
- xx) Visits by clients are relatively infrequent, but are made primarily by car in all areas.
- xxi) the location decision itself is frequently taken on the basis of ad hoc location viewings, rather than being based on scientific location studies or advice from financial institutions, although the role of those institutions is now becoming more prominent;
- xxii) the most significant factors in the choice of new location were the availability of purpose-built sites together with relatively cheap rents and rates. These factors can be broadly grouped into categories thus: local incentives, access to facilities/markets, physical site characteristics, road provision and labour factors.

CHAPTER SIX: DISCUSSION, CONCLUSION AND
RECOMMENDATIONS

- 6.1 INTRODUCTION
- 6.2 THE LOCATION DECISION
- 6.3 REDISTRIBUTION OF ECONOMIC ACTIVITY
- 6.4 ECONOMIES OF SCALE
- 6.5 TRANSPORT
- 6.6 CONCLUSIONS
- 6.7 RECOMMENDATIONS

Chapter outline

The hypotheses presented in chapter three are reintroduced and discussed in relation to the findings illustrated in chapters four and five. Broad conclusions are drawn and related to the potential areas of study outlined in chapter one. These are then used to formulate recommendations for further research.

6.1 INTRODUCTION

This thesis has explored a broad range of issues which link transport policy, business location, regional policy and employment. The hypotheses upon which the thesis is based have been set out in chapter three and the findings of the survey given in the previous chapter can now be set against those original hypotheses and conclusions drawn.

6.2 THE LOCATION DECISION

The first hypothesis stated that "the strategic road network is of no importance to the business location decision". It is clear that the influence of the road network upon business location falls into two distinct phases: first, the importance of the road network to firms making choices of location and second, its importance to the property developers and estate agents who actually sell and promote sites for business.

On the first of those counts, the direct importance to individual businesses, the hypothesis is largely upheld. The significance of the strategic road network is remarkably low in relation to other factors, particularly rents and rates and the design of sites and premises. In terms of transport infrastructure and supply its importance is generally below that of local road access and public transport.

Subjects' awareness of the role and costs of transport within their firms was low, but there remains a strong *perception* of the importance of the strategic road network to business as a whole.

This perception is related to the second sphere of influence of the road network on the location decision: that upon the people responsible for the promotion and marketing of locations. Developers are quick to appreciate and exploit the importance of perceptions in promotion of an area. One of the main reasons for the success of Telford in attracting business from Japan is the presence of a marketing professional in Tokyo with responsibility for promoting the town to Japanese industry. Whilst the developers and

agents accept the limited importance of the roads to business operations, they nonetheless see them as an important factor in the promotion of an area which already has potential in the form of the other more important location factors for which business is looking. In effect, roads open up areas of land which already have the potential for successful development. Both the literature reviewed and the attitudes demonstrated by those responsible for the promotion of the locations emphasise that a road can only be of positive promotional value if other factors have first been satisfied.

So whilst the hypothesis is supported in relation to *direct* influence upon the location decision (ie. in terms of its consideration by those making the location decision), it falls in terms of indirect influences. Whilst businesses may not see the strategic road network as an influential factor in their location, property developers will promote road-side sites. The options open to locating businesses are largely determined by the developers who, in turn, are influenced by the major road network.

In terms of the location theory reviewed in chapter two, it is clear that a Weberian analysis is too simplistic to be applied to the real-life location choice: transport variables do not play the major role envisaged by Weber. Greenhut's analysis appears to be far more applicable and recognises the complex nature of the location decision and also the importance of non-quantifiable variables which, despite not figuring to a large degree in the responses overall, are determining factors in some of the location decisions reviewed.

Nowhere is that lack of quantification better illustrated than in the way in which location options are assessed: in short, the lack of detailed analysis was remarkable. The process of choosing a site depends largely on informal surveys of areas with which the person responsible for the decision is familiar. Clearly this is not the case in many instances, but was a common procedure amongst the firms surveyed. Two factors do, however, affect the amount of research that is involved in location selection: first, the time at which the location decision was made and second, the size of firm. Hence newer firms are much more likely to take

advice from financial institutions in particular. Banks responsible for the financing of a business want to know that such major investment is based upon more than a whim of a director. The second factor, size of firm, is related to the first: larger firms require higher levels of investment in premises, but they are also more likely to have the financial resources necessary for more detailed location studies.

One factor has remained undiscussed so far: the extent to which the subjects who were responsible for the location decision were exhibiting post-rationalisation in their analysis of that decision. The reasons given for the location may well be ones which make sense after the act: for example, floorspace may not have been a major consideration at the time of location but, since that time, the benefits of large floorspace may have become known and a greater importance attached to it as a factor in the original decision. More critically for this study, it is conceivable that the road network *did* play a major part in the location decision but a realisation of its relative unimportance to the firm's operations have led to an interpretation that it had not played this role.

Here the marked similarity between the responses given by subjects who were involved in the decision and those who were not is notable. The latter group inevitably based their opinions upon the firms' current operations, yet the former group gave similar responses. This tends to suggest that a certain degree of post-rationalisation is taking place although this study can do no more than suggest it as a factor to be considered. Only by carrying out an analysis of the location decision as it is made can this phenomenon be controlled.

There is one other major reservation that is common to many social science projects which must be introduced here: the problem of the counterfactual. Essentially 'what would have happened without the road?'. The above suggests that from the point of view of the locating firm the location decision would have remained largely unchanged. However those firms are offered limited options by those promoting areas and here we can say, at the least, that the likelihood of each area being promoted without the motorway is low.

6.3 REDISTRIBUTION OF ECONOMIC ACTIVITY

The second hypothesis states that "any change in the economy of a region following its connection to the major road network is due to a redistribution of economic activity rather than new activity". Over 50% of the firms in the survey were relocated business, the remainder being new firms. That relocation itself tends to be intra- rather than inter-regional. Hence the redistribution effects are considerable: firms are relocating to the areas in the survey after the opening of the relevant roads.

The hypothesis above does not imply a causal link between the motorway opening and business location but infers that business relocation itself is the major factor in local economic change. Over half of the firms were indeed relocated (ie. a redistribution of economic activity) and this redistribution is responsible for changes in local economic conditions.

That deals only with relocated firms. Nearly half of the firms arriving after the openings are actually new businesses. This begs the question

"would these businesses have started up without the motorways being present?" No evidence emerged to suggest otherwise. If this is the case then we are, in effect, looking at a redistribution of business. Those firms would have come into existence anyway; they have been attracted to Basildon, Telford or Nottingham in preference to other possible sites.

There is, of course, a major difference between these firms and the relocated firms in that they do not leave one area for another - there is no loss of employment in the area left (although there may be disbenefits to other firms who lose trade in competition with the new firms).

The area where there is redistribution of economic activity is that of employment. The survey results show that business does have a tendency to shed local labour upon relocation (at an average of 26% of the workforce) although this does not necessarily lead to a net loss in employment. Further, relocating firms do take workers to their new sites, particularly those with skills, so aiding redistribution of skilled labour. This may in turn have effects on the

willingness of other firms to locate in the area vacated by a firm.

The strong tendency to lay workers off at an old site is a disbenefit to that area. However, even if this results in a net loss of jobs this may be seen as a benefit in terms of regional policy, the aim of which is to enhance depressed regions. Nonetheless, the majority of the relocating firms in the survey were relocating to another site within the same region suggesting that the majority of changes are at a level below that at which regional policy operates. Indeed the survey suggests that changes must be considered at the borough level, with neighbouring boroughs competing with each other for the same business and employment.

The hypothesis in its current form cannot, however, be supported: the word 'any' implies 'all' and this cannot be demonstrated. If 'any' is replaced by 'a major factor in...' then it becomes supportable.

6.4 ECONOMIES OF SCALE

The final hypothesis is connected directly to the redistribution and rationalisation of labour. It is that "firms relocating to the vicinity of major roads achieve economies of scale by a concentration of their activities". The thoughts behind this hypothesis were that, as in Saunders (chapter 2), firms are able to centralise activities from two or three sites to one large site, thus achieving economies of scale, particularly through reductions in the workforce.

There were firms in the Basildon survey who had contracted in this way, but in the survey as a whole they were the exception rather than the rule. Again, as Saunders' research would lead us to expect, those firms who made savings in labour costs did tend to increase their transport costs upon relocation.

In all cases where elements of a company's operating costs rose, others fell to a larger extent. The most important savings that firms were able to make were not so much economies of scale, but changes due to the new location itself primarily in the form of lower property costs.

The introduction of new technology is an example of a saving due to economies of scale with already increasing demand being more efficiently met by new production methods. Introduction of such productivity-enhancing technology was often a benefit of relocation in the survey. There were, therefore, as the hypothesis suggests, economies of scale achieved although property price differentials were also a major factor in reducing overall costs. The introduction of high-productivity technology introduced during relocation has meant that fewer extra workers are employed than would have been previously to meet increased demand.

6.5 TRANSPORT

Considerable doubts have been cast upon the role of transport within the national economy in the literature reviewed in chapter two. These doubts were echoed by the apparent lack of importance attached to the motorway network, the relatively low priority given to transport variables in the location decision, and the general lack of awareness of the transport elements of the day to day operations of the firm amongst people with an

otherwise excellent overview of those operations. At the time of writing the publication of a review of the available evidence concerning the economic impacts of transport investment on inner cities, commissioned by the Department of the Environment, is awaited. This research is significant on two counts: first, it is highly unusual for the Department of the Environment to examine the work of the Department of Transport in this way and, second, the findings (which have been made public at a conference presentation) echo the uncertainty represented here stating unequivocally that the link between transport and the economy is not proven.

6.6 CONCLUSIONS

There is no hard and fast answer to the question "are roads good for the economy?". It is not the intention of this thesis to provide an answer although evidence reviewed in this thesis suggests that perhaps it is not. This thesis has focussed on specific areas of economic impact, namely industrial location and employment change but the course of the research has inevitably led to consideration of the wider questions.

The potential range of specific areas of investigation was set out in chapter one. It is now possible to illustrate the areas which the thesis has investigated and thus to identify gaps in the existing knowledge in order to formulate recommendations for further research.

The section below consists of a series of tabulated lists of possible areas of research illustrating the extent of the research, followed by a summary of the relevant conclusions. The "investigated" column indicates whether or not the item was studied in this research. Recommendations for further research are included in each section.

6.6.1 Transport

FACTOR	INVESTIGATED
Transport costs (overall),	yes
terminal costs	no
fuel efficiency	no
congestion costs	no
vehicle utilisation	no
driver productivity	no
modal shift (passenger)	no
modal shift (freight)	no
importance of motorway access	yes

Investigation of the costs explicitly associated with transport was limited in scope to overall costs. The mean proportion of total operating costs thus accounted for was 19%. This figure has to be treated with some caution as there is a distinct lack of knowledge of this area amongst managers. The more transport-intensive firms tended to have more awareness of these costs leading to a higher than expected mean percentage.

The general lack of awareness of transport is of interest in itself. Whilst subjects were generally aware of the operations of the companies, transport represented the main area of ignorance.

Overall transport costs are made up of smaller elements listed above. These were not investigated specifically in this study. Previous research (particularly by Simon and Mackie in 1986) has illustrated the various ways in which the factors listed above change giving rise to the overall costs changes.

Transport costs were as likely to rise as to fall upon relocation of a firm. The direction of change depended largely upon savings or costs increases in other factors of production. Hence firms achieving savings in labour costs, for example, were likely to experience increases in transport costs.

Reduction of transport costs remains a key policy goal of the roads programme as a means of assisting regeneration. The evidence in the literature reviewed and from the surveys here suggest that this role is not as crucial as the

policy statement implies. Data in this survey pertaining to transport costs has been generally unreliable. Detailed examination of the operations and accounts of a firm is necessary to ascertain the changes in transport costs that it experiences when it relocates to the vicinity of a major road or a major road opens in its vicinity.

More detailed research is needed to identify the exact proportion of operating costs accounted for by transport and to develop the work started by Mackie and Simon. In particular there is a need to examine changes in these costs and operations that occur within firms that already exist in the location prior to the construction of the major road - a point that will be returned to below.

Such an investigation should take the form of an audit of costs which will demonstrate whether changes in transport costs (if any) are brought about by changes in vehicle productivity, driver productivity, other labour changes or other factors. Links should also then be drawn between reductions or increases in transport costs and economic indicators such as Gross Domestic

Product, unemployment levels, interest rates and so forth.

The *perceptions* of the importance of the motorway network appear to be central to the understanding of the impacts of roads upon business location and, indeed, operation. From this study it is evident that there is a high perceived importance of the operational role of the major road network to the business community which is not reflected in the experience of the subjects giving that judgement.

The difference between actual and perceived importance of the roads is reflected in the attitudes of the property professionals who see the road network as a useful selling tool whilst accepting that this is more due to image than to business need.

6.6.2 Accessibility variables

FACTOR	INVESTIGATED
market area	yes
supply area	yes
employment catchment area	yes
inter-regional dynamics	yes
intra-regional dynamics	yes
property costs	no

A broad range of accessibility oriented variables were investigated by the study. This took the form of an assessment of current supply and market areas and of the dynamics of business relocation. The results showed that supply areas are predominantly within the region in which the firm is located whilst, although still predominantly local, many products are distributed nationwide.

Similarly, the employment catchment area is local, with firms more likely to move to areas where labour is available than to expect labour to travel considerable distances to work. Indeed, labour availability emerged as a major consideration in the location decision itself.

The study revealed that relocation is primarily of an intra-regional nature. Familiarity with a location plays an important part in the initial framework (such as it is) within which relocation options are assessed. It is thus perhaps not surprising that the distances moved by firms upon relocation tend to be relatively small (although usually far enough to justify labour changes). This has distinct implications for regional policies which may be geared towards attracting business from prosperous to relatively depressed regions. It appears that such dramatic relocations occur relatively infrequently. Nonetheless, the distances moved are such that shedding of labour is a frequent occurrence prior to the employment of new workers at the new location.

The link between accessibility and property prices was not investigated here. Previous research has attempted to draw those links, albeit with slightly varying results. These costs were, however, included in the analysis of factors germane to the choice of location which is discussed below.

The assessment of accessibility variables (as with transport variables) did not take account of changes within existing firms before and after the construction. Once again an ongoing audit of the companies' activities in this respect is required in order to track changes brought about by changes in accessibility.

6.6.3 Location

FACTOR	INVESTIGATED
Role of road in attracting industry	yes
facilitation of industrial emigration	no

The location variables available for study fall into two distinct categories: those causing firms to locate in a locality and those causing firms to leave. It is, of course, conceivable that a factor which causes one firm to locate in an area is the same factor that causes another to leave.

The first of these was investigated in some detail, putting the effect of the road as an attracting influence into the context of a broad range of factors which influence the location

decision. The results here were conclusive: that the role of the major road network in the decision itself is small. As has been discussed previously, the main influencing factors are the availability of sites that are of efficient design and with low property costs. There remains, nonetheless, the strong perceived importance of the road network in terms of the economy as a whole.

This perception is utilised effectively by the property professional who are able to utilise roads as a promotional tools and whose choice of location for promotion is also determined to an extent by the creation of road links.

The factors determining location are clustered in chapter five and fall into broad categories of factor: local incentives; access to facilities and markets; physical site characteristics; road provision and labour factors. Previous studies of the location decision have not put roads into this context nor classified the factors in the manner above.

The second set of variables, the 'emigration effects' were only analysed in relation to the

reasons why firms relocating to the study areas left their previous locations. Whilst traffic congestion represented a significant reason for firms to leave London (to Basildon) this factor was of minor importance in relation to others, in particular the small size and bad design of previous premises influencing the productivity of the workforce.

There is, however, a need to study firms in the case study areas which have left during the period in which studied firms located in the areas. Whilst business may have been attracted to the areas it is conceivable that a considerable proportion of businesses left simultaneously. There proved to be practical difficulties in obtaining data on such firms which need to be circumvented. The best way of doing so is to carry out before and after studies of the localities in question, monitoring both business immigration and emigration. Alternatively extensive examination of previous trade directories for an area can lead to the identification of emigrating firms. This is a relatively time-consuming and cumbersome process which in turn entails further investigation of

the destination (or demise) of the businesses identified.

6.6.4 Operational/production variables

FACTOR	INVESTIGATED
changes following relocation	yes
changes (within existing firms) following completion of road within and outside vicinity	no

The studies examined changes in various factors following relocation. These included product type and volume, overall production or operating costs, labour costs and volumes, transport costs and storage and inventory costs.

Two major sets of conclusions can be drawn here: first, whilst product type remains unchanged, overall production costs fall upon relocation due primarily to increases in productivity brought about by rationalisation of the production process. This is explained by the importance attached to site design in the location decision - good design allows efficient arrangement of plant and machinery. Further, many firms in the studies took the opportunity of relocation to

invest in new technology, enhancing productivity gains further.

The relocation of business cannot be separated from employment change. As businesses relocate so changes occur in patterns of employment. No net gains in employment through relocation in this study can be attributed directly to the major roads; conversely nor can any net losses. Further, the predominance of intra-regional relocation casts doubt upon the efficacy of roads as an instrument of regional policy.

The second area of investigation identified above, the effects of the roads upon existing firms in the vicinity which do not relocate, and concomitant effects on firms outside the study areas, remains unclear and is a suitable subject for further research. It is vital that future projects examine in detail the changes experienced by firms which experience the benefit of a new road without relocation. This provides something of a control situation where the precise influence of a road scheme can be more easily identified. Similarly, it has been suggested that market gains made by one firm may be at the expense of others in the region.

Investigation of this phenomenon is undoubtedly complex and worthy of research.

6.6.5 Temporal aspects

In chapter one the significance of changes over time in relation to the effects of road building was raised. The study was designed such that the roads in question were at different stages of 'maturity' in order to identify differences in the various elements of the research which could be thus explained. In the event, there appeared no significant divergence between the sample areas which could be explained by the temporal differences.

A more effective means of controlling for these effects would be a study which monitored the same location through all stages of development of a road scheme: from rumour of a future road, through the planning processes, agreement of the scheme, construction and maturation of the completed scheme. Only then can we successfully identify the point (or points) at which new roads influence the local economy and the business location decision. It must be recognised,

though, that this is a long-term and potentially highly resource-consuming exercise

6.7 RECOMMENDATIONS

As has been shown, particularly in chapter two, the existing state of knowledge is very low, there being a dearth of literature and research into what is a subject of major importance.

Throughout the summaries of conclusions above one message comes through concerning the direction of research into his field: the need for effective before and after studies. These not only have to be long-term projects examining, as has been suggested, the whole road planning, construction and maturation process, but should entail detailed examination (or 'auditing') of the operations of the companies involved. The research needs to go beyond the educated perceptions of individual subjects towards an objective examination of (essentially accounting) data. Such studies are inevitably long-term and resource consuming but are needed to shed light on this important area.

Whilst the current political situation is such that expenditure on expansion of the strategic road network is likely to remain high, it is conceivable that future administrations might adopt policies such that this investment is curtailed or, hypothetically at least, that roads are actually closed. The research presented here is related specifically to additions to the road network. Future research should also address the other possibilities.

Beyond this stage research is needed into the applications of this type of research within current appraisal methods. Current reliance upon cost-benefit analysis as the major form of appraisal makes no allowance for development effects. Where development effects are included in (qualitative) appraisal they are normally assumed to be benefits to one area without considering any disbenefits to another resulting from loss of a business. Cost-benefit analysis does not take account of the distribution of benefits and disbenefits and there is currently no accepted methodology which can trace the distribution of benefits and disbenefits in relation to equity. Thus an obvious direction for research is towards a modelling of the

development effects of roads in order to feed directly into the appraisal processes.

Towards the end of this project it was suggested that the area towards which we should look for help is that of telecommunications. The modelling of the development and spatial effects of telecommunications is a new but fast growing field and some examination of this is warranted as there may be lessons to be learned.

Finally, future research relies on the first step of the identification and modelling of the phenomena that occur when a road is built. The Department of Transport is notable for its lack of research, in particular its lack of enthusiasm for monitoring the effects of its own schemes. Such monitoring, as has been stated, is crucial as the basis for an increased understanding of the effects of road building.

APPENDICES

APPENDIX 1.1 People consulted during project.

Dr. John Adams	University College London
Dr. Stephen Atkins	Southampton University
Bob Bixby	Oxford Polytechnic
Stuart Cole	Polytechnic of North London
John Elliot	Greater London Council
Dr. Margaret Grieco	Transport Studies Unit, Oxford University
Dr. Philip Goodwin	Transport Studies Unit, Oxford University
Mick Hamer	Author and journalist
Jeremy Hawksley	Movement for London
Dr. Mayer Hillman	Policy Studies Institute
Dr. Sion Howarth	London Docklands Development Corporation
Susan Hoyle	Transport 2000
Nick Lester	Greater London Council/ Association of London Authorities
Dr. Alan MacKinnon	Leicester University
Stephen Plowden	Policy Studies Institute
John Roberts	Transport and Environment Studies Ltd.
Jonathon Roberts	Transport 2000
Dr. David Simon	Leeds University Transport Studies Group
Peter Stonham	Author and journalist
Andrew Street	British Road Federation
Matthew Walker	Polytechnic of Central London

Dr. John Whitelegg University of Lancaster

APPENDIX 3.1 Interview schedule

name

add

ref:

INTERVIEWEE

Location:

ACTIVITY

1. SIC:

Agriculture, forestry and fishing.....	0
Energy and water supply industries.....	1
Extraction of mineral ores other than fuels; manufacture of metals, mineral products and chemicals.....	2
Metal goods, engineering and vehicle industries.....	3
Other manufacturing industries.....	4
Construction.....	5
Distribution, hotels and catering; repairs....	6
Transport and communication.....	7
Banking, finance, insurance, business services.....	8
Other services.....	9

LOCATION

2. Years at present location.....

3. Location decision taken by:	interviewee....	1
	other.....	2

4. advice taken about location:	none.....	1
	bank.....	2
	existing firms..	3
	estate agents...	4
	local authority.	5
	other.....	6
	don't know.....	7

5. Previous location?	yes....	1	no....	2
-----------------------	---------	---	--------	---

6. Number of sites previous to new location:

0 1 2 3 4 5 6 7 8 9(don't know)

7. Number of sites now:

0 1 2 3 4 5 6 7 8 9(don't know)

8. Location of closed sites (Enter number in each region)

Central London..	Essex.....
South East.....	East Anglia.....
South West.....	West Midlands...
East Midlands...	Yorkshire and Humberside.
North West.....	North.....
Wales.....	Scotland.....
N.Ireland.....	

TOTAL.....

9. main reasons for leaving previous location(s) (where applicable)

high rents/rates.....	1
premises too small.....	2
premises badly designed.....	3
lack of skilled labour.....	4
too far from market.....	5
too far from supplies.....	6
lack of local authority incentives...	7
traffic congestion.....	8
other.....	9
don't know.....	0

10. part played by factors in new location decision

FACTOR	MAJOR PART	MINOR PART	NO PART
ACCESS TO SCARCE			
SKILLS.....	1.....	2.....	3
LABOUR AVAILABILITY..	1.....	2.....	3
REGIONAL INCENTIVES..	1.....	2.....	3
LOCAL AUTHORITY AID..	1.....	2.....	3
LOCAL ROAD ACCESS....	1.....	2.....	3
ACCESS TO NATIONAL			
ROAD NETWORK.....	1.....	2.....	3
ACCESS TO LOCAL			
MARKETS.....	1.....	2.....	3
CENTRALISATION OF			
OPERATIONS.....	1.....	2.....	3
ACCESS TO SUPPLIES..	1.....	2.....	3
ENVIRONMENT.....	1.....	2.....	3
LARGE FLOOR SPACE....	1.....	2.....	3
BUILDING/SITE			
CHARACTERISTICS.....	1.....	2.....	3
ACCESS TO SERVICES..	1.....	2.....	3
LOW RENTS/RATES.....	1.....	2.....	3
GOOD PUBLIC			
TRANSPORT.....	1.....	2.....	3
OTHER.....	1.....	2.....	3
.....			
.....			

COSTS/BENEFITS

11. primary product the same as before?
yes..1 no..2

12. change in volume of output?

decrease substantially....1
decrease.....2
no change.....3
increase.....4
increase substantially....5

13. difference made to costs:

COST	LARGE SAVING	SMALL SAVING	NO CHANGE	SMALL INCREASE	LARGE INCREASE.
PRODUCTION..	1.....	2.....	3.....	4.....	5
RENT.....	1.....	2.....	3.....	4.....	5
RATES.....	1.....	2.....	3.....	4.....	5
LABOUR.....	1.....	2.....	3.....	4.....	5
TRANSPORT....	1.....	2.....	3.....	4.....	5
STORAGE AND INVENTORY....	1.....	2.....	3.....	4.....	5

TRANSPORT

14. How many fleet vehicles at this site?

0....1 1-5....2 6-10....3 10-20....4
>20....5

15. goods transported by:

light van...1
HGV.....2
rail.....3
rail & HGV..4
post.....5
other..... 6

16. number of vehicle movements/day inwards:

less than 5...1 5-10.....2
10-20.....3 more than 20..4
don't know....5

17. number of vehicle movements/day outwards:

less than 5...1 5-10.....2
10-20.....3 more than 20..4
don't know....5

18. most inputs transported from:

Central London.1
Essex.....2
South East.....3
East Anglia....4
South West.....5
West Midlands..6
East Midlands..7
Yorkshire and Humberside.8
North West.....9
North.....10
Wales.....11
Scotland.....12
N.Ireland.....13
Abroad.....14
Nationwide....15

19. product transported to:

Central London.1
Essex.....2
South East.....3
East Anglia....4
South West.....5
West Midlands..6
East Midlands..7
Yorkshire and Humberside.8
North West.....9
North.....10
Wales.....11
Scotland.....12
N.Ireland.....13
Abroad.....14
Nationwide....15

20. Importance of access to M/way:

very important 1
important.....2
unimportant....3

21. proportion of total operating costs
accounted for by transport costs

now..... % don't know 00

before relocation... % don't know 00

22. workers travel from:

less than 5 miles..1
5-10 miles.....2
10-20 miles.....3
more than 20 miles.4

23 Most workers travel by:

private car....1	bus.....2
train.....3	foot.....4
bicycle.....5	

24. Number of visits/week by clients:

0....1	1-5....2	6-10....3	10-20....4
>20....5			

25. Most clients travel by:

private car....1	bus.....2
train.....3	foot.....4
bicycle.....5	

EMPLOYMENT

26. number of employees.....

27. number of employees skilled.....
number of employees unskilled.....

28. number of employees at *previous site(s)*
.....

29. number of employees at *previous site(s)*
skilled....

unskilled..

30. number of employees relocated to new
site.....

APPENDIX 4.1 Primary activity of firms included
in the Basildon Survey

firm activity

- 1 . glass merchants
2. light engineering
3. claddings and metal stock fabricators
4. manufacturers of gun drills and reamers
5. manufacturers of fractional horse power
motors
6. installation and repair of compressed air
systems
7. precision engineers
8. precision engineers
9. precision engineers
10. light and precision engineers
11. precision engineers
12. manufacture of small computer products
13. general engineers
14. manufacture of scientific instruments
15. car and coach body builders
16. marine engineering
17. wholesale meat preparation
18. food processors
19. waste paper merchants and processors
20. magazine finishing and insertion
21. silk screen printers
22. meat preparation and processing
23. plastic injection moulding

24. shotgun cartridge manufacture
25. plastic products
26. industrial building
27. swimming pool manufacture
28. fork-lift truck repair
29. industrial valve reconditioning
30. distribution depot
31. business services
32. distribution of art materials
33. wholesale distribution of tropical fish
34. coach hire
35. international freight forwarders
36. shipping agents
37. post office sorting depot
38. credit brokers
39. business services
40. computer consultants
41. property developers
42. insurance brokers
43. property developers
44. television services
45. golf range
46. aerial photographs
47. funeral directors
48. food flavour manufacture

49. bakery

50. tractor manufacture and design

51. bakery.

APPENDIX 4.2 Primary activity of firms included
in the Telford study.

<u>firm</u>	<u>activity</u>
52.	manufacture of safety clothing
53.	manufacture of circuit boards
54.	service of circuit boards
55.	freight forwarding
56.	circuit board manufacture
57.	builders
58.	office furniture manufacture
59.	stationery distribution
60.	car part distribution
61.	electrical contractors
62.	switchgear manufacture
63.	food processing
64.	photocopier supplies and servicing
65.	office furniture distribution
66.	freight forwarding
67.	timber products
68.	furniture renovation
69.	precision engineering
70.	exercise equipment distribution
71.	aluminium door manufacture
72.	machine knitting
73.	freight forwarding
74.	food packaging

- 75. word processing
- 76. computer consultants
- 77. steel cabinet manufacture
- 78. metal goods manufacture
- 79. hauliers
- 80. farm machinery manufacture
- 81. chimney manufacture
- 82. signwriters
- 83. garage and showroom
- 84. plastic fabrication
- 85. thermal insulation manufacture
- 86. abrasive manufacture
- 87. vehicle component wholesale
- 88. office supplies
- 89. precision engineers
- 90. chemical processing
- 91. construction
- 92. hauliers
- 93. manufacture of industrial lubricants
- 94. computer analysts
- 95. computer consultants
- 96. office machine rental
- 97. general engineering
- 98. car part distribution.

APPENDIX 4.3 Primary activity of firms included
in the Nottingham study.

<u>firm</u>	<u>activity</u>
97.	fibreboard manufacture
98.	fabric wholesale
99.	hosiery manufacture
100.	freight operators
101.	textile manufacture
102.	packaging manufacture
103.	distribution
104.	advertising agency
105.	plastic products
106.	hydraulic equipment manufacture
107.	waste disposal
108.	sports equipment distribution
109.	carton manufacture
110.	precision optical equipment manufacture
111.	textile making-up
112.	advertising agency
113.	metal processing
114.	financial and credit services
115.	throwing and texturing of yarn
116.	precision engineering
117.	word processing
118.	building contractor
119.	mechanical handling machinery manufacture

- 120. construction equipment manufacture
- 121. storage and warehousing
- 122. precision engineering
- 123. textile machinery maintenance
- 124. precision engineering
- 125. cotton weaving
- 126. pattern manufacture
- 127. machinists
- 128. swimming pool cover manufacture
- 129. electro-depositing
- 130. textile manufacture
- 131. foundry
- 132. industrial adhesive manufacture
- 133. silk weaving
- 134. bulk transport
- 135. metal forging
- 136. paper and board packaging manufacture
- 137. computer consultants
- 138. aluminium casting
- 139. Textile machinery manufacture
- 140. precision instrument manufacture
- 141. textile manufacture
- 142. copper cable manufacture
- 143. textile finishing
- 144. machine knitting.

APPENDIX 4.4: THE STUDY AREAS

This section consists of a brief overview of the three study areas. Here the depth of information for Telford is noticeable. The Development Corporation produce a 'potted history' of the area, whereas Basildon and Nottinghamshire councils do not.

A4.1 Basildon

Basildon District (including Basildon New Town) is located in Essex approximately 30 miles to the east of London and 12 miles east of the M25. It is made up of six areas: the New Town, Billericay, Laindon, Pitsea, Wickford and Basildon. The A13 connects the area to London as do the A127/A12. Direct rail routes are to Fenchurch Street and Liverpool Street. There is direct road access to Southend via A127, to Chelmsford via A130 and Tilbury via A13.

The District centres on the New Town, and the New Towns Commission had, until very recently, its own office in the town (the Basildon Development Corporation). The transition from New Town

status was ongoing at the time of the survey, with the Corporation moving its records back to London piecemeal. Because of this move, much information was inaccessible for the simple fact that it was in transit or was not yet catalogued at the New Towns Commission.

In 1962, the Development Corporation produced its Master Plan, on which the New Town was set to develop. This included plans for population growth, land-use and communications. This plan was updated annually. Central to the original plan were rail links to London with effective bus services within the area. A proposal for a local monorail was examined but rejected.

The Corporation expressed concern about Essex County Council's plans for regional roads; increased through traffic due to new roads from the A12 being central to those worries. Alternatives were proposed by the Corporation which would take traffic westwards and on to the A13.

Within the New Town itself, plans were made to redirect traffic through the industrial areas and away from residential. Problems were encountered

however in attempts to apply Buchanan's definitions of Primary, District and Local Distributor roads and access roads. Nonetheless, the current pattern of roads reflects these attempts to segregate traffic from residential areas, with distinct industrial, residential, leisure and shopping areas (a pattern also reflected in Telford and other New Towns planned in the 1960's).

The importance of pedestrian travel was recognised: the 1962 Master Plan stated that "...indeed it is no less important than the vehicular circulation". To that end comprehensive and segregated pedestrian system was considered central to the Plan. The general aims of this system were set out as follows:

"The main footpath system is designed to serve two functions. Firstly to distribute people locally between homes, schools, shops, industry, the Town Centre and other major centres. Secondly, to give outlets to large scale recreational areas and natural countryside as well as providing long distanced recreational routes within these areas. In parts one footpath may serve both purposes.

Within the built-up areas the aim is to create a system which would be the core of local activity and would be the natural and most obvious route for the pedestrian. The pedestrian routes would not only be the shortest routes to the centres of attraction but by

their design and by the design of adjacent buildings and landscape they would present the most convenient and attractive way. The precise disposition of land uses, particularly neighbourhood shops and primary schools will be decided at the detailed planning stage in relation to the pedestrian system."

Hence the importance of the pedestrian network extended beyond the aim of pedestrian mobility and into the field of land-use planning.

Local authorities with jurisdiction over the area include Essex County Council, Basildon District Council and, until recently, Basildon Development Corporation.

The District's two major employers are the Ford Tractor Plant, which designs and builds tractors for world-wide distribution, and Access, who have expanded their main Southend office in order to cope with the consumer credit boom. Heavy job losses were sustained following the closure of the two previous main employers, the Ilford film factory and the Rothmans' cigarette factory. Both of these closures can be attributed to slumps within their own particular industries: Ilford produced monochrome camera film which has been largely superseded by colour. Ilford now

have a smaller factory in the North East. With rising awareness of the health implications of smoking, demand for tobacco products has fallen dramatically. The slump in demand led to the closure of the Rothmans' factory. Rothmans do, however, retain a presence in the District with a site on one of the industrial estates acting as a business bureau, with workshop and studio space aimed at the employees who were made redundant in the factory closure.

The largest sector of employment is in manufacturing, followed by public and financial services (as related in chapter four). Over the past five years, there has been a dramatic increase in the area of floorspace dedicated to business, in particular retail and manufacturing, as new firms locate in the District.

A4.2 Telford

Telford lies just over ten miles west of Wolverhampton and approximately twenty-five miles north-west of Birmingham, within the county of Shropshire. It was designated as a New Town in 1968, consisting of the previous major population

centres of Dawley, Wellington and Oakengates. Previous plans for Dawley to become the New Town were dismissed by the John Madin Group consultancy who were commissioned by the Development Corporation to prepare a 'master plan' in September 1963. One of the main reasons for this switch was the large amount of derelict land available for reclamation within the new area.

The consultants put forward certain principles or 'goals' on which the New Town should be based and these were taken to be the guiding principles for the future development of the town:

- "1. Freedom of Choice - to promote conditions which will allow the individual to exercise freedom of choice within the context of a recognisable social and physical order.
2. Mobility - to promote accessibility and allow choice in the use of both public and private transport without undue congestion or restraint.
3. Coherent image and structure - to unify the existing and the new into a clearly recognisable form and order, sufficiently varied in scale to encourage a sense of belonging, and to allow people, as individuals or groups to establish identity with their surroundings.

4. Realisation of improved living standards - to secure the provision of a viable social and economic infrastructure which will enable the realisation of improved living conditions for the present inhabitants and those who will be attracted to live in Telford; one that will also meet the demand for leisure and recreation and be sufficiently flexible to respond to changing demands over time.
5. Flexibility for growth - to allow for change in rates of growth, to allow internal change within the framework of the plan, and to secure a range of options for future choice in both the direction and form of further growth.
6. Maximum use of existing resources- to secure the fullest use of economic and social investment already established in the area. Also to exploit to the full, the unique potential of the site. This will entail the gradual redemption of the blemished areas and the conservation of valued features of historic and architectural interest."

In a typed briefing enclosed with the Development Corporation's information pack, the degree to which these goals have been met is discussed. In brief, this is the Corporation's view (any quotes are from this briefing):

Freedom of Choice - (primarily of housing, shopping, entertainment and schooling). This is a difficult goal to measure let alone achieve. However, new facilities, especially for shopping and leisure, are being built thus increasing

choice. The Corporation admit, however, that "...the range of employment and public sector housing available has fallen in recent years".

Mobility - As the Corporation states "...this implies the need for an elaborate network of bus lanes, alongside equally efficient car routes. The ideals of both an efficient, cheap bus service and high car ownership would contradict each other and would do little to ease congestion". The section goes on to point out that Telford has a relatively high rate of car ownership and a relatively expensive bus network. There has been a strong policy of segregation of cars and pedestrians and the Corporation admits shortcomings in some of its pedestrian provision which they are now attempting to rectify.

Coherent Image and Structure - The Corporation has experienced some difficulty with the integration of the old and new parts of the town. They suggest that "...physical unification is only possible over a long period of time, when the new estates have had time to mature".

Realisation of Improved Living Standards - No study has been carried out into this area.

Flexibility for growth - Once physical development had begun the options for future development were restricted. There are conflicts with the achievement of a coherent image as in 3 above.

Maximum use of Existing Resources - The Corporation state that "one of the problems is that the existing infrastructure is often inadequate to deal with the pressure from new development, and so new roads etc., have to be built through existing areas, by-passing roads and other facilities which already exist."

Great efforts are being made to promote the area for tourism, as nearby Ironbridge is the birthplace of the industrial revolution.

The indigenous industries of coal and iron extraction and processing flourished until the end of the nineteenth century when the iron industries faltered. This decline, however, was accompanied by rapid expansion of clay industries. Coal extraction continued until 1979, when Granville Colliery was closed. Today the emphasis is firmly upon 'high-tech'

industries with Telford's reputation being largely for its abilities to attract such firms from abroad, particularly from Japan, Germany and the USA. Major employers include Peaudouce, Truprint, Ricoh, Tatung and Maxell.

The largest employing sector was, until 1980, manufacturing, but since 1981 the service sector has retained this role (see chapter four)

A2.1 The M54

In 1967 a Planning Brief was issued by the Corporation stressing the need for a new motorway to link the New Town with the rest of the West Midlands and to the M6 and hence the national road network. Approval for the M54 motorway was given in August 1969. The road finally opened in November 1983 after three Public Inquiries, one of which resulted in its restriction to two lanes. At the time Telford's unemployment was running in the region of 20% and much hope was pinned on the M54 as an economic panacea.

The 1979 Inquiry included a submission from the vociferous 'M54 Support Group', which consisted

primarily of local business representatives. In its evidence to the Inquiry it stated:

"For industry and commerce to be competitive, good road communications, particularly with the National Motorway Network, are necessary...the Support Group believe that the lack of a road link to modern standards between Shropshire and the M6 motorway...is making it increasingly difficult for industry and commerce, not only in the greater part of Shropshire, but also in areas of mid-Wales such as Newtown and Welshpool and other parts of Powys and Clwyd, to compete successfully in national and international markets."

Further:

"This is particularly important in the present climate where the high cost of transport means that good road communications must be high on the list of priorities when an industrialist is considering the location for a new factory or enlarging an existing one and when the older indigenous industries are contracting and are having to be replaced." (1)

A petition containing 28,750 signatures was collected from employers, trade unions and community organisations. The Group's case for the road is encapsulated in the above two paragraphs and runs to only five pages, but appendices consisting of letters in support of the campaign and lists of financial contributors run to some 100 pages. Some of the firms who

were involved in the campaign were included in the survey of Telford.

The views of the Support Group were echoed by The Times at the opening of the motorway in 1983:

"The motorway had almost become a test of virility for Telford, because after many delays, caused by the environmentalist's lobby, it began to appear that the whole future of the town hung on getting the motorway built. The kind of companies which Telford was trying to attract were reluctant to bring their investment and jobs where the link with the M6 was the tortuously slow A5...There has been universal acclaim for the motorway, but one major industrialist has said that it may have come too late: If we had the motorway earlier, we would have had a lot less unemployment. We would have attracted bigger industries here at an earlier date which would have reflected to an extent the horrifying job losses we had in the late 1970's and early 1980's". (2)

The Times' comment was typical of that of other local and national papers at the time and the road itself still features very strongly in promotional literature for the Town.

The Development Corporation has constructed a number of industrial estates in the town for which they are responsible and Enterprise Zone status was applied to various parts of the town in January 1984. The benefits of this to

industrialists included an exemption from rates and Development Land Tax, 100% allowance for capital expenditure and industrial training levies. In addition, Enterprise Zones were subject to a relaxed planning regime, with no requirement for planning permission within certain limits.

A4.3 Nottingham

Nottingham is located in the heart of the Midlands on the M1 motorway. Unlike the two previous studies, its development is historically more established. It has a number of locations of historic importance associated with the Norman Conquest, the Civil War and, of course, Robin Hood. Leisure facilities extensive for both participatory and spectator sports and include the National Water Sports Centre at Holme Pierrepont, Trent Bridge test match ground, Nottingham Forest and Notts County football clubs and provision for a wide range of other minor sports.

The city boasts a number of theatres and concert venues including the Royal Centre which consists of a four-star hotel, theatre and concert hall. There are two major shopping centres in the City, and many smaller centres around the conurbation.

These factors have given rise to a dramatic increase in tourism to the area which now plays a major part in the local economy. This has been recognised by the County Council who have formulated a strategy for the promotion of tourism.

The industrial structure of the county is varied,, with agriculture predominant in the south and coal-mining in the north. This study, though, is concerned with the Nottingham travel-to-work area of around ten miles radius from the city. Here the indigenous industry is the textile industry which remains the largest sector of employment. Nottingham is famed for its lace which, although not as dominant as it used to be, has led to diversification within the textile sector.

Manufacturing industry has gained a foothold with major employers such as Boots (chemists), Plessey Telecommunications, Z F Gears, Courtaulds, John

Player and Raleigh Bicycles. The last two have had problems due on the case of Players to a recession as for Rothmans' in Basildon. Raleigh have been suffering from what a Nottingham Evening Post journalist described to me as "inept management". Both of these companies have made workers redundant. Raleigh has now been bought by an American company and is showing signs of recovery in its new range of products and its promotion.

Road communications are primarily by the M1 (which reached Nottingham in 1959) and A1. Routes to Stoke and Birmingham are planned and will give access to the M5 and M6 respectively. Nottingham is well served by the Inter-City rail network with frequent services to the neighbouring cities of Derby, Leicester and Sheffield. There is an hourly service to London St.Pancras and a freightliner terminal near to the main station.

The main development for rail in the area has been the electrification of the East Coast Main line which runs through nearby Newark and will reduce travel times to the Capital to around 80 minutes. This will be discussed in chapter 5

under the interviews with property developers, but dramatic increases in property prices and to a growth in commuting to London from the area are being attributed to this improvement.

Other transport facilities include an international airport at Castle Donnington (The East Midlands Airport) and an inland customs facility at the Sutton International Freight Terminal which allows goods for import and export to be cleared through customs in Nottinghamshire rather than at sea ports or airports. In addition, Nottingham is one of the Department of Transport's experimental 'cycle cities', with an expansive and well-utilised network of cycle routes.

A4.4. POPULATION

Basildon and Telford have population sizes of the same order of magnitude, at 157,700 and 131,865 respectively (1984 figures), whilst Nottingham's population stood at 593,768 at that time. Both Basildon and Telford experienced rapid rises in

their population as a result of its New Town Status, with rates of increase being four times that of the United Kingdom as a whole between the years 1951-1984 (3).

APPENDIX 4.5 Transcript of an interview with the Managing Director of a general engineering company in Basildon.

JV Let me start by explaining why I'm here. I need to find out why firms have come to Basildon. I've spoken at some length to the Council and the Development Corporation, and now I'm interviewing people like yourself about their firms and the factors that brought them here. I'll need to know something about your operations and the people you employ...of course everything that you say will be treated in complete confidence.

Could you give me an overview of your operations here?

S Well, we set up here in 1980. I'd worked for another engineering firm in the area for ten years and decided that it was time to make the break. We're a very general engineering company. We make all sorts of things from car parts to dishwasher components. When we started up we had twenty people working for us, now we have forty. In the early I spent a fair amount of my time actually on the shop floor, but now I'm able to spend all of my time on the business side. I trained at Aston by the way, that's why I was interested in your letter.

Anyway, at the time the market was expanding so my partner and I (he was working for the same firm) decided to go it alone. We both worked in Basildon previously. I live in Southend, he lives in London, so Basildon was a sort of half-way point for the two of us. We outgrew our first building four years after we started, so we moved down the road to this place which is twice the size. The move allowed us to bring in new machinery and to increase productivity substantially.

As you can see, we're now building onto this site to allow for more expansion...although most of that is loading space for the lorries and for storage, but that frees space in other places for us to use as we

please. Sorry, I'm wittering on! Is that enough background?

JV Yes thanks, that's fine. You were responsible for the decision to move here then?

S Yes, very much so...with my partner of course.

JV What sort of advice did you take to help you with the decision?

S Well, none really! As I've said, we chose Basildon originally because we were familiar with the place...and its workforce. Of course we had to be sure we had the building we wanted and that it wasn't too expensive.

JV Did you investigate other locations?

S No. Well, yes and no! We looked at other sites in the District, but there was never any doubt that we wanted to be here...Basildon that is.

JV What role did your bank play in the decision. Were they looking for costings of alternatives?

S It was really very easy to raise the money. The bank just made sure that we knew what we were doing and cast their eyes over the figures for the first place. Of course it's a lot more difficult nowadays...they really have quite a big say, but then it was much easier...and I think we've shown them that we were right!

JV You said you 'looked at' other sites in Basildon. What did you mean by that?

S Well we didn't look very hard I admit. We basically toured the area and followed up on sites we liked the look of. We certainly didn't go very deep into the financial implications...that costs money in itself. No, we found a site which suited our purposes very well...the only mistake was to underestimate our growth.

JV So was the rapid expansion the only reason for your move?

- S Yes, we had no alternative. The orders were rolling in, we were taking on more staff. Then we learned that this site was free. This building is very flexible...we were able to rearrange it to suit our production. That was the deciding factor.
- JV Can you tell me more about the reasons for choosing this site? Perhaps you could start with the factors you considered very important?
- S Well the single most important factor was that we could keep the same labour force and keep the same market and suppliers. Then, as I've said, these premises suited us.
- JV Do you mean just the building, or the size of the whole site?
- S Both. The site gives us room to expand.
- JV What were the factors that weren't crucial to your decision but nonetheless played a role in bringing you here?
- S Well, rents and rates obviously. We wouldn't have come here if they were astronomical.
- JV You haven't mentioned transport at all. Did the M25 play any part in bringing you here?
- S At the time it wasn't complete... and many of us doubted that it ever would be. It's an added bonus, sure, but in terms of what we do here it's of negligible importance. The only time I use it is when I drive to meetings in other parts of the country...then it may save me an hour or so, but that's it really. We do transport stuff by road but there's no real difficulty. We have about four HGV's a week going out to anywhere in Britain.
- JV What about goods coming in?
- S One of the big savings we made when we moved was to switch to a just-in-time system of stock control. You know what that is?
- JV Yes.

- S That saved us a lot of storage space and administration. I suppose just-in-time has made us more reliant on the M25.
- JV So how many lorry-loads come in each week?
- S It varies. Usually one or two...plus a Transit van every now and then delivering stationery and stuff like that.
- JV Where are most of inputs transported from?
- S Mostly from the Midlands.
- JV How do your employees travel to work?
- S Almost exclusively by car. Public transport here is a joke and the lads tend to share cars.
- JV Is that formally arranged?
- S No, it just seems to happen...most of them live fairly near to each other...
- JV Where?
- S In Basildon.
- JV Do clients visits you here?
- S I tend to visit them. One may come here every month or so, but no more than that.
- JV And those that do come, come by car?
- S Yes.
- JV You mentioned the fall in storage costs when you moved...were there any other changes in costs?
- S Well our rents and rates went up considerably because of the size of this place, but we were able to cope with that by increasing the amount of stuff we sold...it paid for itself.
- JV What about transport and labour costs?
- S Labour costs didn't change...we took all our workers with us. Although we've changed to just-in-time I don't think our transport costs have changed. Of course we now employ

more people and move more stuff, so both of those costs have risen, but that wasn't a direct result of the move.

JV So what proportion of your total operating costs are formed by transport?

S To be quite honest I'm not sure. Probably around 2-3%.

JV Do you own your own vehicles?

S No, they're externally contracted...it's cheaper.

JV But you're not sure how much it costs?

S Well no, but I do know it's not worth our buying and running our own lorries for the amount of freighting we do.

JV Do you have any fleet vehicles?

S No...apart from two company cars.

JV Can we talk briefly about your workforce? You said you have forty employees...are they all full-time?

S Yes.

JV And how many are skilled?

S I consider all of them 'skilled'...but in the sense you mean, around half.

JV And you had twenty employees when you moved?

S No, we'd expanded to...let me see...I think it was twenty-eight by then. It was getting pretty cramped!

JV Was the skilled/unskilled split the same then as now?

S Yes.

JV OK, I have all the information I require. Are there any questions you'd like to ask?

S No. That was painless!

JV Thank you very much for giving me your time.

S Not at all...good luck with the project.

APPENDIX 5.1: RESULTS

A5.1	INTRODUCTION.
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A5.3	LENGTH OF TIME SINCE LOCATION OR RELOCATION.
A5.4	RELOCATED AND NEW FIRMS
A5.5	NUMBER OF SITES PREVIOUS TO LOCATION
A5.6	LOCATION OF PREVIOUS SITES
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A5.8	CHANGES IN MAIN TYPE OF PRODUCT/OUTPUT
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A5.22	CLIENT VISITS
A5.21	ADVICE TAKEN ABOUT LOCATION
A5.22	REASONS FOR CHOOSING NEW LOCATION
A5.23	ROLE OF SUBJECT IN LOCATION DECISION1

A5.1 INTRODUCTION.

This chapter presents the results of the interviews. For ease of comparison these will be presented in order in which they appear in the main body of the text.

A5.2 SAMPLE COMPOSITION

A5.2.1 Basildon

From 250 letters requesting interviews, 222 replies (88.8%) were received. Of these, 51 (20.4% of the sample) were positive. The sample was as follows:

SIC Division	n (%)
0	0 (0.0%)
1	0 (0.0%)
2	8 (3.2%)
3	89 (35.6%)
4	45 (18.0%)
5	19 (7.6%)
6	34 (13.6%)
7	14 (5.6%)
8	17 (6.8%)
9	24 (9.6%)
All Divisions	250

TABLE A5.1 SIC Divisions of firms in sample:
Basildon

The firms responding positively to the interview request were made up as follows:

SIC Division	n (%)
0	0 (0.0%)
1	0 (0.0%)
2	2 (3.9%)
3	17 (33.3%)
4	10 (19.6%)
5	2 (3.9%)
6	6 (11.8%)
7	4 (7.8%)
8	6 (11.8%)
9	4 (7.8%)
All Divisions	51

TABLE A5.2 SIC Divisions of firms in sub-sample:
Basildon

A5.2.2 Telford

A total of 200 letters were sent to firms on Telford. From this appeal 187 replies were received (93.5%) of which 47 (23.5% of total) were positive. The sample was as follows:

SIC Division	n (%)
0	0 (0.0%)
1	0 (0.0%)
2	10 (5.0%)
3	64 (32.0%)
4	21 (10.5%)
5	10 (5.0%)
6	48 (24.0%)
7	17 (8.5%)
8	23 (11.5%)
9	7 (3.5%)
All Divisions	200

TABLE A5.3 SIC Divisions of firms in sample:
Telford

The firms responding positively to the interview
request were made up as follows:

SIC Division	n (%)
0	0 (0.0%)
1	0 (0.0%)
2	2 (4.3%)
3	15 (31.9%)
4	6 (12.8%)
5	2 (4.3%)
6	11 (23.4%)
7	5 (10.6%)
8	6 (12.8%)
9	0 (0.0%)
All Divisions	47

TABLE A5.4 SIC Divisions of firms in sub-sample:
Telford

A5.2.3 Nottingham

200 letters were sent to firms in Nottingham. In all 176 replies were received (88.0%) of which 46 (23.0% of the whole sample) were positive. The sample was as follows:

SIC Division	n (%)
0	0 (0.0%)
1	0 (0.0%)
2	1 (0.5%)
3	61 (30.5%)
4	87 (43.5%)
5	6 (3.0%)
6	5 (2.5%)
7	20 (10.0%)
8	16 (8.0%)
9	4 (2.0%)
All Divisions	200

TABLE A5.5 SIC Divisions of firms in sample:
Nottingham

The firms responding positively to the interview request were made up as follows:

SIC Division	n (%)
0	0 (0.0%)
1	0 (0.0%)
2	1 (2.2%)
3	16 (34.8%)
4	18 (39.1%)
5	1 (2.2%)
6	1 (2.2%)
7	4 (8.7%)
8	4 (8.7%)
9	1 (2.2%)
All Divisions	46

TABLE A5.6 SIC Divisions of firms in sub-sample:
Nottingham

A5.2.4 All areas

650 letters were sent to firms in all three areas. In all 585 replies were received (90.0%) of which 144 (22.2%) were positive. The sample was as follows:

SIC Division	n (%)
0	0 (0.0%)
1	0 (0.0%)
2	19 (2.9%)
3	214 (32.9%)
4	153 (23.5%)
5	35 (5.4%)
6	87 (13.4%)
7	51 (7.8%)
8	56 (8.6%)
9	35 (5.4%)
All Divisions	650

TABLE A5.7 SIC Divisions of firms in sample:
all areas

The firms responding favourably to the interview request were made up as follows:

SIC Division	n (%)
0	0 (0.0%)
1	0 (0.0%)
2	5 (3.5%)
3	48 (33.3%)
4	34 (23.6%)
5	5 (3.5%)
6	18 (12.5%)
7	13 (9.0%)
8	16 (11.1%)
9	5 (3.5%)
All Divisions	144

TABLE A5.8 SIC Divisions of firms in sub-sample:
all areas

A5.3 LENGTH OF TIME SINCE LOCATION OR RELOCATION.

Subjects were asked about the length of time since the firm located at the current site. The results are presented below.

A5.3.1 Basildon

Years at location	frequency	%
0	1	2.0
1	2	3.9
2	8	15.7
3	4	7.8
4	4	7.8
5	4	7.8
6	5	9.8
7	3	5.9
8	6	11.8
9	1	2.0
10	4	7.8
11	2	3.9
12	3	5.9
13	1	2.0
17	1	2.0
37	1	2.0
99	1	2.0
Total	51	100.0

TABLE A5.9 Length of location at current site:

Basildon

Mean=8.6 years

The last firm in the above table is a firm of undertakers established in 1888.

A5.3.2 Telford

The lengths of location for firms in the Telford study are as follows:

Years at location	frequency	%
1	10	21.3
2	17	36.2
3	4	8.5
4	6	12.8
5	4	8.5
7	1	2.1
8	1	2.1
9	1	2.1
10	1	2.1
13	1	2.1
15	1	2.1
37	1	2.1
99	1	2.1
Total	47	100.0

TABLE A5.10 Length of location at current site:
Telford

Mean=3.4 years

A5.3.3 Nottingham

The results for Nottingham are as follows:

Years at location	frequency	%
1	8	17.4
2	7	15.2
3	7	15.2
4	9	19.6
5	6	13.0
11	1	2.2
Total	47	100.0

TABLE A5.11 Length of location at current site:
Nottingham

Mean=3.2 years

A5.3.4 All areas

The lengths of time for which firms in all three study areas had been at their locations, is represented in the table below:

Years at location	frequency	%
0	1	0.7
1	20	13.9
2	32	22.2
3	15	10.4
4	19	13.2
5	14	9.7
6	13	9.0
7	4	2.8
8	7	4.9
9	2	1.4
10	5	3.5
11	3	2.1
12	3	2.1
13	2	1.4
15	1	0.7
17	1	0.7
37	1	0.7
99	1	0.7
Total	144	100.0

TABLE A5.12 Length of location at current site:
all areas

Mean=5.3 years

A5.4 RELOCATED AND NEW FIRMS

In order to determine whether the firm was a new business or a relocated business when it arrived at the site, subjects were asked whether the company had a previous location.

A5.4.1 Basildon

response	frequency	%
relocated	27	52.9
new firm	24	47.1
Total	51	100.0

TABLE A5.13 Frequencies of new and relocated firms: Basildon

A5.4.2 Telford

response	frequency	%
relocated	26	55.3
new firm	21	44.7
Total	47	100.0

TABLE A5.14 Frequencies of new and relocated firms: Telford

A5.4.3 Nottingham

response	frequency	%
relocated	21	45.7
new firm	25	54.3
Total	46	100.0

TABLE A5.15 Frequencies of new and relocated firms: Nottingham

A5.4.4 All areas

response	frequency	%
relocated	74	51.4
new firm	70	48.6
Total	144	100.0

TABLE A5.16 Frequencies of new and relocated firms: all areas

A5.5 NUMBER OF SITES PREVIOUS TO LOCATION

Subjects were asked how many sites the company had previous to this location and the number of sites they now occupy.

A5.5.1 Basildon

Sites previously	frequency	%
0	24	47.1
1	20	39.2
2	5	9.8
3	2	3.9
Total	51	100.0

Sites now		
1	48	94.1
2	3	5.9
Total	51	100.0

TABLE A5.17 Previous and current no. of locations per firm: Basildon

With this data it is possible to use the 'crosstabs' function in SPSSPC+ to determine that of the five firms who previously occupied two sites, only one now does so. The other four have centralised to one site. One company has expanded from one site to two whilst the two firms previously occupying three sites have reduced to one and two respectively.

A5.5.2 Telford

Sites previously	frequency	%
0	21	44.7
1	23	48.9
2	3	6.4
Total	47	100.0

Sites now

1	42	89.3
2	3	6.4
3	2	4.3
Total	47	100.0

TABLE A5.18 Previous and current no. of locations per firm: Telford

The changes in site numbers in Telford were due to the expansion of two firms from one to two sites and of two firms from two to three.

A5.5.3 Nottingham

Sites previously	frequency	%
0	25	54.3
1	20	43.5
2	1	2.2
Total	46	100.0

Sites now

1	44	95.7
2	2	4.3
Total	46	100.0

TABLE A5.19 Previous and current no. of locations per firm: Nottingham

In the Nottingham sample one firms had expanded from one site to two.

A5.5.4 All areas

Sites previously	frequency	%
0	70	48.6
1	63	43.8
2	9	6.3
3	2	1.4
Total	144	100.0

Sites now

1	134	93.1
2	8	5.6
3	2	1.4
Total	144	100.0

TABLE A5.20 Previous and current no. of locations per firm: all areas

In all, four firms had expanded from one to two sites and two from two to three sites. Four firms had reduced from two sites to one whilst

one had gone from three to two and one firm from three to one.

A5.6 LOCATION OF PREVIOUS SITES

Subjects working for relocated firms were asked the location of the site or sites that the company occupied previous to moving.

A5.6.1 Basildon

Region	No. of sites closed
Central London	11
South East	1
North West	1
Northern Ireland	1
East	15
East Anglia	4
West Midlands	1
Total	34

Table A5.21 Locations of sites closed by relocating firms: Basildon

The above includes a total of six firms who had actually reduced the number of sites that they used, whilst the remaining 28 were re-opened in a different location.

A5.6.2 Telford

Region	No. of sites closed
East Midlands	2
West Midlands	26 (inc. 2X2)
Total	28

Table A5.22 Locations of sites closed by relocating firms: Telford

A5.6.3 Nottingham

Region	No. of sites closed
East Midlands	18 (inc. 1X2)
West Midlands	2
East Anglia	1
Total	21

Table A5.23 Locations of sites closed by relocating firms: Basildon

A5.6.4 All areas

Region	No. of sites closed
Central London	11
South East	1
North West	1
Northern Ireland	1
East	15
East Anglia	5
West Midlands	29
East Midlands	20
Total	83

Table A5.24 Locations of sites closed by relocating firms: Basildon

A5.7 REASONS FOR LEAVING PREVIOUS LOCATIONS

The following results represent the number of mentions of each factor contributing to the decision to leave any previous location. The percentage figures refer to the percentage of relocated firms to whom each factor was considered significant.

A5.7.1 Basildon

(n=27)

factor	frequency	%
High rents	10	37.0
Site too small	17	63.0
Bad site design	14	51.9
Too far from markets	5	18.5
Too far from supplies	4	14.8
Traffic congestion	6	22.2
Other	3	11.1
Don't know	1	3.7

TABLE A5.25 Reasons given for leaving previous location(s): Basildon

The 'other' responses were related to other factors already mentioned: one firm left London because of a poor financial situation and the

need to reduce rents and the workforce, the other two were successful businesses which nonetheless wanted to reduce their labour force.

A5.7.2 Telford

(n=26)

factor	frequency	%
High rents	3	11.5
Site too small	25	96.2
Bad site design	15	57.7
Lack of labour	1	3.8
Too far from markets	7	26.9
Too far from supplies	5	19.2
Don't know	1	3.8

TABLE A5.26 Reasons given for leaving previous location(s): Telford

A5.7.3 Nottingham

(n=21)

factor	frequency	%
High rents	4	19.0
Site too small	17	81.0
Bad site design	5	23.8
Too far from markets	2	9.5
Traffic congestion	1	4.8
Other	2	9.5
Don't know	2	9.5

TABLE A5.27 Reasons given for leaving previous location(s): Nottingham

The 'other' responses were from firms who needed to shed labour and did so in the process of relocation.

A5.7.4 All areas

(n=74)

factor	frequency	%
High rents	17	23.0
Site too small	59	79.7
Bad site design	34	45.9
Lack of labour	1	1.4
Too far from markets	14	18.9
Too far from supplies	9	12.2
Traffic congestion	7	9.5
Other	5	6.8
Don't know	4	5.4

TABLE A5.28 Reasons given for leaving previous location(s): all areas

A5.8 CHANGES IN MAIN TYPE OF PRODUCT/OUTPUT

This section and sections A5.9 and A5.10 refer only to firms who have relocated. This section asks whether the firms primary output had changed since relocation. Answers were a simple 'yes' or 'no'. None of the firms in any areas had changed the type of product or service, any

changed post-relocation were in the volume of that product or service as in A5.9 below.

A5.9 CHANGES IN PRODUCT VOLUME OR OUTPUT

Subjects rated any changes in the output of their company on a five-point scale from 'large decrease' to 'large increase'.

A5.9.1 Basildon

response	frequency	%
large decrease	1	3.7
decrease	1	3.7
no change	9	33.3
increase	13	48.1
large increase	3	11.1
Total	27	100.0

TABLE A5.29 Changes in output volume after relocation: Basildon

A5.9.2 Telford

response	frequency	%
large decrease	0	0.0
decrease	1	3.8
no change	4	15.4
increase	18	69.2
large increase	3	11.5
Total	26	100.0

TABLE A5.30 Changes in output volume after relocation: Telford

A5.9.3 Nottingham

response	frequency	%
large decrease	0	0.0
decrease	0	0.0
no change	6	28.6
increase	15	71.4
large increase	0	0.0
Total	21	100.0

TABLE A5.31 Changes in output volume after relocation: Nottingham

A5.9.4 All areas

response	frequency	%
large decrease	1	1.4
decrease	2	2.8
no change	19	25.7
increase	46	62.2
large increase	6	8.1
Total	74	100.0

TABLE A5.32 Changes in output volume after relocation: all areas

A5.10 CHANGES IN COSTS AFTER RELOCATION

Costs were divided into six categories as below, with the first (production) being the total 'running costs' of the firm.

A5.10.1 Basildon

This sample included three interviewees who did not know what changes had occurred, so n=24.

COST	LARGE SAVING n (%)	SMALL SAVING n (%)	NO CHANGE n (%)	SMALL INCREASE n (%)	LARGE INCREASE. n (%)
production	4(16.7)	10(41.7)	10(41.7)	0(0.0)	0(0.0)
rent	9(37.5)	6(25.0)	7(29.2)	2(8.3)	0(0.0)
rates	12(50.0)	5(20.8)	7(29.2)	0(0.0)	0(0.0)
labour	4(16.7)	8(33.3)	10(41.7)	2(8.3)	0(0.0)
transport	1(4.2)	5(20.8)	11(45.8)	5(20.8)	2(8.3)
storage and inventory	2(8.3)	5(20.8)	17(70.8)	0(0.0)	0(0.0)

TABLE A5.33 Changes in costs following
relocation: Basildon

A5.10.2 Telford

COST	LARGE SAVING n (%)	SMALL SAVING n (%)	NO CHANGE n (%)	SMALL INCREASE n (%)	LARGE INCREASE. n (%)
production	0(0.0)	9(34.6)	15(57.7)	2(7.7)	0(0.0)
rent	3(11.5)	10(38.5)	7(26.9)	5(19.2)	1(3.8)
rates	9(34.6)	10(38.5)	5(19.2)	2(7.7)	0(0.0)
labour	0(0.0)	4(15.4)	21(80.8)	1(3.8)	0(0.0)
transport	0(0.0)	5(19.2)	17(68.0)	4(15.4)	0(0.0)
storage and inventory	3(11.5)	10(38.5)	13(50.0)	0(0.0)	0(0.0)

TABLE A5.34 Changes in costs following
relocation: Telford

A5.10.3 Nottingham

COST	LARGE SAVING n (%)	SMALL SAVING n (%)	NO CHANGE n (%)	SMALL INCREASE n (%)	LARGE INCREASE. n (%)
production	0(0.0)	6(28.6)	14(66.7)	1(4.8)	0(0.0)
rent	2(9.5)	3(14.3)	13(61.9)	3(14.3)	0(0.0)
rates	2(9.5)	4(19.0)	13(61.9)	2(9.5)	0(0.0)
labour	0(0.0)	3(14.3)	16(76.2)	2(9.5)	0(0.0)
transport	0(0.0)	3(14.3)	18(85.7)	0(0.0)	0(0.0)
storage and inventory	0(0.0)	1(4.8)	20(95.2)	0(0.0)	0(0.0)

TABLE A5.35 Changes in costs following
relocation: Nottingham

A5.10.4 All areas

Taking account of the three subjects unable to respond to this section, the sub-sample is reduced to n=71.

COST	LARGE SAVING n (%)	SMALL SAVING n (%)	NO CHANGE n (%)	SMALL INCREASE n (%)	LARGE INCREASE. n (%)
production	4(5.6)	25(35.2)	39(54.9)	3(4.2)	0(0.0)
rent	14(19.7)	19(26.8)	27(38.0)	10(14.1)	1(1.4)
rates	23(32.4)	19(26.8)	25(35.2)	6(8.5)	0(0.0)
labour	4(5.6)	15(21.1)	47(66.2)	6(8.5)	0(0.0)
transport	1(1.4)	13(18.3)	46(64.8)	9(12.7)	2(2.8)
storage and inventory	5(7.0)	16(22.5)	50(70.4)	0(0.0)	0(0.0)

TABLE A5.36 Changes in costs following relocation: all areas

A5.11 CURRENT EMPLOYMENT

In the last stage of the interviews subjects were asked about the number of employees at each site. The results are presented in a slightly different format to the above with the employment profile being given for each firm rather than as aggregate figures for each location. Figures are

given for unskilled and skilled workers. For the larger firms some of the figures are estimates, but these can be considered as reliable. The data represents the current employment of each firm; section A5.21 will present pre-move figures for relocated firms and A5.22 will illustrate any changes that have occurred since relocation.

Figures in brackets represent the number in each category as a percentage of the firm's total workforce. N/A is entered on occasions where the answer was unknown. This missing data, particularly in the case of firm 50 (a very large employer) leads to some differences

A5.11.1 Basildon

firm	unskilled	skilled	total
1	15 (60.0)	10 (40.0)	25
2	40 (80.0)	10 (20.0)	50
3	30 (50.0)	30 (50.0)	60
4	4 (8.7)	42 (91.3)	46
5	16 (50.0)	16 (15.0)	32
6	0 (0.0)	24 (100.0)	24
7	26 (56.5)	20 (43.5)	46
8	10 (20.0)	40 (80.0)	50
9	20 (52.6)	18 (47.4)	38
10	7 (33.3)	14 (66.7)	21
11	14 (41.2)	20 (58.8)	34
12	18 (64.3)	10 (35.7)	28
13	19 (54.3)	16 (45.7)	35
14	20 (57.1)	15 (42.9)	35
15	7 (18.9)	30 (81.1)	37
16	2 (4.3)	44 (95.7)	46
17	28 (82.4)	6 (17.7)	34
18	16 (80.0)	4 (20.0)	20
19	10 (71.4)	4 (28.6)	14
20	11 (73.3)	4 (26.6)	15
21	10 (83.3)	2 (16.7)	12
22	0 (0.0)	10 (100.0)	10
23	14 (58.3)	10 (41.7)	24
24	16 (51.6)	15 (48.4)	31
25	31 (75.6)	10 (24.4)	41
26	0 (0.0)	8 (100.0)	8
27	15 (65.2)	8 (34.8)	23
28	78 (56.5)	60 (43.5)	138
29	50 (83.3)	10 (16.7)	60
30	50 (62.5)	30 (37.5)	80
31	29 (93.5)	2 (6.5)	31
32	22 (57.9)	16 (42.1)	38
33	1 (9.9)	10 (90.1)	11
34	0 (0.0)	26 (100.0)	26
35	0 (0.0)	30 (100.0)	30
36	0 (0.0)	46 (100.0)	46
37	200 (50.0)	200 (50.0)	400
38	800 (80.0)	200 (20.0)	1000
39	20 (8.3)	220 (91.7)	240
40	0 (0.0)	17 (100.0)	17
41	50 (19.8)	203 (80.2)	253
42	N/A	N/A	400
43	40 (66.7)	20 (33.3)	60
44	26 (72.2)	10 (27.8)	36
45	16 (88.9)	2 (11.1)	18
46	10 (0.0)	0 (0.0)	10
47	0 (0.0)	14 (100.0)	14

48	80 (80.0)	20 (20.0)	100
49	15 (75.0)	5 (25.0)	20
50	N/A	N/A	3000
51	10 (41.7)	14 (58.3)	24
employee	mean no. (%)	std. dev.	
total	135.0 (100/00	433.7	
unskilled	38.7 (54.2)	114.3	
skilled	32.6 (45.8)	53.2	

TABLE A5.37 Current employment in Basildon sample firms

A5.11.2 Telford

firm	unskilled	skilled	total
52	0 (0.0)	18 (100.0)	18
53	4 (25.0)	12 (75.0)	16
54	4 (50.0)	4 (50.0)	8
55	0 (0.0)	15 (100.0)	15
56	16 (80.0)	4 (20.0)	20
57	15 (48.4)	16 (51.6)	31
58	4 (50.0)	4 (50.0)	8
59	6 (60.0)	4 (40.0)	10
60	0 (000)	10 (100.0)	10
61	20 (50.0)	20 (50.0)	40
62	0 (0.0)	8 (100.0)	8
63	1 (11.1)	8 (88.9)	9
64	7 (77.8)	2 (22.2)	9
65	0 (0.0)	6 (100.0)	6
66	2 (28.6)	5 (71.4)	7
67	21 (67.7)	10 (32.3)	31
68	10 (50.0)	10 (50.0)	20
69	1 (14.3)	6 (85.7)	7
70	4 (28.6)	10 (71.4)	14
71	1 (9.1)	10 (90.9)	11
72	10 (90.1)	1 (9.1)	11
73	4 (22.2)	14 (77.8)	18
74	46 (53.5)	40 (46.5)	86
75	8 (80.0)	2 (20.0)	10
76	4 (50.0)	4 (50.0)	8
77	6 (50.0)	6 (50.0)	12
78	10 (50.0)	10 (50.0)	20
79	32 (84.2)	6 (15.8)	38
80	0 (0.0)	7 (100.0)	7
81	2 (76.9)	24 (23.1)	26
82	16 (61.5)	10 (38.5)	26
83	26 (72.2)	8 (27.8)	34
84	0 (0.0)	7 (100.0)	7
85	0 (0.0)	8 (100.0)	8
86	9 (47.4)	10 (52.6)	19
87	8 (66.7)	4 (33.3)	12
88	1 (12.5)	7 (87.5)	8
89	0 (0.0)	3 (100.0)	3
90	7 (87.5)	1 (12.5)	8
91	10 (50.0)	10 (50.0)	20
92	1 (3.7)	26 (96.3)	27
93	7 (77.8)	2 (22.2)	9
94	0 (0.0)	6 (100.0)	6
95	2 (16.7)	10 (83.3)	12
96	7 (53.8)	6 (46.2)	13
97	4 (44.4)	5 (55.6)	9
98	3 (27.3)	8 (72.7)	11

employee	mean no. (%)	std. dev.
total	16.3 (100.0)	100.6
unskilled	7.2 (44.2)	9.2
skilled	9.1 (55.8)	7.1

TABLE A5.38 Current employment in Telford sample firms

A5.11.3 Nottingham

firm	unskilled	skilled	total
99	35 (46.7)	30 (53.3)	65
100	50 (55.6)	40 (44.4)	90
101	10 (33.3)	20 (66.7)	30
102	0 (0.0)	12 (100.0)	12
103	40 (80.0)	10 (20.0)	50
104	70 (70.0)	30 (30.0)	100
105	5 (20.0)	20 (80.0)	25
106	0 (0.0)	7 (100.0)	7
107	15 (75.0)	5 (25.0)	20
108	12 (75.0)	4 (25.0)	16
109	580 (87.9)	80 (12.1)	660
110	0 (0.0)	30 (100.0)	30
111	26 (72.2)	10 (17.8)	36
112	15 (65.2)	8 (34.8)	23
113	0 (0.0)	12 (100.0)	12
114	0 (0.0)	9 (100.0)	9
115	140 (77.8)	40 (22.2)	180
116	60 (40.0)	90 (60.0)	150
117	0 (0.0)	3 (100.0)	3
118	2 (16.7)	10 (18.3)	12
119	60 (75.0)	20 (25.0)	80
120	50 (55.6)	40 (44.4)	90
121	70 (46.7)	80 (53.3)	150
122	35 (77.8)	10 (12.2)	45
123	15 (42.9)	20 (57.1)	35
124	6 (28.6)	15 (71.4)	21
125	8 (66.7)	4 (33.3)	12
126	0 (0.0)	5 (100.0)	5
127	4 (66.7)	8 (33.3)	12
128	20 (83.3)	4 (16.7)	24
129	9 (56.3)	7 (43.7)	16
130	14 (70.0)	6 (30.0)	20
131	10 (55.6)	8 (44.4)	18
132	0 (0.0)	4 (100.0)	4
133	9 (47.4)	10 (52.6)	19
134	9 (64.3)	5 (35.7)	14
135	0 (0.0)	3 (100.0)	3
136	0 (0.0)	15 (100.0)	15
137	3 (30.0)	7 (70.0)	10
138	12 (70.6)	5 (29.4)	17
139	0 (0.0)	12 (100.0)	12
140	15 (60.0)	10 (40.0)	25
141	11 (68.8)	5 (31.2)	16
142	17 (56.7)	13 (43.3)	30
143	10 (41.7)	14 (58.3)	24
144	20 (66.7)	10 (33.3)	30

employee	mean no. (%)	std. dev.
total	49.5 (100.0)	49.5
unskilled	31.9 (64.4)	85.9
skilled	17.6 (55.6)	20.0

TABLE A5.39 Current employment in Nottingham sample firms

A5.11.4 All areas

employee	mean no. (%)	std. dev.
total	69.0 (100.0)	269.1
unskilled	26.1 (56.7)	84.3
skilled	19.9 (43.3)	34.9

TABLE A5.40 Summary of current employment in sample areas

A5.12 EMPLOYMENT PREVIOUS TO RELOCATION

Subjects working for relocated businesses were asked to give equivalent employment figures for their firm directly prior to moving. The results are presented for each firms in each location and aggregated data is given for all areas.

A5.12.1 Basildon

firm	unskilled	skilled	total
2	25 (71.4)	10 (28.6)	35
3	30 (66.7)	15 (33.3)	45
4	0 (0.0)	40 (100.0)	40
6	0 (0.0)	16 (100.0)	16
7	20 (66.7)	10 (33.3)	30
8	10 (20.0)	40 (80.0)	50
9	22 (52.4)	20 (47.6)	42
11	26 (56.5)	20 (43.5)	46
12	16 (61.5)	10 (38.5)	26
13	30 (50.0)	30 (50.0)	60
14	10 (50.0)	10 (50.0)	20
16	50 (92.6)	4 (7.4)	54
17	28 (73.7)	10 (26.3)	38
19	10 (71.4)	4 (28.6)	14
20	21 (84.0)	4 (16.0)	25
25	N/A	N/A	65
26	8 (100.0)	0 (0.0)	8
30	N/A	N/A	180
31	0 (0.0)	20 (100.0)	20
32	N/A	N/A	50
33	0 (0.0)	4 (100.0)	4
34	0 (0.0)	24 (100.0)	24
35	0 (0.0)	30 (100.0)	30
36	0 (0.0)	100 (100.0)	100
41	100 (39.5)	153 (60.5)	253
50	N/A	N/A	5000
51	10 (41.7)	14 (58.3)	24

employee	mean no. (%)	std. dev.
total	233.3 (100.0)	9.4
unskilled	18.1 (41.4)	21.8
skilled	25.6 (58.6)	33.9

TABLE A5.41 Previous employment in relocated Basildon sample firms

A5.12.2 Telford

firm	unskilled	skilled	total
53	2 (14.3)	12 (85.7)	14
54	4 (57.1)	3 (42.9)	7
55	0 (0.0)	18 (100.0)	18
56	14 (77.8)	4 (22.2)	18
57	10 (50.0)	10 (50.0)	20
61	N/A	N/A	20
63	1 (11.1)	8 (88.9)	9
64	7 (77.8)	2 (22.2)	9
65	0 (0.0)	6 (100.0)	6
66	2 (28.6)	55(71.4)	7
68	5 (33.3)	10 (66.7)	7
72	0 (0.0)	10 (100.0)	10
74	30 (50.0)	30 (50.0)	60
75	6 (75.0)	2 (25.0)	8
77	4 (40.0)	6 (60.0)	10
79	30 (75.0)	10 (25.0)	40
80	0 (0.0)	6 (100.0)	6
81	0 (0.0)	20 (100.0)	20
82	5 (33.3)	10 (66.7)	15
84	0 (0.0)	7 (100.0)	7
85	0 (0.0)	10 (100.0)	10
87	6 (60.0)	4 (40.0)	10
93	9 (81.8)	2 (18.2)	11
94	0 (0.0)	6 (100.0)	6
95	1 (9.1)	10 (90.9)	11
98	8 (57.1)	6 (42.9)	14
employee	mean no. (%)	std. dev.	
total	14.3 (100.0)	11.6	
unskilled	6.5 (42.8)	8.7	
skilled	8.7 (57.2)	6.1	

TABLE A5.42 Previous employment in relocated Telford sample firms

A5.12.3 Nottingham

firm	unskilled	skilled	total
101	10 (33.3)	20 (66.7)	30
104	50 (62.5)	30 (37.5)	80
105	10 (33.3)	20 (66.7)	30
107	15 (75.0)	5 (25.0)	20
108	8 (66.7)	4 (33.3)	12
109	550 (87.3)	80 (12.7)	630
115	140 (77.8)	40 (22.2)	180
116	50 (50.0)	50 (50.0)	100
118	0 (0.0)	8 (100.0)	8
119	50 (71.4)	20 (28.6)	70
120	30 (42.9)	40 (57.1)	70
121	N/A	N/A	158
124	8 (44.4)	10 (55.6)	18
127	4 (28.6)	10 (71.4)	14
130	10 (66.7)	5 (33.3)	15
131	10 (66.7)	5 (33.3)	15
134	10 (55.6)	8 (44.4)	18
136	0 (0.0)	15 (100.0)	15
140	14 (58.3)	10 (41.7)	24
141	10 (62.5)	6 (37.5)	16
142	24 (82.3)	5 (17.7)	29

employee	mean no. (%)	std. dev.
total	76.2 (100.0)	133.0
unskilled	50.1 (71.9)	118.7
skilled	19.6 (28.1)	19.2

TABLE A5.43 Previous employment in relocated Nottingham sample firms

A5.12.4 All areas

employee	mean no. (%)	std. dev.
total	112.1 (100.0)	578.0
unskilled	22.9 (56.5)	68.3
skilled	17.6 (43.5)	23.7

TABLE A5.44 Summary of previous employment in relocated sample firms

A5.13 CHANGES IN EMPLOYMENT

This section examines the changes in employment before and after relocation. The results are presented as aggregated totals for each type of employment before and after relocation and an overall percentage change in each are given, along with a percentage change in the total number of people employed.

A5.13.1 Basildon

	n before relocation	after relocation	% change
employment type			
skilled	590	697	+18.1
unskilled	416	445	+7.0
all employees	6299	4149	-34.1

Table A5.45 Employment change after relocation -
Basildon

There are obvious discrepancies here between the overall total for and the sum of skilled + unskilled. As before this is due primarily to the influence of firm 50 whose employee was unable to give a break-down for skilled vs unskilled workers. The sheer size of this firm also has an undue influence on the changes in

employment; it having employed 5,000 people pre-move compared to its 3,000 current.

Removing this firm from the above sample makes the picture somewhat different with the overall decrease falling from 34.1% to 11.5%.

A5.13.2 Telford

	n before relocation	after relocation	% change
skilled	217	243	+12.0
unskilled	144	219	+52.1
all employees	381	462	+21.3

Table A5.46 Employment change after relocation -
Telford

Missing data for firm 61 accounts for the discrepancies between totals.

A5.13.3 Nottingham

	n before relocation	after relocation	% change
employment type			
skilled	391	447	+14.3
unskilled	979	1083	+10.6
all employees	1523	1654	+7.9

Table A5.47 Employment change after relocation -
Nottingham

The discrepancy between totals is due to the
absence of skills data for firm 121.

A5.13.4 All areas

	n before relocation	after relocation	% change
skilled	1198	1387	+15.8
unskilled	1539	1747	+13.5
all employees	8203	6265	-23.6

Table A5.48 Employment change after relocation -
all areas

If, however, the major employer in Basildon is
once again omitted, the decrease of 23.6% becomes
an increase of 20.7%.

A5.14 RELOCATION OF STAFF

Section A5.13 above examined the net changes in employment in the relocated firms. This section asked how many of the staff at the previous site were relocated to the new one and hence, how many were made redundant at the old site.

Figures given are the previous total number of employees, the number relocated and percentage relocated and the number and percentage made redundant.

5.14.1 Basildon

firm	employees	relocated		redundant	
	n	n	(%)	n	(%)
2	35	10	(28.6)	25	(71.4)
3	45	45	(100.0)	0	(0.0)
4	40	18	(45.0)	22	(55.0)
6	16	16	(100.0)	0	(0.0)
7	30	16	(53.3)	14	(46.7)
8	50	30	(60.0)	20	(40.0)
9	42	32	(76.2)	10	(23.8)
11	46	18	(39.1)	28	(60.9)
12	26	8	(30.8)	18	(69.2)
13	60	30	(50.0)	30	(50.0)
14	20	0	(0.0)	20	(100.0)
16	54	40	(74.1)	14	(25.9)
17	38	6	(15.8)	32	(84.2)
19	14	8	(57.1)	6	(42.9)
20	25	14	(56.0)	11	(44.0)
25	65	30	(46.2)	35	(53.8)
26	8	8	(100.0)	0	(0.0)
30	180	50	(27.8)	130	(72.2)
31	20	15	(75.0)	5	(25.0)
32	50	26	(52.0)	24	(48.0)
33	4	4	(100.0)	0	(0.0)
34	26	26	(100.0)	0	(0.0)
35	30	30	(100.0)	0	(0.0)
36	100	46	(46.0)	54	(54.0)
41	253	220	(87.0)	23	(13.0)
50	5000	3000	(60.0)	2000	(40.0)
51	24	20	(83.3)	4	(16.7)
mean no. employees		233.4			
mean % relocated		61.6%			
mean % redundant		38.4%			

TABLE A5.49 Relocation of staff - Basildon

A5.14.2 Telford

firm	employees n	relocated n (%)	redundant n (%)
53	14	12 (85.7)	2 (14.3)
54	7	6 (85.7)	1 (14.3)
55	18	12 (66.7)	6 (33.3)
56	18	10 (55.6)	8 (44.4)
57	20	10 (50.0)	10 (50.0)
61	20	15 (75.0)	5 (25.0)
63	9	9 (100.0)	0 (0.0)
64	9	8 (88.9)	1 (11.1)
65	6	6 (100.0)	0 (0.0)
66	7	5 (71.4)	2 (28.6)
68	15	10 (66.7)	5 (33.3)
72	10	8 (80.0)	2 (20.0)
74	60	40 (66.7)	20 (33.3)
75	8	6 (75.0)	2 (25.0)
77	10	10 (100.0)	0 (0.0)
79	40	30 (75.0)	10 (25.0)
80	6	6 (100.0)	0 (0.0)
81	20	18 (90.0)	2 (10.0)
82	15	11 (73.3)	4 (26.7)
84	7	7 (100.0)	0 (0.0)
85	10	6 (60.0)	4 (40.0)
87	10	8 (80.0)	2 (20.0)
93	11	9 (81.8)	2 (18.2)
94	6	6 (100.0)	0 (0.0)
95	11	10 (90.1)	1 (9.1)
98	14	8 (57.1)	6 (42.9)
mean no. employees		14.7	
mean % relocated		79.8%	
mean % redundant		20.2%	

TABLE A5.50 Relocation of staff - Telford

A5.14.3 Nottingham

firm	employees n	relocated n (%)	redundant n (%)
101	30	30 (100.0)	0 (0.0)
104	80	70 (87.5)	10 (12.5)
105	30	20 (66.7)	10 (33.3)
107	20	18 (90.0)	2 (10.0)
108	12	4 (33.3)	8 (66.7)
109	630	500 (79.4)	130 (20.6)
115	180	140 (77.8)	40 (22.2)
116	100	100 (100.0)	0 (0.0)
118	8	8 (100.0)	0 (0.0)
119	70	50 (71.4)	20 (28.6)
120	70	60 (85.7)	10 (14.3)
121	158	140 (88.6)	18 (11.4)
124	18	14 (77.8)	4 (12.2)
127	14	10 (71.4)	4 (28.6)
130	15	15 (100.0)	0 (0.0)
131	15	12 (80.0)	3 (20.0)
134	18	12 (66.7)	6 (33.3)
136	15	15 (100.0)	0 (0.0)
140	24	20 (83.3)	4 (16.7)
141	16	14 (87.5)	2 (12.5)
142	29	20 (69.0)	9 (31.0)

mean no. employees 73.9
mean % relocated 81.7%
mean % redundant 18.3%

TABLE A5.51 Relocation of staff - Nottingham

A5.14.4 All areas

mean no. employees 111.3
mean % relocated 73.7%
mean % redundant 26.3%

TABLE A5.52 Summary of staff relocation rates -
all areas.

A5.15 FLEET VEHICLES

This section concerns the number of fleet vehicles, of any type (cars and goods vehicles), operated from the site. The responses were banded at 0, 1-5, 6-10, 10-20 and >20.

A5.15.1 Basildon

no. of vehicles	frequency	%
0	16	31.4
1-5	24	47.1
6-10	7	13.7
10-20	3	5.9
>20	1	2.0
Total	51	100.0

TABLE A5.53 Numbers of fleet vehicles: Basildon

A5.15.2 Telford

no. of vehicles	frequency	%
0	11	23.4
1-5	30	63.8
6-10	6	12.8
10-20	0	0.0
>20	0	0.0
Total	47	100.0

TABLE A5.54 Numbers of fleet vehicles: Telford

A5.15.3 Nottingham

no. of vehicles	frequency	%
0	24	52.2
1-5	17	37.0
6-10	4	8.7
10-20	1	2.2
>20	0	0.0
Total	46	100.0

TABLE A5.55 Numbers of fleet vehicles:

Nottingham

A5.15.4 All areas

no. of vehicles	frequency	%
0	51	35.4
1-5	71	49.3
6-10	17	11.8
10-20	4	2.8
>20	1	0.7
Total	144	100.0

TABLE A5.56 Numbers of fleet vehicles: all
areas

A5.16 TYPES OF VEHICLE

Following on from A5.14, subjects were asked what type of vehicle these were. Responses were categorised by type of vehicle and 'post' was included as some subjects stated that this was, in effect, the major form of transport used for their goods.

A5.16.1 Basildon

Type of vehicle	frequency	% of firms
light van	29	56.9
medium van	6	11.8
HGV	10	19.6
post	3	5.9
don't know	3	5.9
Total	51	100.0

TABLE A5.57 Types of vehicle used: Basildon

A5.16.2 Telford

Type of vehicle	frequency	% of firms
light van	30	63.8
medium van	3	6.4
HGV	11	23.4
post	3	6.4
don't know	1	2.1
Total	47	100.0

TABLE A5.58 Types of vehicle used: Basildon

A5.16.3 Nottingham

Type of vehicle	frequency	% of firms ⁰
light van	22	47.9
medium van	2	4.3
HGV	19	41.3
post	2	4.3
don't know	1	2.2
Total	46	100.0

TABLE A5.59 Types of vehicle used: Nottingham

A5.16.4 All areas

Type of vehicle	frequency	% of firms
light van	81	56.3
medium van	11	7.6
HGV	40	27.8
post	8	5.6
don't know	5	3.5
Total	144	100.0

TABLE A5.60 Types of vehicle used: all areas

A5.17 FREQUENCY OF VEHICLE MOVEMENTS

Subjects were asked approximately how many vehicle movements in and out of the site there were each day. Responses were banded at 0, <5, 5-10, 11-20 and >20.

A5.17.1 Basildon

Number of movements	frequency IN	frequency OUT
0	0 (0.0)	1 (2.0)
<5	27 (52.9)	27 (52.9)
5-10	11 (21.6)	12 (23.5)
11-20	11 (21.6)	9 (17.6)
>20	2 (3.9)	2 (3.9)
don't know	0 (0.0)	0 (0.0)
Total	51 (100.0)	51 (100.0)

TABLE A5.61 Frequency of vehicle movements:

Basildon

A5.17.2 Telford

Number of movements	frequency IN	frequency OUT
0	0 (0.0)	0 (0.0)
<5	31 (66.0)	29 (61.7)
5-10	9 (19.1)	11 (23.4)
11-20	5 (10.6)	6 (12.8)
>20	1 (2.1)	1 (2.1)
don't know	1 (2.1)	0 (0.0)
Total	47 (100.0)	47 (100.0)

TABLE A5.62 Frequency of vehicle movements:
Telford

A5.18.3 Nottingham

Number of movements	frequency IN	frequency OUT
0	0 (0.0)	0 (0.0)
<5	35 (76.1)	34 (73.9)
5-10	8 (17.4)	8 (17.4)
11-20	2 (4.3)	2 (4.3)
>20	1 (2.2)	1 (2.2)
don't know	0 (0.0)	1 (2.2)
Total	46 (100.0)	46 (100.0)

TABLE A5.63 Frequency of vehicle movements:
Nottingham

A5.17.4 All areas

Number of movements	frequency IN	frequency OUT
0	0 (0.0)	1 (0.7)
<5	93 (64.6)	90 (62.5)
5-10	28 (19.4)	31 (21.5)
11-20	18 (12.5)	17 (11.8)
>20	4 (2.8)	4 (2.8)
don't know	1 (0.7)	1 (0.7)
Total	144 (100.0)	144 (100.0)

TABLE A5.64 Frequency of vehicle movements: all areas

A5.18 ORIGINS AND DESTINATIONNS OF GOODS MOVEMENTS

Subjects were asked the main sources of their inputs and the main origins of their outputs.

A5.18.1 Basildon

source/destination	frequency	%	frequency	%
	IN		OUT	
Central London	3	5.9	6	11.8
Essex	15	29.4	13	25.5
South East	19	37.3	13	25.5
East Anglia	1	2.0	0	0.0
West Midlands	3	5.9	0	0.0
North West	1	2.0	0	0.0
abroad	3	5.9	3	5.9
nationwide	5	9.8	15	29.4
don't know	1	2.0	1	2.0
Total	51	100.0	51	100.0

TABLE A5.65 Sources and destinations of inputs and outputs: Basildon

A5.18.2 Telford

source/destination	frequency	%	frequency	%
	IN		OUT	
West Midlands	31	66.0	36	76.6
Scotland	1	2.1	0	0.0
abroad	1	2.1	0	0.0
nationwide	12	25.5	11	23.4
don't know	2	4.3	0	0.0
Total	47	100.0	47	100.0

TABLE A5.66 Sources and destinations of inputs and outputs: Telford

A5.18.3 Nottingham

source/destination	frequency IN	%	frequency OUT	%
South East	1	2.2	0	0.0
West Midlands	5	10.9	0	0.0
East Midlands	34	73.9	28	60.9
North West	1	2.2	0	0.0
abroad	0	0.0	0	0.0
nationwide	5	10.9	18	39.1
Total	46	100.0	46	100.0

TABLE A5.67 Sources and destinations of inputs and outputs: Nottingham

A5.19 IMPORTANCE OF THE MOTORWAY NETWORK

Subjects were asked to rate the importance of the relevant motorway (M25, M54, M1) to the everyday running of their business. Responses were 'very important', 'important', or 'unimportant'.

A5.19.1 Basildon

rating	frequency	%
very important	6	11.8
important	16	31.4
unimportant	29	56.9
TOTAL	51	100.0

TABLE A5.68 Subjects' ratings of importance of motorway: Basildon

A5.19.2 Telford

rating	frequency	%
very important	5	10.6
important	12	25.5
unimportant	30	63.8
TOTAL	47	100.0

TABLE A5.69 Subjects' ratings of importance of motorway: Telford

A5.19.3 Nottingham

rating	frequency	%
very important	4	8.7
important	21	45.7
unimportant	21	45.7
TOTAL	46	100.0

TABLE A5.70 Subjects' ratings of importance of motorway: Nottingham

A5.19.4 All areas

rating	frequency	%
very important	15	10.4
important	49	34.0
unimportant	80	55.6
TOTAL	144	100.0

TABLE A5.71 Subjects' ratings of importance of motorway: all areas

A5.20 TRANSPORT COSTS

Subjects were asked the proportion of their total production or running costs that were accounted for by transport. Subjects from relocated firms were also asked what their transport costs were before moving as a cross-check to the earlier question about changes in costs.

It should be noted that in some cases the figures seem abnormally high: this is because those firms were in the transport business and hence attributed most of their costs to moving goods. These figures should not be confused with transport costs stated as a proportion of final retail price.

A5.20.1 Basildon

transport costs (%)	frequency	%
1	2	3.9
2	4	7.8
3	1	2.0
4	2	3.9
6	1	2.0
8	2	3.9
10	1	2.0
30	1	2.0
40	1	2.0
55	1	2.0
don't know	35	68.6
Total	51	100.0

TABLE A5.72 Current transport costs: Basildon

previous transport costs (%)	frequency	%
1	3	11.1
2	1	3.7
3	1	3.7
4	2	7.4
5	1	3.7
6	1	3.7
8	1	3.7
10	1	3.7
45	1	3.7
don't know	15	55.6
Total	27	100.0

TABLE A5.73 Transport costs previous to relocation: Basildon

A5.20.2 Telford

transport costs (%)	frequency	%
2	3	6.4
3	3	6.4
4	1	2.1
6	1	2.1
8	1	2.1
60	2	4.3
68	1	2.1
70	2	4.3
don't know	33	68.1
Total	47	100.0

TABLE A5.74 Current transport costs: Telford

previous transport costs (%)	frequency	%
2	1	3.8
3	3	11.5
4	1	3.8
5	1	3.8
64	1	3.8
65	1	3.8
don't know	18	69.2
Total	26	100.0

TABLE A5.75 Transport costs previous to relocation: Telford

A5.20.3 Nottingham

transport costs (%)	frequency	%
3	1	2.2
4	4	8.7
5	2	4.3
6	3	6.5
8	3	6.5
9	1	2.2
10	1	2.2
70	1	2.2
75	2	4.3
85	1	2.2
don't know	27	58.6
Total	46	100.0

TABLE A5.76 Current transport costs: Nottingham

previous transport costs (%)	frequency	%
3	1	4.8
4	2	9.5
5	2	9.5
6	3	14.3
8	2	9.5
9	1	4.8
10	1	4.8
70	1	4.8
75	1	4.8
don't know	7	33.3
Total	21	100.0

TABLE A5.77 Transport costs previous to relocation: Nottingham

A5.20.4 All areas

transport costs (%)	frequency	%
1	2	1.4
2	7	4.9
3	5	3.5
4	7	4.9
5	2	1.4
6	5	3.5
8	6	4.2
9	1	0.7
10	2	1.4
30	1	0.7
40	1	0.7
55	1	0.7
60	2	1.4
68	1	0.7
70	3	2.1
75	2	1.4
85	1	0.7
don't know	95	66.0
Total	144	100.0

TABLE A5.78 Current transport costs: all areas

previous transport costs (%)	frequency	%
1	3	4.1
2	2	2.7
3	5	6.8
4	5	6.8
5	4	5.4
6	4	5.4
8	3	4.1
9	1	1.4
10	2	2.7
45	1	1.4
64	1	1.4
65	1	1.4
70	1	1.4
75	1	1.4
don't know	40	54.1
Total	74	100.0

TABLE A5.79 Transport costs previous to relocation: all areas

A5.21 TRIPS BY EMPLOYEES

Subjects were asked how far the company's employees tended to travel to work and what was the most common mode used for those trips. Distances were banded at <5 miles, 5-10 miles and 10-20 miles and more than 20 miles.

A5.21.1 Basildon

distance travelled	frequency	%
<5 miles	17	33.3
5-10 miles	31	60.8
10-20 miles	3	5.9
>20 miles	0	0.0
don't know	0	0.0
Total	51	100.0

TABLE A5.80 Journey to work distances: Basildon

In every case in Basildon the major travel-to-work mode was the car. It was, however, evident that a great deal of car-sharing takes place, organised by the workers themselves.

A5.21.2 Telford

distance travelled	frequency	%
<5 miles	22	46.8
5-10 miles	23	48.9
10-20 miles	1	2.1
>20 miles	0	0.0
don't know	1	2.1
Total	47	100.0

TABLE A5.81 Journey to work distances: Telford

Mode of travel was more varied than in Basildon:

mode	frequency	%
car	28	59.6
bus	18	38.3
bike	1	2.1
Total	47	100.0

TABLE A5.82 Main mode of journey to work:

Telford

A5.21.3 Nottingham

distance travelled	frequency	%
<5 miles	32	69.6
5-10 miles	13	28.3
10-20 miles	0	0.0
>20 miles	0	0.0
don't know	1	2.2
Total	46	100.0

TABLE A5.83 Journey to work distances:

Nottingham

Main mode of travel was as follows:

mode	frequency	%
car	11	23.9
bus	35	76.1
Total	46	100.0

TABLE A5.84 Main mode of journey to work:

Nottingham

A5.21.4 All areas

distance travelled	frequency	%
<5 miles	71	49.3
5-10 miles	67	46.5
10-20 miles	4	2.8
>20 miles	0	0.0
don't know	2	1.4
Total	144	100.0

TABLE A5.85 Journey to work distances: all areas

Mode of travel:

mode	frequency	%
car	90	62.5
bus	53	36.8
bike	1	0.7
Total	144	100.0

TABLE A5.86 Main mode of journey to work: all areas

A5.22 CLIENT VISITS

In order to assess the importance of the road network to client visits, subjects were asked to estimate the number of visits made to the site by clients and customers, and the mode by which the majority of those journeys were made.

A5.22.1 Basildon

number of visits	frequency	%
0	25	49.0
1-5	17	33.3
6-10	4	7.8
11-20	3	5.9
>20	2	3.9
Total	144	100.0

TABLE A5.87 Weekly number of visits by clients:

Basildon

Mode of travel for clients (n=27):

mode	frequency	%
car	26	96.3
foot	1	3.7
Total	27	100.0

TABLE A5.88 Main mode of travel for clients:

Basildon

A5.22.2 Telford

number of visits	frequency	%
0	11	23.4
1-5	19	40.4
6-10	4	8.5
11-20	5	10.6
>20	8	17.0
Total	47	100.0

TABLE A5.89 Weekly number of visits by clients:
Telford

Mode of travel for clients (n=36):

mode	frequency	%
car	35	97.2
foot	1	2.88
Total	36	100.0

TABLE A5.90 Main mode of travel for clients:
Telford

A5.22.3 Nottingham

number of visits	frequency	%
0	15	32.6
1-5	18	39.1
6-10	6	13.0
11-20	4	8.7
>20	3	6.5
Total	46	100.0

TABLE A5.91 Weekly number of visits by clients:

Nottingham

Mode of travel for clients (n=31):

mode	frequency	%
car	20	64.5
foot	11	35.5
Total	31	100.0

TABLE A5.92 Main mode of travel for clients:

Nottingham

A5.22.4 All areas

number of visits	frequency	%
0	51	35.4
1-5	54	37.5
6-10	14	9.7
11-20	12	8.3
>20	13	9.0
Total	144	100.0

TABLE A5.93 Weekly number of visits by clients:
all areas

Mode of travel for clients (n=93):

mode	frequency	%
car	81	87.1
foot	13	14.0
Total	93	100.0

TABLE A5.94 Main mode of travel for clients:
all areas

A5.23 ADVICE TAKEN ABOUT LOCATION

Each subject was asked what advice was taken by the company to help them with their location decision. Subjects who had not taken part in the location choice often knew or had an idea. Where responses were given by these subjects they are

included in these results. However, this group accounts for only five responses with over 91% of those not involved in the decision-making process admitting to not knowing how the decision was made.

A5.23.1 Basildon

response	frequency	%
no advice taken	14	27.5
bank	4	7.8
existing firms	4	7.8
don't know	29	56.9
Total	51	100.0

TABLE A5.95 Advice taken on location: Basildon

A5.23.2 Telford

response	frequency	%
no advice taken	6	12.8
bank	2	4.3
existing firms	5	10.6
estate agents	2	4.3
local authority	16	34.0
don't know	16	34.0
Total	47	100.0

TABLE A5.96 Advice taken on location: Telford

A5.23.3 Nottingham

response	frequency	%
no advice taken	12	26.1
bank	15	32.6
existing firms	5	10.9
don't know	14	30.4
Total	46	100.0

TABLE A5.97 Advice taken on location:
Nottingham

A5.23.4 All areas

response	frequency	%
no advice taken	322	22.2
bank	21	14.6
existing firms	14	9.7
estate agents	2	1.4
local authority	16	11.1
don't know	59	41.0
Total	144	100.0

TABLE A5.98 Advice taken on location: all areas

A5.24 REASONS FOR CHOOSING NEW LOCATION

The reasons that subjects gave for the choice of site were rated as playing a major, minor or no part in the decision.

A5.24.1 Basildon

factor	MAJOR PART n (%)	MINOR PART n (%)	NO PART n (%)
access to			
scarce skills	3 (5.9)	13 (25.5)	35 (68.6)
labour	24 (47.1)	15 (29.4)	12 (23.5)
regional			
incentives	1 (2.0)	13 (25.5)	37 (72.5)
local			
authority aid	3 (5.9)	16 (31.4)	32 (62.7)
local road			
access	19 (37.3)	16 (31.4)	16 (31.4)
access to			
national road			
network	5 (9.8)	18 (35.3)	28 (54.9)
access to			
local			
markets	11 (21.6)	13 (25.5)	27 (52.9)
centralisation			
	8 (15.7)	0 (0.0)	43 (84.3)
access to			
supplies	7 (13.7)	20 (39.2)	24 (47.1)
environment	3 (5.9)	9 (17.6)	39 (76.5)
large floor			
space	20 (39.2)	16 (31.4)	15 (29.4)
building/site			
	32 (62.7)	14 (27.5)	5 (9.8)
access to			
services	1 (2.0)	30 (58.8)	20 (39.2)
rents and			
rates	36 (70.6)	7 (13.7)	8 (15.7)
public			
transport	1 (2.0)	7 (13.7)	43 (84.3)
other	7 (13.7)	0 (0.0)	44 (86.3)

TABLE A5.99 Factors influencing choice of location: Basildon

The 'other' responses consisted of four who had moved to Basildon because it was close to their existing sites (which had been closed in three of those cases) and three which had moved there because of the proximity to the Director's home.

A5.24.2 Telford

factor	MAJOR PART n (%)	MINOR PART n (%)	NO PART n (%)
access to			
scarce skills	10 (21.3)	6 (12.8)	31 (66.0)
labour	11 (23.4)	26 (55.3)	10 (21.3)
regional			
incentives	19 (40.4)	16 (34.0)	12 (25.5)
local authority			
aid	19 (40.4)	24 (51.1)	4 (8.5)
local road			
access	7 (14.9)	23 (48.9)	17 (36.2)
national			
road network	5 (10.6)	9 (19.1)	33 (70.2)
access to local			
markets	28 (59.6)	16 (34.0)	3 (6.4)
centralisation	3 (6.4)	2 (4.3)	42 (89.4)
access to			
supplies	15 (31.9)	25 (53.2)	7 (14.9)
environment	3 (6.4)	9 (19.1)	35 (74.5)
floor space	25 (53.2)	18 (38.3)	4 (8.5)
building/site	35 (74.5)	10 (21.3)	2 (4.3)
access to			
services	9 (19.1)	27 (57.4)	11 (23.4)
rents/rates	38 (80.9)	7 (14.9)	2 (4.3)
public			
transport	1 (2.1)	22 (46.8)	24 (51.1)
other	3 (6.4)	1 (2.1)	43 (91.5)

TABLE A5.100 Factors influencing choice of location: Telford

Once again the 'other' responses represented the influence of the location of the directors' homes (in two cases) and a familiarity with Telford through having worked there previously in the third case.

A5.24.3 Nottingham

factor	MAJOR PART n (%)	MINOR PART n (%)	NO PART n (%)
access to			
scarce skills	6 (13.0)	7 (15.2)	33 (71.7)
labour	16 (34.8)	18 (39.1)	12 (26.1)
regional			
incentives	0 (0.0)	0 (0.0)	46(100.0)
local authority			
aid	0 (0.0)	1 (2.2)	45 (97.8)
local road			
access	8 (17.4)	26 (56.5)	12 (26.1)
national			
road network	4 (8.7)	19 (41.3)	23 (50.0)
access to			
local markets	24 (52.2)	21 (45.7)	1 (2.2)
centralisation	2 (4.3)	1 (2.2)	43 (93.5)
access to			
supplies	11 (23.9)	24 (52.2)	11 (23.9)
environment	2 (4.3)	16 (34.8)	28 (60.9)
floor space	19 (41.3)	19 (41.3)	8 (17.4)
building/site	23 (50.0)	22 (47.8)	1 (2.2)
access to			
services	9 (19.6)	32 (69.6)	5 (10.9)
rents/rates	22 (47.8)	23 (50.0)	1 (2.2)
public			
transport	8 (17.4)	33 (71.7)	5 (10.9)
other	2 (4.3)	1 (2.2)	43 (93.5)

TABLE A5.101 Factors influencing choice of location: Nottingham

Both of the 'other' responses were that Nottingham was where the person making the decision on the location had lived and knew well.

A5.24.4 All areas

factor	MAJOR PART n (%)	MINOR PART n (%)	NO PART n (%)
access to			
scarce skills	19 (13.2)	26 (18.1)	99 (68.8)
labour	51 (35.4)	59 (41.0)	34 (23.6)
regional			
incentives	20 (13.9)	29 (20.1)	95 (66.0)
local authority			
aid	22 (15.3)	41 (28.5)	81 (56.3)
local road			
access	34 (23.6)	65 (45.1)	45 (31.3)
access to national			
road network	14 (9.7)	46 (31.9)	84 (58.3)
access to			
local markets	63 (43.8)	50 (34.7)	31 (21.5)
centralisation	13 (9.0)	3 (2.1)	128 (88.9)
access to			
supplies	33 (22.9)	69 (47.9)	42 (29.2)
environment	8 (5.6)	34 (23.6)	102 (70.8)
floor space	64 (44.4)	53 (36.8)	27 (18.8)
building/site	90 (62.5)	46 (31.9)	8 (5.6)
access to			
services	19 (13.2)	89 (61.8)	36 (25.0)
rents/rates	96 (66.7)	37 (25.7)	11 (7.6)
good public			
transport	10 (6.9)	62 (43.1)	72 (50.0)
other	12 (8.3)	2 (1.4)	130 (90.3)

TABLE A5.102 Factors influencing choice of location: all areas

A5.25 ROLE OF SUBJECT IN LOCATION DECISION1

Subjects were asked whether or not they played any part in the decision to locate at the current location. Answers were simply 'yes' or 'no'.

A5.25.1 Basildon

response	frequency %	
Yes	25	49
No	26	51
Total	51	100

TABLE A5.103 Subject's role in location
decision: Basildon

A5.25.2 Telford

response	frequency %	
Yes	30	64
No	17	36
Total	47	100

TABLE A5.104 Subject's role in location
decision: Telford

A5.25.3 Nottingham

response	frequency %	
Yes	31	67
No	15	33
Total	46	100

TABLE A5.105 Subject's role in location
decision: Nottingham

A5.25.4 All areas

response	frequency %	
Yes	86	60
No	58	40
Total	144	100

TABLE A5.106 Subject's role in location
decision: all areas

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