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Signed ....Paul Courtney

Date ....01-09-2000

# SMALL TOWNS AND THE RURAL ECONOMY: A STUDY OF THEIR CONTEMPORARY FUNCTIONS AND POTENTIAL ROLE IN RURAL DEVELOPMENT

By

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A thesis submitted to the University of Plymouth

In partial fulfilment for the degree of

**DOCTOR OF PHILOSOPHY**

Department of Land Use and Rural Management

Seale-Hayne Faculty of Agriculture, Food and Land Use

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# Small Towns and the Rural Economy: A study of their contemporary functions and potential role in rural development

**Paul Richard Courtney**

## Abstract

As Rural Development assumes a greater importance in European policy, one strategy to stimulate economic activity across a broad range of sectors is to use small towns as a focal point for economic development. This may be particularly relevant in the UK where there is increasing concern over the future vitality and viability of these towns. However, such a strategy rests on the assumption that there is a strong level of interdependence between small towns and their surrounding areas. While their historical legacy suggests close integration, developments in the wider economy and resultant socio-economic restructuring have undermined the traditional functions of small towns and may have severed many of these local linkages.

Methodologies are developed to measure the size and spatial distribution of economic linkages in and around two small towns in rural England; one located in the 'remote' area of South Devon, and one in more 'accessible' Buckinghamshire. Results from two validation exercises indicate that self-completion methods are a useful means of obtaining spatial economic data from producers and consumers. Analysis compares the degree of economic integration of the towns into their respective local economies, and identifies key characteristics of firms and households that are good predictors of strong local integration.

Results show that the strength of local economic integration is a function of economic and demographic structure as well as proximity to urban centres. This illustrates that the functional role of small towns in the economy is a more useful criterion on which to base policy recommendations than is demographic size. The town in the 'remote' rural area is found to be more strongly integrated into its locality than the town in the 'accessible' area; indicating that benefits of intervention are more likely to 'trickle out' into the surrounding area in the former case. Further, the minimal role of agriculture in the local economy implies that traditional measures of farm support are no longer likely to provide a valuable method of supporting rural communities. A useful area for subsequent enquiry would be to employ an 'integration index' to develop settlement typologies so that more generalisations can be made to aid the process of policy formulation.

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# AUTHOR'S DECLARATION

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A programme of advanced study was undertaken which included a number of staff development courses.

Relevant academic and professional conferences were regularly attended at which papers were presented and work peer-reviewed. Papers based entirely on the thesis material have been prepared for publication and to date one has been accepted for publication in a refereed journal.

## Publications

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Errington, A.J and Courtney, P.R. 1999. *The role of small towns in rural development: A preliminary investigation of some rural-urban linkages.* Contributed paper prepared for the *IX European Congress of Agricultural Economists,* Warsaw, Poland, August 24-28, 1999.

Courtney, P. and Errington, A. 1999. *Spatial patterns of economic activity: the role of small towns in the rural economy and some implications for planning and development policy.* Proceedings from *Roots 99:* The 1999 Rural Practice Research Conference of the Royal Institution of Chartered Surveyors, held at Harper Adams University College, 20-21 April 1999.

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Courtney, P.; Cullinane, S.; Dawson, J. and Errington, A. 1998. *Rural Travel Patterns: A Comparison Between Two Market Towns.* Proceedings from the Universities Transport Study Group 30th Annual Conference, Trinity College, Dublin, 5-7 January 1998.

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* Poster presentation

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# CHAPTER ONE

# INTRODUCTION AND BACKGROUND

## 1.0 Introduction

Rural England is home to almost a quarter of the nation's population and contains a diversity of communities in which people live and work. In recent years, rapid changes have taken place in the economic and social structure of England's rural areas, giving rise in some localities to severe unemployment, underemployment and deprivation (Marsden *et al.* 1993). As a result, the rural economy has moved higher up the contemporary political agenda, and there is now a strong recognition that the post war policy framework, which viewed agriculture as the primary function of rural areas, is in need of modernisation. This recognition is reflected by the Governments' appreciation of the diversity in rural areas that make policies tailored to a single 'rural economy' inappropriate. According to the Cabinet Office (2000), the new policy framework should be *'built around the vision of promoting and supporting productive, sustainable and inclusive rural economies'*. As part of this approach, the Government has shifted its focus away from village services towards market towns, with the aim of making them hubs of prosperity that reinvigorate rural areas (Meikle, 2000). In the 1995 White Paper *Rural England,* DoE/MAFF (1995) it was argued that market towns '*continue to provide important services and employment for their rural hinterland and are essential for the vitality of their surrounding villages'*. Indeed, one of the five key strands in the more recent discussion document (DETR/MAFF, 1999) is a recognition of the interdependence between town and country.

This underlying assumption forms the main rationale for this study, which seeks to measure the size and spatial distribution of economic linkages in and around two small

towns in rural England. Given the recognised heterogeneity in rural areas, two contrasting, study areas are selected in an attempt to illustrate the importance of case study research in the policy making process. The study aims to inform the debate of the potential role that small towns can play in promoting rural development. The approach involves an identification of those agents that can most readily facilitate local economic growth, thus taking account of the relationship the towns have with their surrounding areas.

## 1.1 The Policy context

The policy context of the research can be considered at two levels. The first relates to the local level, in the interest of developing policies for securing the future viability of small market towns; and the second to the regional, national and European level whereby small towns represent a possible focus for development initiatives in the face of evolving rural policy. The need to devise strategies to secure the future viability of small towns, and in many cases to revitalise their social and economic base, is reflected by a number of initiatives formulated and debated by a variety of organisations. A key example is the Civic Trust, who have endeavoured to address the decline in the viability of small town centres over the past decade by designing and implementing local regeneration projects. In 1997, the Rural Development Commission (RDC) created *Action for Market Towns,* a national membership organisation that aims to promote the vitality and viability of small towns, and provide a national forum for debate on issues affecting them. Likewise, the Urban Regeneration Unit (URBED) are actively involved in developing programmes for revitalisation and also distribute their work through *Action for Market Towns.* At a more grass-roots level, local Chambers of Commerce all over the country engage in developing strategies to promote economic vitality in small towns, particularly in recent years as many local retailers have come under threat from the large supermarket chains. A key factor that many of these schemes have in common is that they focus more on the *form* of settlements

as opposed to their economic *function.* What is lacking is detailed information about how these settlements function in their local economy, an important aspect of which is the flows of goods and services between the town and its surrounding area. By focusing on marketing strategies (that aim principally to attract people to shop in small town centres), as opposed to development strategies (aimed at stimulating economic growth in all sectors of the local economy), they fail to capitalise on the human and economic resources which underpin the vitality of small towns in the rural economy.

At regional, national and European level the policy context relates to the possible evolution of the Common Agricultural Policy (CAP) into a Common Agricultural and Rural Policy (CARP), foreshadowed in the European Commission's strategy paper of 1995 (EC 1995). This has been considerably slower than might have been expected in the immediate aftermath of the 1996 Cork Declaration, with its unequivocal support for '*encompassing within the same legal and policy framework: agricultural adjustment and development, economic diversification...the management of natural resources, the enhancement of environmental functions, and the promotion of culture, tourism and recreation*' (Cork Declaration, Point 2). In fact, Agenda 2000 (EC 1997) and the more recent Rural Development Regulation (EC 1999) have continued to concentrate quite narrowly on the farm business in devising mechanisms to facilitate agricultural adjustment. Although the new Rural Development Regulation offers increased national discretion to deploy CAP resources to meet environmental and rural development objectives, this is evidently tailored more towards agri-environment schemes than to rural development initiatives.

As Buckwell (1997) explains, the logic for redirecting public resources into a broader programme of Rural Development is strong. Many farming families are already pluriactive (Bryden *et al.* 1992) and, as Gasson (1988) and Shucksmith and Smith (1991) have argued, the provision of additional, often part-time, employment opportunities off the farm (rather

than farm diversification) may provide the most effective means to support farm family incomes. Moreover, the nature of upstream and downstream linkages from farming means that many of the social costs of agricultural adjustment are borne by non-farming firms and households in rural areas (Errington *et al.* 1996). In other words, if agriculture is no longer the primary function of the rural economy, then it is unlikely that the CAP will provide a useful method of supporting rural communities in the future.

If the CAP does eventually evolve into a more integrated rural policy some important issues of policy implementation will arise. One of the most fundamental concerns the most appropriate focus for interventions if support is no longer directed towards farmers. A possible alternative is to focus on small towns within rural areas, and indeed this approach is implied in the Commission's earlier analysis of rural issues in *The Future of Rural Society* (EC 1988). Referring then to rural development as a facet of regional policy it concluded that, rather than *'concentrate development effort on a few major central poles of economic activity....a larger number of intermediate centres (subpoles) should be assisted in their development, scattered over a wide area'*. If this option is to be considered, it is important to establish whether there are in fact strong economic linkages between small towns and their surrounding rural areas. Further, the Government's plans to facilitate rural development include *'introducing a new commitment to market towns, recognising the key role these settlements play in rural economies and rural communities'* (Cabinet Office, 2000). If the Regional Development Agencies are to ensure that market towns are addressed explicitly in their regional economic strategies as this document suggests, then it is clear that empirical investigation is required to establish the degree to which such towns are integrated into their local and regional economies. While their original *raison d'être* suggests close integration, developments in the wider economy and the resultant rural restructuring (Marsden *et al.* 1993) may have severed many of these links (Errington,

1998). Indeed, globalisation may have weakened local multipliers to such an extent that it has led to the 'death of the local economy' (Curran and Blackburn, 1994).

## 1.2 Aims and objectives of the study

*The aims of the study are as follows:*

- To examine the contemporary functions of the small town in the rural economy;
- To advise policy makers on the potential role such towns can play in promoting rural development.

*The objectives of the study are as follows:*

- To select two contrasting small towns of comparable size in England, one located in a relatively 'remote' rural area, and one located in a more 'accessible' rural area;
- To construct a picture of the flows of goods, services and labour between the towns and their local, regional, national and international economies;
- To develop suitable methodologies to allow measurement of the size and spatial distribution of these flows;
- To compare and contrast the degree of local economic integration between the two case study towns;
- To compare and contrast the degree of local economic integration between different types of firm and different types of household in the selected study areas;
- To identify the key characteristics of locally integrated firms and households in the study areas using multivariate modelling procedures.

## 1.3 Background to the research

The purpose of this section is to place the study in context with respect to a number of relevant historical, geographical, economic and social factors. It is divided into three main sections. The first outlines the historical development of the market town, with emphasis on its traditional roles in the rural economy and society. The second examines the contemporary functions of these settlements, drawing on geographical theory to aid the discussion. The final section is concerned with the external forces that have influenced the functional development of small towns in post war Britain, which involves an analysis of socio-economic restructuring and the influence of the English planning system.

### 1.3.1 Historical development of the market town

Historically, the market town not only played a central role in the local economy but also made an important contribution to the culture of British society. As Hoskins (1972) notes, the primary function of the ancient market towns was to act as a local market, serving a hinterland of seven to ten miles. Colwell (1983) shows that in the Middle Ages most towns were well served by markets and indeed created by them, often lying the statutory seven miles apart which was the common law distance stipulated by Edward the third's charter in the Fourteenth Century. This was close enough together to allow farmers and their families to visit them on foot or horseback on market day, generally once a week, and return home on the same day (Hudson, 1976). At these small towns they were able to sell all manner of farm produce and purchase all required farm inputs. As noted by Murray *et al.* (1996), in the early fourteenth century there may have been 2,000 - 2,500 markets in England. This role as a first destination of farm outputs, a source of farm inputs and source of consumer goods and services to the farm household was of paramount importance throughout history. As well as agricultural produce, market towns also acted as important trading

points for local industries such as cloth, wool and tin. They also supported a few craftsmen such as carpenters, saddlers and flour millers. The better-placed market towns, situated at focal points in the more populous areas, were known as 'county towns', which took on the wider functions of administration, commerce and domestic industry (Hudson 1976).

Traditionally, all rural communities were agricultural in function with the family being the principal economic and social unit. Thus, the market town also acted as a focus to a rural society with strong kinship and family links.

*One son was up on the hillside a few miles away hacking at the edge of the waste; his brother was down in the town putting up a house and shop. They hailed each other on market-days and fair-days, when the town met the country on which its livelihood so often depended* (Hoskins, 1972: 106-107).

These kinship connections played a vital role in determining the relationships between families, the informal communication network and the allegiances to local social organisations. As Lewis (1979) illustrates, the immobility of the population could be related to the solidarity of the family, the bonds of kinship and the individual status among his neighbours. Leisure and welfare were two further important social functions of the settlement. Trade fairs, held primarily for economic reasons, also served an important social function in rural communities. The many charities and welfare institutions, which were housed by the market towns, were established to deal with the problems of social exclusion. By the 19$^{th}$ Century, the Agricultural and Industrial revolutions had diversified the employment functions of some market towns. With the developments in communications and infrastructure, these towns not only served their local communities, but began to support businesses which sold their products to the national or even international market (Errington, 1998).

### 1.3.2 Contemporary definitions of the market town

Today, the small market town remains the most common type of urban settlement to be found in rural areas. Hudson (1976) defines this form of settlement as *a place - open or enclosed with facilities for the exchange of commodities, especially the sale and purchase of agricultural surpluses and the purchase and sale of consumer goods.* There is also evidence, presented by Harrison (1993), to suggest that the small market town continues to act as a source of farm inputs for both goods and services, although the importance of this role is yet to be determined. The Countryside Agency use the term 'market town' to cover all small towns that *'serve as a focus for trade and services for a rural hinterland'* (Action for Market Towns, 1997), although this inevitably makes some important assumptions about the contemporary role of small towns in the rural economy. As Hudson (1976) notes, many functional changes have occurred in market towns this century. Some have acquired factory industry and have come to be noted for their manufacturing, many attract tourists, and others have developed dormitory and retirement functions.

There are two main criteria commonly used to define settlements, demographic size and function. Everson and Fitzgerald (1969) suggest a minimum population of 2,500 for a country town. Likewise, Green (1971) classifies the 'country town' as having a maximum size of 15,000, which also coincides with *Action for Market Towns* fairly loose demographic classification of the small market town. The Rural Development Commission defined the 'market town' as a settlement with between 3,000 and 10,000 inhabitants (RDC, 1992). However, Cloke and Park (1985) argue that although population size has traditionally served as an indicator to settlement type, this criterion has managed to confuse, rather than illuminate the issue (Cloke and Park, 1985). Definitions based upon the functionality of settlements may therefore prove to be more useful. This is most easily conceptualised by reference to Christaller's Central Place Theory, the basic notion of

which is that there is an underlying regularity in the size and spacing of towns. A hierarchy of settlements is postulated, based on a uniform distribution of 'central places' allowing for economies of scale, types of service proposed, the frequency of consumption and the costs of transporting goods and people (Leon, 1999). The kind of area in which such a pattern of settlements might be expected to develop would be one in which terrain, resources, population and purchasing power were evenly distributed, and in which movement was equally easy in all directions (Hudson, 1976). In this theory, the rural area is given over to the production of goods with limited scale economies, and the provision of low order goods that have a short *range* and require a relatively small *threshold population* to sustain their supply[1]. Therefore, as Carter (1990) implies, in serving tributary areas (Lewis, 1979) small market towns are 'central places' that are likely to provide goods and services of a lower order in comparison to regional centres which provide goods and services of a higher order.

It is important to note that the market town can no longer be distinguished from other types of settlement on the basis of it providing the site for an open-air market or agricultural livestock market. As Hudson (1976) notes, small towns no longer necessarily possess an agricultural market because improved transport facilities have reduced the number of weekly markets in most countries. Likewise, Colwell (1983) shows that during the two world wars of the twentieth century, governments organised central market places in the bigger towns to save energy and fuel, causing many smaller markets to die. On the basis of both historical significance, and the inherent assumptions that are implied about the contemporary functions of the market town, it is perhaps more accurate to refer to the

[1] *Threshold population* is the minimum number of people required to sustain an economic establishment. The *range* of a good or service is the maximum distance people will travel for it, assuming that the consumer will aim to minimise travel costs relative to price. The term 'order' effectively denotes a rank in the hierarchy of goods and services. Low order goods and services are purchased relatively frequently and therefore have a low threshold population and a short range (for example, food and groceries, hairdressing). High order goods and services are purchased relatively infrequently and thus have a larger threshold population and a longer range (for example, clothing and footwear, vehicle repairs).

small 'market' town as opposed to the 'small market town'. Therefore, for the remainder of this thesis, these settlements will be referred to simply as 'small towns'.

### 1.3.3 Evolution of small towns in the twentieth century

Traditionally, small towns acted as the social foci of their hinterland, which helped to maintain linkages and a degree of economic self-containment locally. Thus, activity patterns in rural areas were supported and complemented by a dispersed spatial arrangement of small towns. However, as Keane (1990) argues, recent functional shifts in rural space, such as changes in services and employment, greater mobility and a general increase in the level of urban orientation have presumably altered the situation. The evolution of the small town in post war Britain can be examined through the processes of economic and demographic restructuring, as well as considering the role of the English planning system in shaping development.

*Economic restructuring*

Errington (1991) notes that an important feature of agricultural development over recent years has been the way in which technological change and increased specialisation has led to a growing dependence on inputs from beyond the farm gate, particularly as purchased services as well as purchased goods have become more important. Likewise, developments in food processing have increased the importance of linkages further down the food chain. For example, in the UK, over seventy percent of farm produce now undergoes processing before sale (Swinbank and Burns, 1984). Thus, as Errington (1991) explains, agriculture has become more closely enmeshed in the wider economic system. In turn, this has also removed the historic purpose of many smaller market towns (DoE/MAFF, 1995). Barker (1989) identifies four methods of distribution used to supply the farmer alternative to the traditional agricultural merchant, which combined with changes in the retail sector, has

lead to a sharp decline in the number of livestock markets in England and Wales (Murray *et al.* 1996). However, Harrison (1993) suggests that many agricultural transactions may still be taking place in small towns, with small value transactions taking place locally but longer journeys being made for more expensive inputs such as fertiliser and livestock. In the Reading Province, small towns with a population between 1,000 and 10,000 were found to provide the source of 34.7% of farm input transactions (by number) and of 29.4% of output destinations.

Associated with these changes has been the inevitable decline in agricultural employment, with an average annual loss from the farming industry of 2-3% of the workforce between 1946 and the present (Blunden & Curry, 1988). Cloke (1979) points out that with the decline in agricultural jobs much of the manual employment now takes place in towns and this has lead to a trend of commuting from this section of the village community. New sources of rural employment have been associated with the significant growth in service and manufacturing. Indeed, Fothergill, Kitson & Monk (1985) show that the net increase in the stock of industrial floor space has been concentrated in small towns and rural areas. Likewise, industrial investment has been responsible for the major share of new employment created in small towns of Norfolk and Suffolk since 1945. In post war UK, new firm formation rates were higher in small towns and rural areas than in large urban centres (Hodge & Monk 1987, Champion & Townsend, 1990). Service activities such as finance and law have also relocated to rural areas as some have been seen as contexts ideally suited to flexible, accumulative strategies for small businesses in a post-agricultural, post-industrial world. However, according to (Marsden *et al.* 1993), the most significant economic interests investing in rural areas are associated with corporate organisations at national and international scales, including agri-businesses, house builders, mineral and industrial firms, forestry companies and leisure concerns. The increasing integration of rural areas into the world economy has increased their exposure to the

vagaries of international markets, business cycles, shifts in production technology and work practices. Indeed, the work of Moseley (1974) on Haverhill and Thetford suggests that the multiplier effect of new industrial development is low, as in both the industrial and service sectors, 'trickle up' (to larger centres) rather than 'trickle down' effects operate in relation to the generation of supplementary economic activity. Lemon (1975) argues that small towns cannot be expected to grow substantially as a result of trickle-down effects from larger centres, but only as a result of direct investment in the towns concerned. Indeed, a study of a small Devon town by Glyn-Jones (1982) indicated that two thirds of new businesses did most of their trade within a twenty-mile radius, filling gaps in the local provision of supplies and services.

The growing move towards larger and more economic outlets benefiting from economies of scale for both goods and services has also meant that the smaller settlements have lost functions and the larger settlements have acquired additional or larger scale functions (Carter, 1990). DoE/MAFF (1995) note that the number of retail outlets in Great Britain has fallen from 577,000 in 1961 to 319,000 in 1992, a decline which has particularly affected village shops and small retail outlets in town centres. According to Raven and Lang (1995) there are now more shopping trips made, a greater proportion of which are made by car due to increasing retail concentration and the rise of the supermarket giants. Of course, it may also be the case that supermarkets actually draw people into town centres, perhaps combining low order trips with additional shopping in the town itself.

*Demographic restructuring*

Between 1946 and the late 1960's rural depopulation was the principal demographic change occurring, initiated by the decline in agricultural employment. According to Cloke (1979), two of the major contributory factors to rural out-migration in Devon were the 'push' from employment in rural areas caused by structural changes in agriculture and the

'pull' of employment in urban areas caused by the higher wages offered by manufacturing industries. This often produced an imbalance between the age and class structure of remote rural areas. As Lewis (1983) explains, a major implication of diminishing employment opportunities, depopulation and increasing personal mobility was the decline in rural service provision. Since the early 1970's, the socio-economic structure of rural areas has continued to evolve at differing rates through the process of counterurbanisation, a hypothesis advanced to explain the expansion of economic activity, particularly in accessible rural areas. As Errington (1996a) explains, the first 'wave' involves the movement of people, many of whom continue to work in towns; the second 'wave' involves the relocation of employment as 'footloose' firms (and their managers) seek a more congenial setting for their activities. Reasons for counter-urban migration have included the increased accessibility of rural areas, increasing employment and individual prosperity, early retirement and increasing redundancy rates and the improved quality of life offered by rural environments (Marsden *et al.* 1993; Champion, 1989; Cross, 1990; Cloke, 1983; Newby, 1985). Likewise, technological change has freed firms in manufacturing and service sectors to locate in urban centres. The newer, more 'footloose' industries are attracted to rural areas because they offer a more attractive working environment, as well as a more flexible workforce without the same level of unionisation found in many traditional industrial areas (Newby, 1985; Fothergill, Kitson and Monk, 1985; Errington, 1996a).

The extent to which small towns have experienced population increases varies between regions and between settlement sizes. Between 1971 and 1981, towns with a population under 6,000 experienced a mean increase of 7.0%, whilst rural districts in England experienced growth rates of between 4.3% and 12.9%, with the most impressive population gains in the less remote districts (Cross, 1990; Champion, 1989). According to Marsden *et al.* (1993), the growth of a residential middle class in country towns has been

primarily responsible for drawing into them employment in personal and commercial services and public administration, adding to the traditional employment of tourism, retailing and the rural professions. With the integration of local communities into wider society, new values and norms of behaviour have been introduced. Individual activity spaces have become more widespread and diffuse, so weakening the coherence of the community (Lewis, 1979). Newby (1985) argues that immigrants have brought with them an urban middle class lifestyle that is largely alien to the indigenous agricultural population. According to Cloke (1979), their location in the villages sets up new demands in nearby towns: for example, supermarkets, restaurants, antique shops and garden centres. The result is the transformation of the settlement into a highly specialised aspect of the intra-urban hierarchy (Carter, 1990). Long distance commuting and second homes have had further impacts, pricing locals out of the housing market and transforming communities into dormitory villages or weekend resorts (Cawley, 1979). Likewise, Gilg (1985) notes that, although second homes can provide an injection of capital investment and employment in the building and related industries, they can effect local house prices, create low paid seasonal work and initiate a withdrawal of services through under use.

*The role of the English planning system*

As a result of migratory trends, small towns therefore began to evolve into important locations for containing housing. Although the processes of counterurbanisation were primarily due to socio-economic forces of change, the town and country planning system, as part of an attempt to prevent urban sprawl into the countryside, designated a number towns and villages in the countryside to receive the necessary urban development. As Hall *et al.* (1973) explain, the 1947 planning system aimed to create communities that were self-contained and 'balanced'. However, the new suburban communities of owner occupied homes in the small towns and villages often catered for a narrow spectrum of social classes, driven more by migratory change than planning control. Thus, underlying socio-

economic trends have proved to be the predominant force of change, with the function of small towns modified only a little by land-use planning policies. Pearce (1992) suggests that urban containment and concentration, in the face of increased rates of demographic change and the protection of residential areas from employment uses, has actually led to the separation of home and workplaces and to longer journeys to work and hence to increased commuting and congestion.

In the 1960's and 70's, and to a lesser extent in more recent years, an important feature of rural settlement planning has been key settlement policy. Within this framework small towns have formed part of a hierarchy[2] of settlements targeted to provide services and facilities in reasonably accessible locations (Powe and Whitby, 1994). The key objectives have been to create an optimum economic pattern of polarised service and infrastructure provision, and to centralise facilities in order to stabilise opportunities for hinterland residents (Cloke, 1979). As Woodruffe (1976) explains, the concept has close affinities with the Central Place theory, the idea that a facility only becomes economic when its threshold population is reached. Thus, by grouping together a number of villages and hamlets, this critical threshold can be achieved. However, as Cloke (1979) explains, in Devon the success of key settlement policy has been somewhat limited. By facilitating a new economic and social base in central nodes, the policy has effectively withdrawn public support and investment from outlying villages and has, therefore, contributed directly to the decline in rural services and transport provision. In reality, local facilities have tended to concentrate in larger settlements, as much because of market forces as part of a planned policy of centralisation. Although key settlement policy has attempted to guide new employment into small and medium sized towns, many new ventures have tended to opt for the sizeable urban locations of these settlements anyway (Glyn-Jones, 1983). Most importantly, a further set of problems described by Cloke (1979) concerns the lack of

[2] In Devon, the hierarchy included ninety settlements, including 4 sub-regional centres, 4 sub-urban towns, 13 key inland towns (small and medium sized towns), 11 coastal resorts and 68 key settlements. (Gilg, 1978).

practical measures to ensure that the benefits accruing from the growth in key settlements are spread to surrounding villages. In other words, planners have not paid due attention to the degree to which designated settlements are integrated into their surrounding areas. Indeed, a number of policy analysts have recognised the inherent gap that exists between the planning system and the economic processes of local and global markets (Holliday, 1994; Kingaby, 1995; Bateman, 1985 and Cullingworth, 1994).

This observation is also relevant to the Government's system of Planning Policy Guidance (PPG's) which are taken into account by local authorities as they prepare their development plans. Of particular relevance to small towns are those relating to town centres, economic development and transport (See Department of the Environment, 1996; 1997; 1995). PPG 6 *(Town Centres and Retail Developments)* has attempted to strengthen the Government's resolve in opposing out-of-town shopping developments. It effectively takes a sequential approach to site selection for retail development - town centres first, then edge-of-town, and finally out of centre sites. However, the note implies that permission for new retail development outside town centres should not be given on the grounds of the effect on the town centre, unless there is clear evidence to suggest that the result would be to undermine its vitality, viability and role in serving the community. Thus, PPG 6 does not actually preclude out-of-town development. PPG 13 *(A guide to Better Practice: reducing the need to travel through land use and transport planning)*, on the other hand, clearly endorses town centres as the preferred location for retail development on the basis that this will reduce dependence on the private car. It also aims to avoid sporadic housing in the open countryside and promote appropriate development within existing communities that can help sustain local services and employment. PPG 7 *(The Countryside - environmental quality and economic and social development)* also recognises the importance of this, although it conflicts with advice given in PPG 13 with respect to its stance on promoting new business development in the open countryside. According to Elson *et al.* (1996), a

number of local authorities feel that diversification policies conflict with the advice in PPG 13 to avoid patterns of land use which encourage car use. This presents an important question regarding the appropriate spatial distribution of development in rural areas; whether in fact rural development is better focused in small towns, or in the hinterland of these settlements. Indeed, in respect of the rural economy, Elson *et al.* (1996) conclude that local knowledge of economic circumstances and the needs of firms at district level is uneven, with many authorities having only a general idea of the economic needs of their rural areas.

## 1.4 A conceptual framework for research

Traditionally, the small town has formed an integral part of the rural economy, having had a symbiotic relationship with its surrounding area. In the latter part of the 20$^{th}$ Century, we have witnessed a significant evolution of small and medium sized towns in terms of their function in the rural economy. Further, it is evident that the direction of that evolution is not identical in all areas of the country, and there may now be more functional diversity in small and medium sized towns. Indeed, this is likely to reflect the heterogeneity of the rural economy as a whole. Although the land use planning system in this country has had an influence on this evolutionary process, this has evidently been rather marginal as compared with the underlying socio-economic trends in rural areas. Further, it is evident that land use planning policy has suffered from a lack of knowledge about the nature of economic processes in the rural economy, which has inevitably hindered its success. Most importantly, it is clear that these underlying socio-economic trends may have led to the breakdown of local economic linkages, diminishing the interdependence between small towns and their surrounding hinterlands.

In order to examine the contemporary functions of the small town, it is clear that the settlement must not be considered in isolation from its locality. An understanding of the production and consumption of goods and services in rural areas and the operation of markets through which they are traded is required (Errington, 1997a). To date, only town centre issues and retail trends have been considered in any detail. There is, however, a dearth of information relating to the linkages between firms, particularly non-retail firms, and households in and around these settlements. Although there have been studies which have addressed travel patterns and the nature of economic interaction in and around small towns (See Errington, 1994a; Dawson and Errington, 1998a; 1998b, 1998c; Ragbourne, 1997; Ragbourne and Hammond, 1999), in-depth studies which seek to measure the size and spatial distribution of economic linkages between firms and households in and around English small towns, have not yet been undertaken. Curran and Blackburn (1994) note that the way in which local economic relations are structured in real localities has not been the subject of much systematic research. According to Williams (1994), detailed empirical research is required on the expenditure habits of both the businesses and household population of a local economy so that current levels of income generation and leakage in an economy can be identified. Indeed, as Harrison (1993) states, if small towns do have a crucial role to play in the rural economy, not only will this have important locational implications in the case of changing agricultural fortunes, but it will also provide a potential focus for rural development policy.

In order to pursue this area of enquiry it is therefore necessary to set this work in the context of literature on local economic activity. The following chapter presents a review of the relevant literature, examining in detail, the range of global, national and regional trends that are influencing economic processes at the local level.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.0 Introduction

In this chapter the attention is turned away from the small town and focuses on the 'local economy', primarily addressing the nature and importance of economic activity within defined localities and the processes influencing it. The analysis presented has three overarching aims: (a) to assess, in an era of increasing economic globalisation, the extent to which it is still meaningful to speak of the 'local economy'; (b) to examine, in detail, the range of global, national and regional socio-economic trends which are influencing the nature of economic activity; and (c) to review, with reference to recent empirical evidence, which types of firm and household, if any, are more likely to be closely linked to the local economy than others. To provide some background and context to the discussion, it is important initially to address two fundamental questions. First, what is the nature of economic linkages and how can they be quantified? Second, how can 'locality' be defined in order to effectively conceptualise this area of research?

## 2.1 Economic linkages defined

Any form of economic linkage can be viewed as a *transaction.* In economic theory a transaction has been defined as *'any form of economic organisation which involves carrying out an exchange of goods or services'* (Hobb, 1996). For the purposes of analysing the spatial distribution of economic linkages at a local level, it is important to note that a transaction constitutes three distinctive but inter-relating elements: *number*; *value* and *distance*. While the *number* of transactions may be significant in terms of traffic

movements, it does not tell us the true significance of the transaction to the local economy. It may be, for example, that a high proportion of recorded transactions involve the purchase of low order goods which contribute relatively little to the income generation within a locality. Knowledge is therefore required of the *value* of each individual transaction, or set of transactions. Finally, in order to ascertain the spatial pattern of transactions in a particular locality, the *distance* travelled to carry out the transactions is of key importance. However, an increasing number of transactions are being carried out via the telecommunications network. Thus, an analysis of 'distance', must also take account of the number of transactions carried out in this way, for example through teleworking or teleshopping. Economic linkages can therefore be summarised as *a network of transactions of varying nature which either contribute to the income generation within, or leakages from, the 'local economy'.*

*Transactions at the firm level*

Transactions analysed at the level of the firm can be divided into three broad types[1]. First, there are *inputs*, the linkages between firms involving the purchase of producer goods and services. Second, there are *outputs*, the linkages between firms and households that constitute the sale of both producer and consumer goods and services. Finally, there is a further firm-household transaction in the form of the 'purchase' of labour.

*Transactions at the household level*

In terms of transactions initiated at the household[2] level three main types of transaction can also be identified[3]: *a) The sale of labour,* which represents a direct linkage between

[1] It is specifically economic linkages that are of concern in this study. An examination of social transactions, or 'networking' activities in rural areas, although very useful, would constitute a separate project.
[2] The household is a unit that is defined by Potter (1995) as a person living alone or a group of people living together.
[3] There may in fact also be an element of between - household transactions which are of some significance, although a consideration of such activity is outside the scope of this study.

household and firm, with the transaction in the form of the payment of wages; *b) The purchase of goods and services.* This class of transaction includes both the purchases of *low order* and *high order* consumer goods and the purchase of services from the private sector. Purchases of consumer goods range from food and clothes through to garden furniture and fitted kitchens. The purchase of private sector services refers to high street services such as hairdressing, reprographics, banking services and professional services. It also includes those services which often involve the firm travelling to the household to perform the transaction, such as maintenance and building services; and *c) Accessing public services.* This refers to the accessing those services that are, or have traditionally been, provided by the public sector such as health, education and leisure services[4].

## 2.2 In search of the 'local economy'

Within the economics literature the terms 'local economy', 'locality' and 'local economic initiative' are used frequently in discussion of economic issues which are not of regional, national or international scale. Likewise, the importance of economics at the local level is frequently stressed. For example, research indicates that one of the key areas with which growing small rural firms actually need help is in developing a non-local market (Smallbone *et al.* 1993), which perhaps indicates the well-established nature of local economic processes in the UK. What is not evident in the literature though is a precise definition of what a 'local economy' actually constitutes, and how it can be differentiated from the wider economy.

[4] It is only the first two types of transaction - the sale of labour and the purchase of consumer goods and services which are of interest in this research project. What is of primary concern is the economic linkages, or transactions, which exist between households and firms in a given locality. In the case of public sector services it is presumed that Local Authorities will aim to provide public amenities as economically as possible to all sectors of the community. It is noted that there may be a need for ground level research to identify areas of inadequate public service provision, although due to the limitations on resources such a remit falls outside the scope of this project.

Curran and Blackburn (1994) point out that, in analytical terms, it is not difficult to take some geographical area, for example, a 'travel to work area' or 'local labour market area' drawn from official statistics of one kind or another and designate this as a local economy. Yet the extent to which establishments located within such boundaries form an integrated set of economic activities is clearly open to question. In the research reported by Harloe *et al.* (1990), examining local political initiatives in seven contrasting localities, 'locality' is interpreted as travel-to-work areas. In the study undertaken by Williams (1994), however, 'locality' is defined as an area within a 20-mile radius of the establishment. Likewise, Curran and Blackburn (1994) denote a 10-mile radius as the local economic threshold.

Urry (1990) argues that, for most people, locality is increasingly coming to mean 'travel-to-shop' or 'travel-to-engage-in-leisure-areas'. In such cases the range or boundaries of such localities will be quite different for those with access to a car than for those without, and indeed for those with access to forms of public transport which may do much to eliminate the distances between apparently separate localities. Blackburn and Curran (1993) note that different types of businesses have different shaped markets geographically. For example, advertising, marketing and design businesses have been shown to have very different markets geographically to the video hire outlets.

*Over half of the advertising, marketing and design businesses reported that three quarters or more of their business was with customers outside the locality....Even North East Suffolk's businesses which come closest to the idea of small firms and locality being closely linked, display considerable tendencies to ignore local boundaries defined by, for example, local authority areas or Rural Development Areas* (Blackburn and Curran 1993: 188).

Goodwin's (1989) point that no economy is spatially bounded, and the economic relations and processes occurring in their districts are connected through a myriad of links to the wider world is therefore a valid one. This author also argues that certain sets of economic processes are more referent to a local area than are others. This is an important point, highlighting the spatial variation that exists between different localities. Although there will inevitably be *non-place specific* economic activity such as corner shops, bakers,

supermarkets, banks and petrol stations present in each of the localities, there are also likely to be activities which are more referent to the particular locality. For example, research by Keeble *et al.* (1992) reveals for the first time striking differences in market niche specialisation and orientation between rural and urban enterprise.

*In particular, remote rural firms are significantly more specialised in market niches created by rising consumer incomes, and hence more frequently serve consumer, retailing, tourist and agricultural markets. In contrast, accessible rural firms predominantly specialise in market niches created by increasing business and technological complexity, while urban firms specialise mainly in more traditional subcontracting and manufacturing niches* (Keeble *et al.* 1992: xii).

As Goodwin (1989) rightly points out, however, the fact that economic processes are constituted in a particular place does not necessarily make them 'local'. Teitz (1987) notes that whether it makes sense even to attempt to influence the economy at the local level has been a subject of dispute. Over recent years, conventional economic analysis has stressed the importance of national and international policies in shaping the economic environment in which localities function. Teitz (1987) argues that a city, for example, should be seen both as an economic system in itself and as an economy interacting with the outside world.

According to Howe (1991), local shops, especially small specialist shops, are giving way steadily to national chain stores with their uniformity of shop style, selling patterns and stock. This has a strong spatial dimension, especially with the proliferation of out-of-town supermarkets and shopping developments. As Curran and Blackburn (1994) note therefore, businesses may well be less connected to local economies and offer fewer opportunities to develop non-economic relations. Further discussion of the myriad of links to the wider economy is well illustrated by reference to the rural economy.

As is evident from Chapter One, rural localities are increasingly likely to have the kinds of businesses found elsewhere in Britain, regardless of locality. Curran and Storey (1993) also note that there has been an influx of manufacturing in rural areas but, even more, it is likely that newer businesses will be in the expanding services sector. However, many

commentators refer to *the rural economy* as if it were somehow separate from the rest of the national and international economy. As Errington (1991) shows, this is not the case, for each sector of the economy is linked to others in a 'seamless web'. Townroe and Mallalieu (1993) point out that post and parcel services complement the telecommunication system in linking firms to their input and output networks, and therefore view rural Britain as a continuation of urban Britain but at a lower density.

> *In its productive activities any one sector tends to use not only primary inputs such as labour but also intermediate inputs which have been produced by other sectors of the economy...* (For example, the fact that farms have been drawn into an ever closer embrace with the rest of the economy has already been discussed in Chapter One.) *...the same principles apply to virtually all types of economic activity. Economic development and technological change tend to have increased the interdependence on different parts of the economy. As a result, any initiative designed to influence the magnitude or nature of economic activity* (in agriculture) *will have effects elsewhere in the economy* (Errington, 1996b: 1-2).

Thus, 'local economies', however defined, will have links-direct or indirect, material or cognitive-with a wider economy, regional or national or even international (Curran and Blackburn, 1994). The local economy could therefore be described as a *bounded spatial form within the web of wider economic activity where local income generation within, and leakage through this 'pervious' boundary, is variable.* This latter point has strong implications for the spatial distribution of development within defined localities and in turn provides a rationale for study into local economic activity. Following from the above description of the 'local economy', the selection of a suitable defined boundary is likely to be a fairly arbitrary one, largely dependent on the geographical area(s) in question. The most important factor is that in any comparative studies, the boundaries chosen to represent locality in different locations must be comparable. Any variations in income generation and leakage between localities can then be compared to the same baseline.

*Transport and transactions issues*

As Errington (1997a) points out, technological change has tended to reduce the private costs of carrying out transactions.

*Some of the most striking examples of this trend lie in the production, consumption and exchange of services that can be acquired through the telecommunications network. But more important than this has been the internal combustion engine and the development of the road network* (Errington, 1997a: 4).

However, as the private costs of transactions have effectively decreased, the social costs have in fact increased. The interest in transport and the environment and the advice contained within PPG 13 (DoE 1995) clearly illustrates the growing awareness of this. In an economic sense therefore, the 'distance' element of transactions is of growing interest. It is important to find out how many, and what type of, transactions in a given locality are local as opposed to being linked to the wider economy in order that attempts can be made to minimise the social costs of transactions.

The reduction in the private costs of transactions through the increased use of the telecommunications network has further implications for localities. For example, Hopkinson and May (1990) note that the FAX machine has become a popular form of communication in a relatively short space of time. The reasons for its success are self-evident. It is able to transmit written and graphical information rapidly and at relatively low cost and the transmission technology is based around familiar devices - a telephone system and a photo-copier. Likewise, with the case of the internet, it has been noted that E-mail is fast becoming an essential part of the organisation of all sizes (Anon, 1995). As Cronin (1993) argues, global networking via the internet is an essential resource for companies seeking a competitive advantage. Following this, two main questions are posed. Firstly, do modern forms of communication such as telephone, fax machine and internet affect what is perceived as the 'local economy'? The perception of what constitutes 'local' is obviously very important because it will influence the actions of business owner/managers. For example, in all areas there is an element of local commitment from which entrepreneurs will benefit. Secondly, does 'locality' expand with increased use of these communication links?

It is clear that, the 'local economy' is becoming increasingly important. However, the following question remains: How can it be that the 'local economy' is becoming more important when economic globalisation is the prevailing trend? Curran and Blackburn (1994) have argued that because of the growing importance of foreign suppliers of components and services, 'locality', that is some geographically demarcated area in the UK, may well be becoming less important.

*What are the trends over time: for instance, is what has been described as the 'globalisation of the economy', robbing local economies of their significance as relevant units of analysis? Or to what extent is globalisation being achieved through localisation?* (Curran and Blackburn, 1994: 1-2).

These questions are among those addressed in the following two sections, which aim to examine some of the contemporary trends occurring in the economy and society that are influencing the nature of economic activity patterns at the local level. The first is concerned mainly with economic globalisation and the structural changes that are influencing the nature of firm activity. The second moves on to consider the key socio-economic trends which are influencing activity patterns at the household level, including the growth in car ownership and developments in communications technology.

## 2.3 Globalisation and structural change

The nature and importance of economic globalisation has already been mentioned in Chapter One. For example, Marsden *et al.* (1993) have documented the importance of international corporate investment in rural areas including agribusiness, house builders, forestry companies and leisure concerns. The aim here is to expand upon the global influences of economic restructuring and identify the main global trends that have occurred over the last few decades.

Cooke (1989) shows that the post war era has been distinguished by an accelerating process of international investment.

*As an economy that has traditionally been remarkably open to foreign trade, and dependent for its survival upon export markets, the UK may be said to be a particularly clear example of a country experiencing the extremes of global restructuring, both negative and positive, as the world economy shifts its axis in directions which undermine historically powerful regions and present opportunities for development to hitherto significant ones* (Cooke, 1989: 13).

Likewise, Meegan (1989) notes that since the UK economy has always been a highly *open economy,* it is especially true that what happens locally is strongly influenced by international changes. The ratios of both imports and exports to Gross Domestic Product (GDP) have historically been high compared to other advanced industrial countries. Likewise, UK firms' investments overseas and foreign firms' ownership of UK enterprises are also relatively high. Harris (1988) argues that there are two ways to view the UK economy. One way is to think of the UK economy as a national entity where the different parts - the various industries, banks, sections of the labour force and so on - are bound together by relations which are internal and national. An alternative way is to see national cohesion as secondary, and to think of the UK economy as simply one site where the forces of a world-wide, supranational economy are in play. In effect, Harris's (1988) argument provides a useful analogy at the local level. On the one hand the local economy can be thought of as a distinct area where local economic processes are of prime importance. On the other hand, local linkages, such as those which may exist between a small town and its hinterland, may be secondary to those which are regional, national or international, perhaps due to the number of transactions being made via the information super highway.

*Changing ownership of the economy*

According to Cooke (1989), the rise in the number of Newly Industrialising Countries has posed a challenge to the competitive dominance of the advanced economies in certain key economic sectors over recent decades. For example, consumer electronics producers in the West have been unable to compete with producers from South East Asia and Japan. Cooke (1989) also points out that globalisation has involved the widening and deepening of markets, a two way process in which Western markets are increasingly extended, but also

penetrated by low cost LDC producers. Much of the growth in global finance activity reflects the growth in international division of labour in manufacturing.

Thrift (1988) argues that capital has become more footloose in both time and space and will continue to accelerate, noting three main effects of the internationalisation of capital that are likely to continue. First, exchange rates change every few hours, interest rates change more frequently, prices can be adjusted much more swiftly and companies now make investment decisions every year. Because the economic system has speeded up, multinational corporations now review the productivity of their plants much more frequently and if plants do not produce the required level of profits they are likely to shut down. Thus, there is a constant process of strategic rationalisation in which plants are set up and shut down more frequently than before, with all the consequences this has for the countries and areas where these plants are located.

*The second net effect is the growing interpenetration of capital as multinational corporations based in different countries have spread world-wide. For example, European direct investment has increasingly been directed to the UK and vice versa. Therefore the core industrialised economies have become more tightly integrated. The third net effect is that the borders of capitalist production have moved a little further out, now encompassing a few developing countries, the newly industrialised countries, partly through their own efforts and partly through the attention of the multinational corporations* (Thrift, 1988: 25-26).

### 2.3.1 Impacts of economic globalisation on localities

As Meegan (1989) notes, contemporary literature emphasises the increasing instability of local, regional and national economies in the face of global economic restructuring. In other words, the number of factors which are quite beyond local control are continually increasing. Core areas across the globe now compete with other core areas and hinterlands, with other hinterlands creating disparities intra-nationally and internationally. Thus, localities in the UK, even remote peripheral ones, are shown to be linked fundamentally to the global economic system in new and not always beneficial ways.

According to Castells and Henderson (1987), the development of the international economy, the dramatic growth of new information and communications technologies, and the formation of powerful trans-national organisations (linked by subordinated, decentralised networks), are crucial factors in the process that provides the structural meaning for each territory in terms of the functions it performs in the broader framework of interdependent operations.

*We certainly still have spatial forms, since societies and economies develop on a given territory and unevenly across the globe. Yet the logic and dynamics of territorial development are increasingly placeless from the point of view of the dominant organisations and social interests....However, while dominant interests may be losing their sense of place with regard to the development process, 'community' social relations and socio-political mobilisations continue to operate, for the most part, according to a local, place orientated logic* (Castells and Henderson, 1987: 7).

Cooke (1986) summarises local response to global economic restructuring as the rationalisation of employment brought about by the undermining of the UK's competitive base across many sectors of economic activity. This has lead to the factors listed in Figure 2.1.

- Reconcentration on the part of multi-locational companies

- Development of flexible systems of production (especially in motor vehicles and electronics and also producer services such as finance and insurance) For example, computer aided design, IT, improved attention to quality control and marketing.

- Increased use of subcontractors. For example, in insurance some tasks, such as selling are being allocated to freelance, sometimes home-based workers.

- Polarisation of the social structure of localities. For example, increase in the numbers and relative income levels of higher order service workers in buoyant localities.

- A heightened degree of localism in terms of electoral practices and policy formation. For example, local economic initiatives.

**Figure 2.1: Local response to global economic restructuring**

Source: Adapted from Cooke (1986)

It is clear from the analysis of its process and impacts that globalisation has been, and continues to be, the prevailing trend within economic activity. However, as Cooke (1986) notes, this is not to say that as a result all local economies are homogenous, on the contrary:

*The UK space-economy is changing dramatically but the details of how and why local variation is so great still require detailed theoretical and empirical investigation* (Cooke, 1986: 21).

A central paradox surrounding economic globalisation therefore seems to exist: Local economic processes are becoming more important despite the fact that globalisation is the prevailing trend. In effect, globalisation can be viewed in terms of the changing *ownership* of the economy, principally stemming from the trend of national and international investment in local areas. A second trend, which has not yet been discussed in any detail however, is the fact that the *structure* of the economy has also been changing. An examination of the changing structural base of the economy may in fact reveal a further reason why economic activity at the local level is of importance.

### 2.3.2 Changing structure of the UK economy

According to Stallings (1995) the decade of the 1980's brought important changes in technology, the organisation of production, and trading networks. Rapid innovations in micro-electronics, materials science, and biotechnology jointly led to what some have called a new technological revolution. This has made possible the transition from mass production to flexible specialisation, producing smaller batches of differentiated goods. Such developments have made it increasingly advantageous to spread developments around the globe. Harris (1988) describes how the new production, based on a fragmented labour force and information technology (computerisation of design and production), have been established in the 1970's and 1980's on an international rather than purely national basis. They are employed by multinational companies which, during this period of

structural change, have organised or reorganised their production on a world-wide basis with different parts of the production process carried out in different countries.

The changing structure of the UK economy can essentially be divided into three broad areas: technological Specialisation, a move towards service-based industry, and the increasing rate of firm formation.

*Technological specialisation*

According to Mair (1992) the onset of global instability in the mid 1970's brought a phase of accelerated spatial restructuring that continued unabated into the 1990's. As a result, many local and regional economies have been subject to profound recomposition (Scott and Storper, 1986). In some, deindustrialisation has removed their economic rationale, while in others there are new roles and new growth, often based upon economic sectors that have adopted new technological and organisational structures (high-tech, flexible specialisation) that may provide new growth impetus at the macro-economic level (Piore and Sabel, 1984). Curran and Blackburn (1994) note that the level of specialisation has increased within many sectors, with firms attempting to create a market niche by concentrating on a narrow range of services or products. According to these authors a major factor influencing the extent of local sales both between sectors and within sectors appears to be level of specialisation of the business. One important ramification of this is the more a firm specialises, the less likely it is that the local market can provide a sufficient demand for it outputs, other things being equal.

*Move towards service-based industry*

Keeble *et al.* (1991 and 1993) note that a new economic structure has emerged over recent years, with the rapid growth in information based business services such as management consultancy. Curran and Blackburn (1994) have found that business services appear to be

much less locally dependent than consumer services. Likewise, Massey (1988) argues that, at the local level services may very well perform an exporting role.

*There are many examples of local areas with service industries as their basic, that is, exporting, sectors. Some services may bring in income from quite a wide geographical area, sometimes including from outside the country* (Massey, 1988: 246).

However, it could be that consumer services have the greater influence over local economic activity. For example, it has already been noted by Keeble *et al.* (1992) that remote rural firms are more frequently serving consumer, retailing and tourist markets. Likewise, Williams (1994) study of Fenland firm markets reveals that over 84% of consumer services customers are located within the immediate locality, which implies that this sector is of key interest in terms of local economic development. In order to assess whether in fact this is a common trend, empirical work examining the local travel patterns of consumers, not only the firms themselves, is required.

*Increasing rate of firm formation*

Keeble *et al.* (1993) point out that the turnover, employment and stock of firms in a range of information-intensive services in the UK have grown at an explosive rate since the early eighties. Large firms in sectors such as management consultancy have recorded growth rates in turnover and employment of 20% to 30% each year during this period. The number of small firms has also expanded dramatically, with increases in the total stock of businesses of 83% for management consultancy, 74% for personnel recruitment and employment agencies and 30% for advertising and market research. Daly (1990) notes that the number of businesses registered for VAT rose by 87,000, an average of nearly 1,700 a week - compared with 1,200 a week in 1988 and 800 a week in 1987. The fact that the rate of new firm formation is continuing to increase could also have important ramifications for localities. For example, Curran and Blackburn (1994) have found that newly established firms tend to have more links with their locality than older, more well established businesses. The increasing rate of firm formation could therefore be increasing the

proportion firms serving localities, making the study of economic activity at a local level an important new area of interest.

## 2.4 Socio-economic trends

In the previous section it was noted how global trends have impacted on the economic activity of firms within localities. In the same way there are number of socio-economic trends which have had an impact on the local activity patterns of households. These are divided broadly into two areas. Firstly, there are structural changes which have taken place within the household itself and the associated changes in working-time patterns and in the amount of time and money devoted to leisure. Secondly, there are issues and trends in travel and transport and the development of telecommunications which have had an impact on local activity patterns. It is the aim of this section to review some of these key changes before moving on to assess their possible influence on economic linkages at the local level.

### 2.4.1 Household structural change

Potter (1995) describes a number of significant changes in the makeup of households and families since the Second World War. In particular there have been large increases in the number of people living alone. Over the period 1981 to 1991, the number of households containing four or more people fell from 18.1 to 15.6 percent whereas the number of people living alone rose from 21.7 to 26.7 percent. Gershuny, Godwin and Jones (1994) also note that the completed family size has declined, although only older working age people have fewer dependent children than previously and this is not the case for the younger age groups. It is now also the general case that women with young dependent co-resident children have jobs whereas previously they did not. In terms of employment patterns, these authors also note the continuing trend in the prevalence of self-employment

for men and the growing importance of women's discontinuous employment (movements between employment statuses).

As a result of such changes, the social and political economy of the household and the need to understand the connection between macro and micro level processes has come to the forefront of academic enquiry surrounding the contemporary household and family life. For example, between 1990 and 1992, the Economic and Social Research Council (ESRC) funded a British Household Panel Survey. The national study in which 10,000 respondents took part, focused on household organisation, the labour market, housing, income and wealth, health and socio-economic values. Between 1985 and 1990 the ESRC also funded a multi-institution, interdisciplinary research programme as part of the Social Change and Economic Life Initiative (SCEL). Teams from eleven universities co-ordinated three major surveys, conducted in six British travel-to-work areas. Central to the concerns of the research were the issues of the organisation of household economic behaviour, how this varies between sections of the population, and how it changes over the household's life course and over historical time. (Anderson, Bechhofer and Gershuny, 1994). Hakim (1987) and Rubery (1989 have also carried out surveys on labour market aspects, investigating the emergence and sectoral distribution of jobs with non-standard working-time patterns and Martin and Roberts (1984) study *Women and Employment* investigated women's hours of work and household arrangements. These surveys have revealed key changes in the household activity which may have had an impact on the pattern of local economic activity. The most important of these fall into two areas: working-time patterns and changes in the amount of time and money devoted to leisure.

*Working-time patterns*

According to Horrell *et al.* (1994), the pressures towards more flexible work patterns within the industrial system and changes in women's labour market participation patterns have had significant repercussions on working-time patterns. These include changes in the

average hours of work, changes in the predictability of working-time patterns, and changes in the spread of working time through the day, week and even year. These authors provide evidence of extensive and highly variable involvement in flexible and non-standard working in all types of jobs. Essentially, men and women may be involved in jobs requiring different types and degrees of flexibility but there is widespread involvement of both sexes in weekend, evening, shiftwork, overtime and working later than expected. There is also evidence of relationships between working-time patterns and household circumstances, from partners' working time to the presence of children. For example, women with 5 to 16 year-olds are more involved in flexible working patterns and forms of non-standard working such as weekend work. Likewise, there are indications that the presence of children also affects the working time patterns of men.

The Royal Commission on Environmental Pollution (1994) also note that the organisation of work is becoming more flexible and decentralised. For a number of reasons, including a shift from manufacturing to services and improvements in labour productivity, employment is now spread more thinly over a large number of establishments.

> *There have been increases in the numbers of self-employed, part-time workers, women workers and workers with more than one job. An increase in the number of workers without a fixed place of employment may help to account for the increase by a third in the late 1980's in the average number of journeys made on business, which now represent over a tenth of distance travelled* (Royal Commission on Environmental Pollution, 1994: 16).

This obviously has important implications for economic activity patterns within localities. If journey lengths associated with employment are increasing, it would follow that a higher proportion of labour is being 'sold' outside locality, weakening household linkages with local firms. Secondary to this there is also the pattern of transactions associated with commuting through the 'chaining' of journeys to serve several purposes. (These points will be examined in more detail in the following section). On the other hand, flexible working may well involve the need for fairly local employers due to the varied nature of working time-patterns, strengthening local linkages with firms. In the case of the purchase of goods

and services the impacts may be two fold. Firstly, a higher number of short trips to local shops and services may be made in order to accommodate flexible work patterns. On the other hand, less frequent visits may be made to larger regional centres or more non-local transactions made via telephone, fax, post or even Internet.

*Leisure-time and spending patterns*

As Morgensen (1990) points out, changes in time use alter the structure of demand and have repercussions on the industrial structure and employment. Therefore, household time use becomes an integral part of the economic system (Horrell *et al.* 1994). Krippendorf (1987) notes that shorter working hours have given people more leisure time. Indeed, since the middle of the nineteenth century, social scientists have charted factors such as reduction in hours worked and growth in statutory paid holidays as evidence of the growth of time available for leisure (Haywood *et al.* 1989). Between 1971 and 1995 the number of holidays of four nights or more taken by British residents increased by 43% (Office for National Statistics, 1997). The increase in the amount of time available for leisure may be contributory to the fact that further distances are being travelled to participate in leisure. The Royal Commission on Environmental Pollution (1994) note that 29% of all journeys are for leisure purposes, although this in fact represents 40% of the total proportion of distance travelled.

It is also noted that more and more money is being spent on leisure. As Krippendorf (1987) notes, leisure budgets have been rising at an explosive rate, much faster than all other expenditure. Essentially, travel and holidays come at the top of the spending list followed by, in order of importance, the car, television, the radio, gardening and pets, sport and camping, games and toys, hobbies and do-it yourself, theatre, cinema, education and entertainment, photography and film. According to Krippendorf, the upward trend in leisure consumption is expected to continue to rise in the coming years, with expenditure on other goods and services stagnating or even declining.

### 2.4.2 Current issues and trends in travel and transport

Transport is a subject of intense public interest in contemporary life. Central to the debate on transport policy is the need to reconcile the different requirements for a competitive economy, a healthy environment and freedom of choice. In relation to rural development, there are two opposing views as to the impacts of transport on economic activity. On the one hand, commentators and policy makers believe that one of the reasons for the slower development of rural areas is their peripheral nature in terms of the lack of transport accessibility. Within this argument is the issue of 'travel poverty', a complex concept, combining both 'absolute' and 'relative' needs. For example, shopping at a local market town might not seem satisfactory if neighbours are using a city which has a wider range of shops and goods.

*If some people increase their travelling, others might feel deprived of choice if they cannot afford to go as far. The needs of different industries for travel have further altered expectations and aspirations. The change from settled agrarian ways of life to more mobile 'post-industrial' demands from service sector industries, for example, has had a major impact on what is considered 'normal' travel* (Root *et al.*, 1996:4).

On the other hand, commentators such as Cullinane and Stokes (1997) argue that, although a good road network is essential in many respects, evidence suggests that improved road links do not necessarily lead to local economic growth, but can in fact draw economic development into cities which are already developed. Environmental impacts also lie at the heart of this argument, with major public concerns about air quality, climate change, land use and noise pollution. Current debates by professionals involved in transport and planning acknowledge that it is important to address rising car use because of its effects on the quality of life that everyone, both country and urban dwellers, will experience in the future (Root *et al.* 1996). Indeed, according to the Department of Transport (1996), the Government is committed to a sustainable transport policy.

The vast improvement in road transport that has taken place this century is at the core of the transport debate. It has been the policy of successive UK Governments in the 1970's and 1980's to 'invest' in more and more road building in an effort to improve the economy. As Cullinane and Stokes (1997) point out, one of the fundamental objectives of Government road building programmes has been to assist economic growth by reducing transport costs. As Headicar and Bixby (1992) note:

*Transport is simply a means of enabling links between activities at one place and another - between home and workplace for example, or between factory and warehouse. As these links are improved so firms and households will alter their location and behaviour to take advantage of the enhanced accessibility on offer* (Headicar and Bixby, 1992: 10).

Following from this, there are three important trends in travel and transport which are of interest to local economic linkages: the growth in car ownership, the associated increase in journey lengths, which have both occurred particularly significantly in rural areas, and the development of telecommunications technology.

### 2.4.3 The growth in car ownership

One of the most predominant changes which has taken place this century is the increase in car ownership. In the UK the number of licensed cars and light vehicles has increased from 2.5 million in 1950 to 19.2 million in 1987 (Department of Transport, 1988). In 1965 36% of households had one car and 5% had two cars. By 1990 this had increased to 44% and 19% respectively (Department of Transport, 1993). As Bannister (1989) points out, the car has facilitated access to the village and migration to and from rural areas. Mobility in rural areas is now dominated by the car, offering transport at a level of convenience far exceeding any mode of public transport. In fact Cloke *et al.* (1994) note that it is the high levels of car ownership which is the hindrance to any viable form of public transport in rural areas. There are 1.2 cars per household in rural areas with 0.58 cars per adult, in comparison to the national figures for car ownership of 0.83 and 0.42 respectively (Department of Transport, 1988). In 1989/91 as many as 37 per cent of rural households

had two or more cars, whereas in urban areas this was 21 per cent. However, it is important to note that 23 % of rural households had no cars. During the same period 87 per cent of the mileage travelled by rural residents was by car, compared with 77 per cent for those living in urban areas (Department of Transport, 1993).

Figure 2.2 illustrates that travel in and around rural settlements is not only at a higher level than in urban settlements but is also more dependent on access to a car. The 1991 Population census shows that, in a very rural county such as Devon, 51.2 per cent of households have one car and 31.9 per cent have two or more cars, compared to 43.7 per cent and 23.9 percent respectively for England.

| Mode | Rural Settlement | Urban Settlement |
|---|---|---|
| **Car driver** | 4,890 | 2,881 |
| **Car passenger** | 3,046 | 1,878 |
| **Other private** | 355 | 218 |
| **Rail** | 311 | 429 |
| **Local bus** | 194 | 285 |
| **Other public** | 186 | 207 |
| **Walk (over 1 mile)** | 157 | 247 |
| **All modes** | **9,140** | **6,145** |

**Figure 2.2: Average number of miles per person per year by mode of transport**
Source: Stokes (1995a)

It has been argued that settlement size provides a key to the likely levels of travel generated by urban settlements, with self containment and so less travel tentatively linked to medium sized settlements of about 25,000 people (Bannister, 1992). According to the Department of Transport (1994), this pattern may now be increasingly obsolete, as there is some evidence that average yearly distance travelled has become broadly similar for the whole population, irrespective of the type or size of settlement where they live. Thus, in the context of local activity patterns access to both a private car and public transport is

obviously an important factor. Presumably it is those rural dwellers with access to a private vehicle which are more likely to travel further afield, and those reliant on public transport or lifts who are likely to be dependent on their local settlement. Conceivably though, it may be the case that those without a private car find it easier to gain access to the nearest regional centre or large scale shopping centre because of better public transport networks to these centres.

### 2.4.4 Increasing journey lengths

Over the 20 years from 1965, National Travel Survey (NTS) data shows a 61% growth in total person - km of travel. More detailed analysis by Root *et al.* (1996) suggests that 4 % of this growth is due to increased population, 22 % is due to more journeys and 35% is due to longer journeys. This implies that around 60% of the growth in travel has been due to people travelling further, rather than making more journeys. According to Hopkinson and May (1990), the increase in average journey length has been due to the growth in car ownership, the increase in incomes leading to widespread commuting, the development of larger units for a wide range of activities and the reduction of journey costs stimulated by transport policy. The NTS results indicate that the largest growth in journey length has been for work journeys (at 58%), with that for other purposes nearer to 20%. Root *et al.* (1995) note that journeys to work have increased from 20 miles per day in 1977 to 41 miles per day in 1995. An increasing number of these work journeys are made by car, in 1991/93 55% of the working population in Great Britain drove to work by car (if car passengers are included the proportion increases to 65%). Commuter mileage per worker per year has also increased, by 12% between 1985/86 and 1991/93, but those miles driven by car have increased by 27% for both car drivers and passengers. (Root *et al.* 1996).

Another important observation to be made is that, although average journey lengths have increased, most journeys by car drivers are short - about 60 per cent are under five miles

and a quarter are under two miles. Only 4 per cent are between 25 and 50 miles, and less than 1 per cent are over 100 miles (Department of Transport, 1996). Evidence from the 1989/91 National Travel Survey indicates that the majority of journeys undertaken by all modes of transport are between 2 and 5 miles in length: 279 journeys per person per year as opposed to 101 journeys of between 10 and under 25 miles. (Department of Transport, 1993). Trip making in rural areas is of similar scale to that elsewhere - 13.9 journeys per person per week as compared with 13.1 journeys per person per week in urban areas. However, the total distance travelled is some 40 per cent higher than urban levels, and these higher levels are apparent across all sectors of the population. Consequently, average trip lengths are also greater in rural areas - 15.4 kms in rural areas, 11.7 kms in urban areas and 12 kms on average (Banister, 1989). The question is posed therefore as to the implications of these trends for the spatial pattern of economic activity in rural areas. It could be that it is mainly labour flows that are going outside the locality. In fact, evidence shows (see for example, Parr, 1987) that larger cities experience net in-commuting and smaller towns experience net out-commuting, which may have an important influence on shopping patterns.

### 2.4.5 The development of telecommunications technology

Technological developments to be considered which may have an impact on the pattern of transactions are associated with the growing prevalence of telecommuting and the new emerging forms of teleshopping. As Fritz *et al.* (1995) note, the current merging of computer and telecommunications technologies is facilitating the trend towards telework-remote work arrangements enabled by information technology. Handy and Moktharian (1996) point out that organisations today have ever increasing options in the management and distribution of their work processes, and in the USA planners often advocate telecommuting as a transportation demand management strategy. These authors also highlight the need for further research into the trends and impacts of telecommuting. The

tasks performed by telecommuters are also expanding. While the early telecommuters performed repeated transactions such as processing insurance claims at home, today's telecommuters can perform almost any task that they do in the office (Tung and Turban, 1996).

In the case of teleshopping, a recent example is the development of the Tesco Home Shopping Service, whereby items can be ordered via Tescos web site. The groceries are then delivered by the company directly to the household. The linkage therefore remains, although the number of physical journeys made in order to carry out the transactions is reduced. Cairns (1995a) also notes some teleshopping delivery schemes which have been in operation over the last decade or so. For example, 'Gateshead Shopping and Information Service' was set up in 1981 to help those with mobility problems. Orders were placed via terminal in community centres and subsequently delivered by Tesco staff. Other examples include the tele-ordering and home delivery grocery service run by Peadpod in Chicago and San Francisco, and the 'Stock Your Larder Scheme' set up in Taunton in 1993.

Hopkinson and May (1990) show that technological developments in telecommunications and information technology are providing the possibility for a new form of relationship between travel and activity. In the closely related fields of telecommunications services, such as video-conferencing, remote working and teleshopping, three competing claims for the effects of new technology on travel demand have been put forward. Firstly, it is suggested that telecommunication technology would act as a substitute for travel. This would obviously have important implications for the spatial patterns of economic activity. It may be that there are now an increased number of teleworkers working from home, able to live a significant distance from firms and clients. This may weaken linkages with local firms. On the other hand, not having to commute long distances may in fact strengthen local economic linkages because a higher proportion of shopping can be carried out, and services utilised, close to the place of residence as opposed to the place of work.

Secondly, it is suggested that an increase in the use of electronic based communications is likely to lead to an increase in the demand for travel, either as previously time-consuming activities are capable of more rapid transactions or as the technology itself identifies new opportunities and possibilities. Again, there are some important implications, either in the form of stronger linkages with leisure services, or through an increased number of short journeys being made to access local shops and services, as opposed to a single longer journey being made to out-of-town supermarkets or regional centres during leisure time. A third claim is that there is no single direction of change and that substitution and generation can occur, leading to alterations in the organisation of daily activities and trip making and possibly longer term processes such as decisions on where to live and work. As Hopkinson and May (1990) point out, there is little or mixed empirical support for any of these claims.

A common theme which is important to note in relation to these three factors is that the private costs of transactions have essentially decreased, possibly leading to a more dispersed pattern of transactions in rural areas. Local economic linkages between the consumer and enterprise sector have therefore potentially weakened as a result. The following section moves on to assess whether in fact this has been the case.

### 2.4.6 Impacts of trends on activity patterns

The main aim is to examine whether local economic linkages in the form of the sale of labour and the purchase of consumer goods and services have become weaker, or in fact stronger, as a result of the trends discussed. A summary of the findings is presented at the end of this section before moving on to present further empirical evidence of linkages.

Curtis (1996) has found work journeys to be a very important feature in the regular travel patterns of selected households in Oxfordshire. Figure 2.3 illustrates the extent to which residents in the five settlements surveyed had workplaces at locations other than their home town.

| Workplace | Botley | Kid'ton | Bicester | Didcot | Witney |
|---|---|---|---|---|---|
| Home town | 10 | 22 | 18 | 16 | 21 |
| Oxford City | 53 | 48 | 22 | 15 | 26 |
| Remainder of Oxfordshire | 21 | 22 | 23 | 34 | 33 |
| External Metropolitan | 10 | 5 | 24 | 27 | 10 |
| External Other | 6 | 4 | 13 | 8 | 10 |

**Figure 2.3: Workplace location in the Oxfordshire survey area**
Source: Curtis (1996: 61)

Overall it was found that work purposes contributed to 57% of all regular journeys but 81% of total distance travelled. Variations were also found according to distance by location. In locations closest to Oxford a smaller proportion of all regular journeys were made by car (67% at Kidlington and 78% at Botley). Conversely, adults in the more peripheral locations undertook a higher proportion of all regular journeys by car with those at Bicester being almost entirely car dependent. The data presented in Figure 2.3 indicates that only a relatively small number people in these five settlements, between 10 and 22 per cent, work in their home town with a significant amount commuting elsewhere in the county and beyond. Indeed, nationally commuting accounts for 19 % of both total journeys per person per year and total travel distance for all purposes (Department of Transport, 1993). According to Cullinane and Stokes (1997), the process whereby rural areas close to major cities become commuting zones often changes rural communities completely.

*Previously more-or-less self-contained communities become literally 'dormitory towns' where people go home to sleep and perhaps do little more* (Cullinane and Stokes, 1997:18).

Studies have shown that people who commute elsewhere to work spend much of their wages elsewhere too, so they have a much smaller economic multiplier effect on the local economy. (See, for example, Stabler and Rounds (1997); Errington (1997b)).

As was noted in Chapter One, there is evidence that the proportion of 'white collar' or service sector workers moving to rural areas is increasing (McLaren, 1995), a well recognised strand of counterurbanisation. According to Root *et al.* (1996), 'white collar' workers, particularly professionals and managers, tend to travel greater distances than other workers. The greater amount of travel being largely due to people with portable but specialised skills tending to have higher participation in national, rather than local labour markets. Thus, it may be the case that the prevalence of service sector activity in the 'accessible' south east causes a higher rate of commuting. In turn, this may also cause the smaller settlements to become less self-supporting with the loss of local shops and other facilities.

*Telecommuting*

Recent evidence from a large-scale Telecommute Pilot Project in California, USA, (where telecommuting is defined as the performance of work outside the traditional central office, either at home or at a neighbourhood centre close to home), indicated that telecommuting is an effective trip reduction measure (Kitamura, Goulias and Pendyala, 1990). The key findings implied commuting trips are reduced without resulting in an increase in non-work trips; and that household members of telecommuters do not increase car use even when additional family cars may become available for their use. Henderson and Mokhtarian (1996) found that the number of vehicle miles was reduced significantly as a result of centre-based telecommuting (from 63.25 miles per person per day on non-telecommuting days to 29.31 miles on telecommuting days). However, the number of personal vehicle

trips did not change significantly. Saxena and Mokhtarian's (1997) study into the impact of telecommuting on the activity spaces of participants showed that 86 percent of telecommuters' activities were performed closer to home than work, compared to 56 percent on normal commuting days. Destinations on telecommuting days were more evenly distributed in all directions around the home, whereas a majority of destinations on commuting days were orientated toward the work location. The evidence from all three American studies suggests that telecommuting may in fact strengthen local economic linkages in respect of shopping and accessing services although employment linkages are likely to be weakened if labour is being 'sold' outside the locality.

According to Root *et al.* (1996), however, the trend away from self-contained local economies in the UK has become well established although the growth of travel is not yet affected by working from home or 'teleworking', which currently affects about six per cent of Oxfordshire residents (Oxfordshire County Council, 1994).

*Given these figures it looks unlikely that 'teleworking' will greatly reduce demand for travel in the foreseeable future* (Root *et al.* 1996: 10).

*Shopping behaviour*[5]

It is widely believed that modern shopping patterns have reduced the number of shopping trips. In fact there are more shopping trips, they are longer, and more are by car (Raven and Lang, 1995). According to the 1975/76 and 1989/91 National Travel Surveys, the average annual shopping trips increased by 28 per cent. The total distance travelled for shopping increased by 60 per cent over the same period. Whitelegg (1995) shows that new developments designed to fulfil the retailer's desire to increase retail floor area, and therefore sales, have occurred at greater distances from traditional retail areas in town centres. One obvious result is that shoppers are being encouraged to travel greater distances to reach these new stores. Results from a survey indicate that trip rate to stores

[5] To provide a background to this discussion, Appendix A contains some national trends in household consumption and expenditure

increases as retail floor area (RFA) increases, which also correlates with increasing distance from the town centre. Town centre locations were shown to have 3,875 trips per day, increasing to 8,956 trips per day for edge-of-town sites. Raven and Lang (1995) show that the total distance travelled by consumers to edge-of-town store locations is over twice that travelled to town centre stores. This may indicate, therefore, that rural dwellers are more likely to visit an out-of-town store as opposed to a town centre store, weakening the linkages with the town itself. However, there is evidence to suggest that this may not be the case. The Department of Transport (1993) note that 18% of all journeys per person per year are associated with shopping, although when considered in terms of travel distance by journey purpose, this figure falls to 11%. This would indicate that, in comparison to commuting journeys, people travel shorter distances to shop than they do to work. In turn, this could imply that despite the socio-economic trends noted, shoppers are continuing to use their local centres for the bulk of purchases. Indeed, survey data analysed by Cairns (1995b) suggest that most people do shop locally.

*According to the 1993 TGI survey, 64.9% of housewives go to a store less than 2 miles away for regular major shopping, with only 4.2% travelling more than 10 miles. ....Telephone surveys calculated that 62% of car shoppers use the nearest store to their home for main food shopping* (Cairns, 1995b: 3).

Research undertaken in Oxfordshire by this author also indicates that those visiting out-of-town superstores do not necessarily travel further. Figure 2.4 illustrates that, in Witney, 92 per cent of people shop in the town centre, yet average distances travelled are longer than those in Kidlington, Bicester and Didcot, where more than half the shopping trips made are to out-of-town stores. Cairns also shows that town centres attract more frequent trips than out-of-town centres, whilst intra-urban, or edge-of-town centres, actually attract the most frequent visits of all. There is also agreement over the predominant use of the car for shopping trips. Raven and Lang (1995) note that over three quarters of total mileage for shopping is now by car, while only one in fourteen miles of shopping journey is on foot. Indeed, according to Cairns (1995b), although town centre locations enable people to combine food shopping with other activities, they are still likely to visit by car.

| Settlement | Base % of trips | Town centre | Out of town | Ave dist (miles) | Ave time (mins) |
|---|---|---|---|---|---|
| Botley | 100 | 42% | 58% | 3.64 | 11.84 |
| Kidlington | 100 | 49% | 51% | 2.42 | 9.33 |
| Bicester | 100 | 23% | 77% | 2.24 | 6.43 |
| Didcot | 100 | 28% | 72% | 2.10 | 7.13 |
| Witney | 100 | 92% | 8% | 2.67 | 9.02 |

**Figure 2.4: Oxfordshire data: Where people shop and journey lengths**
Source: Cairns (1995a)

As noted by the Royal Commission On Environmental Pollution (1994), a strong trend has been the 'chaining' of journeys to serve a number of purposes in succession. For example, the journey to work may be combined with delivering one or more children to school or from playgroup; the journey home from work may be combined with collecting children and shopping. Cairns also points out that food shopping is often carried out on the way to, or from, another activity and there are a significant number of people who do combine trips, in some cases as many as 30-50 per cent (Cairns, 1995a). MacIver and Dickinson (1992) estimated that 25-40% of trips to four out-of-town stores were of a pass-by-nature, noting that the most common combination of activities involved shopping on the way back from work. Likewise, research in Swindon indicated that trips combining food shopping with other activities constituted 24% of town centre shopping visits, compared with 35% and 38% at edge-of-town and out-of town locations.

## 2.5 A Rationale for research

This review has considered some of the influences that global restructuring and contemporary socio-economic trends are having on the spatial patterns of economic activity in rural areas, both in terms of production and consumption. A key implication of the trends discussed is that they are likely to be weakening economic linkages at the local

level, and more specifically, weakening the relationship between small towns and their surrounding areas. This in itself presents a clear rationale for research into the contemporary functions of small towns and an assessment of their potential role in rural development. A further summary of the key findings highlights the need for research into economic activity at the local level:

- Some establishments are likely to be more closely tied to locality than others. Therefore in order to formulate effective local economic policy, these types of establishment need to be identified.

- It is important to identify the types of transactions which are likely to be of a local nature in order that attempts can be made to minimise the social costs of transactions.

- Transactions made through the telecommunications network may be leading to the widening of some localities and the depletion of others, although little empirical evidence is available on which to base such claims.

- Despite the influence of globalisation, spatial variations between localities, for example with firms specialising in different market niches, continue to be great. Such variations highlight the need for local policies, which require primary research to aid in their formulation.

- The increasing prevalence of commuting could well be having the effect of weakening linkages in and around small towns, not only in respect of the flows of labour to outside firms, but also due to the secondary impact that commuting has on purchasing patterns. Journey 'chaining' could well be causing local income leakage through transactions being carried out outside of locality.

- Telecommuting may well be strengthening local economic linkages in respect of shopping and accessing services, although employment linkages are likely to be weakened if labour is being 'sold' outside the locality.

- Transactions involving convenience purchases continue to be fairly localised, despite the influence of out-of-town superstores. However, more information is

required on the number and value of such transactions in order to their relative influence on local income generation. Likewise, the spatial patterns of both low order and high order purchases need to be explored further to assess their relative impact.

## 2.6 Empirical evidence of economic linkages

A key implication of the previous discussion is that certain types of firm and household are likely to be more strongly tied to their locality than others. For example, in the case of enterprises, it is evident that there are important variations between types of rural area and industrial classification. The increasing rate of firm formation also poses an important question with regard to the influence of firm age on corporate spatial activity. Likewise, in the case of consumers, the level of car ownership is clearly an important influence on local activity patterns, as is place of work and household structure. This final section aims to examine if this is in fact the case. Indeed, if certain types of establishment do show a higher degree of local economic integration than others, this will have implications for policies aimed at facilitating development and growth at the local level. The following review of existing empirical evidence is divided into two sections: analysis at firm, or enterprise, level and analysis at household, or consumer, level.

### 2.6.1 Analysis at firm level

A key study of relevance to this review is the ground level approach adopted by Curran and Blackburn (1994), which by focusing on substantive relations between people and businesses in real localities, has clear implications for policy making. In their study, two main samples were constructed for two different research products. One was concerned with small firm-large firm relations in two contrasting local economies: Kingston upon Thames and Sheffield, and the second with small service sector firms in five other localities: Guildford, Doncaster, Islington, Nottingham and North East Suffolk. To this

end, 410 small businesses and 16 large enterprises / public sector organisations were drawn from seven contrasting localities. The following review of the empirical evidence of economic linkages highlights the salient findings of Curran and Blackburn's study, as well as considering the findings of Curran and Storey (1993); Keeble *et al.* (1992); Gripaios *et al.* (1989); Williams (1994); and Harrison (1993). To provide a clear structure, it is presented under the following sub-headings:

- Small vs. large firms
- Local businesses vs. branch plants
- Newly established vs. mature firms
- New technology vs. traditional firms
- Remote rural vs. accessible rural firms
- Service business vs. manufacturing firms
- Business services vs. consumer services
- Agricultural vs. non-agricultural firms

*Small vs. large firms*

On average, the businesses in Curran and Blackburn's (1994) study showed a high degree of local dependence for their sales, selling almost two thirds of their output locally, that is, within a radius of ten miles. Conversely, almost a third of the firms' sales went outside the locality and just under 3% was exported outside the UK. However, the study did indicate differences according to the size of establishment.

*Small businesses do not behave like large businesses and their relations with locality show two distinct characteristics. Different kinds of small businesses display their sectoral character by having their own 'localities' where their markets, though not usually their suppliers, are often spatially proximate* (Curran and Blackburn, 1994: 183).

These findings are similar to those revealed by Errington's (1994a) baseline study of the Lambourn Valley[6]. Figure 2.5 illustrates that small firms with a workforce of between 2 and 4 persons were more closely tied to the immediate locality in terms of sales than were

[6] The findings presented are based on supplementary analysis of the Lambourn study data undertaken by the author.

larger firms. 32.5 % of such firms' customers, were found to be in the immediate locality in comparison to 0.0% for firms with more than 30 employees, and a mean of 25.0% for all firms surveyed. In terms of inputs, the differences were not so clear, although there was a tendency for larger firms to source their supplies more readily from the international economy. Harrison's (1993) study of agriculture's links with the rural economy also revealed that smaller farms had greater links with the Reading province than large farms, most likely due to the fact that the former would be purchasing or selling sufficient quantities to cover the higher transport costs of transacting over a longer distance.

| % OF SALES | Within Locality | Within Region | Elsewhere UK | Elsewhere EU | Outside EU |
|---|---|---|---|---|---|
| **Workforce size: 1** | 28.4 | 58.4 | 12.8 | 0.3 | 0.0 |
| **2-4** | 32.5 | 35.2 | 27.3 | 3.2 | 1.7 |
| **5-9** | 22.2 | 42.4 | 38.3 | 1.9 | 1.6 |
| **10-30** | 20.9 | 32.3 | 40.5 | 2.9 | 3.3 |
| **More than 30** | 0.0 | 25.3 | 70.6 | 7.3 | 7.3 |
| **All firms** | 25.0 | 40.0 | 32.9 | 2.5 | 2.0 |
| % OF INPUTS | | | | | |
| **Workforce size: 1** | 10.6 | 47.5 | 41.8 | 0.0 | 0.0 |
| **2-4** | 11.0 | 40.6 | 35.7 | 3.1 | 7.3 |
| **5-9** | 9.4 | 57.1 | 20.3 | 6.8 | 6.3 |
| **10-30** | 12.3 | 42.4 | 35.6 | 6.0 | 3.6 |
| **More than 30** | 0.0 | 6.6 | 57.4 | 19.4 | 16.6 |
| **All firms** | 10.2 | 44.9 | 33.5 | 5.0 | 5.6 |

**Figure 2.5: Geographic structure of Lambourn firm markets:** by size of firm

Another interesting finding from the Lambourn study was that the region (Berkshire, Oxfordshire and Wiltshire) is the most important geographical area in terms of both sales and inputs for all firms of differing sizes across all economic sectors.

On the basis of available evidence therefore it would appear that small firms exhibit stronger linkages to locality, certainly in terms of sales, than do larger firms.

*Local firms vs. branch plants*

In their Plymouth study, Gripaios *et al.* (1989) found that all branch plants purchased less than 25% of their output locally and appeared to have only limited integration with the local area. The postal survey revealed that the branch plants in the high technology sector tend to purchase service services from other branches in the organisation. On the supply side a more varied response emerged, with one firm taking 60% of services from the local area and another taking 100%. Dobson's (1985) study of manufacturing linkages in Devon and Cornwall also showed a similar pattern. For both outputs and inputs, proportionately more independent than externally owned manufacturing plants attributed a substantial amount of business to the local area. Errington's (1994a) study of the Lambourn Valley does not strongly support the local sourcing case of independent firms, as is evidenced by Figure 2.6. However, the findings do suggest that independent firms show a higher degree of integration in terms of sales, at both local and regional levels. Firms with no other sites attributed 27.4% of sales to the locality and 41.2% to the region.

| % OF SALES | Within Locality | Within Region | Elsewhere UK | Elsewhere EU | Outside EU |
|---|---|---|---|---|---|
| **Business no other sites** | 27.4 | 41.2 | 30.0 | 1.8 | 1.8 |
| **Firm HQ with sites elsewhere** | 13.5 | 37.8 | 42.3 | 3.9 | 2.6 |
| **Branch plant with HQ in UK** | 12.5 | 37.5 | 51.0 | 4.5 | 2.0 |
| **Branch plant with HQ abroad** | 0.0 | 22.5 | 52.5 | 15.0 | 10.0 |
| **All firms** | 23.8 | 40.1 | 34.1 | 2.6 | 2.1 |
| **% OF INPUTS** | | | | | |
| **Business no other sites** | 11.3 | 44.4 | 35.1 | 4.3 | 3.8 |
| **Firm HQ with sites elsewhere** | 10.0 | 62.0 | 27.8 | 0.0 | 0.2 |
| **Branch plant with HQ in UK** | 1.0 | 25.0 | 37.5 | 9.5 | 26.5 |
| **Branch plant with HQ abroad** | 15.0 | 10.0 | 30.0 | 45.0 | 0.0 |
| **All firms** | 10.2 | 43.5 | 34.5 | 5.3 | 5.8 |

**Figure 2.6: Geographic structure of Lambourn firm markets:** by firm ownership

On the basis of the evidence presented, it would appear that independent, locally based firms, are more strongly tied to locality than branch plants of national and multi-national corporations.

*Newly established vs. mature firms*

A theme brought out in Curran and Blackburn's (1994) empirical analysis of local sales is the positive relationship between market dispersal and age of the business. According to these authors, newer businesses were more likely to begin by serving local customers, but as they develop a market niche they will begin to sell over a wider area. Older businesses in the study were more likely to have developed a wider geographical customer base although this is strongly contingent on sector. One finding illustrating this point was the more extensive trading patterns by the electronics firms in Kingston compared with those in Sheffield.

*New technology vs. traditional businesses*

The most salient finding of Curran and Blackburn's (1994) study is that the most rapidly expanding kinds of firm making use of information technology to carry out business, are much less likely to be tied to locality. In particular, local suppliers were of little importance to independent, high tech firms in the locality, with less than 25% selling their output to local firms.

*Using modern communications they deliver their 'products', often intangibles involving knowledge manipulation rather than tangible objects, and maintain contacts with other businesses quickly and effectively, increasingly regardless of spatial considerations* (Curran and Blackburn, 1994: 183).

On the basis of Curran and Blackburn's argument we might hypothesise that new businesses are more closely tied to locality than more established firms although, this is not likely to be the case if the new business is of a high technology nature, carrying out a large number of transactions via the telecommunications network. In this case, more

traditionally based firms, delivering 'tangible' goods and services are likely to exhibit stronger links to locality.

*Remote rural vs. accessible rural firms*

Keeble *et al.'s.* (1992) study surveyed over 1100 enterprises operating in England's 'remote' rural, 'accessible' rural and urban areas, using intensive face to face interviews and a postal questionnaire. The main findings of the research were that most rural enterprises are relatively new, small businesses, which are independent and locally formed, reflecting a vigorous recent process of new firm formation in England's rural areas.

The limited local markets and supplier base of the less-populated rural area in Keeble *et al.* (1992) study clearly suggests that rural businesses are more likely to serve distant, non-local markets and to be forced to purchase inputs from outside the locality, than their urban counterparts. Local sales of up to 10 miles were shown to account for 16%, 12% and 23% of remote rural, accessible rural and urban business markets, respectively, with percentages of local purchases being 12%, 16% and 24% respectively. Markets 'elsewhere in the UK' were shown to account for 50% of remote rural firms sales, 47% for accessible rural firms but only 40 % for urban firms. Equivalent mean purchasing proportions were 52%, 39% and 40%. Thus, differences between the two types of rural area are not great, although on balance we find that the activity patterns of accessible rural firms are marginally more spatially proximate than are those of remote rural firms. This would suggest that remote rural firms appear to exhibit slightly weaker links with locality than those located in accessible rural areas. Indeed, this ties in with the findings of Blackburn and Curran (1993) who found that businesses in the more remote rural areas were not more locally dependent:

> *If anything, firms in the more remote areas were reaching outside their locality for their sales. Of the firms in the more rural areas, 14.6 per cent were selling 75 per cent or more of their services outside the locality in comparison with 6.7 per cent in the less rural areas of North East Suffolk, although this difference was not statistically significant* (Blackburn and Curran, 1993: 187-188).

On the basis of available evidence, it would appear that firms in 'accessible' rural areas are likely to be more strongly tied to their locality than those in 'remote' rural areas.

*Service business vs. manufacturing firms*

In a case study of the Fens undertaken by Williams (1994), examining the relative extent to which the service sector brings in income from outside and the extent to which it sources its inputs locally, 'locality' was defined as within a 20 mile radius of the establishment. The postal survey of all 728 business establishments on the register of commercially rated premises revealed that the service sector is more local market orientated than the manufacturing sector in the Fens. The differences between the two sectors are clearly portrayed by the data in Figure 2.7. Sixty eight percent of local customers and 45% of local suppliers for service based firms compares to only 39% and 27% respectively for manufacturing firms.

| SOURCE OF CUSTOMERS | % Within Locality | % Within Region | % Within UK | No. of Firms |
|---|---|---|---|---|
| Primary | 56.4 | 61.4 | 100.0 | 7 |
| Manufacturing | 39.9 | 58.3 | 97.0 | 84 |
| Construction | 52.4 | 87.9 | 99.1 | 18 |
| Services | 68.3 | 84.5 | 98.3 | 149 |
| Producer Services | 51.8 | 70.7 | 98.0 | 54 |
| Consumer Services | 84.1 | 92.6 | 98.0 | 54 |
| Mixed prod/cons Services | 73.1 | 94.2 | 99.5 | 41 |
| **All Industries** | **57.4** | **75.8** | **98.3** | **256** |
| **SOURCE OF SUPPLIERS** | | | | |
| Primary | 63.6 | 86.4 | 98.5 | 7 |
| Manufacturing | 27.1 | 45.0 | 90.1 | 84 |
| Construction | 41.4 | 71.1 | 98.3 | 18 |
| Services | 45.3 | 63.3 | 95.2 | 149 |
| Producer Services | 37.4 | 56.3 | 91.9 | 54 |
| Consumer Services | 44.2 | 61.1 | 96.6 | 54 |
| Mixed prod/cons Services | 61.4 | 75.7 | 97.7 | 41 |
| **All Industries** | **39.2** | **58.3** | **93.8** | **256** |

**Figure 2.7: Geographic structure of Fenland Firm Markets, March 1990**

Source: Williams (1994: 77)

Likewise, Curran and Blackburn (1994) found that manufacturing firms sold 56.4% of their output locally, whilst for services the figure rose to 67.3%. According to Williams

(1994) services also play a major role in hindering the leakage out of the Fens economy. This occurs, first, by local services substituting for imports and, second, by services retaining that spending of Fenlanders in the locality which would otherwise be spent outside.

*Although the service sector generates a relatively smaller proportion of its income from outside the local economy than other sectors it has higher multiplier effects because a greater percentage of its inputs are sourced locally..... Given that the service sector makes an important contribution to local economic development both in its role as an external income generator and as an enterprise which prevents income leakage, this has implications for local economic policy. If the service sector is to be employed to revitalise local economies, then local economic policy will first, have to change its attitude towards both local economic development and the service sector and, second, detailed empirical research to advise policy decisions will need to be implemented* (Williams, 1994: 78-79).

*Business services vs. consumer services*

A major aspect highlighted by the findings of Curran and Blackburn (1994) on trading patterns was the large variation in the 'shapes' of the markets within the locality in which the businesses operated. The local market served by small advertising, marketing and design agencies, for example, was very different to that served by small video hire outlets. The latter's geographical coverage was often confined to private consumers in a few streets in any direction from the outlet, while the advertising, marketing and design agency would not only cover a wider local area, but, more importantly, its local business to business transactions often provided only a minority of its turnover. In other words, its spatial focus would be very much less concentrated than that of the video hire outlet (Curran and Blackburn, 1994). As Figure 2.8 illustrates, firms in consumer services, such as video hire, health studios and clubs, free houses, wine bars and restaurants, were, as expected, tied very closely to local markets. Firms in business services, such as advertising, marketing and design; employment, secretarial and training agencies; and computer services, showed a much lower level of local sales. Likewise, Williams (1994) study showed a similar trend, with the locality providing 84.1 % of customers and 44.2 % of suppliers for consumer services, compared with 51.8% and 37.4% respectively for producer services.

| Enterprise | Average local sales | Average sales rest of UK | Average export sales |
|---|---|---|---|
| Printing | 79.6 | 20.2 | 0.2 |
| Electronics | 32.9 | 56.2 | 11.0 |
| **Manufacturing Sector** | **56.6** | **37.9** | **5.5** |
| Advertising, Marketing & Design | 37.8 | 58.5 | 3.7 |
| Computer Services | 37.5 | 57.7 | 4.8 |
| Free houses, Wine Bars & Restaurants | 61.6 | 32.8 | 5.7 |
| Garages | 79.8 | 20.2 | 0.0 |
| Plant and Equipment Hire | 82.4 | 17.4 | 0.2 |
| Video and Leisure | 81.9 | 18.0 | 0.2 |
| Employment Agencies | 93.9 | 6.1 | 0.0 |
| **Service Sector** | **67.3** | **30.6** | **0.0** |
| **All** | **65.7** | **31.7** | **2.6** |

**Figure 2.8: Geographical sales patterns and types of enterprise**

Source: Curran and Blackburn (1994: 78)

The findings of Curran and Blackburn (1994) and William's (1994) are supported by those of Errington (1994a), as Figure 2.9 illustrates. In the case of the Lambourn Valley, 47.4 % of consumer service customers and 11.5 % of suppliers were found in the immediate locality, in comparison to only 7.6 % and 7.1 % for business services respectively.

| % OF SALES | Within Locality | Within Region | Elsewhere UK | Elsewhere EU | Outside EU |
|---|---|---|---|---|---|
| Agriculture | 1.6 | 73.8 | 24.3 | 0.3 | |
| Manufacturing | 11.0 | 48.3 | 25.2 | 8.6 | 7.1 |
| Construction | 46.7 | 38.3 | 15.0 | 0.0 | 0.0 |
| Consumer services | 47.4 | 35.6 | 19.6 | 0.7 | 0.0 |
| Business services | 7.6 | 33.8 | 57.0 | 3.0 | 2.1 |
| Other services | 43.1 | 36.9 | 18.9 | 0.8 | |
| **All firms** | **27.7** | **41.1** | **29.5** | **2.3** | **1.5** |
| **% OF INPUTS** | | | | | |
| Agriculture | 2.1 | 89.3 | 8.2 | 0.0 | 0.3 |
| Manufacturing | 2.8 | 13.9 | 64.6 | 9.3 | 9.3 |
| Construction | 1.8 | 80.6 | 17.5 | 0.0 | 0.0 |
| Consumer services | 11.5 | 49.7 | 33.0 | 2.7 | 0.0 |
| Business services | 7.1 | 29.1 | 33.4 | 16.5 | 13.7 |
| Other services | 11.5 | 53.9 | 27.9 | 0.0 | 6.6 |
| **All firms** | **7.6** | **46.3** | **33.3** | **6.1** | **5.8** |

**Figure 2.9: Geographic structure of Lambourn firm markets:** by industrial classification

It is clear from the empirical evidence therefore that firms providing consumer services are more likely to be closely tied with their locality than those in the producer service sector.

*Agricultural vs. non-agricultural firms*

From the analysis of invoices and receipts obtained from the Farm Business Survey data for the Reading province, Harrison (1993) has shown the influence that farms have in their immediate locality. From the results presented in Figure 2.10, it appears that for farm inputs, 53% of the transactions are made, and over 40% of the value of the input bought, within a 10 km radius of the farm.

| Distance (km) | No. Transactions (%) | Mean Value (£) |
|---|---|---|
| **Farm Inputs** | | |
| 0-<5 | 36.7 | 507.39 |
| 5 <10 | 16.3 | 788.07 |
| 10 <20 | 17.2 | 854.59 |
| 20-<50 | 15.7 | 1034.17 |
| 50+ | 13.6 | 1104.14 |
| **Farm Outputs** | | |
| 0-<5 | 21.4 | 5294.63 |
| 5-<10 | 15.8 | 8386.38 |
| 10-<20 | 21.0 | 8744.39 |
| 20-<50 | 25.9 | 4909.47 |
| 50+ | 15.9 | 10,923.90 |

**Figure 2.10: Distances of transactions - farm inputs and outputs**

Source: Harrison (1993: 86)

In terms of the numbers of transactions, 70.2 % of agricultural inputs and 58.2% of outputs were made within a 20km radius of the farm. Another interesting point is that the mean value of the transaction seems to increase with the greater distance over which it is purchased, with small value transactions taking place 'around the corner', but longer journeys being made for those more expensive goods. This observation conforms to economic theory, recognising the importance of transport costs, and their influence on the patterns of purchases and sales. In terms of the value of transactions we find a similar proportion of outputs, although in the case of inputs the figure falls to 59.3%. In comparison to non-agricultural firms, Curran and Blackburn (1994) found that 65.7% of non-agricultural sales took place within a 10-mile radius. Williams (1994) found that 57.4% of all non-agricultural output transactions took place and 39.2% of supplies were received within the 20-mile radius of the establishment. On balance therefore it would appear that non-agricultural firms are more strongly tied to locality in terms of sales, although in the case of inputs the opposite may in fact be true.

The geographic structure of Lambourn firm markets illustrated in Figure 2.9 indicates a major difference between the locality and the region in terms of agricultural economic activity: 1.6% of local sales and 2.1% of local inputs compares to an average of 27.7% and 7.6% respectively for all firms. However, this scenario is reversed in the case of regional economic activity.

Thus, in the context of a local case study area, it is likely that non-agricultural firms will be more strongly tied to their locality than those in the agricultural sector.

### 2.6.2 Analysis at household level

This section is concerned with an empirical review of linkages analysed at the household, or consumer, level. However, unlike the case of those analysed at firm level, little empirical evidence is available which measures both the *number* and *value* of transactions carried out by private consumers, thus integrating the analysis of consumption and travel related data at the local level. What is available is data drawn from separate studies of travel patterns and shopping behaviour, which provide a useful source of information with which to examine the nature of household activity patterns.

The relative lack of existing empirical evidence in this field presents a problem with regard to the definitions of household characteristics on which to base comparisons. According to Dusenberry (1960), economics is all about how people make choices. Sociology (the principal discipline concerned with household behaviour), on the other hand, is about 'how they don't have any choices to make'. In relation to how choices are made with the household, Anderson, Bechhofer and Gershuny, (1994) argue that there are two particular aspects to pursue. The first, which attempts to provide a sociological account of observations, is the fact that behaviour is profoundly influenced by belief systems. The second is the study of structural factors external to the household or arising from its own

composition and membership, which open up or constrain options. The individuals' involvement in the local labour market, the presence or absence of dependent children, the skills and earning potential of various household members are just a few examples which influence outcomes which can be observed. As this is an economic study, it is the structural factors which provide an appropriate method by which to differentiate households in terms of their characteristics. In light of this, the available empirical evidence of transaction patterns is presented under the following sub-headings:

- Remote rural vs. accessible rural
- Stage in the family life-cycle
- Income level
- Social class
- Rural vs. town dwellers
- Car ownership
- Commuters vs. non-commuters
- Newcomers vs. indigenous population

*Remote rural vs. accessible rural*

Cloke *et al.'s* (1994) research into issues relating to accessibility in England's rural areas gives an interesting comparison between the use of a local town by accessible rural dwellers and remote rural dwellers. The results presented in Figure 2.11 indicate that accessible rural households appear to have stronger linkages to their nearest town than do those in Northumberland and North Yorkshire, although in comparison to Devon the difference is marginal. However, combining the first two columns to represent 'locality', we find that the remote rural households show a higher degree of local economic integration than do those in the accessible areas. Eighty four percent of Devonshire and North Yorkshire households carrying out convenience shopping within this boundary compares to seventy percent of households in Cheshire and West Sussex respectively.

| REMOTE | Local Shop | Nearest town | Shops in other town | Out-of-town supermarket |
|---|---|---|---|---|
| Devon | 35.5 | 48.4 | 14.1 | 1.9 |
| Northumberland | 69.8 | 18.8 | 7.4 | 3.0 |
| North Yorkshire | 37.4 | 46.9 | 12.2 | 1.4 |
| **ACCESSIBLE** | | | | |
| Cheshire | 18.2 | 50.9 | 25.7 | 3.0 |
| Essex | 17.6 | 55.7 | 20.1 | 4.5 |
| West Sussex | 22.7 | 47.5 | 19.4 | 9.7 |

**Figure 2.11: Place of shopping for everyday needs, percentage of rural households**
Source: Cloke *et al.* (1994)

It is important to note that the data relates only to everyday shopping needs, in other words low order grocery items purchased on a day to day basis. Rural households in the three remote counties tend show a higher level of local village shop use for such purchases. As Cloke *et al.* (1994) note, these areas are often with fewer opportunities available to shop at larger stores. On this basis it is likely that the nearest town will be used more frequently for purchases of higher order goods than in the accessible areas. Indeed, the two remaining columns indicate that households in accessible rural areas show a significantly higher usage level of both towns further afield and out of town supermarkets for everyday purchases. As Root *et al.* (1995) note, in rural South Oxfordshire, many people use large supermarkets for most of their shopping, 'topped up' with purchases from local stores. In the same way it is likely that higher order purchases will take place more commonly at the larger regional centres, weakening linkages with the local town in this respect.

On the basis of the evidence presented, it would appear that households in 'remote' rural areas are more strongly tied to their locality than those in 'accessible' rural areas.

*Stage in the family life-cycle*

Dix's (1977) report on investigations of travel decision making behaviour provides a useful insight into the variation in travel behaviour among different types of household in a medium sized provincial town in the UK. According to Dix (1977), one of the most striking features about travel behaviour is the apparent importance of stage in the family life cycle, with each defined group exhibiting fairly distinct travel characteristics. Figure 2.12 illustrates the key findings of the study, which indicate that it is young families without dependants and the elderly that are most restricted in terms of their activity patterns. Indeed, Root *et al.* (1996) consider the 16-29 age group to be the one which would suffer most from transport poverty. They found that 33% of this age group had not applied for a job that they had considered suitable because of the difficulties in getting to work.

- Young adults without children engage in a great deal of discretionary travel.
- In the case of families with dependent children the youngest aged seven years or less journeys are restricted with the need to synchronise family activities more closely.
- In families with dependent children the youngest aged twelve years or less it was found that children stimulate discretionary travel, for example with journeys to group activities such as football, swimming, brownies, scouts etc. Families with older dependants make fewer discretionary journeys and do not replace them with many new journeys of their own.
- Families of adults appear to be more mobile than those with dependants, with a higher incidence of group involvement such as organised sport and recreation activities involving an increased incidence of discretionary journeys.
- The elderly were found not to engage in very much discretionary travel, even when they do own a car, independent of the absence of the work journey.

**Figure 2.12: Key findings of the investigation into travel decision making**

Source: Dix (1977)

The findings of research by the target group Index (TGI) survey of 25,832 adults (designed to be representative of Great Britain) reported by Cairns (1995a) gives further indication of

travel behaviour across different stages of the family life cycle. Figure 2.13 illustrate the average distances travelled for major grocery shopping according to age group. The results indicate that young adults and those of retirement age are most likely to travel less than one mile to carry out grocery shopping, and the least likely to travel more than ten miles to shop compared to other age groups. These finding support those of Dix (1977).

| | Distance travelled | | | | | |
|---|---|---|---|---|---|---|
| **Age Group** | **<1 mile** | **1-2 miles** | **3-4 miles** | **5-9 miles** | **>10 miles** | **Total** |
| **15-24** | 39.2 | 35 | 14.1 | 7.6 | 3.4 | 100% |
| **24-34** | 30.3 | 33.1 | 20.1 | 10.6 | 4.5 | 100% |
| **35-44** | 28.8 | 31.4 | 19.8 | 12.6 | 5.9 | 100% |
| **45-54** | 29.2 | 31.6 | 19.9 | 14 | 4 | 100% |
| **55-64** | 32.6 | 31.9 | 17.2 | 11.5 | 4.7 | 100% |
| **65+** | 37.2 | 32.3 | 16.1 | 8.9 | 2.7 | 100% |

**Figure 2.13: Average national distances travelled for major grocery shopping:** according to age group

Source: Adapted from Cairns (1995a)

It would appear from the available evidence regarding travel patterns that those family stages likely to exhibit stronger linkages to their locality are young families and those of retirement age.

*Income level*

According the Department of Transport (1995) there is a clear correlation between income and travel, with increasing affluence contributing to greater demand for travel. Curtis (1996) notes that there is, not surprisingly, a broad relationship between car ownership and household income. Whitelegg (1995) points out that, by design, edge-of-town shopping centres tend to favour more affluent consumers who can afford to run a car and have

sufficient weekly income to take advantage of lower price and bulk buy their weekly or even fortnightly food requirements.

Stokes (1995c) found that rural people in the highest income quartile drive 42% of the total of personal mileage, whilst the lowest income quartile drive only eight per cent of this distance. According to Curtis and Headicar (1997), these figures are part of bigger trends towards professional specialisation and greater mobility, partly due to more households where one or both partners frequently have to travel to major cities to reach their workplaces. Economically inactive households, on the other hand, may have even less fuel available for other purposes, as it is estimated that journeys to shops may account for about 20% of the weekly budget for running a car (based on distance travelled to shops and money spent on fuel) (Root *et al.* 1995). Residents of households who rent properties, privately or from a local authority, travel 47% and 97% more miles by bus than those in owner occupied accommodation (Department of Transport, 1996).

It therefore follows that stronger linkages to locality are likely to be associated with lower income households due to the restrictions on work and travel.

Errington (1994b) throws light on a further income related point, that concerning transport poverty. As Cullinane and Stokes (1997) point out, the transport poverty problem is often considered to be worst in remote rural areas. However, Errington (1994b) suggests that in some ways it is worse in the peri-urban fringes, or 'accessible' rural areas, where those without a private car, may actually have less access to basic amenities (shops, schools, healthcare etc) than their counterpart in some remoter rural areas.

*Social class*

Cairns (1995a) has also revealed some variations in activity spaces according to social group. Figure 2.14 indicates that the most common distance travelled for major grocery

shopping is 1-2 miles, which is fairly consistent across all social groups. However, there is then a clear correlation between increasing distance and social class, with the lower social groups, D and E, less likely to travel over 4 miles to shop and more likely to travel less than a mile.

| | Distance travelled | | | | | |
|---|---|---|---|---|---|---|
| **Social Class** | **<1 mile** | **1-2 miles** | **3-4 miles** | **5-9 miles** | **>10 miles** | **Total** |
| AB | 27.7 | 31.3 | 20.4 | 15.1 | 4.5 | 100% |
| C1 | 30.3 | 33.6 | 19.0 | 10.9 | 4.7 | 100% |
| C2 | 32.1 | 31.3 | 19.3 | 11.2 | 4.5 | 100% |
| D | 34.8 | 33.8 | 15.9 | 9.6 | 3.5 | 100% |
| E | 40.3 | 31.5 | 14.7 | 7.6 | 3.0 | 100% |

**Figure 2.14: Average distance travelled for major grocery shopping**: According to Social class

Source: Adapted from Cairns (1995a)

Further evidence is presented in Figure 2.15, which considers the frequency of shopping trips according to social class.

| | Shopping Frequency | | | | | |
|---|---|---|---|---|---|---|
| **Social Class** | **Daily** | **4-5 days** | **2-3 days** | **Weekly** | **2-3x month** | **Monthly** |
| *AB* | 1.5 | 1.9 | 13.8 | 63.0 | 10.5 | 7.2 |
| *C1* | 2.4 | 3.1 | 14.4 | 60.6 | 9.4 | 7.8 |
| *C2* | 4.1 | 3.1 | 14.9 | 65.6 | 5.6 | 5.0 |
| *D* | 5.8 | 3.1 | 15.6 | 63.5 | 6.2 | 3.3 |
| *E* | 5.3 | 2.5 | 19.1 | 57.7 | 6.2 | 4.2 |

**Figure 2.15: Frequency of major grocery shopping according to social class**

Source: Adapted from Cairns (1995a)

The findings illustrate that a weekly shop is by far the most common across all social groups, although trends towards less frequent shopping trips, as noted by Cairns (1995a), are more common among the higher groups AB and C1. As expected, groups D and E are also more likely to shop on a more frequent basis, daily or every few days.

The Rural Development Commission (1991) reveal a close correlation between travel to work and social class. In Cornwall and Wiltshire, the great majority of women from social groups I II and III were found to use a car to get to work, compared with employees from lower social groups who more commonly walked to work. Likewise, Headicar and Curtis (1994) note that the location of home in relation to work is the key factor determining young, affluent highly mobile households' choice of home location. For young affluent households on new housing estates, the journey to work forms the greater proportion of total distance travelled per week. In terms of regular weekly journeys, work and business journeys account for 76% of total miles travelled. If measured by single weekday trips work purpose trips account for 65% of mileage (Curtis and Headicar, 1997).

These observations suggest that it is the lower social groups, D and E, which are likely to exhibit the strongest linkages to locality due to the shorter work journey and shorter, more frequent trips being made to purchase consumer goods.

*Car ownership*

According to Dix (1977), the principal differences between car-owning and non-car owning households lie in the wider range of choice available to the former, which usually results in a more complicated work journey, and in the enhanced opportunities they enjoy for discretionary travel. Cairns (1995b) argues that if people own a car they will drive, irrespective of where they are going or the travel opportunities available to them. Root *et al.* (1996) found that non-car owning rural residents in Oxfordshire only visited 31% of travel destinations visited by car-owners, indicating less access to facilities than car-

owning households. These authors also indicate that public transport availability may funnel travel demand into corridors. In the study area, where there was poor public transport (defined as less than an hourly service) most of the journeys were dispersed and did not follow particular corridors. As expected, the findings indicated that maximum distances travelled were associated with those made by car. In South Oxfordshire, Root *et al.* (1995) also found that car-less households went on proportionately more shopping trips than car owning residents: 24 % of journeys in car less households were for shopping, compared to 10% in one-car households and 8% in multi-car households. Car less household travelled on average a total of 4.5 miles in connection with shopping, whilst multi-car households travelled 12 miles.

This information indicates the potential of non-car ownership in keeping journeys, and therefore, transactions local. There is evidence, however, (for example, the Norfolk Rural Community Council, 1997) which indicates that car ownership levels in rural areas are not always a good indicator of accessibility. Often the cars owned by rural households, particularly second or third cars, are not always reliable and there is a reluctance to having to rely on them for journeys such as the work trip, the cost of running even the main household car is also prohibitive in many cases (Cullinane and Stokes, 1997). Research by the Rural Development Commission (1991) also indicates the number of cars in the household to be a significant factor. In Cornwall and Derbyshire it was found that a constraint to women taking employment was their access to a car during the day.

On the basis of the above evidence, it would follow therefore that car owning households are likely to exhibit weaker linkages to locality than those without access to a car.

*Commuters vs. non-commuters*

In Canada, Stabler and Rounds (1997) have found that resident workers who commute spend significantly less in their community than those who do not. Likewise, in the UK,

Errington (1997b) has shown that residents in accessible rural areas who commute to work by car were more likely to use leisure facilities and shops outside the rural area.

*The results of the logistic regression confirm the influence of location of employment upon the use of local shops and facilities, supporting the contention that the maintenance of rural employment promotes the sustainability of the community by securing the continued use of local shops and facilities* (Errington, 1997b: 220).

These findings indicate that households who commute outside their locality are likely to exhibit weaker linkages to local firms than those who work locally, not only in respect of the sale of their labour, but also 'chaining' effect of the work journey causing income leakage through the purchase of goods and services at the place of work as opposed to the place of residence.

*Rural vs. town dwellers*

Root *et al.* (1995) note that rural households have a lower total weekly expenditure than people in more densely populated areas and have to spend more, both in absolute terms and as a percentage, on their travel. This may imply, therefore, that it is more economic for rural households to make less frequent trips to large regional centres than more frequent visits to small market towns. Nationally, the 20% of rural households with the lowest incomes travel about 25 miles per week to shop, compared to 12 miles per week for similar households in urban areas (Root *et al.* 1995). In general, Stokes (1995b) points out that rural households travel at least 20 miles per week to shop.

Data collected by the household survey and journey log in Errington's (1994a) study, indicated that Lambourn is a key settlement in its catchment area, providing retail and leisure services to the locality. There was also some data from the study which indicated some variation in terms of location in the study area and shopping patterns. While the great majority (75 per cent) of households in the hinterland settlements of Eastbury, East Garston and Great Shefford were shown to go to Newbury, only 39 per cent of the households in Lambourn village did so. Here, a substantial number went to the regional

centres of Wantage and Swindon. Sixty six per cent reported a weekly shopping trip to a superstore while a further 21 per cent said that they went once a fortnight with 8 per cent going less frequently, a pattern which showed virtually no variation between the different villages. This indicates that rural dwellers in Berkshire, although having significant links with their local town, were more likely to travel to regional centres than those living in larger settlements such as Lambourn.

Respondents were also asked about the main shopping centres used for non-food items and again some variations between town and hinterland dwellers is evident. Figure 2.16 illustrates the findings.

| Village | Lambourn | Newbury | Hunger-ford | Wantage | Swindon | Other |
|---|---|---|---|---|---|---|
| Lambourn | 7.5 | 45.7 | 1.7 | 8.7 | 29.5 | 6.9 |
| Eastbury | 0.0 | 59.0 | 2.6 | 0.0 | 12.8 | 25.6 |
| E. Garston | 0.0 | 84.6 | 0.0 | 7.7 | 5.1 | 2.6 |
| G. Shefford | 0.0 | 77.3 | 2.7 | 2.7 | 8.0 | 9.3 |
| Hamlets | 2.2 | 46.3 | 0.0 | 4.0 | 29.4 | 18.0 |
| Scattered | 2.8 | 44.4 | 0.0 | 25.0 | 11.1 | 16.7 |
| **Total** | **4.0** | **55.7** | **1.6** | **7.5** | **19.7** | **9.5** |

**Figure 2.16: Main centre used for non-food shopping**
Source: Errington (1994a)

In the case of transactions involving higher order goods, the regional centres of Newbury and Swindon were evidently more important than the smaller towns of Lambourn, Hungerford and Wantage. It is also evident that those households living in Lambourn itself were more likely to shop in the town than those residing in the surrounding villages and hamlets. Likewise, a higher proportion of hinterland dwellers travelled to Newbury for such purchases.

From the evidence presented it would appear that those households located within the market town are likely to exhibit stronger economic linkages to local firms than those located in the surrounding rural areas.

*Newcomers vs. indigenous population*

In view of the changing nature of the rural population over the last few decades, due to counterurbanisation, this is a household characteristic which may have important implications for the functionality of small towns. In a study of women and employment in rural areas, the Rural Development Commission (1991) found that 30% of the survey sample had lived in their village for less than 5 years and a further 18% for between 5 and 10 years. Likewise in the case of women in Cornwall, the figures were 33% and 50% respectively. As Errington (1994b) has found, many newcomers to 'accessible' rural areas retain the lifestyle and shopping habits of their recent urban past. As many are also more likely to commute to work, this would result in the weakening of local linkages, partly due to the influence of journey chaining. Indeed, Pahl (1970) concluded that in-migration was reflective of the dominant classes being mobile middle class commuters. Cullinane and Stokes (1997) also argue that most newcomers are fairly wealthy.

*Their demand for houses force prices to increase. Local residents are forced out and this frequently leads to the closure of local schools and other employment opportunities.*
(Cullinane and Stokes, 1997: 19).

Dix (1977) reports that young adults living in or near the neighbourhood in which they grew up have fairly localised travel patterns, whereas people living 'away from home' usually have quite elaborate travel patterns, reflecting the incidence of journeys designed to maintain family and friendship ties.

It would therefore appear that newcomers are likely to exhibit weaker ties to their locality than members of the indigenous population.

## 2.7 Conclusion

This chapter has examined the influence of key economic and social trends on spatial patterns of production and consumption at the local level, with an emphasis on the rural economy. In an era of increasing globalisation, it is clear that the local economy, both as an economic system and as a unit of study, is becoming increasingly important, not least for the need to examine how and why local variation is so great. Globalisation has led to the development of more flexible systems of production, and the move away from primary and manufacturing sectors towards service-based industry has lead to the transition of local labour markets and a heightened degree of localism in terms of policy formation. Important structural changes have also taken place in the household sector, particularly in terms of the transition in working and leisure time patterns. Coupled with influential trends in travel and the developments in information technology, such changes have greatly influenced the nature of local activity spaces. Thus, localities have also had to adapt to changing patterns of consumption as well as production. For example, increasing levels of car ownership have lead to more dispersed patterns of economic activity in rural areas, fuelled by the move towards economies of scale by the major retailers.

A key implication of the trends discussed is that they are likely to be weakening economic linkages at the local level, and more specifically, weakening the relationship between small towns and their surrounding areas. This itself provides a clear rationale for research, particularly in the light of the current developments in rural policy discussed in Chapter One. A further implication of the review is that certain types of establishment, both firm and household, are likely to be more strongly tied to their locality than others. In turn this implies that the evolving function of small towns and the decline in local linkages may be related to the mix of firms and households in any particular town, as well as its proximity to urban centres. Indeed, if this proves to be the case, it will have important implications for policy formulation at the local level. The empirical evidence of linkages allows the

development of specific hypotheses to test the systematic variation in local economic integration between different types of firm and household. These hypotheses are developed in the following chapter, which presents the conceptual model and describes the process of conceptualisation and operationalisation.

# CHAPTER THREE

# CONCEPTUALISATION AND OPERATIONALISATION

## 3.0 Introduction

The aim of this chapter is to, first, conceptualise this area of enquiry in the context of existing literature in the field and, second, to operationalise the research in order that a suitable methodology can be designed to achieve the aims and objectives set out in chapter one. Following the identification of an agenda for research, the previous two chapters have further clarified the need for investigation, isolated a number of questions to be addressed, and identified the key concepts and issues which relate to the original research question. However, at this stage such concepts are in effect 'theories' that require transformation into hypotheses to be tested. To achieve this, a conceptual model is presented, the aim of which is to clarify and synthesise the relevant literature in the context of the research aims. From this model, conceptual hypotheses are then developed which are transformed into operational hypotheses through the process of identifying measurable variables and units of study for the relevant concepts.

## 3.1 The Conceptual Model

Essentially, the literature review has provided a number of concepts that require clarification through targeted research. Peil (1982) describes a concept as *'an abstract idea that can be used to describe situations, events and individuals'*. Likewise, Frankfort-Nachmias and Nachmias (1992) assert that a concept is *'an abstraction representing an object, a property of an object, or a certain phenomenon'*. Similarly, Bouma and Atkinson

(1995) argue that a concept is simply a theoretical construct that helps develop thought. However, arguably the most useful definition in this case is de Vaus's (1991) assertion that concepts are abstract summaries of a whole set of behaviours, attitudes and characteristics which we see as having something in common. This definition is particularly useful because it implies that all concepts have relationships that lead them to a common end. What is needed, therefore, is the conceptual organisation of these relationships, which in turn will help identify exactly what needs to be tested in the next stage of the research process. Frankfort Nachmias and Nachmias (1992) note that conceptual organisation is often attempted by models, which make explicit the significant relationships among aspects relevant to the enquiry, and enable the formulation of empirically testable propositions regarding the nature of these relationships. Thus, the conceptual model aims to place the key concepts identified in the previous two chapters into a clear framework, whereby *'descriptive categories can be systematically placed into a broad structure of explicit, assumed propositions'* (Frankfort-Nachmias and Nachmias, 1992). A summary of the Conceptual Model is presented in Figure 3.1, and the full version is contained in Appendix B. The model attempts to show the inter-relationships between processes of socio economic restructuring, and how they have led to the functional evolution of small towns and a possible weakening of economic linkages between agents in the local economy. Conceptual hypotheses are then developed out of the further proposition that there are variations in the strength of local linkages between different types of firm and different types of household.

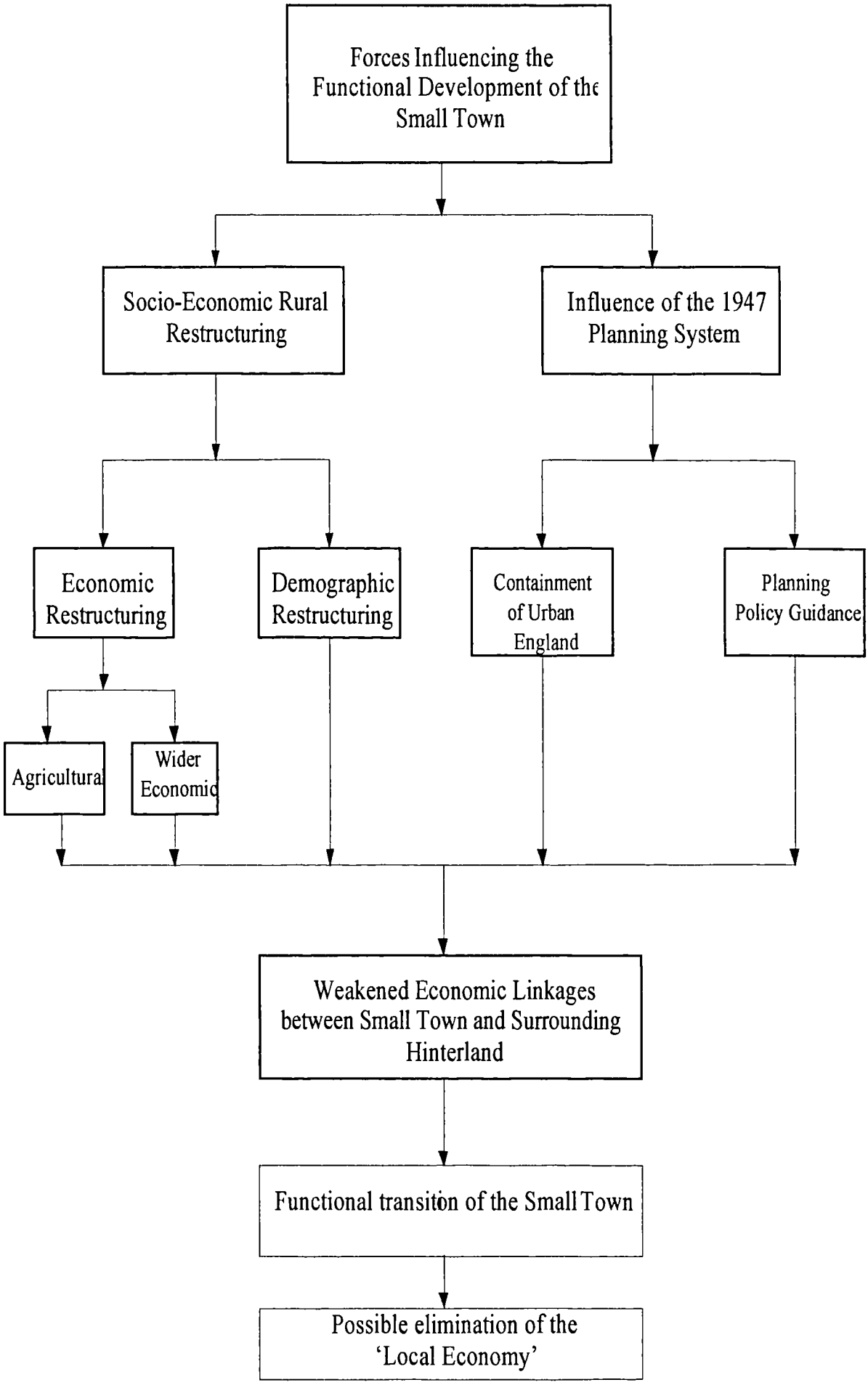


**Figure 3.1: Summary of the Conceptual Model**

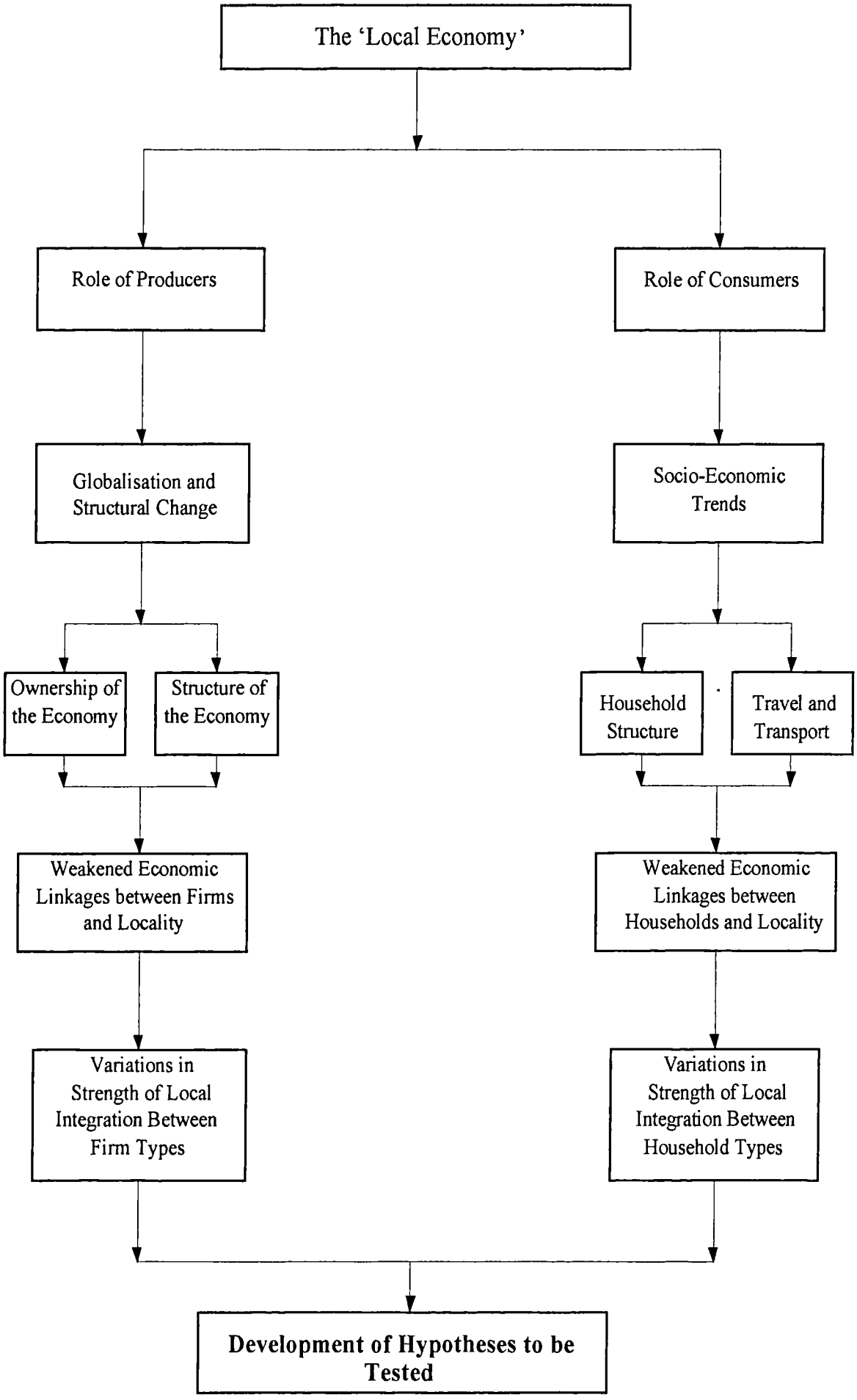


**Figure 3.1: Summary of the Conceptual Model (Cont.)**

## 3.2 Conceptual hypotheses

As Bouma and Atkinson (1995) note, a hypothesis is a statement that asserts a relationship between two or more concepts, and is developed in order to focus the aim of the research. A hypothesis can be stated at both the conceptual (theoretical) level and at the operational (empirical) level. At the theoretical level, a hypothesis asserts a relationship between concepts and at the empirical level it asserts a relationship between variables. Thus, as Frankfort Nachmias and Nachmias, 1992) note, a hypothesis is a tentative answer to a research problem, expressed in the form of a relationship between independent and dependent variables. Hypotheses are *tentative* answers because they can be verified only after they have been tested empirically. The relevant concepts in this study are presented in the final two sections of the conceptual model, one relating to the strength of economic integration into 'locality' and the other relating to firm and household type respectively. Following this, sixteen conceptual hypotheses can be developed, eight concerned with analysis at firm level and a further eight relating to analysis at household level.

*Analysis at firm level*

*Ho* Firms in 'accessible' rural areas have stronger economic linkages with the firms and households located within the small town and its immediate hinterland than do firms in 'remote' rural areas.

*Ho* Small firms have stronger economic linkages with the firms and households located within the small town and its immediate hinterland than do large firms.

*Ho* Independent locally based firms have stronger economic linkages with the firms and households located within the small town and its immediate hinterland than do the branch plants of national and multi-national corporations.

*Ho* Newly established firms have stronger economic linkages with the firms and households located within the small town and its immediate hinterland than do well established firms.

*Ho* Traditional firms have stronger economic linkages with the firms and households located within the small town and its immediate hinterland than do new technology firms.

*Ho* Firms in the service sector have stronger economic linkages with the firms and households located within the small town and its immediate hinterland than do firms in the manufacturing sector.

*Ho* Consumer service firms have stronger economic linkages with the firms and households located within the small town and its immediate hinterland than do producer service firms.

*Ho* Non-agricultural firms have stronger economic linkages with the firms and households located within the small town and its immediate hinterland than do agricultural firms.

*Analysis at household level*

*Ho* Households in 'remote' rural areas have stronger economic linkages with the firms located within the small town and its immediate hinterland than do those in 'accessible' rural areas.

*Ho* Young families and retired households have stronger economic linkages with the firms located within the small town and its immediate hinterland than do those in other stages of the family life cycle.

*Ho* Low income households have stronger economic linkages with the firms located within the small town and its immediate hinterland than do those on high incomes.

*Ho* Households in low social groups have stronger economic linkages with the firms located within the small town and its immediate hinterland than do those in higher social groups.

*Ho* Households with no car have stronger economic linkages with the firms located within the small town and its immediate hinterland than do car-owning households.

*Ho* Non commuting households have stronger economic linkages with the firms located within the small town and its immediate hinterland than do those who commute outside the locality.

*Ho* Households located within the town have stronger economic linkages with the firms located within the small town and its immediate hinterland than do those located in the rural hinterland.

*Ho* Indigenous households have stronger economic linkages with the firms located within the small town and its immediate hinterland than do newcomers to the area.

## 3.3 Operationalising the conceptual hypotheses

The above hypotheses are presented at the conceptual level; they propose a relationship between concepts identified by the literature review which have implications for the key subject under study. In order to test these hypotheses, the concepts need to be operationalised. As Frankfort-Nachmias and Nachmias (1992) note, operationalisation is the activity of finding measurable variables for concepts that will enable the relationships asserted by the hypotheses to be tested empirically. The aim is to provide an operational definition for each concept that will effectively describe the set of procedures required to establish the relationship between them. In this case, there are two key areas where operational definitions need to be sought: the design of appropriate variables (both dependent and independent); and the identification of suitable geographical units to represent the 'local economy'.

### 3.3.1 Variable design

*Dependent variables*

As was described in Chapter Two, in the context of analysing the spatial distribution of transactions at the local level, it is important to note that a transaction constitutes three distinct but inter-relating elements: number, financial value and distance. The question of distance can effectively be addressed by defining appropriate geographical boundaries and calculating the transactions that fall within them. This follows the approach taken in previous studies of linkages, including Curran and Blackburn (1994) and Williams (1994), and is addressed in the following section. The key questions relating to the design of the dependent variables, therefore, are: a) whether to employ the number or financial value of transactions as the principal measure; b) whether to use an absolute measure, or one based on the proportion of transactions; and c) what categories of transaction to incorporate into

the analysis. The selection of the dependent variables is related to two main factors:

- ensuring comparability with existing empirical evidence;
- aims of the research .

As noted in section 2.1, although it is possible to record the number of transactions carried out over a certain time period, this does not indicate their true significance in terms of local income generation, and therefore the conditions for economic development via the spatial distribution of appropriate multipliers. Further, as Harrison (1993) points out, whether analysis based on the number of transactions is a valid representation of local dependency is a matter of subjective opinion. It is therefore preferable to employ the financial value of transactions as the principal measure. However, the number of transactions is likely to be an important descriptive tool to help inform the debate on the nature of economic activity in and around small towns[1], and particularly the implications of economic activity for traffic movements.

In all studies of economic linkages presented in Chapter Two, the unit of measurement to represent the strength of economic integration is commonly given by the proportion of transactions, either by value or number, attributed to various geographical areas. The empirical evidence effectively focuses on the behaviour of establishments as economic units. In order to enable comparability to existing findings, the present study should do the same. Further, employing the proportion of transactions by financial value as a key measure overcomes the problem posed by the likely correlation between disposable income and consumption expenditure. This may unduly influence the findings, as those agents with more financial resources are liable to spend a larger amount of money in any given location. In the same way, some firms trade in significantly higher financial sums than

[1] In a larger project, it may be preferable to employ both measures as dependent variables.

others for a variety of reasons, irrespective of spatial considerations. Thus, incorporating absolute values of transactions could effectively yield an un-representative picture with regard to the *relative* strength of local integration between firm and household types. Whilst analysis based on the absolute values of transactions would no doubt be of interest to local policy makers, it is not the aim of this project to advise on marketing techniques to alter the economic behaviour of producers and consumers. Further, there is insufficient information relating to the travel and expenditure patterns of households to make any strong inferences regarding choice criteria for purchasing trips.

In the case of firms, existing research into local linkages provides two obvious categories of transaction worthy of analysis: those relating to the market for sales and those concerned with the sourcing of supplies. In other words, firm outputs associated with downstream linkages, and firm inputs associated with upstream linkages. In the case of households, where we are concerned only with consumption, the clearest distinction is between low order and high order purchases, of both goods and services. Indeed, this structure relates directly to the geographical theory of settlement patterns discussed in Chapter One, and thus makes it a sensible one to follow. However, a more detailed breakdown of categories will certainly be a useful descriptive tool to examine the contemporary functions of the small town.

### 3.3.2 Definition of geographical units for study

At the conceptual level, we are concerned with the strength of economic linkages between firms, and between firms and households, both in the town and its surrounding hinterland. The first task then is to design an appropriate study area that can be applied to a range of case study towns within which firms and households can be surveyed. It is clear that this needs to encompass the town, and an area surrounding it to represent the 'hinterland', or at

least part of the 'hinterland'. Thus, the study area can either be represented by a circle encompassing the settlements and a radius around it, or by a grid square overlaying the town and a surrounding area. Although a circle may seem more appropriate in spatial terms, a grid square approach is favourable in that it is more adaptable to irregularities in settlement patterns. It also follows the operational method employed by the Market Towns baseline studies (See Errington, 1994a; and Dawson and Errington, 1998a; 1998b and 1998c). As the ultimate aim of the Faculty's Market Towns Research Group is to construct a national data base relating to small towns, this is deemed particularly important. Thus, in terms of study area size, it is also appropriate to follow that of the baseline studies, which employed a grid of approximately seven miles square.

Having defined a study area model which can be applied to the chosen case study towns, it is necessary to operationalise the 'small town and its immediate hinterland' to represent a meaningful 'local economy'. Again, previous studies of linkages provide a useful guide, and are obviously important with respect to comparability. As discussed in section 2.2, various thresholds of local economic activity have been employed by researchers, ranging from a 10 mile radius (Curran and Blackburn, 1994) to a 20 mile radius (Williams, 1994). Harrison (1993) selected various distances according to the distribution of transactions recorded, ranging from 5 km as the smallest threshold, though 10, 20, 50 and 50+ km. In Errington's (1994) study of the Lambourn Valley, the 'immediate locality' was defined simply as the town itself and its hinterland within the grid square, with the next stage in the geographical hierarchy encompassing the three counties of Berkshire, Oxfordshire and Wiltshire.

Bearing in mind the ambiguities of defining the 'local economy' discussed in section 2.2, these varying approaches to defining thresholds are not surprising. Given such ambiguities, it seems sensible to define two geographical levels of locality with which to test the

hypotheses relating to local economic integration. Indeed, this ties in well with the policy context of the research. At one level, the study aims to advise policy makers on methods for revitalising small towns, and at another it is concerned with the trickle-down effects of development in the context of wider rural policy. Thus, it seems appropriate to define a 'locality' which approximates to the town and a surrounding four mile radius (roughly equating to the study area) and a 'district' level, approximating to the town and a ten mile radius around it. In this way, the operational model can attempt to deal with the ambiguities surrounding the 'local economy' debate, address the policy issues in a fairly direct and rational way, and enable a sufficient degree of comparability to previous studies of local economic integration.

*Independent variables*

The predictor variables relate to specific types of firm and household, with eight different categories relevant to each level of analysis. Again, the design of the variables is related to existing empirical evidence and the aims of the research. Operationalisation of the sixteen independent variables is set out in Appendix C. A summary of the operationalisation process is presented in Tables 3.1 and 3.2, which show the dependent and independent variables selected and their operational form.

| Concept | Variables related to the concept | Operationalisation: stage I | Operational variables selected |
|---|---|---|---|
| **Economic linkage** | • Number of transactions<br>• Financial value of transactions<br>• Distance travelled to perform /spatial proximity of transactions | • Proportion of sales revenue/supply expenditure attributed to defined area<br>• Absolute value of sales revenue/supply expenditure attributed to defined area<br>• Proportion of sales/supplies transactions attributed to defined area<br>• Absolute number of sales/supplies transactions attributed to defined area | **Dependent variables:**<br>• Proportion of sales revenue attributed to (i) locality (town & approx. 4 mile radius); (ii) district (town & approx. 10 mile radius)<br>• Proportion of supply expenditure attributed to (i) locality (town & 4 mile radius); (ii) district (town & approx. 10 mile radius) |
| **Firm type** | • Rurality of firm<br>• Firms size<br>• Firm ownership<br>• Firm age<br>• Technology base of firm<br>• Firm classification | • RDC (1993) classification<br>• Size of workforce<br>• Local, national or international ownership<br>• Length of time firm trading at present address<br>• Traditional or ICT orientated firm<br>• Standard Industrial Classification (SIC, 1992) | **Independent variables**<br>• 'Remote' study area vs. 'Accessible' study area<br>• 5 employees or less vs. More than 5<br>• Independent firms vs. national/international branches/HQ's<br>• In existence at present location up to 6 yrs vs. More than 6 years<br>• Firms selling 'tangible' products vs. firms delivering 'intangibles' via ICT network<br>• Service sector vs. Manufacturing (According SIC 1992 guidelines)<br>• Consumer service vs. Producer service (According SIC 1992 guidelines)<br>• Agricultural firms (ft/pt, pluriactive/ancillary/horticulture) vs. All other firm sectors |

**Table 3.1: Operationalisation of the conceptual hypotheses: analysis at firm level**

| Concept | Variables related to the concept | Operationalisation: stage I | Operational variables selected |
|---|---|---|---|
| **Economic linkage** | • Number of transactions<br>• Financial value of transactions<br>• Distance travelled to perform /spatial proximity of transactions | • Proportion of total/low order/high order household expenditure attributed to defined area<br>• Absolute value of total/low order/high order household expenditure attributed to defined area<br>• Proportion of total/low order/high order transactions attributed to defined area<br>• Absolute number of /low order/high of transactions attributed to defined area | **Dependent variables:**<br>• Proportion of low order consumption expenditure attributed to (i) locality (town & approx. 4 mile radius); (ii) district (town & approx. 10 mile radius)<br>• Proportion of high order consumption expenditure attributed to (i) locality (town & approx. 4 mile radius); (ii) district (town & approx. 10 mile radius) |
| **Household type** | • Rurality of household<br>• Stage in the family lifecycle<br>• Income level of household<br>• Social class of household<br>• Level of car ownership<br>• Commuting status of household<br>• Location of household<br>• Indigenous status of household | • RDC (1993) classification<br>• Family stage Groups according to Dix (1977)<br>• Total gross annual household income<br>• Social class based on ONS occupation of household head (1990)<br>• Number of cars/vans in the household<br>• Workplace of economically active members<br>• Postcode of household within study area<br>• Length of residence in study area | **Independent variables:**<br>• 'Remote' study area vs. 'Accessible' study area<br>• Groups II & IV vs. Other groups<br>• Up to £8,501 p.a. vs. More than £8,501 p.a.<br>• Groups IV and IV vs. Other groups<br>• No car/van vs. At least one car/van<br>• Key shopper employed in study area vs. Key shopper employed outside study area<br>• Town postcodes vs. Other study area postcodes<br>• Resident in area all of life vs. Moved into area at some point in life |

**Table 3.2: Operationalisation of the conceptual hypotheses: analysis at household level**

## 3.4 Operational hypotheses

*Analysis at firm level*

$H_o^1$ There is no significant difference in the proportion of corporate revenue received from sales to customers based within the case study (i) **locality** and (ii) **district** between the following types of firm:

| | |
|---|---|
| **A** | 'Accessible' and 'remote' rural firms |
| **B** | Small and large firms |
| **C** | Independent firms and branch plants |
| **D** | Newly established and mature firms |
| **E** | Traditional and new technology firms |
| **F** | Service sector and manufacturing firms |
| **G** | Consumer service and producer service firms |
| **H** | Non-agricultural and agricultural firms |

$H_a^1$ There is a significant difference in the proportion of corporate revenue received from sales to customers based within the case study (i) **locality** and (ii) **district** with the following types of firm exhibiting the highest proportions:

| | |
|---|---|
| **A** | 'Accessible' rural firms |
| **B** | Small firms |
| **C** | Independent local firms |
| **D** | Newly established firms |
| **E** | Traditional firms |
| **F** | Service sector firms |
| **G** | Consumer service firms |
| **H** | Non-agricultural firms |

$H_o^2$ There is no significant difference in the proportion of corporate expenditure on supplies sourced within the case study (i) **locality** and (ii) **district** between the following types of firm:

| | |
|---|---|
| **A** | 'Accessible' and 'remote' rural firms |
| **B** | Small and large firms |
| **C** | Independent firms and branch plants |
| **D** | Newly established and mature firms |
| **E** | Traditional and new technology firms |
| **F** | Service sector and manufacturing firms |
| **G** | Consumer service and producer service firms |
| **H** | Non-agricultural and agricultural firms |

$H_a^2$ There is a significant difference in the proportion of corporate expenditure on supplies sourced within the case study (i) **locality** and (ii) **district** with the following types of firm exhibiting the highest proportions:

**A** 'Accessible' rural firms
**B** Small firms
**C** Independent local firms
**D** Newly established firms
**E** Traditional firms
**F** Service sector firms
**G** Consumer service firms
**H** Non-agricultural firms

*Analysis at household level*

$H_o^1$ There is no significant difference in the proportion of consumption expenditure carried out in the case study (i) **locality** and (ii) **district** on low order goods and services between the following types of household

**A** 'Remote' and 'accessible' rural households
**B** Retired/young families and other stages of the family lifecycle.
**C** Lower income groups and higher income groups.
**D** Lower social groups and higher social groups.
**E** Non-car owners and car owners.
**F** Locally based employees and commuters.
**G** Town dwellers and hinterland dwellers.
**H** Indigenous members of the community and newcomers to the area.

$H_a^1$ There is a significant difference in the proportion of consumption expenditure carried out in the case study (i) **locality** and (ii) **district** on low order goods and services with the following types of household exhibiting the highest proportions:

**A** 'Remote' rural households
**B** Retired/young families
**C** Lower income groups
**D** Lower social groups
**E** Non-car owners
**F** Locally based employees
**G** Town dwellers
**H** Indigenous members of the community

$H_o^2$ There is no significant difference in the proportion of consumption expenditure carried out in the case study (i) **locality** and (ii) **district** on high order goods and services between the following types of household

| | |
|---|---|
| **A** | 'Remote' and 'accessible' rural households |
| **B** | Retired/young families and other stages of the family lifecycle. |
| **C** | Lower income groups and higher income groups. |
| **D** | Lower social groups and higher social groups. |
| **E** | Non-car owners and car owners. |
| **F** | Locally based employees and commuters. |
| **G** | Town dwellers and hinterland dwellers. |
| **H** | Indigenous members of the community and newcomers to the area. |

$H_a^2$ There is a significant difference in the proportion of consumption expenditure carried out in the case study (i) **locality** and (ii) **district** on high order goods and services with the following types of household exhibiting the highest proportions:

| | |
|---|---|
| **A** | 'Remote' rural households |
| **B** | Retired/young families |
| **C** | Lower income groups |
| **D** | Lower social groups |
| **E** | Non car owners |
| **F** | Locally based employees |
| **G** | Town dwellers |
| **H** | Indigenous members of the community |

# CHAPTER FOUR

# RESEARCH METHODOLOGY

## 4.0 Introduction

Having operationalised the conceptual model, and identified the variables important to achieving the aims of the study, the next stage was to design a programme of research to facilitate the process of collecting, analysing and interpreting the relevant observations. It was essential that the research method be chosen logically in order that it would act as a 'model of proof', allowing inferences to be drawn concerning causal relations among variables under investigation (Frankfort-Nachmias and Nachmias, 1992). Appropriate choice of study areas, data collection mode, sampling frames and method of sample selection were therefore vital, as was the attention paid to designing survey instruments and ensuring that the analytical method was suitably robust.

The purpose of this chapter is to describe and explain the methodological approach and to outline the factors that were taken into account during the research design process. It begins with a discussion of data collection and sampling procedures, before describing the efforts that were made to ensure reliability and validity in the data collection process. The chapter then presents the results of two exercises designed as an attempt to validate the data collected via the main survey instruments. The final section is devoted to a discussion of analytical procedures, and explains the strategic approach to specification and evaluation in the model building process.

## 4.1 Selection of data collection mode

It was clear from the literature and subsequent conceptualisation that a quantitative approach to data collection and analysis was required to test the operational hypotheses and satisfy the aims of the research. Although a qualitative element would have been a useful addition to help illuminate some of the variables further, it was clearly outside the scope of this study given the available time and resources. The selection of an appropriate mode of data collection therefore focused on quantitative methods and sources.

### 4.1.1 Primary vs. secondary data?

As discussed in the previous chapter, the type of information required by this study to test the operational hypotheses is essentially financial data at the sub-regional level. Such data requires detailed, in-depth information relating to transactions carried out by firms and households in two specific case study localities. The first key consideration, therefore, was to assess the extent to which adequate secondary data relating to both sectors was available.

*Firms*

As Moser and Kalton (1971) point out, a mass of information about the populations studied by social surveys is available in historical documents, statistical reports, records of institutions and other sources. Curran and Blackburn (1994) describe a number of official statistics relating to UK businesses, such as unemployment levels, VAT registrations and earnings and expenditure levels. However, what such information can tell us about local economies in the substantive sense is limited, as the main spatial unit used analysing the UK economy is the 'region'. As Curran and Blackburn (1994) describe, the so-called standard regions including the 'South West' and the 'South East' are large geographical

areas containing extensive variations in the levels and character of economic activities. Regional data not only excludes large numbers of smaller enterprises in each region, but also fails to allow for differences in the size distributions of businesses within different industries. As a key characteristic of rural areas is the prevalence of small firms (North and Smallbone, 1993), the use of such data would be a considerable drawback in a study such as this. Indeed, much of the theorising which has dominated academic contributions in economics, economic geography, regional studies and sociology over recent years has tended to be based on regional, national or sectoral analyses. Errington (1990) also considers the usefulness of a number of sources relevant to developing rural policy, including the Census of Employment, the Census of Production and the Agriculture Census, although concludes that their use involves a series of trade-offs in terms of coverage, spatial and industrial disaggregation, accessibility and timeliness. Further, apart from those relating to employment (through the 'selling' of labour), very little of such data is of a financial nature that relates specifically to the transactions of firms.

In analysing agriculture's links with the rural economy, Harrison-Mayfield (1996) used the Reading province of the Farm Business Survey (FBS) to obtain information about the distribution of farms purchases and sales from a sample of invoices and receipts. Despite the relatively small sample size, this proved to be a useful source of secondary data, although unfortunately no equivalent information source is available for other enterprise sectors within the rural economy. In discussion on input-output analysis, Harrison-Mayfield (1996) highlights the problems of data availability to the possibilities of producing a realistic input-output table for rural areas, and notes that the spatial disaggregation of existing data is not adequate for use in conjunction with user defined rural regions.

*To compound these difficulties, many of the sources do not publish data at a sufficiently disaggregated industrial level to enable a distinction between the industries which are of particular interest, or with any attempt to make the aggregations compatible with other data sources. To make data adequate would require firstly larger sample sizes....and*

*secondly greater industrial and spatial disaggregation of published statistics. Given these difficulties, it may be more sensible to pursue this research through 'case studies' of particular localities rather than attempting to model the whole rural economy* (Harrison-Mayfield, 1996: 30).

*Households*

In terms of statistics relating to the household sector, there are four main sources of relevant information: the Census of Population, the General Household Survey, the Family Expenditure Survey and the National Travel Survey. Again, similar problems exist with respect to spatial and social disaggregation of the data, severely limiting the value of such sources in this study. Further, the key criteria for household data in this project was that it would allow the *integration* of localised consumption and travel related data, which no secondary sources would do to the level of detail required to test the hypotheses.

Evaluation of the range of secondary data sources available to the rural development researcher therefore suggested that no combination of sources would provide a data set of sufficient quantity and quality to allow rigorous testing of the operational hypotheses. This pointed towards the need for the collection of primary data, and more specifically to the design of an *analytical survey* (Oppenheim, 1992).

### 4.1.2 Postal survey vs. personal interview?

As Frankfort Nachmias and Nachmias (1992) explain, three major methods are used to elicit information from respondents in survey research: the personal interview, the mail questionnaire and the telephone survey. The latter was felt to be inappropriate in this case, given the relative complexity of the information required to satisfy the aims of the research. This left a choice between carrying out structured personal interviews or administering a self-completion questionnaire by post. A number of factors were taken into account during the course of the decision process. To help illustrate these, Figure 4.1

presents a summary of the main advantages and limitations of each survey method which are documented in the literature. (See, for example, Franfort-Nachmias and Nachmias (1992); Oppenheim (1992); Moser and Kalton (1971); Barnet (1991)).

In selecting a survey method, two factors were felt to be of key importance and relevance to the study. First, was the clear need for respondents to have sufficient time to answer each question, either to make accurate estimations or to consult any relevant documents. Second, were the resource restrictions imposed on the study in terms of both finance and time. On balance, it was therefore decided that self-completion questionnaires would be administered by post to firms and households in the study areas. Indeed, this follows the approach employed by Gripaios *et al.* (1989) and Williams (1994). However, it wa acknowledged that this method of data collection would involve some trade offs, particularly with respect to response rates and the degree of flexibility offered by per nal interviews. Given the relative lack of methodological development in this field it wa a o decided to implement further instruments that would act as 'gold standards' (Litwin, 1995 against which to measure the self completion data for the purposes of validation.

MAIN ADVANTAGES OF POSTAL SURVEYS:

- **Lower costs** of administration, particularly when the population is spread over a wide geographical area. Processing and analysis are also simpler and cheaper than those of the personal interview.
- **Allow considered answers and consultations.** Postal questionnaires are preferable when questions demand a considered (rather than immediate) answer or if the answer requires consultation of personal documents or of other people.
- **Convenience.** Postal questionnaires can be completed at the respondent's leisure.
- **Reduction in biasing error.** Interviewer errors that may undermine the reliability and validity of survey results can be completely avoided with a postal questionnaire.
- **Greater anonymity.** With personal or sensitive questions a postal questionnaire may elicit a higher response rate than a personal interview.

MAIN LIMITATIONS OF POSTAL SURVEYS:

- **Requires simple questions.** Can be used only when questions are straight forward enough to be comprehended solely with the help of printed instructions and definitions.
- **No opportunity to probe** beyond the given answer or to clarify ambiguous answers.
- **No control over who fills out the questionnaire.** An individual other than the intended respondent may complete it.
- **Low response rate.** Reported response rates are much lower than for personal interviews.
- **More difficult to 'sell' the survey** and persuade respondents to complete the questionnaire.
- **Answers cannot be treated as independent** because the respondent can see all the questions before answering any one of them.

MAIN ADVANTAGES OF PERSONAL INTERVIEWS:

- **Greater flexibility.** Allows the interviewer to determine wording of questions, clarify items that are unclear, control the order in which questions are presented and probe for additional and more detailed information.
- **Collection of supplementary information.** This may include background information about the respondent's personal characteristics that can aid in the interpretation of results.
- **High response rate.** Respondents who normally would not respond to a postal questionnaire (for example, those who have difficulty reading or writing) can easily be reached and interviewed.
- **Control of the interview situation.** The interviewer can ensure that respondents answer questions in the appropriate sequence and it is possible to standardise the environment, for example to ensure that respondents do not have the opportunity to consult one another prior to giving their answers.

MAIN LIMITATIONS OF PERSONAL INTERVIEWS:

- **Higher cost.** The costs incurred are significantly higher than that of postal surveys, both in terms of finance and time. Costs of recording and processing information can also be high.
- **Interviewer bias.** Greater flexibility can sometimes leave room for personal influence and bias of the interviewer. Answers may be influenced by the way in which questions are posed and the desire to be empathetic with the interviewer may further bias the response, for example by giving socially desirable answers.
- **Lack of anonymity.** The interview lacks anonymity, which the mail questionnaire typically provides.

**Figure 4.1: Main advantages and limitations of mail questionnaires and personal interviews documented in the literature**

## 4.2 Sample selection

According to Moser and Kalton (1971), two major principles underlie all sample design. The first is the desire to avoid bias in the selection procedure, and the second is to achieve a maximum degree of precision for a given outlay of resources. Ultimately, the essential requirement of any sample is that it be as representative as possible of the population from which it is drawn (Frankfort-Nachmias and Nachmias, 1992). In this study, it was necessary to consider sampling procedures at two levels: the selection of appropriate towns for study and the effective selection of firms and households within the study areas.

### 4.2.1 Selection of study areas

The aim was to select two settlements of comparable size, one located in a 'remote' rural area and one in a more 'accessible' rural area (using classifications developed by the RDC, 1993; Hodge and Monk, 1991; and Craig, 1988 as a guide). It was decided that the population threshold of 3,000-10,000 would be followed, which was suggested by the RDC (1992) to define small towns at the lower end of the settlement hierarchy. The reason for this choice was two-fold. First, given the strong policy application of the research, using a recognised government standard was felt to be appropriate. For example, it would allow the implications of the research to be considered usefully in the context of existing policy objectives and initiatives. Second, it allowed the study to focus specifically on small towns in a structured and recognised way. Following definitions of the small 'market' town noted in the literature, attention was also paid to the functionality of settlements, albeit somewhat subjectively, for example in terms of their ability to act as a 'Central Place' (Hudson, 1976) or 'Key Settlement' (Cloke, 1979). It was also a criterion that, historically, the settlements functioned as a 'market town' as documented in the literature.

The first stage was to select two counties to represent 'remote' and 'accessible' rural in terms of relative proximity to major metropolitan centres. Given the location of the Seale-Hayne Faculty, and the growing interest of various local 'practitioners'[1] in the work of the Faculty's Market Towns Research Group, Devon was an obvious choice. It would also allow some useful comparisons to be made between the Cornish baseline studies that were underway at the time of selection (See: Dawson and Errington, 1998a; 1998b; 1998c). Following some initial research, Buckinghamshire was selected as a more 'accessible' county. This choice was made for three main reasons. Firstly, rural Buckinghamshire exhibits many of the distinctive characteristics of peri-urban areas (See for example Errington, 1994b, 1997b). Secondly, a study carried out in Buckinghamshire would allow some useful comparisons to be made with Errington's (1994a) baseline study of the Lambourn valley in Berkshire, and Root *et al.*'s (1995/96) studies of travel patterns in South Oxfordshire. Finally, some preliminary contacts with relevant practitioners revealed a strong level of interest in the research which would complement, and build upon, existing studies recently carried out in the county (For example, Milton Keynes Chamber of Commerce Training and Enterprise, 1996; Meridien projects Limited, 1995).

The second stage was to select a town in each of the counties. This was achieved through a structured process of elimination involving a combination of two approaches. First, an objective analysis of socio-economic data was carried out to ensure comparability between the selected towns; and second, a more subjective assessment of the two counties and their respective settlements was undertaken to help inform the decision.

The aims of the quantitative exercise were to identify settlements that were broadly 'representative' of small towns in the two counties, and ensure that the selected towns were roughly comparable in terms of their broad socio-economic characteristics. Initially,

[1]This includes local authorities, public sector agencies as well as a variety of NGO's.

data from the 1991 Census of Population was used to select key parameters for all small towns in the two counties; including resident population, proportion economically active, family stage and car ownership. The data was then examined to review which of the towns were 'representative' of settlements in the county as a whole. Median and mean values were calculated for each of the socio-economic parameters, broadly indicating that Kingsbridge, South Molton, Olney and Winslow were the most 'representative' of their respective counties. However, given the overall variation noted, a total of six towns in Devon and four in Buckinghamshire were short-listed for inclusion into the qualitative element of the selection process[2].

| **Devon:** | **Buckinghamshire:** |
|---|---|
| Okehampton | **Olney** |
| **Kingsbridge** | Haddenham |
| Totnes | **Winslow** |
| Dartmouth | Wendover |
| **South Molton** | |
| Bovey Tracey | |

**Figure 4.2: Initial shortlist of towns following examination of census data**

The more subjective aspect of the selection process involved a field reconnaissance of the two counties and respective towns. Initially, informal visits were made to the towns to gain an overview of retail activities, town centre viability, and gain an overall impression of the town with particular reference to its functionality. This exercise also involved a review of any local literature about the towns that could help to inform the decision. Appointments were then made with key players and practitioners in each of the relevant districts and, if it was felt appropriate, the towns themselves. The aim of these meetings was to gain more in depth information about the settlements; including their viability, functions, evolution, and any proposed developments that were of issue or interest at the time.

[2] See Appendix E for town selection Census data and a summary of relevant findings.

In the Buckinghamshire case, the first to be removed from the shortlist were Haddenham and Winslow. The former was felt to be inappropriate because it was essentially a contemporary dormitory settlement with no real centre at all. Similarly, Winslow appeared to be over dominated by commuting activity to be realistically comparable to the Devonshire towns. This left a choice between Olney and Wendover, from which Olney was selected as the 'accessible' rural case study locality for a number of reasons. The position of Olney represents a classic example of a peri-urban settlement pattern, with the town situated equal distance from three major regional centres: Milton Keynes, Bedford and Northampton. Further, its location is particularly interesting in terms of rural classification. The town itself is situated just inside the border of the Milton Keynes district, which is classified as 'Urban' by the RDC (1993). The two other districts falling within the study area, Wellingborough and North Bedfordshire, are both classified as 'accessible rural' by the RDC. According to Hodge and Monk's (1991) rural typologies, Milton Keynes and North Bedfordshire are both classified as 'South Eastern Growth' and Wellingborough as 'Midland Outer Metropolitan'. Craig's (1988) categorisation, based on the average population densities for individual wards, shows all three districts to be classified as 'Industrial rural and suburban', which lies between the categories 'Dense rural' and 'Urban'. Thus, with respect to classifications provided in the literature, it was felt that the term 'accessible' rural could be usefully applied to the Olney study area Indeed, it also enabled a town to be selected at what could be considered the far end of the 'accessible' – 'remote' continuum, which would provide an interesting comparison given that only two study areas were to be selected.

More pragmatically, the town is not too close to any comparable settlements that may indirectly influence the nature of economic activity associated with the town. Indeed, Wendover was felt to be too close to Tring for precisely this reason, although its proximity to Aylesbury would have represented an interesting rationale for enquiry. Olney also has a

legacy of historical development that is strongly akin to that of English market towns as documented in the general literature. Likewise, its potential to act as a 'central place' or 'key settlement' is evident, and thus it conforms well to contemporary definitions of the market town. The meetings with relevant practitioners in the area, including planners, councillors and representatives from Chambers of Commerce and Business Links, proved to be very fruitful and important elements of the selection process. The various issues with regard to settlement patterns, economic activity and town centre functions were discussed in the context of the research and its implications for local development initiatives. Thus, the strong level of interest for the research by Milton Keynes Chamber of Commerce and Olney Town Council was also a key consideration in the decision to select Olney as a case study area. The research proposal was very well received and it was evident that the findings of the study would be efficiently utilised by local actors, and would complement what interest there already was in this type of enquiry. Further, the assistance of local practitioners would help to elicit a good response rate from the surveys.

In the case of Devon, visits to the shortlisted towns and meetings with local actors resulted in the initial elimination of Bovey Tracey and Dartmouth. It was felt that the latter suffered from a number of drawbacks with respect to the study, essentially in terms of its coastal location, the dominance of tourism in the local economy, and its proximity to Kingswear on the eastern bank of the River Dart. The decision was taken to eliminate Bovey Tracey as a possible case study area due to its location adjacent to the A38, the major route connecting Plymouth with Exeter and the M5 Motorway. It was felt that this relative accessibility was not representative of the 'remote' classification applied to rural districts in the county. For the same reason, Okehampton was felt to be inappropriate, given the fact that its bypass, the A30, forms part of a major route linking Cornwall to the M5. This left a choice of three: Totnes, Kingsbridge or South Molton. The former was felt to be inappropriate due to the fact that its population size was not comparable to Olney's. Totnes

also suffered from the recent addition of a major edge-of-town supermarket with an apparent status equivalent to much larger market towns, such as those with a population of 20,000 or more. This left a final choice to be made between South Molton and Kingsbridge.

On paper, both towns presented very interesting potential case study areas. South Molton is a classic example of a traditional market town, with a strong agricultural base and flourishing market. The only real drawback was the proximity of the town to Barnstaple, although, given the evident 'central place' function of South Molton, this was not thought to be of any real concern. Kingsbridge also appeared to be an ideal candidate, and was a strong favourite due to the interest of local actors in the research. Historically, the settlement is a classic example of a market town with its functional development mirroring that documented in the literature. Local planners consider the town to be the 'hub' of the South Hams and it is recognised as a 'central place' serving the district. Again, the agricultural function appeared to be relatively strong in comparison to a number of Devonshire towns. The settlement is 15 miles from its nearest regional centre, which, in English terms, makes the town relatively inaccessible to urban centres. For example, South Molton is only 10 miles from Barnstaple, and Bovey Tracey 10 miles from Exeter. Unlike many other small towns in the county, Kingsbridge is also located away from any major routes and trunk roads. In fact, access to the town from the north is via a single carriageway road. The South Hams district is classified as 'remote rural' by the RDC (1993) and as 'Dense Rural' by Craig (1988). In Hodge and Monk's (1991) study, the district falls into the 'Service' cluster, which reflects it's above average employment in services, most likely associated with the South Devon tourism industry.

Indeed, the only real concerns associated with the choice of Kingsbridge as a case study town were the possible influence of tourism in the local economy and its close proximity to

Salcombe. Although the location of Kingsbridge lends itself to playing a part in the tourism economy, its function is not deemed by local actors to be related specifically to tourism as in the case of Dartmouth. Therefore, the influence of this sector forms only part of the whole economic 'picture'. In fact, tourism has an impact in most areas, particularly in Devon. Concerns about the influence of tourism on a spatial analysis of local economic activity were also quelled by some of the results coming out of the Market Towns baseline studies.

The relatively close proximity of Kingsbridge to Salcombe, a holiday resort located three miles to the South, presented two possible problems to be considered before making the final selection decision. First, would it unduly effect the activity patterns of firms and households, thus biasing results of the surveys? Second, if Salcombe were to fall within, or very close to the 'hinterland' of Kingsbridge, how would this be overcome, and how would it affect comparability with Olney? These two problems were discussed with South Hams District Council and Kingsbridge Chamber of Commerce. Both advised that the strong emphasis on tourism in Salcombe would be unlikely to effect Kingsbridge any more than other comparable settlements in the district which were further away. In relation to the second problem, it was decided that the study area be moved up slightly so that, in effect, two thirds of the study area outside of Kingsbridge would fall to the north of the town. This effectively excluded the northern section of the Salcombe hinterland, potentially making it less influential over documented activity patterns. It was also found that an identical shape of study area was appropriate for the case of Olney, due to the relative proximity of Newport Pagnell, the northern district of Milton Keynes. Again, the proposed adjustments to the 'accessible' rural study area were discussed with the relevant actors who were happy with the decision.

The location of the study areas are illustrated by Maps 4A and 4B, located in Appendix F.

### 4.2.2 Selection of sampling frames and sample design

According to Moser and Kalton (1971), one of the most decisive factors in sample design is the nature of the available sampling frames. Frankfort-Nachmias and Nachmias (1992) note that, although ideally a sampling frame should include all sampling units in the population, in practice a physical list rarely exists, and an equivalent list must be substituted for it. In selecting effective sample frames for firms and households, the advice of Fowler (1993) was taken, and three key characteristics for each sample frame were evaluated. Firstly, it was noted that the sample frame must be as comprehensive as possible. For example, many general lists of households, such as those with driving licenses, homeowners or published telephone directories, cover large segments of populations but also omit segments with distinctive characteristics. Secondly, it was essential that the probability of selection could be calculated for each unit at the time of sample selection by examination of the list. Finally, given the restrictions on time and financial resources, it was important that eligible sampling units could be selected from the sample frame efficiently.

The most comprehensive and up-to-date sampling frame available for the business community was found to be the Yellow Pages *Business Data Base,* issued through British Telecom. This is a national service that is up-dated every month and allows a business sample to be stratified at many different levels, for example according to Standard Industrial Classification (SIC) or geographical location. Obviously in this case, it was a great advantage to be able to stratify the frame geographically in order to that the study areas could be targeted as accurately as possible[3]. The product also allowed two copies of the firm's postal addresses to be produced on self-adhesive labels, and addressed to the

[3] In the case of the Kingsbridge surveys, it was possible to identify the precise postal code sectors of the study areas from the electoral register and obtain a list of all firms within them. In the case of Olney, the town and a four mile radius was specified and subsequently tailored to fit the exact study area.

senior manager.

In the case of the household survey, the Electoral Register was felt to provide the most comprehensive population list from which a representative sample could be selected. As Moser and Kalton (1971) point out, for samples of individuals this generally offers the most convenient frame, being the only available national sampling frame of individuals. Key advantages of the register are that it does not exclude those living in communal establishments and does not omit those without a telephone or those choosing to be ex-directory. As the study was only concerned with a survey of adults, the exclusion of young people from the register did not pose a problem. The only real drawback was the systematic exclusion of those choosing not to register to vote. Individuals also had to be grouped into households before selecting the sample, although at the same time this allowed a personalised letter to be sent to an individual in the household, a key advantage in terms of improving response rates.

Using the *BT Business Data Base* a 'census' survey of all firms in the two study areas was carried out. However, the Electoral Register provided the frame from which a sample of households had to be selected. As Frankfort-Nachmias and Nachmias (1992) point out, the essential requirement of any sample is that it be as representative as possible of the population from which it is drawn. A sample is said to be representative if the analysis made on its sampling units produce results similar to those that would be obtained had the entire population been analysed. In modern sampling theory, a basic distinction is made between probability sampling and non-probability sampling. The distinguishing characteristic of probability sampling is that one can specify, for each sampling unit of the population, the probability that it will be included in the sample (Frankfort-Nachmias and Nachmias, 1992). As already noted, this is an important aspect in selecting a representative sample. Fowler (1993), Frankfort-Nachmias and Nachmias (1992), Oppenheim (1992),

Bouma and Atkinson (1995) and Mangione (1995) all describe a number of methods for selecting a one-stage probability sample. The following were considered in choosing an effective sampling design:

- **Simple random sampling:** This method approximates to drawing a sample out of a hat. Members of a population are selected one at a time, independent of one another and without replacement. It is necessary to enumerate and list each element and, providing a suitable method of selection is devised, each sampling unit is given an equal and known probability of being selected.

- **Systematic sampling:** This procedure involves the selection of every *nth* case in the list, after the first sampling unit is selected at random from the first *n* sampling units. By dividing the total number of the sampling frame by the sample number, the interval at which units are selected can be found. It is important, however, to examine the sample frame prior to selection to check if any biases in the ordering of the list do not occur at the same interval as the sampling interval.

- **Stratified samples:** This method of sampling is appropriate when it is necessary to ensure that different groups of a population are adequately represented in the sample. The underlying idea in stratified sampling is that available information on the population is used to divide it into groups so that sampling units within the groups are more alike than the units in the sample frame as a whole. Some examples of the criteria used to stratify populations are age, stage in life cycle, gender, ethnicity or location i.e. rural versus urban.

- **Cluster sampling:** This method of sampling is commonly employed in large scale research projects where it is necessary, to draw a truly random sample of, for example, 1,600 names and addresses from a nation-wide population of many millions (Oppenheim, 1992). Cluster sampling involves several stages of random selections, taking advantage of the fact that most populations are structured in some way, or can be divided into sub-sections according to certain characteristics.

In this case it was felt that the most appropriate would be to employ a systematic sampling method. As Frankfort-Nachmias and Nachmias (1992) point out, this is a more convenient method than simple random sampling. It also helps to overcome researcher bias in sample selection, which goes on independent of the researcher's preferences, inclinations or prejudices (Bouma and Atkinson, 1995). As Fowler (1993) notes, in practice, most sample frames do not pose any problems for systematic sampling, and when they do, this can be remedied by reordering the list or adjusting the sampling interval. In this case, however, no adjustments were needed.

### 4.2.3 Sample size

In the case of the business survey, the problem of sample size was not an issue due to the nature of the sampling frame and the fact that available resources allowed questionnaires to be sent to all firms on the list. However, some thought and consideration needed to be applied in the design of the household survey.

As Moser and Kalton (1971) explain, in practice, the sample designer's aim is either to get maximum precision at a given cost or to attain a fixed precision at the lowest cost. Thus, decision on sample size is influenced as much by estimates of costs as by standard error estimates. In theory, the sample size necessary to achieve a given precision can be calculated if the researcher can estimate the proportion of the population with some particular attribute and decide how small a standard error is desired. However, as Moser and Kalton explain, this practice is greatly complicated by a number of factors. Since every set of survey results may be used for several different purposes, determining the level of precision is no easy task. One must also then consider analyses of sub-groups in the population, and the numbers required in each to give the desired precision. As noted, this is often well beyond what is practicable. A further problem, and one of particular relevance here, is that surveys often seek information on a number of different variables. The multi-nature of surveys is very difficult to overcome with respect to determining the appropriate sample size. Thus, short of taking a sample large enough to give the desired precision for all variables, which is rarely possible, there is no perfect solution.

Given these complications an objective calculation of an appropriate sample size for the two household surveys was not attempted.

*.....in many social research surveys, the desired size is unattainable anyway, because of financial, time or personnel limitations. In such a situation it is best to take the largest sample financially possible and to discard questions for which a much larger sample would be needed to produce useful results. One must....try to utilise the available sample*

*to the best advantage, i.e. to attain the highest precision possible by statistical ingenuity in the design* (Moser and Kalton, 1971: 151).

The maximum number of households deemed feasible to include in the initial survey was 750 for each study area. This also equated well with the number of questionnaires to be sent to firms in each study area: 598 in the case of Kingsbridge and 474 in the case of Olney.

## 4.3 Ensuring reliability and maximising validity

A key consideration when designing survey instruments were the concepts of reliability and validity. As Oppenheim (1992) explains, reliability refers to the consistency of a measure, to repeatability, and to the probability of obtaining the same results again if the measure were to be duplicated. Validity, on the other hand, tells us whether the question or item measures what it is supposed to measure. At the design stage, attempting to ensure reliability and maximise validity involved careful attention to the design of survey questions and a rigorous process of pre-testing and pilot work prior to the administration of the main surveys.

### 4.3.1 Questionnaire design

Questionnaire design and construction is always an extremely rigorous process. In this case, the relative complexity, and precision, of the required data posed an important challenge in terms of translating research objectives into specific questions and motivating the respondent to provide the necessary information. (Frankfort-Nachmias and Nachmias 1992). The principal challenge was to translate the operational hypotheses into survey questions as efficiently and succinctly as possible. This involved constructing a series of *factual questions* (as opposed to *opinion* or *attitude* questions) to illuminate both

independent and dependent variables. The nature of this information required *a closed question* approach to ensure accuracy and objective comparability between respondents. As Frankfort Nachmias and Nachmias (1992) and Bailey (1978) note, such questions also have the advantage of requiring less motivation on the part of the respondent to communicate, and the response itself is usually less revealing (and hence less threatening) to the respondent than in the case of the open question. Thus, answers are relatively complete, questions are easier to answer, and less frequent refusals to respond tend to be encountered.

During the process of questionnaire design and construction, the advice of Oppenheim (1992), Frankfort-Nachmias and Nachmias (1992), Moser and Kalton (1993), Chisnall (1992) and Bailey (1978) proved very useful. Particular attention was paid to the format, wording and sequence of questions. The key challenge in constructing individual questions, particularly in the case of those tailored towards dependent variables, was to make the questions as user-friendly as possible and obtain the necessary information as simply as possible. Thought also needed to be given to the relative ease with which raw data could be transformed into appropriate variables in the analysis stage. Attempts were made to be as clear and concise as possible, and to provide the necessary information, explanation and instructions to ensure that respondents would understand the concept of the questions and so provide the appropriate information. Further attempts were made to avoid bias and non-response throughout the questionnaires with respect to the wording of questions, in particular avoiding ambiguity, leading questions, vague or loaded words. Care was also taken to ensure that questions would not be considered threatening in any way. A key factor about the more technical questions relating to activity patterns, particularly in the case of the household survey, is that they required the respondent to recall or estimate information. Thus, serious attention had to be given to ways which would help facilitate this process, including manageable time periods in which to set

questions and the suitable breakdown of categories to help the respondent in recalling accurate information.

In terms of the sequence of questions, careful planning resulted in what is closely akin to the *funnel sequence* (Frankfort-Nachmias and Nacmias,1992; Moser and Kalton, 1993) cited as a suitable approach when a survey aims to collect detailed information. This involved starting with a set of general questions (focusing on independent variables) and narrowing down to more specific and technical issues (aimed at illuminating dependent variables). Some general rules for question ordering determined by Bailey (1978) were also followed, including placing more sensitive questions later in the questionnaire and those which were easier to answer nearer the beginning.

### 4.3.2 Influencing response rates

As well as the rigorous attention paid to the design of survey instruments, further action was taken to influence the response rate of the surveys, and thus reduce non-response bias. First, publicity, in the form of press releases (written by the author) appeared in local newspapers and newsletters prior to the administration of the main surveys. This aimed to increase awareness of the research in the two study areas, in the hope of gaining the interest of potential respondents prior to the questionnaires being sent out. Essentially, the press releases aimed to enlist support and to explain the rationale for the research in very simple terms. Second, the support of local actors was sought and it was requested that they allow their endorsement to be made known through the press releases and supporting literature accompanying the questionnaires. The rationale was that local people would be more likely to respond if they perceived that the results would be of benefit to their community as well as to the university. Indeed, Mangione (1995) argues that respondents are more likely to co-operate in surveys if the research is supported by government

organisations or local universities. This proved to be a very straightforward task given the prior communication with local practitioners during the town selection process. In the case of Kingsbridge, the support of *South Hams District Council, Kingsbridge and District Chamber of Commerce* and *South Devon Business Link* was gained. All agreed to endorse the research by way of accreditation, and two of them allowed their logo to appear on the questionnaire covering letters. Likewise, in Buckinghamshire, *Milton Keynes-North Bucks Chamber of Commerce and its Business Link* and *Olney Chamber of Trade* agreed to do the same.

The covering letters themselves were deemed to be a major influence over the response rates, and much careful planning went into their construction. As Mangione (1995) argues, it is critical to produce a covering letter that is 'just right'. According to Frankfort-Nachmias and Nachmias (1992), a covering letter must succeed in overcoming any resistance or prejudice the respondent may have against the survey.

> *As such it should (1) identify the sponsoring organisations or persons conducting the study, (2) explain the purpose of the study, (3) tell why it is important that the respondent answer the questionnaire, and (4) assure the respondent that the information provided by him or her will be held in strict confidence* (Frankfort-Nachmias and Nachmias, 1992: 226/228).

Copies of the press releases are in Appendix G. Copies of all covering letters administered with the questionnaires are in Appendix H.

### 4.3.3 Pre-testing and pilot work

As already mentioned, pre-testing played a key role in the process of questionnaire design. In the case of the business questionnaire, a handful of local firms were approached and asked to attempt completing the first draft questionnaire. As expected, this highlighted a number of problems, and more importantly, elicited suggestions on how such problems

could be overcome. Some very important changes were made at this stage. For example, one local entrepreneur suggested that the schedule ask for financial information relating to the previous quarter, as this would more likely tie in with records for VAT purposes. Another highlighted the need for a clearer statement of the core questions and the removal of technical jargon such as 'volume' and 'value' of transactions.

A similar exercise was carried out with the household questionnaire and transactions logs. In this case, the questionnaire was taken to a local badminton club on three occasions where members agreed to have a go at completing the schedule between matches. Again, this proved to be a fruitful exercise in ironing out ambiguities and sources of confusion. In particular, some very useful suggestions were made regarding the classifications of goods and services and the wording and explanations of the core questions. The structure of the employment sections was also altered at this stage following the difficulties encountered and suggestions made. The final question relating to household income was also changed from requesting a weekly to a gross annual figure.

Pilot work began on the 24th November 1997 to test the methodology and iron out any logistical difficulties. Questionnaires were administered in the Kingsbridge study area to 100 households and 50 firms. Households were systematically selected from the electoral register, and the firms selected from a small local directory produced by South Hams District Council. (Obtaining the BT data base at this time would not have been good practice as it would have been four months out of date at the time of the main surveys). Pilot response rates were encouraging, with a 34% usable response achieved from the household survey and 24% from the business. The household questionnaire proved to be very satisfactory with no further changes made before the production of the final draft. The business questionnaire underwent minor refinements aimed at increasing the response rate and making responses to individual questions more comprehensive.

Validation methods were also piloted at this time. Ten households who responded to the pilot survey were contacted and ask to complete a transaction log over a two-week period, eight of which successfully completed the log and returned it promptly. As with the household questionnaire, no changes were made to the log prior to production of the final draft. A sample of firms was also contacted and subsequently visited to test out the logistics of the financial records analysis procedure. Four out of the six firms initially contacted agreed to take part, which proved successful and indicated that the method was suitable to achieving the aims of the exercise.

The complete set of survey instruments that were used in the main surveys are in Appendix I.

## 4.4 The main surveys

The main surveys in Kingsbridge commenced on 5th March 1998. This was timed to allow the latest version of the electoral register to be used, which was issued in mid-February. Two reminders were sent in both the household and business surveys, one on 20th March comprising of a reminder letter only, and a second on 3rd April which including a reminder letter and a second copy of the questionnaire. The final usable response rates were 29.6% in the case of the business survey and 50.5% in the case of the household survey, yielding 177 and 379 usable cases respectively. A more detailed breakdown of the response rates for the Kingsbridge surveys is provided by Table 4.1.

| BUSINESS SURVEY | | |
|---|---|---|
| **Mailing** | **Usable returns** | **Cumulative response rate %** |
| Initial mail (598) | 94 | 15.7 |
| First reminder (485) | 46 | 23.4 |
| Second reminder (431) | 37 | 29.6 |
| **Total** | **177** | **29.6** |
| **HOUSEHOLD SURVEY** | | |
| Initial mail (750) | 244 | 32.5 |
| First reminder (494) | 60 | 40.5 |
| Second reminder (424) | 75 | 50.5 |
| **Total** | **379** | **50.5 %** |

**Table 4.1: Cumulative response rates achieved at each stage of the Kingsbridge postal surveys**

The initial mail out was administered to the Olney study area on 17th September 1998. Given restrictions on financial resources, and the relatively small gain from the second reminder in the Kingsbridge surveys, only one reminder was sent out to the 'accessible' study area. This comprised of a reminder letter and a second copy of the questionnaire. In this case final response rates were not quite so good: 23.4% in the case of the business survey and 36.1% in the case of the household, yielding 111 and 271 cases respectively, although these were still fairly respectable for a postal survey of this complexity. The short fall was thought to be attributed not only to the lack of an intermediate reminder but also the fact that the University of Plymouth is not a local organisation to North Bucks. Also, the response rates of the Kingsbridge surveys may have benefited from the *Countryside March* which took place in London in the same week that the questionnaires were administered, and was covered extensively by the national media. Thus, rural issues were already firmly embedded in the minds of the general public, which may have stimulated some respondents to complete and return questionnaires.

| BUSINESS SURVEY | | |
|---|---|---|
| **Mailing** | **Usable returns** | **Cumulative response rate %** |
| Initial mail (474) | 69 | 14.6 |
| First reminder (393) | 42 | 23.4 |
| **Total** | **111** | **23.4** |
| **HOUSEHOLD SURVEY** | | |
| Initial mail (750) | 175 | 23.3 |
| First reminder (555) | 96 | 36.1 |
| **Total** | **271** | **36.1** |

**Table 4.2: Cumulative response rates achieved at each stage of the Olney postal surveys**

Data collection for the validation methods took place during April and May of 1998. A more detailed explanation, including sample sizes and response rates is provided in section 4.5.4.

## 4.5 Testing the methodology for reliability and validity

As Oppenheim (1992) explains, reliability and validity are closely related to each other. Above all, reliability is a necessary (though not entirely sufficient) condition for validity although a measure which is unreliable cannot attain an adequate degree of validity. On the other hand, a measure may be highly reliable and yet invalid. The question of reliability has been addressed mainly during the design stage. However, having collected the data there were steps that could be taken to determine the reliability and validity of the survey design.

### 4.5.1 Response bias

Random error is the unpredictable error that occurs in all research and is affected primarily by sampling techniques (Litwin, 1995). This is addressed by the application of statistical tests, used to calculate the probability that a particular result is due to random error. However, the degree of random error is also dependent on how representative a sample is of the population, as is the probability of obtaining identical results if the surveys were to be repeated in that population. By comparing the structure of the respondents to that of the entire population, it is possible to measure the degree of random error. In turn, this allows the amount of response bias to be estimated. The exercise is carried out by comparing the structure of the four survey populations with the entire populations of the study areas, or regions, using data drawn from secondary sources.

*Business survey*

Given that the sampling frame provided a list of all firms in the two study areas, accurate checks of response error could have been carried out by requesting detailed information about each firm, such as industrial classification, at the time of ordering the list. However, financial constraints meant that only the address of each sampling unit could be obtained. Thus, it is necessary to compare the two samples with secondary data sources. The most readily available source of information with regard to economic structure at a regional level relates to Standard Industrial Classification (SIC). The data presented in Table 4.3 compares the two survey samples with firm SIC in their respective regions, recorded by the Office for National Statistics (ONS) in April 1997. As one might expect from two rural study areas, agricultural activity is over represented, by just under 10% in the 'remote' rural area, and 5% in the 'accessible' locality. Services are slightly under represented in comparison to the regional average, again understandable given the inclusion of a number of urban centres in each of the regions. On the whole, there is little deviation between the

respective data sets, indicating that the two samples are likely to be representative of local economic structures. This reflects the importance and success of using an up-to-date sampling frame such as the *BT Business Data Base*.

| SIC | South West | Kings sample | *Deviation* | South East | Olney sample | *Deviation* |
|---|---|---|---|---|---|---|
| Agriculture | 12.8 | 22.6 | *+9.8* | 4.3 | 8.9 | *+4.6* |
| Manufacturing | 8.2 | 11.3 | *+3.1* | 8.5 | 9.8 | *+1.3* |
| Construction | 9.1 | 9.6 | *+0.5* | 9.6 | 13.4 | *+3.8* |
| Services | 54.3 | 47.5 | *-6.8* | 60.9 | 56.3 | *-4.6* |
| Other | 15.6 | 9.0 | *-6.6* | 16.6 | 11.6 | *-5.0* |

**Table 4.3: Comparison between survey samples and regional structures in terms of Standard Industrial Classification (SIC)[4]:** given by proportions of businesses within each classification

*Household survey*

The only information source of sufficient detail relating to demographic structures is the 1991 population census issued by the ONS. Although six years out of date, it does allow a comparison between the two data sources in terms of some key household parameters. Table 4.4 presents a comparison of the survey populations and 1991 social groups, according to the occupational group of economically active household heads. Census data is provided for the respective districts, and the town wards themselves. Given the chronological differences, and the fact that the census data is based only on a 10% sample of the respective populations, the only serious deviations are that both survey samples appear to have an over representation of professional groups at the expense of managerial and technical occupations. This most likely reflects a higher level of interest in social research in the former group given the nature of its associated occupations. Importantly,

[4] Source: Office for National Statistics (1999) Inter-Departmental Business register: Classification of Business Sites, 1997, registered for VAT and/or PAYE on a local unit basis.

this deviation would not affect the classification of households into low and high social groups (the main categorisation to which this study's hypotheses refer - see section 3.4), and so is not of any great consequence regarding the results.

| KINGSBRIDGE Social group (%): | 1991 Census*: South Hams | Kingsbridge | Survey population |
|---|---|---|---|
| I Professional | 5.7 | 1.9 | 16.8 |
| II Managerial / tech | 39.6 | 36.1 | 21.3 |
| III Skilled non-manual | 12.4 | 14.8 | 17.8 |
| IV Skilled manual | 22.8 | 21.3 | 17.3 |
| V Partly skilled | 10.9 | 16.7 | 13.9 |
| VI Unskilled | 3.5 | 6.5 | 12.9 |
| Other** | 5.1 | 2.7 | - |
| **OLNEY Social group (%):** | **1991 Census*: Milton Keynes** | **Olney** | **Survey population** |
| I Professional | 7.4 | 15.2 | 21.9 |
| II Managerial / tech | 32.2 | 46.5 | 34.3 |
| III Skilled non-manual | 14.2 | 9.6 | 18.9 |
| IV Skilled manual | 26.5 | 19.7 | 10.9 |
| V Partly skilled | 13.4 | 7.3 | 10.5 |
| VI Unskilled | 3.9 | 1.7 | 3.5 |
| Other** | 2.4 | - | - |

* Source: Office for National Statistics (1991) According to a 10% sample of Small Area Statistics (SAS)
** Includes those is the armed forces, on Government schemes and inadequately described occupations

**Table 4.4: Comparison between survey population and 1991 census in terms of social class:** given by proportion of economically active households

Further checks are provided in Table 4.5. In terms of lifestage, both survey samples appear to be representative of their local populations. Likewise, the figures for car ownership levels present some very encouraging results. As expected, ownership levels have risen in both study areas since the 1991 census, reflected by the lower proportion of households with no car and the relatively higher proportion who own two or more cars.

| KINGSBRIDGE Lifestage** (%): | 1991 Census*: South Hams | Kingsbridge | Survey population |
|---|---|---|---|
| GROUP I | 2.1 | 2.4 | 4.8 |
| GROUP II | 10.6 | 10.6 | 13.4 |
| GROUP III | 7.9 | 7.6 | 7.8 |
| GROUP IV | 5.9 | 5.5 | 6.7 |
| GROUP V | 39.2 | 33.6 | 32.1 |
| GROUP VI | 34.3 | 40.3 | 35.3 |
| **Car ownership (%)** | | | |
| No car | 19.0 | 28.8 | 13.3 |
| One car | 49.5 | 51.1 | 48.6 |
| Two cars | 25.9 | 16.4 | 31.5 |
| Three + cars | 5.6 | 3.7 | 6.0 |
| **OLNEY Lifestage** (%):** | **1991 Census*: Milton Keynes** | **Olney** | **Survey population** |
| GROUP I | 4.8 | 2.2 | 6.0 |
| GROUP II | 16.2 | 14.2 | 19.8 |
| GROUP III | 11.2 | 10.0 | 8.6 |
| GROUP IV | 7.4 | 6.0 | 7.8 |
| GROUP V | 41.2 | 43.4 | 38.8 |
| GROUP VI | 19.2 | 24.2 | 19.0 |
| **Car ownership (%)** | | | |
| No car | 25.0 | 16.0 | 7.5 |
| One car | 47.1 | 40.4 | 34.2 |
| Two cars | 23.6 | 37.6 | 48.5 |
| Three + cars | 4.3 | 6.0 | 9.8 |

Source: Office for National Statistics (1991) According to a 100% sample of Small Area Statistics (SAS) See Appendix J for breakdown

**Table 4.5: Comparison between survey population and 1991 census in terms of lifestage[5] and car ownership:** given by proportion of households

It is also important to note that in the case of the business and household surveys, sample sizes were almost identical for town and hinterland establishments, indicating that response bias was minimal with respect to location within the study areas.

[5] Slight variations exist in Groups II, II and IV in terms of the ages of children categorised between the ONS Lifestage categories and Dix's (1977) family stage breakdown used in coding the questionnaires. See Appendix J for details.

### 4.5.2 Validation methods

Given the relative complexity of the survey instruments, further checks were now required to determine the validity of the information collected. To achieve this, the results needed to be compared with an independent measure of the same variable, known as a criterion (Oppenheim, 1992). In this case, second, independent sources of information were not available to provide the criteria, which led the author to design two further survey instruments to provide external checks of the data collected via the questionnaires. This approach to validation is most closely akin to what Litwin (1995) describes as *concurrent validity*, which requires that a survey instrument be judged against some other method that is acknowledged as 'gold standard' for assessing the same variable. The approach involves a comparison between the questionnaire data, obtained through a combination of estimation and recall on behalf of the respondent, with that obtained from financial records and transactions logs. While it is not assumed that the financial records or logs necessarily represent measures which are of a 'gold standard', it is likely that they will be more accurate than the data gathered through self-completion methods. The aim is to attempt to validate the data obtained by self-completion methods and to comment on the exercise with respect to methodological development in this area.

Restrictions on time and financial resources meant that the two validation procedures could only be carried out in one of the case study areas. The Kingsbridge study area was selected for the exercises on the basis of important logistical considerations.

#### 4.5.2.1 Financial records analysis

A principle of the two questionnaires was that the information relating to the main variables[6] was based primarily upon the respondent's ability to provide estimates of the relevant economic activity patterns. In the case of the business survey, this involved providing estimates of the information that was, in theory, contained within the firms' invoices and receipts. A useful method of testing the estimated data was therefore to go back to a sample of the firms which responded and examine the relevant data contained in the financial records, to check if the estimated information was a true representation of the firms' activity patterns. In other words, to check estimated information with that which had already been recorded within normal business activity.

This method is based upon the 'spatial tracking' technique developed by Harrison (1993), who used data from the Reading province of the Farm Business Survey to examine agriculture's links with the rural economy. In the present case, however, the approach differed in two ways. First, the analysis involved all types of rural firm, not just farms; and second, the data was collected at the location of the firm itself by visiting the site and spending up to three hours (given resource restrictions) recording information found in the financial records. By analysing a sample of the invoices and receipts it was possible to obtain the amount of each transaction and the location of the customer or supplier involved. Postcodes were also recorded to ensure accuracy in the data collection procedure.

A total of fourteen firms were visited[7], randomly selected from the returns list and later telephoned to discuss the aims of the exercise and ask for the owner / manager's

[6] See section 3.3

[7] A description of the firms which took part in the validation exercise are contained in Appendix K.

permission to carry out the study[8]. This equated to an eleven percent sample of the firms who had completed the questionnaires fully and yielded data relating to a sample of eleven of the fourteen firms for sales transactions and the equivalent for supply transactions. The shortfall in information collected was due to a number of reasons. Consumer service firms only held receipts for supply purchases, with all sales going through the till. In this case, most respondents had estimated where the majority of their customers resided in the self-completion questionnaire. Where there were two or more strands to the business which had been described in the questionnaire, sales records were sometimes found to not relate to all of them, which meant that the information was insufficient to act as a method of external validation. In some cases, records were incomplete or badly kept and in others, parts of the records were held by the firm's accountant or the Inland Revenue at the time of the exercise and could not be examined.

Despite these factors, enough information was collected from the fourteen visits to provide a source of data with which to externally validate data collected via the initial surveys. The information was analysed to produce equivalent key variables yielded by the questionnaires. These were based on proportions of input and output transactions by financial value and number. The data presented in Table 4.6 indicates the percentage deviations of the estimated data obtained from the questionnaires from the equivalent data recorded in the respective firms' invoices and receipts. For example, the respondent on behalf of case number three under estimated sales attributed to the town by 11.6% in terms of financial value and by 5.4% in terms of the number of transactions.

Taking transactions by financial value first, we find a total of 52 deviations recorded out of a possible 98 for the data set as a whole. Encouragingly, over half of these deviations are

[8] A total of seventeen firms were telephoned initially, with three refusing to allow the author permission for reasons of confidentiality.

less than 10%; a fifth are between +/-10% and +/-20%, and the remainder are more than +/-20%. In other words, only a quarter of all estimates of output linkages given in questionnaires show more than a +/-10% deviation from the equivalent data recorded in sales invoices, with almost a half of all possible estimates showing no deviation at all. The case is almost identical when estimates of transaction proportions are considered in terms of their number.

In respect of transactions which are attributed to the town, the most common deviation is an under estimation, in terms of both financial value and number. A 'pseudo residual' is found in the next row whereby it is evident that firms have tended to slightly over estimate the strength of their economic linkages to the hinterland, again in terms of the value and number of transactions. The majority of larger deviations are found further down the table in the 'county', 'region' and 'country' sections. This is fortuitous since they do not affect the key dependent variables used in statistical analysis presented in this thesis. In terms of value, linkages to the county appear to have been slightly underestimated, and perhaps as a result, those to the regional economy over-estimated. In terms of the numbers of transactions, both areas show a slight underestimation, although in the case of the region, all are under -10%, whereas the three over-estimations are between +25% and +33%.

Moving on to Table 4.7, we find a slightly higher number of deviations from the recorded data in respect of input linkages. In terms of financial value, 58% of all possible estimations show a deviation, with just under a half being of a magnitude up to +/-10% and a third being between +/-10% and +/-20%. In effect, therefore, just under one third of all estimates of input linkages show a deviation of more than +/-10%, and a similar proportion show no deviation at all. Estimations of input linkages by number appear to be more reliable. Of the 60% of all possible estimations showing a deviation, almost two thirds are below +/-10% and a further quarter between +/-10% and +/-20%.

| SALES Location / Case no. | 1 | 3 | 5 | 6 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Town** | 0.0 | -11.6 | -10.0 | -2.9 | 0.0 | -18.3 | 0.0 | +0.9 | 0.0 | +26.5 | -1.2 |
| | (0.0) | (-5.4) | (+39.5) | (-6.9) | (+8.2) | (-22.2) | (0.0) | (-5.7) | (0.0) | (+23.6) | (-2.5) |
| **Hinterland** | 0.0 | +7.6 | 0.0 | -0.4 | +0.7 | +15.6 | 0.0 | +2.4 | 0.0 | -12.0 | 0.0 |
| | (0.0) | (+10.8) | (0.0) | (+2.0) | (+27.2) | (+44.4) | (0.0) | (+6.6) | (0.0) | (-9.9) | (0.0) |
| **District** | 0.0 | -13.2 | +10.0 | +27.6 | -38.6 | -32.3 | 0.0 | -4.4 | 0.0 | -13.2 | -9.0 |
| | (0.0) | (+7.1) | (+13.3) | (+23.1) | (-5.0) | (-38.9) | (0.0) | (+16.2) | (0.0) | (-4.0) | (-8.6) |
| **County** | 0.0 | +21.1 | -31.6 | +20.1 | -17.8 | +35.0 | -7.0 | +33.7 | -3.1 | -8.9 | -1.5 |
| | (0.0) | (-7.1) | (-43.8) | (+4.1) | (-26.0) | (+16.7) | (-25.0) | (+1.5) | (-11.9) | (-9.5) | (-23.9) |
| **Region** | +44.2 | -3.0 | +16.6 | +0.7 | +30.0 | 0.0 | +7.0 | -2.2 | -0.6 | 0.0 | +0.6 |
| | (+33.4) | (-4.3) | (-9.0) | (-3.9) | (0.0) | (0.0) | (+25.0) | (-2.9) | (+27.0) | (0.0) | (-2.6) |
| **Country** | -44.2 | -0.9 | +15.0 | -44.1 | +25.7 | 0.0 | 0.0 | -30.4 | +1.3 | -2.4 | +11.1 |
| | (-33.4) | (-1.1) | (0.0) | (-17.0) | (-4.4) | (0.0) | (0.0) | (-15.7) | (-14.7) | (-5.1) | (+37.6) |
| **Elsewhere** | 0.0 | 0.0 | 0.0 | -1.0 | 0.0 | 0.0 | 0.0 | 0.0 | +2.4 | +10.0 | 0.0 |
| | (0.0) | (0.0) | (0.0) | (-1.4) | (0.0) | (0.0) | (0.0) | (0.0) | (-1.4) | (+0.6) | (0.0) |

**Table 4.6:** **Deviations of estimated data from recorded data:** given by proportions of sales transactions by value and number attributed to respective geographical locations*

* Deviations relate to transactions by financial value, with transactions by number given in parenthesis

| SUPPLIES Location / Case no. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Town** | +6.8 | +11.4 | +1.1 | -0.2 | +15.5 | 0.0 | +8.0 | -7.3 | +24.0 | -17.5 | +7.4 |
| | (+3.5) | (-9.1) | (-32.3) | (-7.2) | (-7.2) | (+6.5) | (+15.8) | (-16.8) | (+10.3) | (-30.2) | (-0.5) |
| **Hinterland** | -5.5 | 0.0 | -4.1 | -7.3 | +3.0 | 0.0 | 0.0 | -0.3 | -8.0 | +0.6 | +15.0 |
| | (+3.3) | (0.0) | (-4.2) | (+16.9) | (+18.3) | (+2.0) | (0.0) | (+1.3) | (-6.0) | (-3.3) | (+6.6) |
| ***District*** | *-18.3* | *-8.1* | *-0.1* | *+3.2* | -35.7 | -5.0 | 0.0 | -1.1 | 0.0 | -9.2 | +17.8 |
| | (-3.3) | (+14.1) | (-1.1) | (+6.7) | (-18.3) | (-15.6) | (0.0) | (-3.6) | *(0.0)* | *(+9.6)* | *(+32.3)* |
| **County** | +30.0 | -2.5 | -16.6 | +30.2 | +13.1 | -17.0 | -2.4 | -13.5 | -16.0 | +19.2 | +19.6 |
| | (+7.1) | (-3.8) | (-2.3) | (-7.0) | (+6.1) | (+29.7) | (-18.4) | (+28.8) | (-4.3) | (-4.7) | (-15.5) |
| **Region** | -0.4 | -0.8 | +18.6 | -20.4 | +14.6 | -0.2 | -22.6 | -26.0 | 0.0 | +7.8 | -34.6 |
| | (-1.5) | (-1.2) | (+24.6) | (-5.7) | (-1.7) | (+5.9) | (-8.6) | (+6.5) | (0.0) | (+29.2) | (-9.0) |
| **Country** | -12.6 | 0.0 | +1.1 | -5.5 | -10.5 | +21.8 | +17.0 | +48.2 | 0.0 | -0.9 | -25.2 |
| | (-9.2) | (0.0) | (+15.3) | (-9.9) | (+2.8) | (+40.6) | (+11.2) | (-15.8) | (0.0) | (-0.6) | (-13.9) |
| **Elsewhere** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | (0.0) | (0.0) | (0.0) | (0.0) | (0.0) | (+2.1) | (0.0) | (0.0) | (0.0) | (0.0) | (0.0) |

**Table 4.7:** **Deviations of estimated data from recorded data:** given by proportions of supply transactions by value and number attributed to respective geographical locations*

* Deviations relate to transactions by financial value, with transactions by number given in parenthesis

Interestingly, the majority of deviations with respect to town linkages given by financial value appear to be over-estimations, with hinterland sourcing being slightly underestimated. In terms of those estimates given by the number of transactions, the opposite is true in the case of town linkages, with an even balance for those attributed to the hinterland. Again, the larger deviations are found further down the table, with the main discrepancies between county, regional and national linkages. Once again, this is fortuitous since they do not affect the key dependent variables used in statistical analysis presented in this thesis.

The observed differences between estimated spatial patterns of economic activity and those recorded in the sample of invoices and receipts analysed are likely to be due to a number of reasons. The major reason is the differences in time periods attributed to the data sets. The questionnaire asked for estimations relating to trading over the last financial quarter. In the validation exercise, the maximum amount of data possible in a three hour period was collected. This yielded data relating to a six month trading period, apart from in the ca e of two firms (cases 6 and 7) where the quantity of information available allowed only a one month sample to be recorded. It was felt that the half-yearly time frame would provide a more realistic picture of firm's trading patterns as a whole, and would also help to examine how useful the quarter is as a time period over which to source financial information. However, these differences are likely to be a source of deviation in themselves, especially in the case of firms which provide goods or services of a higher value, and therefore carry out fewer transactions over a specified period.

A common problem noted during analysis of financial records, and one also noted by Harrison (1996), is the problem of determining the address of the supplier when there is choice between the producer and distributor of the goods in question. In some cases, only the address of the distributor is given and in other cases both are given. This meant that, on

collecting the validation data, it was not always possible to distinguish clearly between production, distribution and retail of the goods in question. This problem is exacerbated by the fact that it would have inevitably affected the interpretation, and perception, of the relevant linkages by the respondent in that no prompt was given in the questionnaire. Ultimately, this problem represents not only a likely source of deviation between the estimated and recorded data, but also a drawback to the study itself since it inevitably concentrates on the first round of transactions between study areas firms and the rest of the economy.

A third problem noted whilst collecting the data was the inclusion of telecommunications and fuel bills in the majority of financial records analysed. Again, this presented a two sided problem - first, in respect of whether or not to include these outgoings in the validation analysis, and second, whether respondents themselves were likely to consider them as inputs when compiling the estimations in the questionnaire. Where it was possible to consult the individual who had completed the initial questionnaire on visiting the firms, it was clear that the problem represented a major ambiguity, although the majority had not immediately considered them as inputs when considering the spatial distribution of transactions. As a result it was decided not to include them in the validation analysis but it inevitably poses a problem when attempting to match estimated and recorded data.

A related problem, this time in terms of the downstream linkages of agricultural firms, is the question of whether agricultural premiums and subsidies are considered as sales revenue, given their common inclusion in financial records. Again, where possible it was necessary to consult the individuals in question to ascertain their initial interpretation when completing the questionnaire, and it evidently represented an ambiguity. The decision was taken not to include such income as sales revenue when compiling the validation data set. A second problem discovered in relation to output linkages was the possible confusion

over the distinction between private sales and those that are contracted out to other firms, but still recorded as revenue in the same way as the former. Only one firm out of the fourteen selected for the validation exercise contracted out a significant proportion of business to other firms in the county, although it clearly posed a source of ambiguity in terms of accurately estimating the spatial distribution of downstream linkages.

Two further problems deserve some discussion. The most important problem relates to confusion over geographical boundaries. The distinction between the town and hinterland, referred to as 'within a four mile radius of the settlement', is undoubtedly the easiest to make, and this is reflected by the fact that the smallest deviations are found between these two areas. This observation would suggest that a significant proportion of the deviations are due to confusion over geographical boundaries, particularly between 'district' and 'county' and 'region' and 'country'. It is possible that validity of the spatial data could have been improved by providing a map with the questionnaire which clearly illustrated the relevant geographical boundaries.

Finally, analysis of the financial records revealed that a high proportion of transactions are presented as transaction groups, particularly in the case of purchase receipts. It is highly probable that this may have resulted in some discrepancies, particularly between estimated and recorded numbers of transactions to the relevant geographical areas. During the validation exercise, all transactions were recorded individually, although this was not always possible, which emphasises the fact that it is a problem not easily overcome.

Using a formal approach to validation, as suggested by Litwin (1995), it is possible to carry out a more objective comparison between the two data sets. The main dependent variables of interest, designed to achieve the aims of the research, are based upon proportions of transactions by financial value which are attributed to two geographical areas denoted as

the local economy, one termed the *immediate locality*, and the second termed the *district.* To provide a quantitative comparison between the two data sets, equivalent variables were calculated for the recorded data and a Wilcoxon matched pairs test applied to examine the strength of the differences between the estimated and recorded data. Also computed are Pearson correlation coefficients, to measure the strength of the relationships between the two sets of data. The results of this analysis is presented in Table 4.8.

| SALES | *n* | Mean | St. Dev | Z | Significance * $H_0$ I = II | Correlation coefficient |
|---|---|---|---|---|---|---|
| **Locality** | | | | | | |
| I Estimated | *11* | 35.7 | 36.3 | -.6301 | 0.5286 | .9702 |
| II Recorded | | 21.8 | 23.1 | | | |
| **District** | | | | | | |
| I Estimated | *11* | 47.5 | 39.0 | -1.1832 | 0.2367 | .8654 |
| II Recorded | | 40.1 | 35.3 | | | |
| **SUPPLIES** | | | | | | |
| **Locality** | | | | | | |
| I Estimated | *11* | 22.0 | 26.8 | -.9780 | 0.3281 | .8909 |
| II Recorded | | 22.2 | 23.9 | | | |
| **District** | | | | | | |
| I Estimated | *11* | 26.3 | 28.9 | -.7113 | 0.4769 | .7927 |
| II Recorded | | 32.3 | 27.5 | | | |

* 2-tailed probability

**Table 4.8: Formal comparison between estimated and recorded data for the purposes of validation.**

The above results are very encouraging, indicating no statistically significant differences between the two samples of estimated and recorded data. Likewise, the correlation coefficients indicate sufficiently strong associations between the two data sets. According to Litwin (1995), levels of 0.70 or more are generally accepted as representing good validity. In terms of sales linkages, the largest differences, indicated by smaller *p* values, are found with transactions at the district level whereas, in terms of supplies, it is the immediate locality where deviations were greatest. However, the results suggest that the data collected via self-completion methods are sufficiently valid for the purposes of achieving the primary objectives of the research, which involve identifying the

characteristics of local establishments that are associated with a strong level of economic integration to the respective localities.

#### 4.5.2.2 Transactions logs analysis

In the case of the household survey, quantitative information obtained via the survey instruments also required respondents to provide an accurate estimation of economic activity patterns. The nature of such activity, which concerned purchasing and expenditure patterns, involved more of an element of recall as opposed to estimation. Unlike firms, households generally do not keep comprehensive records of their expenditure. However, the principle was more or less the same, and it required a secondary method of effectively comparing recorded information with that based upon recall. The obvious choice was to design a log which would allow a sample of the respondents to keep a diary of their expenditure and associated travel patterns over a specified period, the results of which could be compared to that obtained via the questionnaires. This was termed a 'transactions log', which following a pre-test and piloting stage, was sent out to a random sample of the Kingsbridge respondents following an initial telephone call to request their assistance and co-operation[9].

The transactions log asked for a record of expenditure and travel patterns over the course of a two week period. The initial pre-tests suggested that one month was too long and it was felt that a record relating to one week would not provide sufficient information for comparability. A total of 38 logs were sent out to willing households, which equated to just over a ten percent sample of the original respondents. This resulted in the collection of twenty one 'usable' logs which contained sufficient information to allow meaningful

[9] A copy of the transactions log is situated in Appendix I.

analysis. Twenty seven logs were returned, following reminder calls where necessary, which amounted to a fairly respectable response rate for this type of exercise at just over seventy percent. The shortfall in information provided in the remaining six logs was due to the fact that respondents did not complete log entries correctly. The most common mistake was that they attempted to record too much information in any one entry, leaving the analyst unable to judge accurately which transactions were attributed to which geographical location. This highlighted some problems in the design of the log itself, which were not revealed through the pre-testing and piloting stages. Some respondents also failed to provide enough information in any one entry, leading to problems with missing data. However, sufficient information was collected via the twenty one cases to allow a validation exercise to be carried out. Some initial results of the exercise are presented in Tables 4.9 and 4.10.

The first point to note from the data presented in Table 4.9 is that, on average, Kingsbridge households have tended to over-estimate the proportion of low order expenditure that they attribute to the study area. The town shows a mean over-estimation of 6.9% in comparison to recorded data, and the hinterland 1.7%. Moving further across the table we find that the key residual is attributed to the 'county', whereby respondents have under-estimated their low order spend by 6.8% in comparison to that recorded by the logs. Likewise, the 'district' and 'elsewhere' columns also show an under-estimation, to a magnitude of 1.5% and 2.0% respectively. Examining the data more closely, we find a total of 76 deviations out of a possible 105. Of these, 47% are less than 10% in magnitude, with 24% between +/-10 and 20%, and the remaining 29% more than +/-20%. In other words, less than 40% of all estimates of low order consumption expenditure provided in questionnaires show more than a +/-10% deviation from the equivalent data recorded in the transaction logs, with just over a quarter showing no deviation at all. This scenario is almost identical for that of the deviations in terms of transactions by number.

| LOW ORDER | Location: | | | | |
|---|---|---|---|---|---|
| Case no. | Town | Hinterland | District | County | Elsewhere |
| 1 | -2.4 (+28.4) | -11.2 (-17.6) | +21.9 (-4.9) | -8.3 (-5.9) | 0.0 (0.0) |
| 2 | -87.6 (-41.0) | -4.3 (+22.6) | +81.3 (+3.5) | +4.4 (+10.8) | +6.2 (+4.1) |
| 3 | +0.2 (-22.1) | +2.4 (-5.4) | -12.7 (-28.7) | +4.9 (+6.2) | +5.2 (+50.0) |
| 4 | +15.7 (+4.8) | 0.0 (0.0) | 0.0 (0.0) | 0.0 (0.0) | -15.7 (-4.8) |
| 5 | +0.8 (+2.5) | 0.0 (0.0) | 0.0 (0.0) | 0.0 (0.0) | -0.8 (-2.5) |
| 6 | +29.2 (+20.4) | 0.0 (0.0) | -16.8 (-15.8) | -6.9 (+0.6) | -5.4 (-5.2) |
| 7 | +2.3 (+2.6) | 0.0 (0.0) | +69.5 (+11.7) | -71.8 (-14.3) | 0.0 (0.0) |
| 8 | +62.6 (+17.7) | -2.5 (+18.6) | -15.2 (-18.3) | -44.9 (-18.2) | 0.0 (0.0) |
| 9 | +82.7 (+25.0) | -4.1 (-12.5) | -78.6 (-12.5) | 0.0 (0.0) | 0.0 (0.0) |
| 10 | -6.6 (-26.9) | +0.6 (+32.3) | +4.2 (+4.3) | +16.7 (+8.5) | -14.9 (-18.2) |
| 11 | +22.6 (-29.0) | -10.1 (+49.0) | -4.3 (-6.7) | -8.2 (-13.3) | 0.0 (0.0) |
| 12 | +3.0 (+17.7) | +5.8 (+18.6) | -3.8 (-18.2) | -5.0 (-9.0) | 0.0 (-9.1) |
| 13 | +27.5 (-17.4) | -26.9 (-19.0) | -8.2 (+35.6) | +7.6 (+0.8) | 0.0 (0.0) |
| **14** | **0.0 (0.0)** | **0.0 (0.0)** | **0.0 (0.0)** | **0.0 (0.0)** | **0.0 (0.0)** |
| 15 | -39.2 (-59.2) | +15.4 (+31.1) | +1.5 (+9.9) | +22.3 (+18.2) | 0.0 (0.0) |
| 16 | -28.6 (-18.3) | +43.5 (+34.9) | -14.9 (-16.6) | 0.0 (0.0) | 0.0 (0.0) |
| 17 | -2.5 (-4.8) | +30.1 (+18.2) | -0.4 (-6.7) | -27.2 (-6.7) | 0.0 (0.0) |
| 18 | +37.7 (+3.3) | 0.0 (0.0) | -13.7 (-11.7) | -13.5 (-10.4) | -10.5 (+18.8) |
| 19 | +22.7 (+18.2) | -5.2 (-4.8) | -11.6 (-6.7) | -5.9 (-6.7) | 0.0 (0.0) |
| 20 | +28.4 (+29.0) | 0.0 (0.0) | -12.6 (-17.7) | -7.2 (-5.9) | -8.6 (-5.4) |
| 21 | +13.4 (-27.3) | +1.2 (+40.0) | -17.5 (-17.7) | 0.0 (0.0) | +2.9 (+5.0) |
| **Mean deviation** | **+6.9 (-3.6)** | **+1.7 (+9.8)** | **-1.5 (-5.6)** | **-6.8 (-2.2)** | **-2.0 (+1.6)** |

**Table 4.9: Deviation of estimated from recorded data:** given by proportions of low order by value and number attributed to the respective geographical locations[10]

Moving on to the deviations of high order transactions presented in Table 4.10, we find an inverse scenario to that of low order economic activity. In this case, respondents have tended to under-estimate the proportion of high order spend that is attributed to the town, by an average of 12.6%. However, this is not the case for expenditure attributed to the hinterland, which shows a mean over-estimation of 4.6%. Again, the key residual area appears to be outside the South Hams district but within the county of Devon, which accounts for a mean over-estimation of 10.6%. This would imply that respondents are

[10] Deviations relate to transactions by financial value, with transactions by number given in parenthesis.

tending to over-estimate the proportion of their income that they spend in Devon's regional centres and under-rating the importance of Kingsbridge's high order function. Further examination of the data reveals that, out of a total of 72 deviations from a possible 105, a quarter are less than 10% and a further quarter are between +/-10 and +/-30%. The remaining 50% are more than +/-30% in magnitude, with half of these appearing in the 'county' and 'elsewhere' columns.

| HIGH ORDER | Location: | | | | |
|---|---|---|---|---|---|
| Case no. | Town | Hinterland | District | County | Elsewhere |
| 1 | +40.6 (+44.5) | -8.1 (-11.1) | -21.8 (-22.2) | -10.7 (-11.2) | 0.0 (0.0) |
| 2 | -33.8 ( 27.8) | 0.0 (0.0) | -25.5 (-25.0) | +85.0 (+30.6) | -25.7 (+22.2) |
| 3 | +27.7 (+24.6) | 0.0 (0.0) | -3.2 (-20.0) | -48.7 (-12.6) | +24.2 (+8.0) |
| 4 | +2.7 (+8.3) | 0.0 (0.0) | 0.0 (0.0) | 0.0 (0.0) | -2.7 (-8.3) |
| 5 | -81.5 (-75.0) | -18.5 (-25.0) | +58.8 (+50.0) | 0.0 (0.0) | +41.2 (+50.0) |
| 6 | -6.0 (-11.1) | 0.0 (0.0) | -9.8 (-22.3) | +15.8 (+33.4) | 0.0 (0.0) |
| 7 | +41.3 (-4.1) | 0.0 (0.0) | +8.8 (+37.5) | -50.2 (-33.4) | 0.0 (0.0) |
| 8 | -12.8 (+2.8) | +78.9 (+42.9) | -5.3 (-20.0) | -57.2 (-5.7) | -3.6 (-20.0) |
| 9 | +49.7 (-40.0) | 0.0 (0.0) | 0.0 (0.0) | -59.1 (0.0) | +9.4 (+40.0) |
| 10 | -50. 6 (-46.4) | -5.0 (-14.3) | 0.0 (0.0) | +75.2 (+58.3) | -19.6 (+2.+) |
| 11 | +26.5 (+10.0) | 0.0 (0.0) | +67.8 (+50.0) | -90.5 (-40.0) | -3.8 (-20.0) |
| 12 | +35.2 (+27.8) | -2.2 (-25.0) | +30.3 (+30.6) | -6.6 (-11.1) | -56.6 (-22.3) |
| 13 | -36.2 (-32.3) | -12.3 (-11.1) | 0.0 (0.0) | +48.4 (+43.4) | 0.0 (0.0) |
| **14** | **0.0 (0.0)** | **0.0 (0.0)** | **0.0 (0.0)** | **0.0 (0.0)** | **0.0 (0.0)** |
| 15 | -89.4 (-42.9) | 0.0 (0.0) | 0.0 (0.0) | +89.4 (+42.9) | 0.0 (0.0) |
| 16 | -18.5 (-11.4) | +50.8 (+20.0) | -32.4 (-8.6) | 0.0 (0.0) | 0.0 (0.0) |
| 17 | -79.2 (-50.0) | 0.0 (0.0) | -7.6 (-25.0) | +100.0 (+100.0) | -13.2 (-25.0) |
| 18 | +19.0 (+10.6) | 0.0 (0.0) | 0.0 (0.0) | -19.7 (-14.3) | +0.7 (+3.7) |
| 19 | -76.9 (-11.5) | -3.1 (-9.6) | -5.3 (-25.0) | +85.2 (+46.1) | 0.0 (0.0) |
| 20 | +52.0 (+40.3) | +15.7 (+15.4) | -35.1 (-33.3) | -29.2 (-11.1) | -3.5 (-11.3) |
| 21 | -74.3 (-10.0) | 0.0 (0.0) | -21.6 (-30.0) | +95.9 (+40.0) | 0.0 (0.0) |
| **Mean deviation** | **-12.6 (-9.2)** | **+4.6 (-0.8)** | **-0.1 (-3.0)** | **+10.6 (+12.2)** | **-2.5 (+0.9)** |

**Table 4.10:** **Deviations of estimated from recorded data:** given by proportions of high order transactions by value and number attributed to the respective geographical locations[10]

The observed deviations between the data recorded by the transaction logs and that estimated in the original questionnaire could have been caused by a number of factors. As in the case of the business validation exercise, the variations in time periods for which the data relates to is likely to have been a key factor. As already explained, a period of two weeks was chosen as a manageable, but realistic, time frame in which to set the transactions log, although the questionnaire requested information relating to the previous thirty days. This variation is likely to be a key source of deviation in itself and one that must be taken into account when interpreting the results of the exercise.

As already mentioned, the design of the log presented some problems to respondents in completing it successfully, despite a fairly rigorous pre-testing and piloting stage. The key problem was that some respondents failed to separate transaction groups from each other where they had purchased items in different locations during the same trip, or purchased different groups of items in any one day. This meant that the correct geographical location could not always be determined for each transaction group. Essentially, the problem highlighted a failure in the design of the log, and one which would have to be re-considered if the exercise were to be repeated within other research projects. This not only meant that some logs were unable to form part of the validation analysis, but also that respondents may have made a choice as to what transaction groups to record, leaving out important information that could have made the results more accurate. In either case it is likely that the exercise produced somewhat inaccurate information, with a degree of missing data that could have been avoided through better design. However, one must consider the fact that the validation exercise itself represents an important methodological innovation in this field.

A key strength of the household survey over the business survey was that it potentially avoided confusion over geographical locations through the way in which these were

classified in both the questionnaire and the log. For example, distinguishing between *Kingsbridge Town, Kingsbridge Supermarket and Local Village,* and not just *Town* and *a four mile radius around Kingsbridge* was clearly an advantage. The nature of household economic activity both allowed, and required, a more comprehensive list of locations. This effectively overcame much of the potential confusion over geographical boundaries noted in the previous section, although again, a map would have been a useful tool to ensure accuracy both in the estimation and recording of activity patterns.

The most significant problem in collecting spatial data from consumers in the household sector is that, unlike businesses, individuals do not plan their expenditure in advance and do not make repeat purchases of items in certain places and at certain times. For example, firms very often have regular suppliers, who require their orders in advance, and may offer discounts for repeat orders. Households, on the other hand, have much more ad-hoc purchasing patterns which are influenced by a wide variety of factors. For example, they may make a number of opportunist purchases as an indirect result of visiting friends and relatives. It is therefore more difficult to identify a set of activity patterns which are representative of the household as a whole. Indeed, this was reflected in supplementary information received with some of the logs. One household noted that the log was not wholly representative of their spending patterns because a recent trip to the Continent had resulted in a bulk purchase of duty free cigarettes. Similarly, another respondent claimed to have recently been staying with friends and relatives in another part of the county whilst completing part of the log, which had invariably altered the pattern recorded. It is very likely that a number of the deviations recorded in Tables 4.9 and 4.10 are in some way attributed to similar factors. Further, it is likely that by selecting a sufficiently large systematic sample for the self-completion survey, these 'exceptions' would have balanced out across the sample as a whole.

Again, formal methods of validation allow a more objective comparison between the estimated and recorded data sets, focusing on the dependent variables that are critical to achieving the aims of the research. Table 4.11 presents the results of Wilcoxon matched pair tests and correlation analyses[11] to formally examine the differences between the estimated and recorded proportions of expenditure attributed to the relevant geographical areas.

| LOW ORDER | *n* | Mean | St. Dev | Z | Wilcoxon Sig*. | Correlation coefficient | Mcnemar Sig*. |
|---|---|---|---|---|---|---|---|
| **Locality** | | | | | | | |
| I Estimated | *21* | 84.8 | 25.2 | -2.2026 | 0.0276 | 0.3837 | 0.9999 |
| II Recorded | | 74.5 | 23.0 | | | | |
| **District** | | | | | | | |
| I Estimated | *21* | 94.1 | 9.5 | -1.8073 | 0.0707 | 0.2956 | 0.5078 |
| II Recorded | | 85.3 | 18.5 | | | | |
| **IIIGII ORDER** | | | | | | | |
| **Locality** | | | | | | | |
| I Estimated | *21* | 52.6 | 41.9 | -.7467 | 0.4553 | 0.7373 | 0.9999 |
| II Recorded | | 60.6 | 30.9 | | | | |
| **District** | | | | | | | |
| I Estimated | *21* | 60.9 | 42.5 | -.5231 | 0.6009 | 0.7066 | 0.9999 |
| II Recorded | | 69.0 | 30.9 | | | | |

* 2-tailed probability

**Table 4.11: Formal comparison between estimated and recorded data for the purposes of validation**

The results illustrate that for high order expenditure patterns, validation is successful, indicated by insignificant *p* values for Wilcoxon tests and correlation coefficients no less than 0.70 (Litwin, 1995). However, in the case of low order activity patterns the results of the validation exercise are not so encouraging. In terms of expenditure attributed to both the *locality* and the *district,* correlation coefficients fail to meet the 0.70 criteria for successful validation, and not suprisingly the *p* values indicate a significant difference between the recorded and estimated proportions, particularly in respect of expenditure

[11] Spearman correlation coefficients are computed due to the violation of the normality assumption.

attributed to the locality. The results of this exercise must therefore be taken into account when interpreting the results of the main surveys presented in Chapter Seven.

A third test is also computed which presents a slightly more encouraging picture with respect to the results of multivariate analysis carried out as part of this study. Given that the dependent variables used in the prediction models are based upon a dichotomy of expenditure levels[12], it is useful to carry out some form of validation exercise using equivalent variables for the estimated and recorded data sets. The Mcnemar test is a non-parametric test for two related dichotomous variables and tests for changes in response using the Chi-Square distribution. The results of the test show that there is no significant difference between the two data sets in terms of the classification of cases into values of the dependent variable, although the *district* shows a slightly higher degree of variation with respect to low order activity patterns. Therefore, with respect to the results of multivariate prediction models presented in Chapter Seven, the data collected via the self-completion methods appears to be sufficiently valid.

## 4.6 Analytical methodology

This section is concerned with the selection process for statistical techniques through which to test the operational hypotheses and model economic behaviour in the respective economies. Essentially, it outlines the factors that were taken into account when selecting suitable analytical tools, the problems which were encountered with regard to the data, and the elimination process by which suitable modelling techniques were selected.

[12] Representing below and above mean proportions of expenditure attributed to the local economy.

*Bi-variate analysis*

Having collected adequate data, and tested it for reliability and validity, the next step was to test the operational hypotheses, developed in section 3.4. In the case of both business and household analysis, this involved comparisons between certain types of establishment in respect of local economic integration. The most obvious choice of statistical test to achieve this was the unpaired t-test. However, a major assumption of the test is that samples must be from normal distributions with equal variances. In all cases these assumptions were found to be violated, so the non-parametric equivalent of the unpaired t-test, the Mann-Whitney U test, was selected. This test requires only that the observations be a random sample and that values be ordered (Norusis, 1990). Although the Mann-Whitney U test is less powerful that the t-test, because the substitution of ranks for the actual values loses potentially useful information, it is preferable to using the t-test when its assumptions are substantially violated to avoid an erroneous observed significance level.

*Multi-variate analysis*

Having tested the operational hypotheses, there was then a need to model the parameters in question to establish the relative importance of establishment type to achieving a strong level of economic integration to locality. The obvious choices to achieve this were Multiple Linear Regression or General Factorial Analysis of Variance (ANOVA). Regression methods are concerned with describing the relationship between a response variable and one or more explanatory variables and are therefore ideal in a situation such as this. In linear regression analysis, it is possible to test whether two variables are linearly related, and to calculate the strength of the linear relationship. General Factorial ANOVA will test a wide variety of null hypotheses about the effects of predictor variables on the mean value of a single dependent variable, and is therefore also well suited. It also allows a great deal of flexibility in specifying models, particularly in the case of specifying

interaction terms among factors. In principle, both techniques would have allowed mean values of the dependent variable to be predicted for each of the independent variables. However, not surprisingly, further problems were encountered with regard to meeting the assumptions of these modelling techniques. Both analytical tools require that a number of rigid assumptions be satisfied in order to make inferences about the coefficients yielded, namely that the variance in the dependent variable be normally distributed and that homoscedasticity exists, whereby the variance is the same for all values of the independent variables.

In an attempt to meet these assumptions, mathematical transformations of the dependent variables were carried out. However, logarithmic, square and arcsine transformations did not produce adequate data sets, in terms of normality of distribution, to allow meaningful analysis via these techniques. There were also further problems associated with the factorial ANOVA with regard to low observation counts for some cells. This meant that the use of a continuous dependent variable was not feasible in any of the cases, and pointed towards the use of a non-parametric equivalent of Linear Regression and General Factorial ANOVA.

The simplest way to overcome the problems encountered was to categorise the dependent variable into ordinal values to represent bands within the continuous variable. First, various polytomous dependent variables were created, representing between three and five relative 'strengths' of local integration based upon a breakdown of the original proportions. Having done this, the use of loglinear analysis as a modelling tool became an option which, in dealing with ordinal variables, immediately overcame the problems faced by linear modelling techniques. Loglinear analysis is effectively a three dimensional Chi-Square, producing multi-way contingency tables to examine associations between variables. Like factorial ANOVA, with loglinear analysis it is possible to distinguish

between *main effects* and *interactions* and it offers various methods of testing the effects separately. Importantly, it is possible to specify a logit loglinear model and treat one or more of the categorical variables as dependants.

However, the nature of the loglinear model creates a vast number of cells, each of which has to conform to the same assumptions as univariate Chi-Square with respect to expected and observed frequencies. Unfortunately, this meant that the development of meaningful loglinear models was not possible due to an inadequate number of observations, given the amount of variables being modelled. This left one last option, to create a dichotomous dependent variable against which to model the relative influence of the predictor variables. As many authors note (see for example Russell, 1997; Menard, 1995; Hosmer and Lemeshow, 1989; Hair *et al.* 1998) the obvious choice in this situation is Logistic Regression Analysis.

There are in fact a number of advantages to using Logistic Regression Analysis as a modelling technique in a case such as this. Russell (1997) notes that the analysis of interaction terms between independent variables is a major advantage of using logistic regression, not only in a practical sense, but it is also more robust than linear regression and allows interaction effects to be modelled with greater confidence. Furthermore, logistic regression has the distinct advantage over linear regression since it allows for the predictive values of ß coefficients to be expressed in terms of log-odds ratios which seem intuitively preferable. According to Greene (1993), the failure of least squares linear modelling to constrain ß'$x$ to the zero-one interval produces both non-sense probabilities and negative variances. In view of this, the linear model is becoming less frequently used except as a basis for comparison to some other more appropriate models. Paulson (1994) states that from logistic modelling it is possible to arrive at estimated probabilities which are fairly robust and 'more sticky' than for least squares modelling, in that the probabilities

it produces make more intuitive sense at the top and bottom of the scale. In the linear model, the predicted value of *p* can often be negative or larger than 1 which violates its interpretation as a relative frequency (Gujarati, 1992; Maddala, 1987; Kennedy, 1992).

## 4.7 Logistic Regression analysis

Regression methods are concerned with describing the relationship between a response variable and one or more explanatory variables. The logistic regression model directly estimates the probability of an event occurring (Norusis, 1994), or to be more precise, estimates the probability that a case will be classified into one as opposed to the other of the two categories of the dependent variable (Menard, 1995). For more than one independent variable, the logistic regression model can be written as:

$$\text{Probability } (Y=1) = \frac{e^{Z}}{1 + e^{Z}}$$

where e is the base of the natural logarithms, approximately 2.718, and Z is the linear combination:

$$ß_0 + ß_1X_1 + ß_2X_2 + \ldots\ldots + ß_kX_k$$

As in the case of linear regression, the parameter $ß_0$ is the intercept, or constant, and represents the probability that (Y=1) when *X* is zero, and $ß_1$, $ß_{2\ldots.}ß_k$ are partial slope coefficients. This reflects the fact that any one of the independent variables provides only a partial explanation or prediction of the dependent variable.

The plot of the logistic regression curve is 'S' shaped, and closely resembles the curve obtained when the cumulative probability of the normal distribution is plotted. The relationship between the independent variable and the probability is non-linear, the

probability estimates will always be between 0 and 1, regardless of the value of Z (Norusis, 1994). The parameters of the model are estimated using the maximum likelihood method, that is, the coefficients that make the observed results most 'likely' are selected. These estimates are identical to the OLS estimates when the assumptions of linear regression are met (Menard, 1995).

### 4.7.1 Model building strategy

Menard (1995) notes the following assumptions of logistic regression, which should be met in order to ensure reliability and validity of the developed models:

- The model must be correctly specified.
- The model must be linear in the logit (for continuous independent variables)
- The model must be additive.
- Collinearity between independent variables should not exist.
- There should be no zero cells or complete separation.
- The distribution of errors should follow a binomial distribution.
- There should be no influential cases.

According to Menard (1995), violation of assumptions can result in one of three problematic effects: biased coefficients which are too high or too low; inefficient coefficients with inflated standard errors (which can result in type II errors); and invalid statistical inference, where the calculated statistical significance of the logistic regression coefficients is inaccurate. In addition, outliers and influential cases can be a problem.

Hosmer and Lemeshow (1989) favour the traditional approach to statistical model building, which involves seeking the most parsimonious model that still explains the data.

The rationale for minimising the number of included variables is that the resultant model is likely to be more numerically stable, and is more easily generalised. Although there has been a move towards including all scientifically relevant variables in a model, irrespective of their contribution, there is a danger that models will become numerically unstable as a result. Further, the parsimonious approach is often more helpful in policy-related fields where policy makers may need to gather information on the most important independent variables in order to follow policy recommendations based on the model. Given the potential problems related to mis-specification, the development of prediction models was approached with caution. The model building strategy followed, as recommended by Hosmer and Lemeshow (1989) and drawing on the advice of Menard (1995), is summarised in Figure 4.3. A more detailed description of the model specification process is contained in Appendix L.

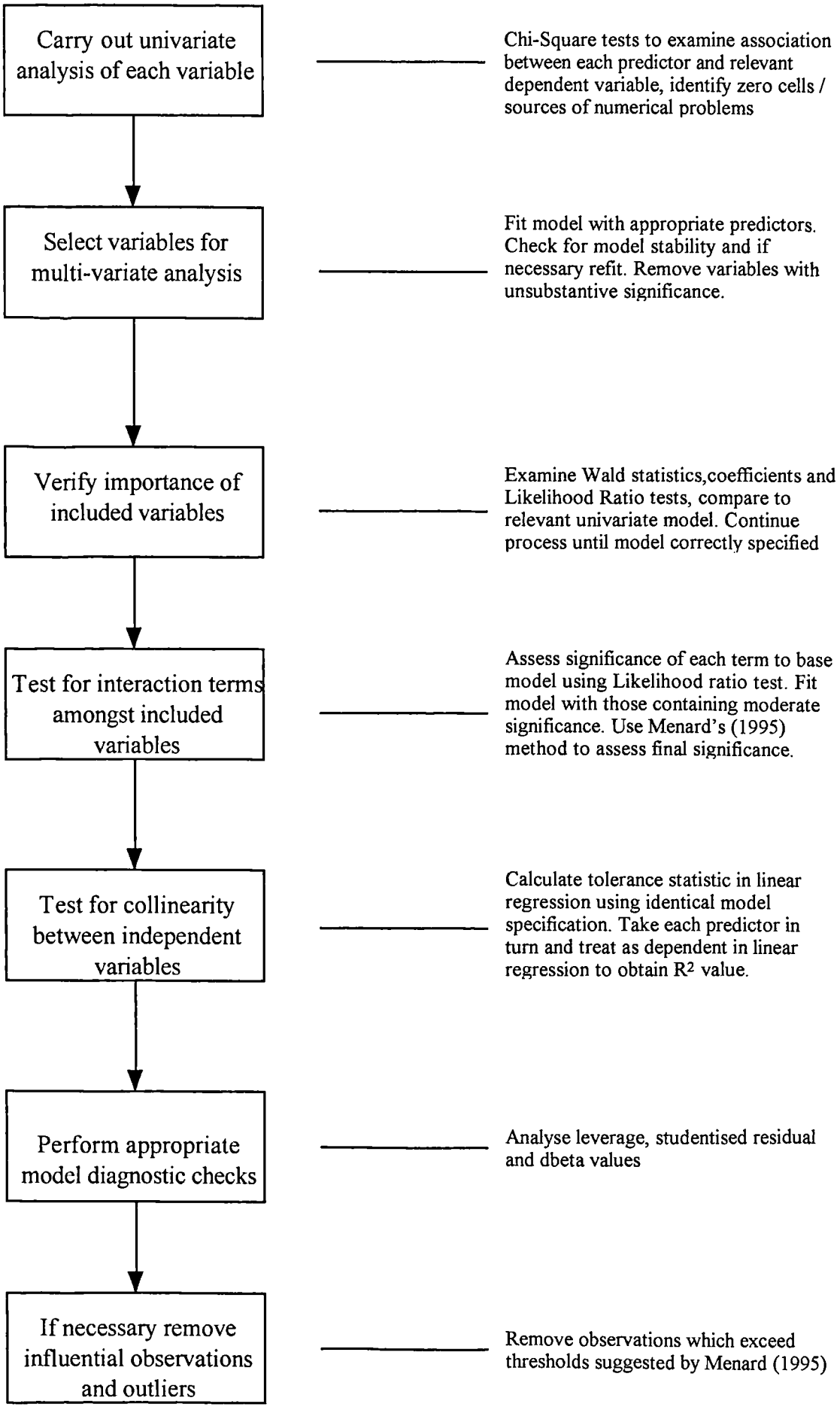


**Figure 4.3: Logistic Regression model specification process:** adapted from Hosmer and Lemeshow (1989) and Menard (1995).

Another approach to variable selection would have been to use a stepwise method, in which variables are selected either for inclusion or exclusion from the model in a sequential fashion based solely on statistical criteria. There are two main versions of the stepwise procedure: a) forward selection with a test for backward elimination and b) backward elimination followed by a test for forward selection. Hosmer and Lemeshow (1989) argue that the stepwise approach is useful in that it allows for the examination of a collection of models which might not otherwise have been examined. However, stepwise procedures have been criticised because they can yield implausible models and can select irrelevant variables (see for example Flack and Chang, 1987; Griffiths and Pope, 1987). As Hosmer and Lemeshow (1989) note, the problem is not the fact that the computer can select such models, but rather that the analyst fails to carefully scrutinise the resulting model, and reports such results as the final, best model. There is also general agreement that stepwise procedures are inappropriate for theory testing because they capitalise on random variations in the data and produce results which tend to be difficult to replicate in another sample. Indeed, Menard (1995) goes as far as to argue that the results from stepwise procedures must be regarded as tentative and inclusive because they are simply a search for plausible predictors, not a convincing test of any theory. In this case, rigorous scrutiny at every stage of the model fitting process was felt to be appropriate in order to ensure validity and reliability. It was therefore decided not to employ stepwise procedures, either as methods for initial variable selection or as a technique for final model fitting.

The derivation of all relevant dependent and independent variables are presented in sections 6.3 and 7.3. All predictors were specified as binary dummy variables for the principal reason that this allowed a useful number of cases in each category to enable meaningful analysis. It also enabled interaction terms to be modelled with relative ease and confidence. Further, the violation of the assumptions already discussed, in particular zero cells, were avoided. The creation of dichotomous independent variables was also

appropriate in this study as it allowed further exploration of the research hypotheses to be approached in a systematic way, developing that of the bi-variate analysis. This method of specification follows that presented by Russell (1997), who employs a series of dichotomous predictors, with no other categorical or continuous variables included, to model the geographic effects of British voting behaviour. As Russel (1997) explains, not only are there benefits with regard to the interpretation of interaction effects, but using dichotomous predictors also allows the fitting of categoric data in an unambiguous fashion.

### 4.7.2 Evaluation and interpretation of the Logistic Regression models

To evaluate and interpret the fitted models, an approach outlined by Menard (1995) was followed. The advice of Hair *et al.* (1998), Hosmer and Lemeshow (1989) and Russell (1997) also proved very useful. In logistic regression there are two main strands to model evaluation. Of most importance is goodness of fit, secondary to which is predictive efficiency. Providing that there are enough observations, a method also exists for externally validating the models. The most accurate method used to evaluate the statistical significance of predictor variables is the likelihood ratio test, and further methods of interpreting the coefficients given by interaction terms are also provided in the literature. A detailed description of the evaluation and interpretation process is contained in Appendix M.

## 4.8 Conclusion

This chapter has examined and explained the many choices made in the design and conduct of this study, from the selection of an appropriate method for data collection, through the steps taken to ensure that the analytical methodology was suitably robust. It has also presented the results from two exercises designed to test the validity of the data

obtained through the chosen methodology. As such, the information contained within should be borne in mind when examining the findings presented in the following three chapters. Where appropriate, reference is made to the material presented here, and the implications of the methodological approach are discussed further in Chapter Eight.

**Throughout the remainder of this thesis a number of geographical terms are used to help describe the study findings. To prevent any confusion in their interpretation the reader is directed to the following glossary:**

**TOWN CENTRE:** Refers specifically to the main shopping areas of the two towns.

**TOWN:** Refers to anywhere within the town wards, as designated by ONS (1991).

**HINTERLAND:** Refers to anywhere outside the town ward but within the study area.

**LOCALITY:** Used inter-changeably to represent:

i) the respective study areas;

ii) the specific geographical demarcation used to form dependent variables, which roughly equates to the two respective study areas.

**DISTRICT:** Used inter-changeably to represent:

i) the South Hams district in reference to Kingsbridge, and anywhere within a ten mile radius of the town in reference to Olney;

ii) the specific geographical demarcations used to form dependent variables, which equates to the South Hams district in the case of Kingsbridge, and anywhere within a ten mile radius of the town in the case of Olney.

**COUNTY:** Refers to the county of Devon in reference to Kingsbridge, and the three counties of Bucks, Beds and Northants in reference to Olney.

**REGION:** Refers to the South West and South East regions respectively.

# CHAPTER FIVE

# CONTEMPORARY FUNCTIONS OF THE SMALL TOWN

## 5.0 Introduction

The purpose of this chapter is to partially fulfil the first aim of the project: to examine the contemporary functions of the small town in the rural economy. This is achieved through a presentation of descriptive results from the postal surveys in both study areas. First, descriptive data from the business surveys is presented in order to summarise the key functions of the settlements in respect of corporate activity. The chapter then moves on to examine the role of the settlements for their resident communities in respect of employment and shopping. Throughout, emphasis is placed on two key areas of analysis: 1) a comparison between the 'remote' and 'accessible' rural settlement in terms of their functions in the contemporary rural economy; and 2) a comparison between town and hinterland in terms of economic structure and activity. In turn, this begins to build up a picture of the relationship between town and countryside whilst providing a firm foundation for the analytical work presented in chapters Six and Seven.

## 5.1 Descriptive results from the business surveys

This section focuses primarily on the economic structure of the two settlements in order to examine characteristics of the study areas in terms of corporate activity. However, the survey results also contain other very useful information, which helps to illustrate the function of the towns in the rural economy. The following section begins by examining the use of town centre facilities by local firms, before presenting a comprehensive analysis of

corporate structure. It then moves on to inspect the nature and spatial distribution of the local workforce, before considering some aspects of corporate behaviour which may influence local activity patterns.

### 5.1.1 Economic functions of settlements

We begin by assessing the extent to which local firms make use of shops and facilities in Kingsbridge town centre. The data presented in Table 5.1 illustrates that the most important town centre facility is the bank, with 85% of local firms using the service once a week. This is followed by the post office, with 55% of firms making use of the facility for business purposes only.

| Service/Facility | Once a week (%) | Once a month (%) | Once a year (%) | Never (%) |
|---|---|---|---|---|
| Bank | 85.4 | 7.6 | - | 7.0 |
| Post Office | 55.0 | 28.4 | 6.5 | 10.1 |
| Accountant | 3.7 | 19.0 | 31.9 | 45.4 |
| Solicitor | 0.6 | 8.4 | 42.9 | 48.1 |
| Livestock market | - | 3.2 | 9.1 | 87.7 |
| Electrical retailer | 2.0 | 35.5 | 35.5 | 27.0 |
| Printing | 7.6 | 23.6 | 38.9 | 29.9 |
| Garage (Repairs Maintenance) | 9.6 | 31.1 | 28.2 | 27.1 |
| Hardware store | 11.7 | 46.9 | 19.1 | 22.2 |

**Table 5.1: Use of town centre facilities by firms in and around Kingsbridge**

Other services accessed by firms, albeit to a lesser degree, are electrical retailers and garages (for vehicle repairs and maintenance). Two thirds of all local firms make use of these facilities either once a month or once a year. It is also worth noting the significant proportion of firms making use of a local accountant and solicitor; less than half of all firms appear to access these professional services elsewhere, a reflection perhaps of the

relative inaccessibility of the settlement to South Devon's regional centres, Plymouth and Torquay. Finally, the decline in the importance of the livestock market is very evident from the Kingsbridge data. Only 50% of all agricultural firms make any use of the market and only 14% of farmers appear to visit the market on a regular basis.

The equivalent data is presented for the 'accessible' rural settlement in Table 5.2. Again, the importance of the bank and post office to Olney's local firms is evident, with almost 70% of all firms using these facilities once a week. The hardware store is also worthy, with 46% of firms visiting once a month, and over half of all firms appear to make use of local garages and electrical retailers. A key difference between the two settlements is the fact that firms in and around Olney do not access professional services to the same degree as in Kingsbridge. 70% of firms in the more 'accessible' locality make no use of local accountants and solicitors, most likely utilising professional services in one of the nearby regional centres.

| Service/Facility | Once a week | Once a month | Once a year | Never |
|---|---|---|---|---|
| | (%) | (%) | (%) | (%) |
| Bank | 69.5 | 5.7 | 2.9 | 21.9 |
| Post Office | 68.6 | 14.7 | 2.9 | 13.7 |
| Accountant | 2.4 | 8.4 | 19.3 | 69.9 |
| Solicitor | 1.2 | 8.6 | 19.8 | 70.4 |
| Livestock market | - | - | - | - |
| Electrical retailer | 3.6 | 26.2 | 23.8 | 46.4 |
| Printing | 2.5 | 21.0 | 13.6 | 63.0 |
| Garage (Repairs Maintenance) | 8.3 | 25.0 | 22.6 | 44.0 |
| Hardware store | 16.0 | 46.8 | 16.0 | 21.3 |

**Table 5.2: Use of town centre facilities by firms in and around Olney**

Olney's livestock market was closed down in 1987, reflecting not only the dominance of crop production in the South East but also the decline in the importance of agriculture to

small towns in the region as a whole. This aspect of the rural economy is explored further in the following section.

### 5.1.2 Economic structure of localities

In the following section, the data from both surveys is used to consider not only the differences between the two settlements, but also to examine the differences in corporate structure between the towns and their respective hinterlands. The data in Table 5.3 illustrates the distribution of firms according to industrial classification.

| Industrial Classification | Kingsbridge Town | (%) Hinterland | All | Olney Town | (%) Hinterland | All |
|---|---|---|---|---|---|---|
| Agriculture | 6.1 | 36.8 | **22.6** | 0.0 | 18.9 | **8.9** |
| Manufacturing | 12.2 | 10.5 | **11.3** | 10.2 | 9.4 | **9.8** |
| Consumer service | 37.8 | 21.1 | **28.8** | 23.7 | 11.3 | **17.9** |
| Business service | 11.0 | 7.4 | **9.0** | 16.9 | 24.5 | **20 5** |
| Cons bus service | 14.6 | 5.3 | **9.6** | 20.3 | 15.1 | **17.9** |
| Construction | 7.3 | 11.6 | **9.6** | 18.6 | 7.5 | **13.4** |
| Other | 11.0 | 7.4 | **9.0** | 10.2 | 13.2 | **11.6** |
| All firms | **100** | **100** | **100** | **100** | **100** | **100** |
| | *(82)* | *(95)* | *(177)* | *(59)* | *(53)* | *(112)* |

**Table 5.3: Industrial classification of firms according to location in the study areas**

The first key observation from the data presented in Table 5.3 is the fact that Kingsbridge has a predominantly more agricultural function than does Olney. 22.6% of all firms in the remote area are agricultural, in comparison to only 8.9% in the accessible rural area. In fact, there are no agricultural ancillary services and suppliers present in Olney, whereas in Kingsbridge such firms account for 6.1% of all town firms. The second major difference highlighted by the data is the considerably higher presence of business service firms in the

Olney study area, where 38.4% of all firms are found to be in this sector. This compares to only 18.6% in the case of Kingsbridge. Examples include management, information technology, human resource consultancies, transport and distribution companies, printers, accountants, architects and a number of other specialist services including marketing and import/export companies. Indeed, a number of writers on the rural economy, including Williams (1994), have noted the growth of service sector firms in the South East of England.

Interestingly, consumer service firms make up a higher proportion of all firms in the remote district: 28.8% in comparison to 17.9% in the accessible area. Indeed, this difference is most marked in the hinterlands of both study areas where 21.1% compares to only 11.3% in the case of the Buckinghamshire study. This finding conforms strongly to the fact that Olney is located in what is essentially the 'peri-urban fringe', where it's local regional centres are relatively accessible. One of the characteristics of the peri-urban fringe is that there is less need, and demand, for local consumer services due to the lower costs associated with travelling to nearby urban centres. Following from this we can note that, in the Kingsbridge study area, the presence of consumer service firms is perhaps not as distinct as would be expected, 37.8% in the town compared to 21.1% in the hinterland. The larger differences between the locations in Olney may imply that local villages in the accessible rural area are less equipped with services and facilities. In turn, this may indicate that hinterland residents are more dependent on their local town for convenience purchases, a hypothesis that is explored in Chapter Seven.

An obvious distinction between town and hinterland is the fact that, as expected, there is considerably more agricultural activity in the hinterlands of both study areas due to farm holdings. In Kingsbridge, construction firms have tended to opt for hinterland locations, and business services for town centre locations as opposed to more rural sites. In Olney,

however, the opposite is true where construction firms are clearly locating in and around the settlement itself, with a more decentralised pattern of business service establishments. Again, there could be a number of reasons for this. For example, teleworking is more prevalent in business services, which means that firms can be more flexible about location. It could also be the case that, in 'accessible' rural areas, settlements such as Olney function less as a 'central place' serving a rural hinterland, and more as a nodal point in the wider hinterland of nearby regional centres. In such a 'hinterland' it may be more logical for firms such as construction to concentrate, in order that they can serve urban as well as rural markets.

| | KINGS | (%) | | OLNEY | (%) | |
|---|---|---|---|---|---|---|
| **Workforce Size** | **Town** | **Hinterland** | **All** | **Town** | **Hinterland** | **All** |
| 1 2 | 32.9 | 57.4 | **46.0** | 30.5 | 37.7 | **33.9** |
| 3 5 | 31.7 | 18.1 | **24.4** | 30.5 | 35.8 | **33.0** |
| 6 10 | 17.1 | 13.8 | **15.3** | 18.6 | 13.2 | **16.1** |
| 11 19 | 9.8 | 7.4 | **8.5** | 10.2 | 5.7 | **8.0** |
| 20 49 | 6.1 | 3.2 | **4.5** | 10.2 | 5.7 | **8.0** |
| More than 50 | 2.4 | 0.0 | **1.1** | 0.0 | 1.9 | **0.9** |
| **All firms** | **100** | **100** | **100** | **100** | **100** | **100** |
| | *(82)* | *(94)* | *(176)* | *(59)* | *(53)* | *(112)* |

**Table 5.4: Business Structure in terms of firm size**

In terms of firm size, we can see that very small firms predominate in both locations. This is a key characteristic of rural areas in general, although in the Olney study area the distribution of firms is more widely spread across categories of workforce size. Here there are fewer firms employing 1 or 2 people and more with 3 to 5 employees in comparison to the remote study area. There is also a higher proportion of firms employing 20 to 49 employees, 8.0% in comparison to only 4.5% in Kingsbridge. In terms of the comparison between town and hinterland we can observe further similarities between the locations in that larger firms with more than five employees appear to favour the town or edge-of-town

locations. The higher proportion of small firms in the hinterland locations is likely to be attributed to agricultural activity and, in the accessible rural area, to hi-tech business services.

| Firm age (years) | Kingsbridge Town | (%) Hinterland | All | Olney Town | (%) Hinterland | All |
|---|---|---|---|---|---|---|
| Less than 2 | 7.3 | 8.4 | **7.9** | 18.6 | 11.3 | **15.2** |
| 2 - 6 | 15.9 | 8.4 | **11.9** | 23.7 | 24.5 | **24.1** |
| 7 - 12 | 20.7 | 16.8 | **18.6** | 11.9 | 24.5 | **17.9** |
| 13 19 | 23.2 | 18.9 | **20.9** | 13.6 | 1.9 | **8.0** |
| 20 or more | 32.9 | 47.4 | **40.7** | 32.2 | 37.7 | **34.8** |
| **All firms** | **100** | **100** | **100** | **100** | **100** | **100** |
| | *(82)* | *(95)* | *(177)* | *(59)* | *(53)* | *(112)* |

**Table 5.5: Business Structure in terms of firm age**

The data presented in Table 5.5 indicates some very clear distinctions between the two areas in terms of the age of firms. It is evident that during the last six years, the O'ney study area has attracted considerably more business start-ups than has the Kingsbridge area. 39.3% of all firms in Olney are recently established compared to only 19.8% in Kingsbridge. This pattern is most distinctive in the case of the hinterland locations where 35.8% of firms in the Olney hinterland have been established within the last six years compared with only 16.8% in the Kingsbridge hinterland.

The final cross-tabulation examining economic structure, presented in Table 5.6, provides a breakdown of firms in terms of ownership. The first point to note is the strong prevalence of independent locally owned firms in both study areas, again a typical characteristic of the rural economy. The most surprising finding revealed by the data is the higher level of national ownership in the Kingsbridge study area, where national corporations own 11.4% of all firms in the economy in comparison to 7.2% in the Olney economy. There is,

however, a higher level of inward investment from international corporations in the peri-urban region, which is as expected given its relative proximity to the capital. In the Kingsbridge area, a Chi-Square test of association reveals more than expected national branch plants located in the town itself and less than expected in the hinterland (**). This is likely to be associated with the presence of retail chain stores in the town centre.

| | Kingsbridge | (%) | | Olney | (%) | |
|---|---|---|---|---|---|---|
| **Firm type** | **Town** | **Hinterland** | **All** | **Town** | **Hinterland** | **All** |
| Independently owned | 74.1 | 91.6 | 83.5 | 81.0 | 79.2 | 80.2 |
| Firm HQ's with sites in UK | 7.4 | 3.2 | 5.1 | 5.2 | 1.9 | 3.6 |
| Firm HQ's with sites abroad | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 | 0.9 |
| National branch plant | 9.9** | 3.2** | 6.3 | 3.4 | 3.8 | 3.6 |
| International branch plant | 1.2 | 0.0 | 0.6 | 1.7 | 5.7 | 3.6 |
| Other | 7.4 | 2.1 | 4.5 | 8.6 | 7 5 | 8.1 |
| **All firms** | **100** *(81)* | **100** *(95)* | **100** *(176)* | **100** *(58)* | **100** *(53)* | **100** *(111)* |

95% significance level (p<0.05)

**Table 5.6: Firm type according to location in the study areas**[1]

Inward investment from large corporations seems to have favoured town centre or edge-of-town locations: over 70% of all national branch plants in the area have located here. Indeed, this may well tie in with the fact that 8.5% of town firms employ 20 or more people in comparison to only 3.2% in the case of hinterland firms. Although the Chi-Square indicates no significant association between town and hinterland in the Olney study area, the data does show that national firm HQ's have again opted for town locations and, interestingly, that the majority of international branch plants are located in the hinterland of the settlement.

[1] The category 'Other' refers to local authority owned establishments, mostly schools.

### 5.1.3 Employment characteristics of localities

Results from the business surveys can also be used to build up a picture of the employment functions of the two settlements. We begin with a breakdown of the study areas by occupational group.

| Occupational Group | Kingsbridge | Olney |
|---|---|---|
| | % | % |
| Professional | 7.2 | 9.9 |
| Owner / Manager | 33.3 | 32.5 |
| Intermediate non manual | 10.0 | 9.6 |
| Junior non manual | 5.5 | 10.6 |
| Skilled manual | 14.0 | 13.5 |
| Semi skilled manual | 16.5 | 16.4 |
| Unskilled manual | 13.3 | 7.3 |
| Sleeping partner | 0.2 | 0.2 |
| **All Occupations** | **100** | **100** |

**Table 5.7:** **Employment functions of settlements:** given by occupational group of employees working within study areas[2]

The key point to note from the data in Table 5.7 is the similarities between the two study areas in respect of occupational groups. Owner/managers feature strongly in both areas, itself a reflection of the predominance of independent firms in the localities. There are a higher proportion of unskilled manual workers employed by firms in and around Kingsbridge, 13.3% in comparison to 7.3% in Olney, and a lower proportion of non-manual workers, 15.5% in comparison to 20.2% in Olney. This distribution reflects the relative predominance of business services and the lack of agricultural firms in the 'accessible' rural area.

[2] This refers to all those employed by firms within the study areas. It excludes residents commuting to work outside the areas and includes those resident outside the areas who are commuting in to work.

Further employment characteristics are presented by the data in Table 5.8, which illustrates the division between full and part time labour in the two localities. In the Kingsbridge study area we find no real difference between town and hinterland firms in terms of the status of their employees, although there are slightly more full time people employed by town firms. However, in the 'accessible' rural locality more full time positions are evident in the hinterland, with a higher proportion of part time positions in the town itself. A possible explanation is the relative importance of agricultural firms in the 'remote' rural locality and business service firms in the 'accessible' rural locality, causing an increase of part time and full time employment respectively in the hinterlands of the two settlements.

| | KINGS | | | OLNEY | | |
|---|---|---|---|---|---|---|
| **Status** | **Town firms** | **Hint firms** | **All firms** | **Town firms** | **Hint firms** | **All firms** |
| Full Time (%) | 71.9 | 70.1 | **71.1** | 66.0 | 72.1 | **68.7** |
| Part Time (%) | 28.1 | 29.9 | **28.9** | 34.0 | 27.9 | **31.3** |

**Table 5.8:** **Employment characteristics of settlements:** given by employment status of employees working in the study areas

Overall, the two localities show no real differences in terms of employment patterns by local firms, although there is a slightly higher proportion of full time employees in the Kingsbridge locality.

The analysis now moves on to present further comparisons between the two study areas in respect of employment characteristics, and we now begin to examine the relationship between the two settlements and their respective hinterlands in more detail. The data presented in Table 5.9 illustrates the spatial distribution of the local workforce by source in and around the two settlements.

| Place of residence | Kingsbridge Town | (%) Hinterland | All | Olney Town | (%) Hinterland | All |
|---|---|---|---|---|---|---|
| Town | 69.5 | 34.5 | **53.0** | 59.6 | 13.0 | **39.5** |
| Hinterland | 8.2 | 44.5 | **25.5** | 7.9 | 35.7 | **19.9** |
| District* | 15.4 | 13.4 | **14.4** | 8.4 | 17.5 | **12.3** |
| County** | 5.0 | 6.6 | **5.7** | 19.7 | 27.3 | **23.0** |
| Region | 1.3 | 1.0 | **1.1** | 3.4 | 3.9 | **3.6** |
| Country | 0.6 | 0.0 | **0.3** | 1.0 | 2.6 | **1.7** |
| All employees | 100 | 100 | **100** | 100 | 100 | **100** |
| | *(319)* | *(290)* | ***(609)*** | *(203)* | *(154)* | *(357)* |

* Defined as the South Hams District in Kingsbridge and a 10 mile radius around the settlement in the case of Olney

** Denotes Devon and the three counties of Bucks/Beds & Northants to be comparable to Devon

**Table 5.9: Spatial distribution of workforce in and around settlements**

It is evident from the data that in both study areas, town and hinterland firms tend to draw employees from their immediate localities. In the 'remote' rural locality, almost 70% of those employed by town firms live in the town itself. Likewise, 45% of those employed by hinterland firms live in the immediate locality. This pattern is not so marked in the 'accessible' rural study area, particularly in the case of hinterland employees where just under 45% of employees are resident elsewhere in the district and county. Indeed, this highlights a key spatial difference between the two study areas in respect of employment. Kingsbridge appears to serve a 'district' wide hinterland, with almost 93% of its employees resident with a ten mile radius of the town; where as Olney effectively serves a 'county' wide hinterland, with almost 95% of local employees resident within the three counties of Bucks, Beds and Northants. Thus, the data implies a trend towards reverse commuting in the 'accessible' rural area with local firms drawing employees from greater distances.

It is therefore evident from the business data that Kingsbridge is more strongly integrated into its locality in terms of the local workforce. The relative strength of this integration can

be explored further by a spatial analysis of associated salary levels. The data in Table 5.10 presents mean annual salary levels for employees of town and hinterland firms in the two localities.

| | KINGS | | | OLNEY | | |
|---|---|---|---|---|---|---|
| Place of residence | Town firms | Hint firms | All firms | Town firms | Hint firms | All firms |
| Town (mean £ p.a.) | 36,330 | 22,283 | **30,450** | 36,644 | 15,870 | **32,128** |
| Hinterland (mean £ p.a.) | 28,095 | 23,742 | **24,790** | 15,962 | 27,280 | **24,046** |
| Locality (mean £ p.a.) | 34,631 | 23,060 | **28,267** | 32,884 | 23,477 | **29,071** |
| District (mean £ p.a.) | 26,587 | 13,794 | **21,150** | 27,202 | 27,887 | **27,635** |
| Elsewhere (mean £ p.a.) | 25,268 | 25,160 | **25,223** | 55,450 | 47,900 | **52,065** |

**Table 5.10: Employment characteristics of settlements:** given by annual mean salary levels for employees of town and hinterland firms

The data reveals some interesting similarities and differences between the two study areas. Differences between average salary levels for respective employees working and living in the two localities are not very great, with those in Olney earning a slightly higher average salary than local employees in Kingsbridge. However, when we consider the spatial distribution of the workforce in the 'accessible' rural locality, we find that significantly more income is 'leaking' out of the local economy in the form of wage and salary payments to inward commuters. The data implies that the majority of higher paid positions in the Olney locality are held by employees who commute into the study area from outside the district. The mean annual salary level for such employees is almost double that for equivalent employees in the Kingsbridge locality. Thus, the degree of economic integration in terms of the employment linkage is considerably stronger in the 'remote' rural study area. This aspect of the analysis is returned to in Chapter Six where the spatial distribution of workforce salaries is explored in more detail.

### 5.1.4 Factors influencing corporate activity patterns

In considering the functions of the two small towns studied, the data has begun to address the question of local economic integration. Before moving on to examine further functions of the towns brought to light by the household surveys, it is useful to consider some further characteristics of corporate activity which may influence the spatial nature of economic activity. In turn, this also throws light on the functional role of the settlements in the rural economy. The data presented in Table 5.11 illustrates that the firms of the two settlements are very similar in respect of vehicle usage, with Olney having slightly more firms operating cars or vans and slightly less operating lorries.

| % of firms operating: | None | 1 - 5 | 6 - 9 | 10 - 14 | More than 15 |
|---|---|---|---|---|---|
| **KINGSBRIDGE** | | | | | |
| Cars / Vans | 19.8 | 72.9 | 4.0 | 2.3 | 1.1 |
| Lorries | 82.1 | 14.6 | 1.6 | - | 1.6 |
| **OLNEY** | | | | | |
| Cars / Vans | 16.1 | 78.6 | 3.6 | 0.9 | 0.9 |
| Lorries | 86.8 | 13.2 | - | - | - |

**Table 5.11: Vehicle operation from firm address:** shown by proportions of firms

Another factor revealed by the literature is the growing importance of the telecommunications network on the nature of economic activity. The data in Table 5.12 illustrates the degree to which firms in the two localities use the telecommunication networks to carry out transactions. The first point to note is the higher proportion of firms in the 'accessible' rural area which have access to fax machines and the Internet: 76.6% and 45% in comparison to 68.2% and 20% respectively in the case of Kingsbridge. In the same way, the firms in and around Olney also use electronic networks to carry out their

business to a greater extent than those in Kingsbridge. 26% of firms in the former either sell or deliver services via the Internet in comparison to 9.4% of those in the latter area.

| | Telephone | Fax machine | Internet |
|---|---|---|---|
| **KINGSBRIDGE** | | | |
| Proportion with access to: | 100.0 | 68.2 | 20.0 |
| Proportion selling via: | 52.9 | 23.6 | 5.8 |
| Proportion delivering via: | 20.8 | 13.7 | 3.6 |
| **OLNEY** | | | |
| Proportion with access to: | 100.0 | 76.6 | 45.0 |
| Proportion selling via: | 63.8 | 38.5 | 17.4 |
| Proportion delivering via: | 16.3 | 12.2 | 8.6 |

**Table 5.12: Use of the telecommunications network to carry out transactions:** shown by proportion of all firms selling and delivering via networks

In Olney, the majority of those selling via the Internet are business services, including software companies, marketing and IT consultants and import/export agencies. Also included are consumer/business services selling products such as vehicles, books and wine via the Internet. Those delivering via the Internet are again mainly business services such as software design companies, Desk Top Publishing/IT consultants, silicon chip design and other management consultants including a chartered accountant and a public relations specialist. In Kingsbridge only a third of those firms selling via the Internet are business services. Also included are two guesthouses, a holiday letting agency and an agricultural merchant. Of the six firms delivering via this network, four are business services, including an accountant and public relations consultant and two community education establishments.

## 5.2 Descriptive results from the household surveys

Descriptive results from the household surveys can also be used to paint a picture of the functions that the towns play in their respective local economies. The following analysis focuses on two keys areas of economic activity: employment and shopping. Following this, further characteristics of the respective populations are identified, and consideration is given to some of the factors that may have an influence on local economic activity patterns. The section begins with an examination of the localities in terms of demographic structure.

### 5.2.1 Demographic structure of the localities

| | Kingsbridge | (%) | | Olney | (%) | |
|---|---|---|---|---|---|---|
| **Family stage** | **Town** | **Hinterland** | **All** | **Town** | **Hinterland** | **All** |
| GROUP I | 5.4 | 4.2 | **4.8** | 8.6 | 3.1 | **6.0** |
| GROUP II | 13.5 | 13.2 | **13.4** | 20.7 | 18.8 | **19.8** |
| GROUP III | 7.0 | 8.5 | **7.8** | 9.3 | 7.8 | **8.6** |
| GROUP IV | 7.0 | 6.3 | **6.7** | 6.4 | 9.4 | **7.8** |
| GROUP V | 31.4 | 32.8 | **32.1** | 38.6 | 39.1 | **38.8** |
| GROUP VI | 35.7 | 34.9 | **35.3** | 16.4 | 21.9 | **19.0** |
| All groups | **49.5** | **50.5** | **100** | **52.2** | **47.8** | **100** |
| | **(185)** | **(189)** | **(374)** | **(140)** | **(128)** | **(268)** |

**Table 5.13: Demographic structure of the study areas:** according to stage in the family lifecycle[3]

The data presented in Table 5.13 illustrates the high proportion of the Kingsbridge population who are retired. 35.3% of the population are over 65 years of age, in comparison to only 19.8% in the case of the 'accessible' rural study area. There is also a high proportion of households in both study areas that consist wholly of adults, all of

[3] According to Dix (1977). See Appendix D.

working age. In terms of those families with dependants, the most common group to be found in both study areas are those where the youngest dependants are aged seven or less.

Combining family stage with the level of indigeneity, we find that a higher proportion of the older age groups are newcomers to the Kingsbridge area in comparison to earlier stages in the lifecycle. 27.8% of young adults and 37.9% of families with dependants aged 12 years or less are indigenous to the area in comparison to only 21.7% of working adults and 18.2% of all retired households. As a whole, 69% of all newcomers to the Kingsbridge area are made up of the latter two groups, which highlights the popularity of South Devon as a retirement location. Examining indigeneity further, 22% of the Kingsbridge population has lived in the area all their life, of which 57.8% live in the town itself and 42.2% in the hinterland of the settlement. In the case of the Olney locality, only 16.7% of the population are indigenous to the area and there are no distinct trends with respect to family stage. 25% of all young adults are indigenous to the area, with the figures for working adults and retired households being 18.3% and 19.6% respectively.

The high proportion of retired persons in the Kingsbridge locality is also highlighted by the data in Table 5.14, which reveals that 10.5% of the population are unoccupied for some reason (i.e. they are not retired and not in employment). In the 'remote' rural locality we find that 19.1% of the resident population are employed in skilled manual and non-manual occupations, with 14.5% employed in partly skilled and unskilled occupations. This relatively high proportion may well be due to the tourism service sector, which tends to rely heavily on this type of employment. Although no statistically significant associations exist between social class and place of residence, we do find a higher proportion of skilled manual workers residing in the town and equivalent non-manual employees living the hinterland. The key difference between the two study areas is that professional and managerial occupations make up only 20.6% of the Kingsbridge population, in comparison

to 42.1% in the 'accessible' rural locality. As a result, there is a considerably larger proportion of households in the three higher social groups in this area. Again, there are no statistically significant associations between social class and place of residence, although it is evident that a higher proportion of professionals tend to reside in the town, with retired residents favouring hinterland locations.

| | Kings | (%) | | Olney | (%) | |
|---|---|---|---|---|---|---|
| **Social class** | **Town** | **Hinterland** | **All** | **Town** | **Hinterland** | **All** |
| I Professional | 8.2 | 10.1 | **9.1** | 19.3 | 13.2 | **16.4** |
| II Managerial / tech | 13.0 | 10.1 | **11.5** | 25.7 | 25.6 | **25.7** |
| III Skilled non manual | 7.6 | 11.6 | **9.7** | 15.0 | 13.2 | **14.1** |
| IV Skilled manual | 12.5 | 6.3 | **9.4** | 9.3 | 7.0 | **8.2** |
| V Partly skilled | 8.7 | 6.3 | **7.5** | 9.3 | 6.2 | **7.8** |
| VI Unskilled | 7.6 | 6.3 | **7.0** | 1.4 | 3.9 | **2.6** |
| Retired / unoccupied | 42.4 | 49.2 | **45.8** | 20.0 | 31.0 | **25.3** |
| All groups | 49.3 | 50.7 | **100** | 52.0 | 48.0 | **100** |
| | (184) | (189) | **(373)** | (140) | (129) | **(269)** |

**Table 5.14: Demographic structure of the study areas:** according to social class[4]

Further differences between the two localities are revealed through an examination of household incomes. Whilst 22.6% of the population in and around Kingsbridge receive a gross household income of more than £23,500 per anum, this rises to 58.6% in the case of the Olney locality. The majority of the population in the 'remote' rural area fall into the middle income brackets, reflecting the lower standard of living in the South West of England. Although the Chi-square test is not statistically significant, it is interesting to note that wealthier households tend to reside in the hinterland. 11.2% of hinterland residents receive a gross household income of more than £39,000 per anum, in comparison to only 4.6% of town residents. In the case of the Olney locality, there is no distinction between town and hinterland in terms of this income group. However, as a general trend we do find

[4] ONS Classification of Occupations (1990). See Appendix D.

that the three lower income groups tend to favour hinterland locations with the upper income groups tending to reside more commonly in the town itself.

| | Kings | (%) | | Olney | (%) | |
|---|---|---|---|---|---|---|
| **Income group** | **Town** | **Hinterland** | **All** | **Town** | **Hinterland** | **All** |
| Less than £ 4,000 | 10.3 | 7.9 | **9.1** | 2.3 | 4.0 | **3.1** |
| £ 4,001 - 8,500 | 17.1 | 20.2 | **18.7** | 6.1 | 11.3 | **8.6** |
| £ 8,501 - 15,500 | 27.4 | 23.6 | **25.5** | 9.8 | 13.7 | **11.7** |
| £15,501 - 23,500 | 26.3 | 21.9 | **24.1** | 18.2 | 17.7 | **18.0** |
| £ 23,501 - 39,000 | 14.3 | 15.2 | **14.7** | 27.3 | 16.9 | **22.3** |
| More than £ 39,000 | 4.6 | 11.2 | **7.9** | 36.4 | 36.3 | **36.3** |
| All groups | 49.6 | 50.4 | **100** | 51.6 | 48.4 | **100** |
| | (175) | (178) | **(353)** | (132) | (124) | **(256)** |

**Table 5.15: Demographic structure of the study areas:** according to income group[5]

### 5.2.2 Employment functions of the localities

The data presented in Table 5.16 shows the workplace of the survey population according to place of residence in the two localities. First, a distinction can be made between Kingsbridge and its hinterland. The data indicates that a total of 57.6% of all inhabitants surveyed work within the town in comparison to only 7.8% who work in the surrounding hinterland. Residents of the town itself are particularly tied to their immediate locality in terms of employment, with 66.2% working within the town. However, a much lower proportion of hinterland residents work in their immediate locality, only 11.2% in fact. Although incidences of commuting appear higher in the case of hinterland residents, with 20.9% travelling outside the district to work, compared to 16.0% of town residents, a significant proportion still work in Kingsbridge itself. This highlights the importance of the settlement as a local employment centre. A final distinction between the two locations is

[5] Gross household annual income (Following that employed by Family Expenditure Survey).

the prevalence of home working which is considerably more prevalent in the rural hinterland.

| | Kingsbridge | (%) | | Olney | (%) | |
|---|---|---|---|---|---|---|
| Place of work | Town residents | Hinterland residents | All | Town residents | Hinterland residents | All |
| Town | 66.2 | 47.0 | **57.6** | 22.1 | 5.3 | **14.9** |
| Hinterland | 4.9 | 11.2 | **7.8** | 2.9 | 2.3 | **2.6** |
| At home | 0.6 | 6.0 | **3.0** | 1.2 | 8.4 | **4.3** |
| Elsewhere in District* | 12.3 | 14.9 | **13.5** | 7.0 | 15.3 | **10.6** |
| Elsewhere in County** | 14.2 | 14.2 | **14.1** | 52.1 | 55.0 | **53.4** |
| Elsewhere in Country | 0.0 | 4.5 | **2.0** | 12.8 | 8.4 | **10.9** |
| Elsewhere / not fixed | 1.8 | 2.2 | **2.0** | 1.7 | 5.3 | **3.3** |
| All locations | 54.9 | 45.1 | **100.0** | 56.8 | 43.2 | **100** |
| | (163) | (134) | **(297)** | (172) | (131) | **(303)** |

* Defined as the South Hams District in Kingsbridge and a 10 mile radius around the settlement in the case of Olney

* Denotes Devon and the three counties of Bucks/Beds & Northants to be comparable to Devon

**Table 5.16: Workplace according to place of residence**[6]

Moving on to examine the data for Olney, we find that employment patterns of the resident population are much less spatially proximate in comparison to the 'remote' rural locality. Over half of the local population works elsewhere in the three counties of Buckinghamshire, Bedfordshire and Northamptonshire, a factor which is related to the influence of the three respective regional centres, Milton Keynes, Bedford and Northampton, on commuting patterns in the area. Only 14.9% of the local working population are employed within the town itself, in comparison to 57.6% in the case of Kingsbridge. This rises to 22.1% for town residents, although we find evidently weak employment linkages between town and hinterland with only 5.3% of rural residents working in their local town.

[6] Based on all economically active respondents (maximum two per household)

The data presented in Table 5.17 provides a more detailed analysis of the respective settlements' employment functions. It can be seen that the highest proportion of those working in the Kingsbridge locality are employed in intermediate non-manual vocations, such as secretarial work and catering. This is followed by unskilled occupations, which are likely to be associated with service sector firms and agricultural firms. Intermediate occupations are also well represented in the district as a whole, as are professional and skilled manual occupations.

| OCCUPATION | KINGS | (%) | | OLNEY | (%) | |
|---|---|---|---|---|---|---|
| | Locality | District | Elsewhere | Locality | District | Elsewhere |
| Professional | 9.4 | 17.5 | 37.0 | 15.2 | 25.0 | 20.0 |
| Employer/manager | 14.4 | 10.0 | 26.0 | 21.2 | 28.1 | 25.9 |
| Intermediate non-manual | 20.3 | 30.0 | 12.9 | 13.6 | 21.8 | 30.7 |
| Junior non manual | 5.9 | 0.0 | 3.7 | 12.1 | 6.3 | 7.8 |
| Skilled manual | 15.3 | 17.5 | 12.9 | 22.7 | 9.4 | 6.3 |
| Semi skilled manual | 16.4 | 17.5 | 5.6 | 6.1 | 6.3 | 8.3 |
| Unskilled manual | 18.3 | 7.5 | 1.9 | 9.1 | 3.1 | 1.0 |
| **All occupations** | **68.2** | **13.5** | **18.3** | **21.8** | **10.6** | **67.6** |

**Table 5.17: Characteristics of respective localities in terms of employment:** given by occupation classification of local residents by workplace

Moving on to the Olney study area, the greatest difference is the relatively small number semi-skilled and unskilled occupations, both within the locality and the district. Only 15.2% of all occupations within the Olney locality fall into these two categories, in comparison to 34.7% in the case of the Kingsbridge locality. The balance consists of a higher proportion of junior non-manual, managerial and professional occupations, which may reflect the bias towards business services in the area. The data illustrates that outward commuting is more associated with professional, managerial and intermediate non-manual occupations in the case of both study areas, which perhaps reflects the association between settlement size and employment functions within the occupations hierarchy.

### 5.2.3 Retail functions of the settlements

Retail functions of the settlements are considered by producing a breakdown of expenditure and purchasing patterns for each individual consumer good and service purchased in the respective town centres. Goods and services are divided into low and high order[7] purchases, and for each, mean transactions are calculated in terms of both financial value and number. This produces the mean monthly expenditure per household and the mean number of purchases for each item, which in turn indicates the mean transaction value per trip. To illustrate the functions more clearly, the proportion of all town centre purchasing activity is also calculated for each good or service.

The data presented in Table 5.18 relates to the low order retail functions of Kingsbridge town centre. The first two columns reveal some very interesting results. Despite the presence of a major edge-of-town-supermarket[8], food and groceries account for the highest average monthly expenditure per household in town centre shops (excluding the supermarket). In turn, this category accounts for the highest percentage of all low order household consumption expenditure in Kingsbridge town centre. Thus, in terms of expenditure, we might assert that the primary low order retail function of the town is still in food and groceries, despite the presence of the supermarket. However, analysis in terms of the number of shopping trips paints a quite different picture. The average number of monthly shopping trips to the town centre to purchase newspapers and magazines is 15.15, with each purchase having a mean transaction value of only 71 pence. The importance of this function is highlighted further in the right hand column of the table. It appears that 35.2% of all shopping trips to the town centre are to purchase newspapers and magazines, a category which represents the lowest transaction value of all goods and services

[7] A discussion of these terms is contained in section 1.3.2.

[8] The influence of the edge of town supermarket on local economic activity patterns is explored further in section 7.1.2

provided. In terms of low order service provision, the recreation function is clear. In terms of consumption expenditure, pub food and drink accounts for both the highest average and the highest proportion in this area. However, in terms of the number of purchases, or trips, the primary low order service function is associated with admissions to sports activities, which accounts for an average of 5.54 trips per month and 5.2% of all trips made to the town centre.

| LOW ORDER GOODS | Mean monthly expenditure £ | Mean no. monthly Purchases (trips) | Mean transaction value £ | % all town centre expenditure | % all town centre purchases (trips) |
|---|---|---|---|---|---|
| Food/groceries | **148.44** | 10.14 | 15.92 | **15.1** | 9.5 |
| Newspapers/magazines | 10.22 | **15.15** | **0.71** | 2.5 | **35.2** |
| Confectionery | 7.91 | 5.88 | 1.36 | 1.1 | 8.2 |
| Alcohol/tobacco | 48.31 | 7.67 | 6.74 | 6.2 | 9.1 |
| Stationary & paper goods | 6.78 | 2.01 | 3.41 | 1.0 | 3.1 |
| Cosmetics & hair products | 11.54 | 2.11 | 5.78 | 2.3 | 3.9 |
| LOW ORDER SERVICES: | | | | | |
| Takeaway food | 23.13 | 2.44 | 9.70 | 3.5 | 3.6 |
| Restaurant food drink | 32.75 | 2.47 | 13.59 | 2.1 | 1.5 |
| Pub food/drink | **36.44** | 4.71 | 8.01 | **3.6** | 4.5 |
| Hairdressing/beauty treatment | 15.59 | 1.61 | 10.22 | 3.1 | 3.0 |
| Laundry & cleaning | 13.15 | 2.16 | 6.48 | 0.7 | 1.3 |
| Shoe/watch repair | 13.63 | 1.08 | 12.58 | 0.5 | 0.4 |
| Sports admissions activities | 22.01 | **5.54** | 4.11 | 2.1 | **5.2** |
| **ALL LOW ORDER GOODS AND SERVICES** | **92.74** | **19.33** | **4.95** | **43.8** | **88.3** |

**Table 5.18: Economic functions of Kingsbridge town centre:** illustrated by a breakdown of low order purchases

In Table 5.19 a similar breakdown of retail functions is provided for high order goods and services. The importance of clothing and footwear retail is indicated by the two right hand columns. This category of high order good represents the highest proportions of both town centre expenditure and purchases in this category, at 4.6% and 2.0% respectively. Not

surprisingly, the highest average household monthly expenditure is associated with the purchase of the furniture and bedding, although this accounts for the lowest number of monthly purchases due to the relatively high value of each transaction.

| HIGH ORDER GOODS: | Mean monthly expenditure £ | Mean no. monthly Purchases (trips) | Mean transaction value £ | % all town centre expenditure | % all town centre purchases (trips) |
|---|---|---|---|---|---|
| Household hardware | 18.64 | 1.54 | 12.79 | 1.8 | 1.4 |
| Books/CD's | 17.02 | 1.61 | 11.20 | 2.1 | 1.9 |
| Clothing & footwear | 41.78 | 1.86 | 23.13 | **4.6** | **2.0** |
| Gas & electrical appliances | 106.94 | 1.91 | 58.56 | 4.0 | 0.7 |
| Furniture & bedding | **231.75** | **1.00** | 231.75 | 3.8 | 0.2 |
| Sports/camping equipment | 21.69 | 1.38 | 15.77 | 0.3 | 0.2 |
| Horticultural goods/plants | 20.59 | **2.21** | 10.40 | 1.6 | 1.6 |
| **HIGH ORDER SERVICES:** | | | | | |
| Solicitor/professional | **520.65** | 1.14 | 433.88 | **17.1** | 0.4 |
| Printing services | 11.71 | **1.80** | 6.83 | 0.4 | 0.6 |
| Building/gardening | 128.88 | 1.70 | 75.80 | 4.2 | 0.6 |
| Plumbing/decorating | 46.19 | 1.26 | 36.68 | 2.0 | 0.6 |
| Vehicle repairs & servicing | 127.43 | 1.21 | 113.84 | 14.0 | **1.3** |
| Cinema & theatre | 6.45 | 1.36 | 4.74 | 0.3 | 0.6 |
| **ALL HIGH ORDER GOODS AND SERVICES** | **149.11** | **3.18** | **47.90** | **56.2** | **11.7** |

**Table 5.19: Economic functions of Kingsbridge town centre:** illustrated by a breakdown of high order purchases

Moving on to high order services, a clearly important function here is the provision of professional services such as estate agents and solicitors, a category which accounts for 17.1% of all town centre expenditure. However, it is important to recognise that this is associated with a relatively small proportion of very high value transactions. Vehicle

repairs and servicing is also notable, accounting for the highest proportion of town centre purchases in this category.

Moving on to the 'accessible' rural locality, the data presented in Table 5.20 illustrates a breakdown of low order purchasing activity in Olney town centre.

| LOW ORDER GOODS | Mean monthly expenditure £ | Mean no. monthly Purchases (trips) | Mean transaction value £ | % all town centre expenditure | % all town centre purchases (trips) |
|---|---|---|---|---|---|
| Food/groceries | **206.61** | 9.57 | 21.59 | **20.3** | 7.2 |
| Newspapers/magazines | 11.91 | **14.35** | **0.83** | 5.0 | **46.1** |
| Confectionery | 6.81 | 5.76 | 1.18 | 1.5 | 9.7 |
| Alcohol/tobacco | 41.00 | 5.80 | 7.07 | 8.5 | 9.2 |
| Stationary & paper goods | 5.58 | 1.61 | 3.47 | 0.7 | 1.6 |
| Cosmetics & hair products | 21.21 | 2.19 | 9.67 | 2.3 | 1.8 |
| **LOW ORDER SERVICES:** | | | | | |
| Takeaway food | 30.27 | 2.36 | 12.82 | **10.3** | **6.2** |
| Restaurant food/drink | **67.82** | 1.91 | **35.48** | 8.1 | 1.8 |
| Pub food drink | 32.33 | 2.90 | 11.16 | 4.4 | 3.1 |
| Hairdressing/beauty treatment | 24.70 | 1.57 | 15.74 | 6.8 | 3.4 |
| Laundry & cleaning | 15.56 | 1.72 | 9.05 | 1.7 | 1.5 |
| Shoe watch repair | 16.27 | 1.00 | 16.28 | 0.5 | 0.2 |
| Sports admissions activities | 33.50 | **4.90** | 6.84 | 2.4 | 2.7 |
| **ALL LOW ORDER GOODS AND SERVICES** | **103.27** | **17.46** | **5.91** | **72.5** | **94.5** |

**Table 5.20: Economic functions of Olney town centre:** illustrated by a breakdown of low order purchases

As in the case of Kingsbridge, food and groceries account for the highest average monthly expenditure on low order goods and services per household, and likewise the highest proportion of all low order expenditure in the town centre. The relatively higher mean expenditure on this category, of £206.61, may well be accounted for by the fact that

consumer disposable incomes are higher in the 'accessible' rural area and that the major supermarket holds less of the market share for low order purchases than does the equivalent store in Kingsbridge[9]. Examination of the data reveals that further similarities are evident between the two settlements. Again, the highest proportion of all town centre purchases is accounted for by newspapers and magazines, a category which is also associated with the highest average number of monthly purchases in the town centre and the lowest mean transaction value. Likewise, in terms of low order services, Olney also serves an important recreation function, although residents of the 'accessible' rural locality evidently prefer restaurants to pubs when dining out. This category accounts for both the highest average monthly expenditure on low order services and the highest mean transaction value. In terms of the proportions of all town centre expenditure and purchases, takeaway food appears to be the most important town centre function in terms of low order services. Finally, as in the case of Kingsbridge, the highest average number of monthly purchases on low order services is attributed to sports admissions and related activities.

In terms of high order consumption patterns, presented by the data in Table 5.21, we find some further similarities with Kingsbridge town centre. Furniture and bedding accounts for the highest proportion of all town centre expenditure on high order goods, albeit only 3.9%, and in turn it also accounts for the highest average monthly expenditure on such items. Unlike Kingsbridge, Olney is not such an important centre for clothes shopping, with this category accounting for only 2.7% of all town centre expenditure. This factor is likely to be related to the popularity of Milton Keynes Regional Shopping Centre for such purchases. Instead, household hardware is a more important function of the town centre in terms of high order purchases, with this category accounting for 1.5% of all town centre purchases and an average of two monthly purchases per household.

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[9]This point is explored further in section 7.1.2

Moving on to high order services, a clear function of Olney town centre is the provision of vehicle repairs and servicing. This category accounts for 11.2% of all town centre expenditure, second only to food and groceries. The average monthly expenditure on repairs and servicing is £244.69 per household, which is in fact the highest of all goods and services sourced in the town centre.

| HIGH ORDER GOODS: | Mean monthly expenditure £ | Mean no. monthly Purchases (trips) | Mean transaction value £ | % all town centre expenditure | % all town centre purchases (trips) |
|---|---|---|---|---|---|
| Household hardware | 15.61 | **2.07** | 7.53 | 1.5 | **1.5** |
| Books/CD's | 14.79 | 1.53 | 9.69 | 1.0 | 0.8 |
| Clothing & footwear | 51.33 | 1.47 | 35.00 | 2.7 | 0.6 |
| Gas & electrical appliances | 32.50 | 1.00 | 32.50 | 0.2 | 0.1 |
| Furniture & bedding | **224.60** | 1.00 | 224.60 | **3.9** | 0.1 |
| Sports/camping equipment | 50.00 | 1.00 | 50.00 | 0.2 | 0.03 |
| Horticultural goods/plants | 11.12 | 1.48 | 7.51 | 1.0 | 1.0 |
| **HIGH ORDER SERVICES:** | | | | | |
| Solicitor/professional | 78.33 | 1.00 | 78.33 | 0.8 | 0.1 |
| Printing services | 14.63 | 1.00 | 14.63 | 0.2 | 0.1 |
| Building/gardening | 111.43 | **1.86** | 60.00 | 2.7 | 0.4 |
| Plumbing/decorating | 73.75 | 1.38 | 53.63 | 2.1 | 0.3 |
| Vehicle repairs & servicing | **244.69** | 1.54 | 159.05 | **11.2** | 0.5 |
| Cinema & theatre | 0.00 | 0.00 | 0.00 | 0.0 | 0.0 |
| **ALL HIGH ORDER GOODS AND SERVICES** | **107.51** | **2.81** | **38.29** | **27.5** | **5.5** |

**Table 5.21: Economic functions of Olney town centre:** illustrated by a breakdown of high order purchases

Unlike Kingsbridge, Olney is not an important centre for professional services such as estate agents and/or solicitors. This category accounts for only 0.8% of all town centre expenditure in comparison to 17.1% in the case of Kingsbridge. Private individuals are likely to be accessing such services in the three nearby regional centres of Milton Keynes,

Bedford and Northampton. As in the case of Kingsbridge, building and gardening services are a relatively important function of Olney, certainly in terms of the number of purchases associated with this category.

This section has provided a useful assessment of the way in which the two settlements serve their local communities by examining some of the contemporary functions of the respective town centres. There are evidently a number of key functions common to both towns which are summarised at the end of the chapter. However, it is important to note the difference that geographical location has on the balance between low and high order provision. The 'accessible' rural settlement serves a predominantly low order function, with low order goods and services accounting for 72.5% of all town centre expenditure and 94.5% of all trips to the town centre. This is logical given the relative accessibility of the settlement to three major high order centres, including the regional shopping centre of Milton Keynes which provides a number of retail chain department stores within one contained unit. The relatively 'remote' rural location of Kingsbridge is likely to be a key reason why the town centre has a more diverse function in its local economy. Although 88.3% of all trips to the town centre are associated with low order purchases, high order goods and services actually account for over half of all expenditure carried out in the town centre, which in terms of income generation, could mean that the high order function is of slightly greater importance.

### 5.2.4 Factors influencing household activity patterns

As in the case of the corporate sector, it is useful to consider some further characteristics of consumer activity that may influence the spatial nature of economic activity. In turn, this also throws light on the functional role of the settlements in the rural economy.

*Level of car ownership*

The data presented in Table 5.22 illustrates the level of car ownership in the two localities. The first key observation is the higher proportion of households in Kingsbridge who do not own a private car, 13.3% in comparison to 7.5% in Olney. However, the higher prevalence car ownership in the 'accessible' rural locality is revealed more significantly through the fact that the majority of households own two cars, whereas in the 'remote' rural locality the equivalent proportion own only one car. In the case of Kingsbridge we find a strong association between the level of car ownership and location. As expected, a higher proportion of households in the hinterland own two cars in comparison to those residing in the town. In Olney there is no statistically significant association between car ownership and location, although a slightly higher proportion of hinterland households own three or more cars.

| | KINGS | (%) | | OLNEY | (%) | |
|---|---|---|---|---|---|---|
| **Ownership level** | **Town** | **Hinterland** | **All** | **Town** | **Hinterland** | **All** |
| **No car** | 18.2 | 8.6 | **13.3** | 7.2 | 7.8 | **7.5** |
| **One car** | 51.9 | 45.5 | **48.6** | 35.5 | 32.8 | **34.2** |
| **Two cars** | 23.2* | 39.6* | **31.5** | 48.6 | 48.4 | **48.5** |
| **Three or more** | 6.7 | 6.3 | **6.0** | 8.7 | 11.0 | **9.8** |

*Denotes 99% significance level

**Table 5.22: Levels of household car ownership in the respective localities**

*Mode of transport used for shopping trips*

Table 5.23 provides a breakdown of mode of transport used for shopping trips according to location. The key observation to note is that a lower proportion of Olney residents carry out shopping trips on foot: 6.0% in comparison to 11.4% in the Kingsbridge locality. The remainder evidently make journeys by car as 70% of shoppers are car drivers compared to 63% of those in the 'remote' rural locality. Comparing locations within the respective localities, the first observation is that, as expected, more residents of Kingsbridge town

carry out shopping trips on foot, 19.8% in comparison to 3.2% of hinterland residents. Conversely, the second major difference between the two groups is the proportion of residents who use a car for shopping trips: 78.5% of hinterland residents compared to only 47.3% of town residents. This would imply that spatial proximity to shopping facilities is key to reducing dependence on the private car. Indeed, a similar pattern of behaviour exists in the 'accessible' rural locality. However, the difference between town and hinterland residents in respect of those carrying out shopping trips on foot is not so marked because they are more likely to be using nearby regional centres rather than the town itself.

| Mode of transport | KINGS | (%) | | OLNEY | (%) | |
|---|---|---|---|---|---|---|
| | Town | Hinterland | All | Town | Hinterland | All |
| Foot | 19.8 | 3.2 | **11.4** | 7.9 | 3.9 | **6.0** |
| Foot & car | 17.6 | 5.4 | **11.4** | 22.3 | 3.1 | **13.1** |
| Bicycle | 0.0 | 0.5 | **0.4** | 2.2 | 0.8 | **1.5** |
| Motorbike/moped | 1.6 | 0.0 | **0.8** | 0.7 | 0.0 | **0.4** |
| Car driver | 47.3 | 78.5 | **63.0** | 59.7 | 81.2 | **70.0** |
| Car passenger | 7.1 | 6.5 | **6.8** | 5.0 | 6.3 | **5.6** |
| Public transport | 1.1 | 3.2 | **2.2** | 2.2 | 4.7 | **3.4** |
| Private hire/co. | 3.3 | 1.6 | **2.4** | 0.0 | 0.0 | **0.0** |
| Other | 2.2 | 1.1 | **1.6** | 0.0 | 0.0 | **0.0** |
| **All forms** | **49.5** | **50.5** | **100** | **52.1** | **47.9** | **100** |
| | *(182)* | *(186)* | *(368)* | *(139)* | *(128)* | *(267)* |

**Table 5.23: Mode of transport used for shopping trips by location**

In the case of both localities the extremely low proportion of the population who make use of public transport is evident. Only 2.2% of all Kingsbridge and 3.4% of Olney residents use public transport for shopping trips. Slightly higher propensities are found in the hinterland of both settlements, again with 'accessible' rural residents showing a higher rate of usage. The relative accessibility of the locality to nearby regional centres evidently does coincide with a slightly more favourable public transport situation, although not to the degree that one might expect.

*Propensity to combine journeys*

Evidence from the literature review[10] indicates that it is useful to examine the extent to which journey 'chaining' takes place. The data presented in Table 5.24 illustrates the propensity to combine shopping trips with the work journey, according to place of work. In the case of the 'remote' rural locality, the findings indicate that the highest propensity to combine shopping trips with the work journey is associated with those who work within Devon, but outside the South Hams district(**). Further analysis of the data reveals that, within this group, the regional centre of Plymouth is a key location where this pattern of economic behaviour is evident, with all commuters to the centre combining the work journey with shopping. Within the Kingsbridge locality itself, there is a marked behavioural difference between town and hinterland based employees, with only 29.4% of the latter combining trips in comparison to 53.8% of those working in the town. Compared to the locality, a higher proportion of those working in the district combine shopping trips with the work journey, 66.7% in comparison to 50%. This would indicate that these residents are using neighbouring market towns in the area (such as Totnes, Dartmouth and Salcombe) for their convenience shopping simply because they are working in closer proximity to them than to their hometown.

In the 'accessible' rural locality a slightly different pattern of behaviour is evident. Although the highest propensity to combine shopping trips with the work journey is associated with those residents working within the three counties of Bucks, Beds and Northants, there is no significant association between journey chaining and workplace.

[10]See section 2.4.6

| WORKPLACE: | KINGS | | | OLNEY | | |
|---|---|---|---|---|---|---|
| (%) | Yes | No | *n* | Yes | No | *n* |
| Within locality | 50.0 | 50.0 | *120* | 51.6 | 48.4 | *31* |
| Within district | 66.7 | 33.3 | *18* | 41.2 | 58.8 | *17* |
| Within county | 88.2 | 11.8** | *17* | 67.1 | 32.9 | *85* |
| Elsewhere / not fixed | 60.0 | 40.0 | *5* | 61.5 | 38.5 | *13* |

** Denotes 95% significance level

**Table 5.24: Propensity to combine shopping trips with work journey:** according to workplace[11]

In the case of those working elsewhere in the district, there is actually a reverse effect, with the majority of employees not combing their work journey with shopping. This would very likely be explained by the influence of the three regional centres on shopping patterns, a factor which is explored further in section 7.1.

*Use of the telecommunications network*

Results from the household surveys indicate that 62.9% of all Kingsbridge households use mail order for some of their household purchases. Further examination of the data reveals a strong association between this and stage in the family lifecycle, with those in retired age groups using the facility significantly less(*). In Olney, 56.8% of households make use of mail order for some purchases and there is also a significant association between this and family stage. However, in this case we find that fewer than expected adults of working age use the facility, with those families supporting dependants under the age of twelve making most use of mail order for shopping(*).

[11] Workplace according to the household member who does the majority of the shopping.

| Proportion of households with access to: | Kingsbridge % | Olney % |
|---|---|---|
| Telephone | 96.8 | 99.3 |
| Fax machine | 17.4 | 32.4 |
| Internet | 7.5 | 19.5 |
| **Of which make purchases by:** | | |
| Telephone | 59.9 | 63.3 |
| Fax machine | 26.2 | 26.1 |
| Internet | 7.1 | 22.6 |

**Table 5.25: Access to, and use of, the telecommunications network for household purchases**

A review of the relevant literature[12] also indicates that teleshopping may have an increasing influence on the activity patterns of consumers. The data presented in Table 5.25 illustrates that, in the 'remote' rural locality, of the 96.8% of the population who have access to a telephone, 59.9% use it to carry out economic transactions, a pattern which is very similar to that in the 'accessible' locality. Likewise, although there are a more households with a fax machine in Olney, the same proportion use them to make purchases in both localities. However, there is a marked difference between the two localities in terms of Internet usage[13]. Whilst 7.5% of Kingsbridge residents have access to the internet, almost 20% of Olney residents do, with over three times as many of these residents making use of the medium for household purchases.

[12] See section 2.4.5

[13] It is recognised that this relates to the proportion of households with Internet connections at the time of the household surveys. The increasing rate at which PC owners are connecting to the Internet is liable to account for marginal differences between these figures and make them slightly out of date at the time of reading.

## 5.3 Summary: contemporary functions of the small town

Descriptive results from the business surveys suggest that the key functions of small town centres to the business community in all rural areas are banking and postal services. In addition, the 'remote' rural settlement of Kingsbridge is also an important centre for professional services such as accountants and solicitors, although this is not the case in Olney where the majority of firms tend to access these services elsewhere. In terms of economic structure, the key points to note are the greater importance of agricultural firms in the 'remote' locality and the larger proportion of firms providing business services in the 'accessible' locality. Firms providing consumer services are also more prevalent in the 'remote' rural town. Both locations are characterised by very small firms, with fewer than five employees, although in the Olney study area the distribution of firms is more widely spread across the categories of workforce size. It is also evident that the 'accessible' locality has attracted considerably more business start-ups in recent years than has the Kingsbridge area. Ownership data emphasises the strong prevalence of independent, locally owned firms in both study areas, again a typical characteristic of the rural economy. The data also shows a higher level of national ownership in the Kingsbridge study area, likely to be associated with retail chains in the town centre. Conversely, there is a higher level of international investment in the 'accessible' area.

In terms of employment functions, both settlements contain a relatively high proportion of owner / managers, which coincides with ownership data. Firms in and around Kingsbridge employ a high proportion of manual workers, whereas Olney firms have a higher proportion of non-manual positions. The majority of positions in the 'remote' rural study area are full time, whereas in the 'accessible' locality firms employ a higher proportion of part time workers. There is a strong association between place of work and place of residence, with proximity to work place featuring strongly in the 'remote' rural area, and to

a lesser degree in the 'accessible' rural locality. Further, the employment catchment of the 'remote' locality is smaller, serving a 'district' wide hinterland in comparison to Olney, which appears to draw labour from a hinterland equivalent to 'county' level. It is also interesting to note that employees commuting into the Olney locality to work command higher salaries than those living and working in the area.

Descriptive data relating to the consumer sector indicate some interesting variations between the two localities in terms of demographic structure. The 'remote' rural town is an important retirement location and also supports a high proportion of working adults without dependants. Likewise, the latter group features strongly in the 'accessible' locality, although the overall trend is towards a younger population, particularly families with young dependants. The emphasis on higher social groups in Olney is also associated with higher household incomes, although there is a distinct trend towards out-ward commuting in the case of professional, managerial and intermediate positions. Thus, the 'accessible' rural settlement is characterised by both outward commuting of local residents and inward commuting of local employees at the top end of the occupation hierarchy; with relatively few manual and unskilled positions held by local residents. The Kingsbridge population is more normally distributed in terms of social class and household income, and likewise has more spatially proximate employment patterns, with a higher proportion if its population working in the immediate locality. There is also a higher propensity for 'remote' rural commuters to combine their shopping trips with the work journey, particularly where this involves commuting to a regional centre.

In terms of retail functions the results suggest that, despite the influence of edge-town supermarkets, food and grocery shopping continues to be an important function of small towns. The newsagent also plays an important role in both settlements, given that the purchases of newspapers and magazines account for such a high proportion of town centre

purchases. Pubs and restaurants provide an important service to their local population, as do hairdressers. Clothing and footwear appears to be a more viable business in the 'remote' rural town, which has less competition from higher order centres. Indeed, the high order sector represents some clear distinctions between the two towns. In terms of expenditure in the 'remote' rural town, this sector is evidently more important than the low order, whereas the relative accessibility of Olney to nearby regional centres clearly undermines the high order function of the town. More specifically, furniture and bedding appears to be a viable retail sector in both towns. Likewise, garage services continue to serve their local populations well, and professional services are clearly an important feature of the 'remote' rural town.

# CHAPTER SIX

# SPATIAL PATTERNS OF ECONOMIC ACTIVITY AND INTEGRATION INTO LOCALITY: FIRMS

## 6.0 Introduction

The purpose of this chapter is to fulfil part of the main aims of the project: to examine, in more detail, the contemporary functions of the small market town in the rural economy; and to advise policy makers of the potential role such towns can play in promoting rural development. This is achieved through an in-depth empirical analysis of the spatial data obtained from the business surveys in both study areas. It begins with an examination of the spatial distribution of local workforce salaries before presenting a comprehensive descriptive analysis of the spatial data relating to other economic transactions. The results illustrate both the spatial distribution of economic activity in and around the two localities, and the relationship between the settlements and the local, regional, national and international economies. The chapter then moves on to test some of the main research hypotheses developed from the literature, comparing the strength of local economic integration between different types of firm. Multivariate prediction models are then developed which allow the hypotheses to be explored further, the results of which have direct implications for development policy in the localities.

## 6.1 Spatial patterns of economic activity

There are two main strands of investigation developed in this section. The first is to assess the relationship between the two settlements and their respective local, regional, national

and international economies. In turn, this allows the degree of local economic integration of the settlements to be considered. The data presented in this section is unique in the fact that, in dealing with economic transactions on aggregate, it is concerned with the *absolute* proportions of input and output transactions, as opposed to *mean* proportions which are used for analysis in the following sections comparing different types of firm. It also considers the potential role of local workforce salary payments in influencing the spatial distribution of economic activity. All descriptive results in this section are presented diagrammatically in order to display the spatial data effectively. Figures 6.1 to 6.10 are situated in the main text adjacent to related discussion. Reference is also made to Figures 6.1A through to 6.8A, which are situated in Appendix N.

### 6.1.1 Spatial distribution of workforce salaries

In the previous chapter, analysis of mean salaries revealed some key differences in terms of location and salary[1] level in each of the study areas. Salary payments effectively represent the 'price' of labour and are therefore a relevant consideration in terms of economic linkages. This section presents an analysis of the *absolute* proportions of salaries paid to employees working in each of the study areas. Locally earned salaries may not be spent in the locality, thus, it is useful to assess the proportion of expenditure on this form of input which is effectively 'leaking' out of the respective local economies. In turn, this indicates the degree to which each of the settlements may be integrated into their local economies.

Figure 6.1 illustrates the flows of employee salaries in and around the Kingsbridge locality, given by the proportional value of these payments. The first point to note is that, in the case of town firms, three quarters of all expenditure on salaries is received by employees resident in the immediate locality. The pattern is similar in the case of hinterland firms

[1] *Salary* is used throughout this discussion to cover both (weekly) wages and (monthly) salary payments.

where 42.8% of salary income is attributed to employees resident within the hinterland. Taking the study area as a whole, employees resident in the town receive 57.1% of all salaries, hinterland residents 20.4%. Only 22.5% of all salary income is effectively 'leaking' out of the local area to employees resident elsewhere: 20% of salaries paid by town firms and 26.0% paid by hinterland firms.

Moving on to Figure 6.2, we can observe that the proportion of income 'leakage' is considerably higher in the 'accessible' area. Although 56.7% of salaries paid out by town firms are received by local residents, 38.0% are paid to employees resident outside the locality. In the case of hinterland firms this figure rises to 70.5%. On aggregate, 52.4% of all salary income is effectively 'leaked' out of the locality, with 34.4% staying in the town and 13.2% going to employees resident in the hinterland.

Although the 'price' paid for labour is not a key variable being used to assess the degree of local integration, this information does help to paint a picture of economic activity patterns in and around the two areas. The fact that 39% of employees of Olney firms commute into the locality to work means that over half of the income generated through salaries is not staying within the local economy. At this stage it appears that Kingsbridge is more deeply integrated into its locality, not only because a higher proportion of its workforce is local, but also because higher salaries are not lost to employees resident outside the locality. The spatial pattern of economic activity is now explored further by considering it in terms of transactions carried out by local firms.

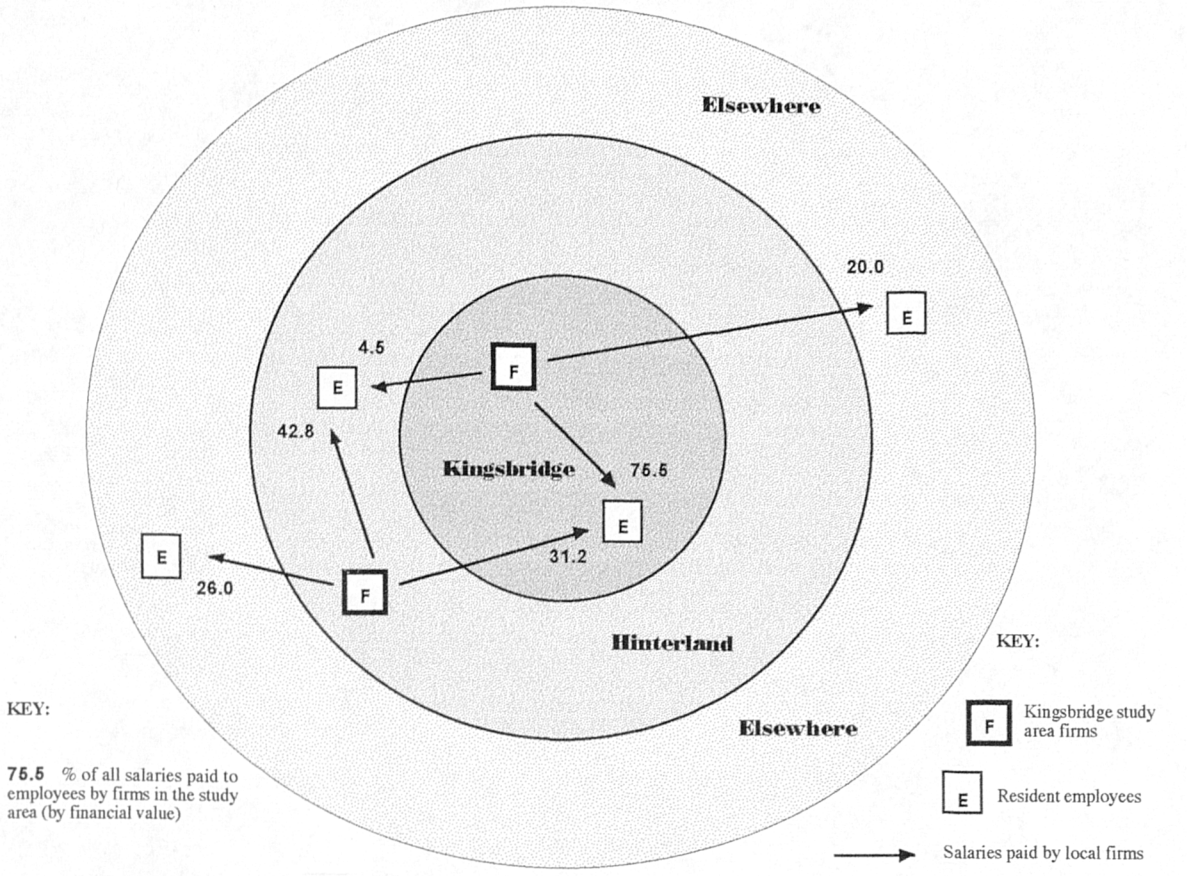



**Figure 6.1: Flows of employee salaries in and around the Kingsbridge locality:** given by proportion of all salaries by financial value

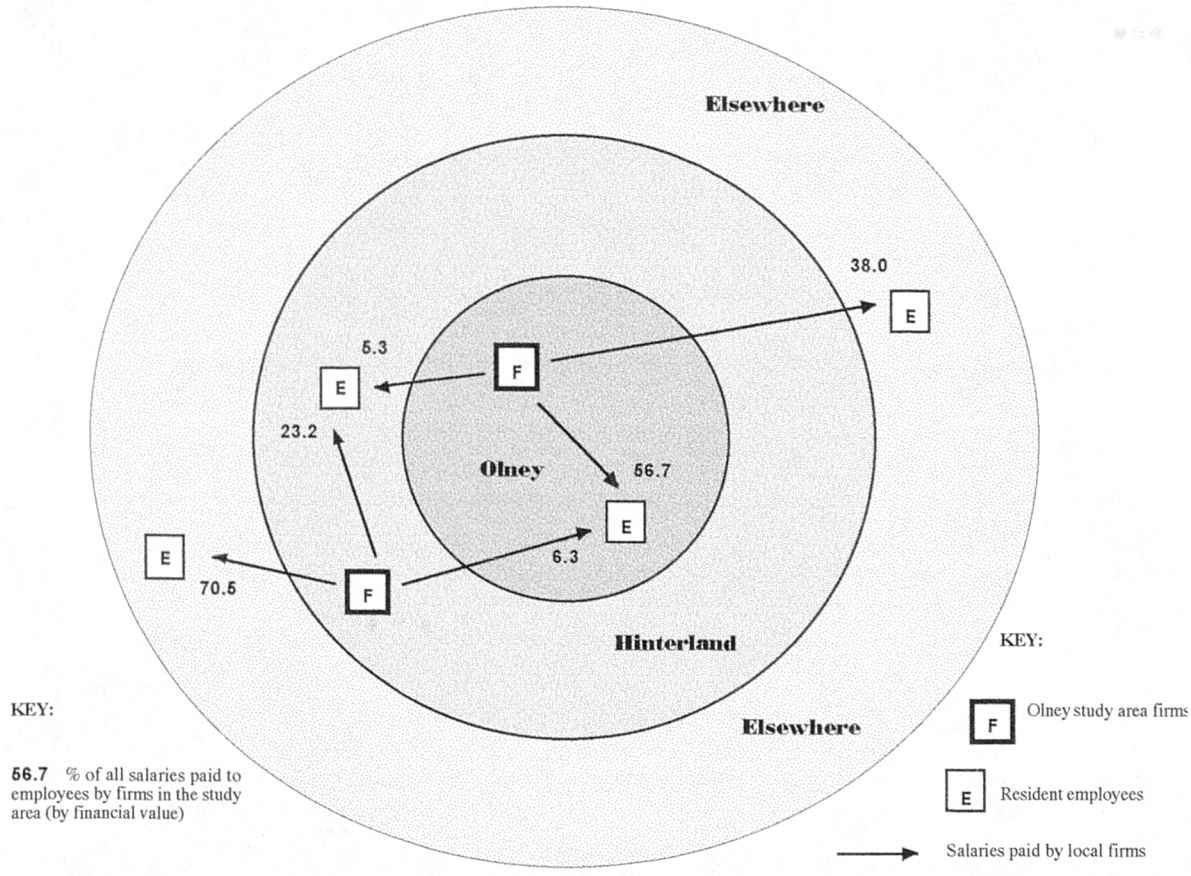



**Figure 6.2: Flows of employee salaries in and around the Olney locality:** given by proportion of all salaries by financial value

### 6.1.2 Spatial patterns of corporate economic transactions

Figure 6.3 summarises the flow of firm outputs in and around the Kingsbridge locality, illustrating the spatial pattern of transactions which involve the sales of locally produced goods and services. In the case of town-based firms, 17.5% of all sales revenue is received from firms and households within the town itself. Similarly, 39.8% of all sales revenue for hinterland firms is received from customers in the hinterland. In fact, a total of 38.2% of all corporate income generated from sales by firms in the study area is received from transactions made within the Kingsbridge local economy, 29.5% in the case of town firms and 45.1% in the case of hinterland establishments. Figure 6.5 illustrates a more detailed breakdown of the distribution outside the locality. From this we can see that 23.2% of sales revenue is received from elsewhere in the UK and that the South Hams district as a whole (including the study area) accounts for a total of 56.4% of all sales transactions in terms of financial value. Figures 6.1A and 6.2A show that this falls to 47.8% in the case of town firms and rises to 63.2% in the case of hinterland firms. The data also illustrates that town firms have stronger links with the national and international economy, drawing a third of its sales revenue from outside the region and just under 5% from within the European Union.

The data relating to the number of transactions indicates that locally made sales are of significantly lower financial value in comparison to those made outside the study area. As can be seen from Figure 6.3, sales to firms and households outside the locality are of considerably higher value, particularly in the case of town firms, where 70.5% of all sales revenue is received from only 18.4% of all sales transactions. Figure 6.5 illustrates that, for all firms, the difference is most marked in the case of sales made to customers elsewhere in Devon. Here, 12.3% of revenue comes from only 1.2% of sales transactions, in comparison

to locally made sales where 10.6% of revenue from firms and households within the town is received through 64.9% of transactions.

Moving on to Figure 6.4, a similar scenario is presented for the source of firm inputs. The first point to note is the considerable leakage of income out of the local economy: 90.1% of all town firms' expenditure on supplies, and 83.0% of all hinterland firms' are going to suppliers located outside the Kingsbridge locality. Figure 6.6 shows that, on aggregate, 39.4% of this expenditure is reaching the national economy, with 15.5% reaching the South West region and 22.1% staying within the county but outside the district. It is also worth noting from Figure 6.4 that hinterland firms are making fewer purchases of a higher value outside the locality in comparison to town firms. 83.0% of expenditure on supplies is associated with 59.0% of purchases whereas in the case of town firms, 90.1% of expenditure is resulting from 83.3% of all supply purchases. Figures 6.3A and 6.4A illustrate that the difference is most marked in the case of transactions with suppliers located elsewhere in the South West and UK. Whereas the ratio of transaction value to number is almost identical for town firms, in the case of hinterland firms, 12.4% of expenditure to suppliers in the South West and 39.8% to those in the UK are associated with only 6.2% and 14.9% of transactions respectively. Focusing on the settlement itself, it is evident that Kingsbridge acts as a source of firm inputs more readily to its hinterland based firms than to firms in the town itself, a fact which may well be attributed to the number of agricultural firms in the hinterland.

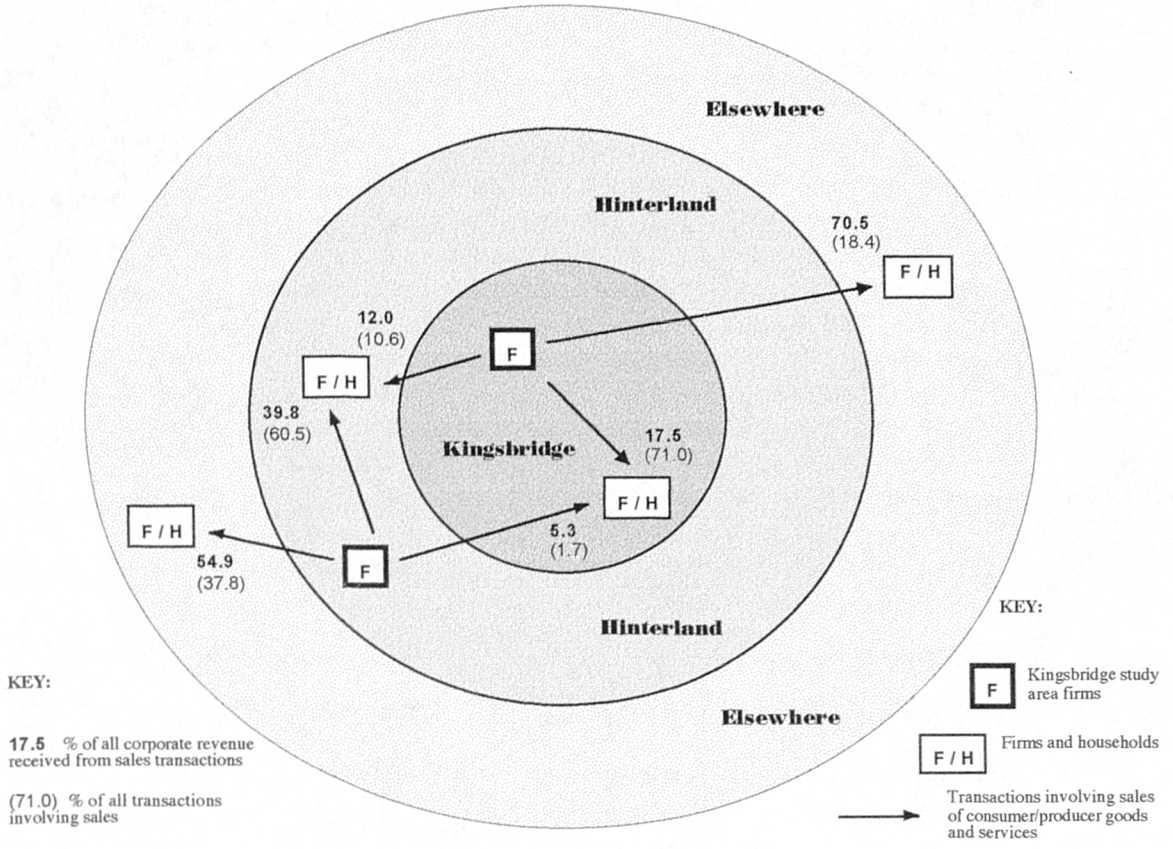



**Figure 6.3:** **Flows of firm outputs in and around the Kingsbridge locality:** given by proportions of transactions by value and number

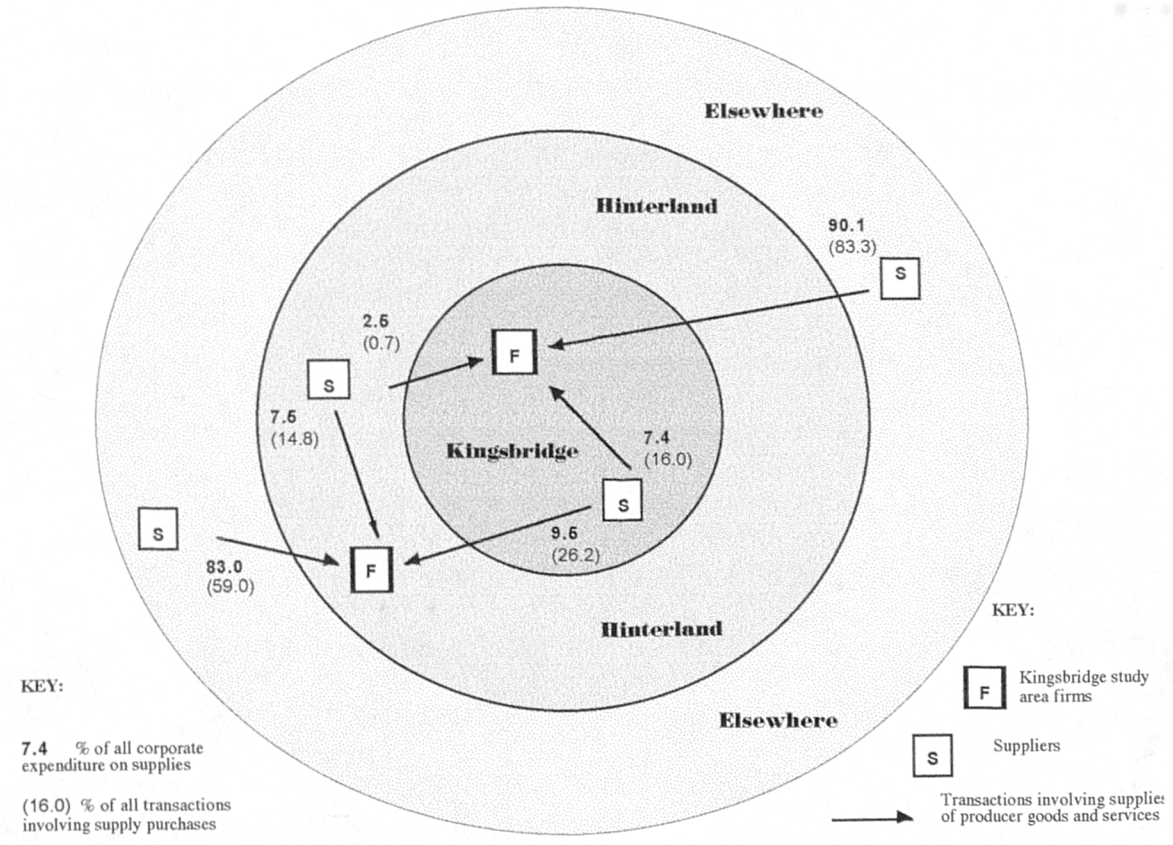



**Figure 6.4:** **Flows of firm inputs in and around the Kingsbridge locality:** given by proportions of transactions by value and number

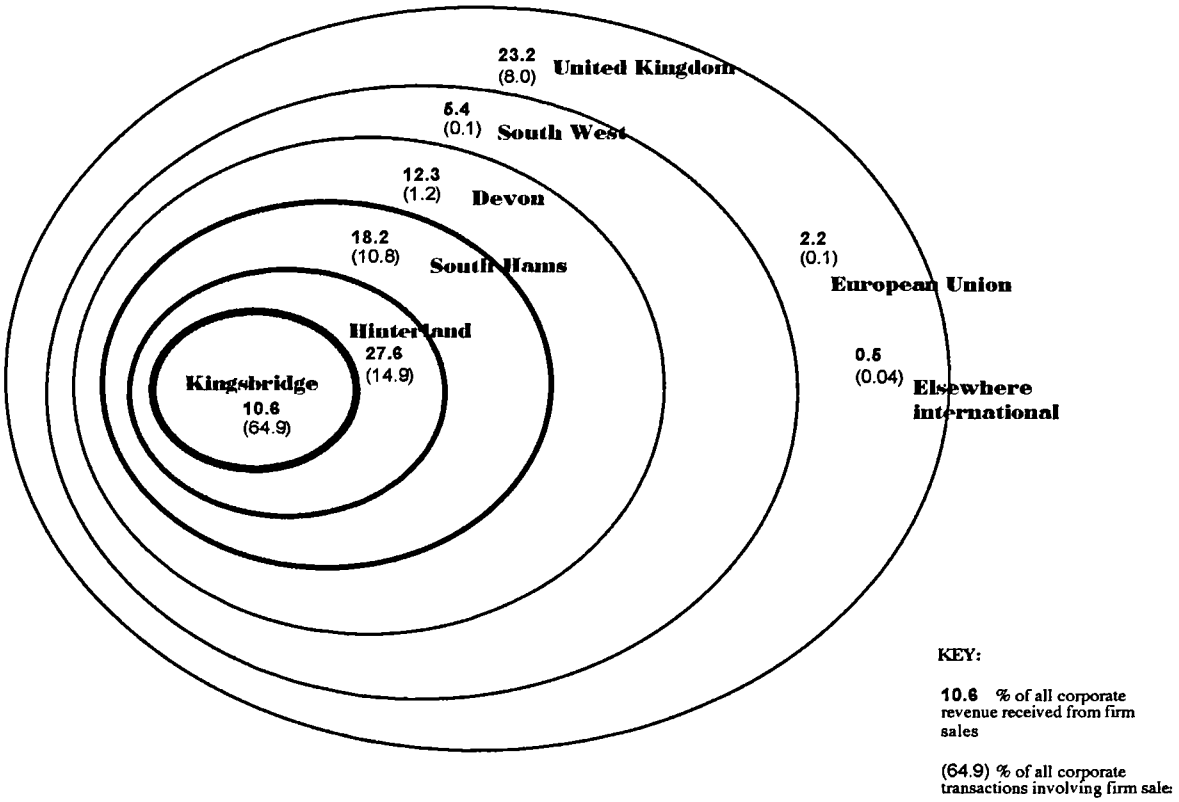



**Figure 6.5:** **The 'economic footprint' of Kingsbridge study area firms:** given by the proportion of output transactions by value and number

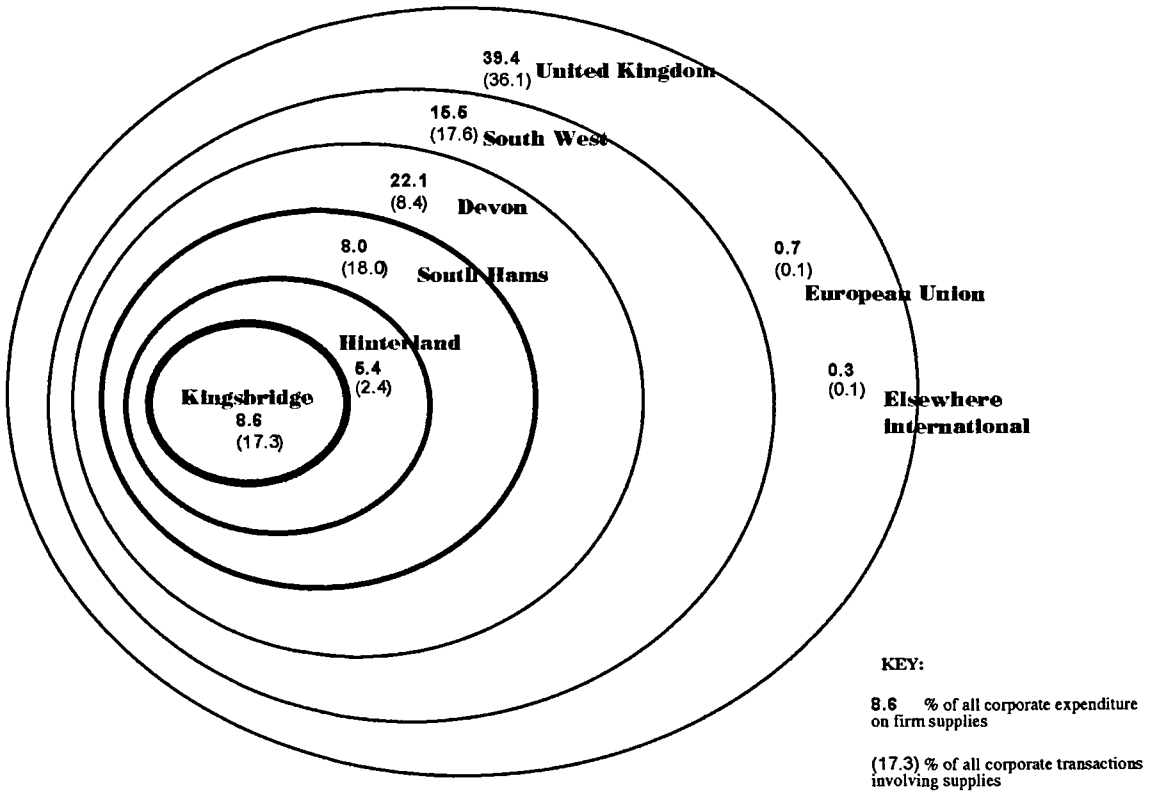



**Figure 6.6:** **The 'economic footprint' of Kingsbridge study area firms:** given by the proportion of input transactions by value and number

Figures 6.7 and 6.8 present an equivalent spatial analysis of the Olney business data set. In Figure 6.7 we can see that the proportion of sales revenue received from establishments within the locality is considerably lower than in the case of Kingsbridge. Only 5.9% of town firms' revenue is received from firms and households in the settlement itself (compared with 17.5% in Kingsbridge); likewise, 2.4% of hinterland firms' revenue is attributed to customers in their immediate locality. Only 7.6% of all town firms' corporate income generated from sales is received from transactions made within the Olney local economy, and in the case of hinterland establishments this falls to 3.3%. Figure 6.5A indicates the size of Olney's sales hinterland. We can see that the majority (54.0%) of sales revenue for town establishments is received from elsewhere in the three counties of Bucks, Beds and Northants, making a total of 64.4% of revenue generated from within this 'county' wide hinterland. Figure 6.6A shows that this figure falls to 44.9% for hinterland firms, and referring to Figure 6.9 we can see that it equates to 53.1% for all firms in the Olney locality.

Again, the relationship between spatial distribution and transaction value is clear, an observation which is particularly marked in the case of town establishments: 92.4% of all revenue is received from only 11.1% of all transactions, indicating that sales of a higher value are made outside the locality. Figure 6.5A illustrates that this scenario is most prominent in the case of sales made to customers in the three counties, where the ratio is 54.0% by value to 3.3% by number, and the European Union, where it equates to 1.2% to 0.06% respectively. In the case of hinterland firms, the ratio is similar to that of their 'remote' rural counterparts, with 96.7% of revenue attributed to 62.2% of all transactions. There are, however, some further observations of interest in Figure 6.6A, which illustrates that almost a quarter of hinterland firms' revenue is received from outside the EU, in comparison to only 0.6% for equivalent sales by town firms in the locality (see Figure 6.5A). This could well be associated with the high proportion of business services located

in the hinterland of Olney. The findings also show a marked contrast between the two study areas. Firms in the Kingsbridge locality make only 2.7% of sales by value to overseas customers, whereas Olney firms make a total 15.0%. In terms of the number of transactions, however, the figures are 0.14% and 0.1% respectively, indicating little difference between the two localities in terms of international linkages (see Figures 6.5 and 6.9).

Finally, the data presented in Figure 6.8 illustrates the distribution of transactions involving supply purchases. It is evident from the data that acting as a source of inputs to local firms is not a key function of Olney, an observation which is clear from analysis of both the value and number of transactions. Suppliers in the settlement itself account for only 0.5% of expenditure on inputs by the firms in its hinterland, and only slightly more by the firms in the town itself. A vast amount of corporate income is therefore 'leaking' out of the local economy, a factor which may well be attributed to the proximity of large regional centres. In fact we can see from Figure 6.10 that, on aggregate, the majority of supply expenditure is attributed to the three counties of Bucks, Beds, and Northants, and to countries outside the EU. Referring to Figures 6.7A and 6.8A, it can be seen that, as in the case of sales, the strong international linkages are associated with hinterland firms who attribute a total of 51.8% of all expenditure on supplies firms outside the UK. The majority of supplies, by number, are sourced from the three counties and elsewhere in the UK.

Interestingly, whereas in Kingsbridge the settlement acts more as a source of inputs to hinterland firms, the opposite is true in the case of Olney, which serves its town firms to a higher degree. Inversely, we could attribute this to the lack of agricultural activity in and around the 'accessible' rural settlement. To summarise, the key observation from both data sets is that, overall, small towns appear to act more as a market for sales than as a source of firm inputs, particularly in the case of the 'accessible' rural settlement.

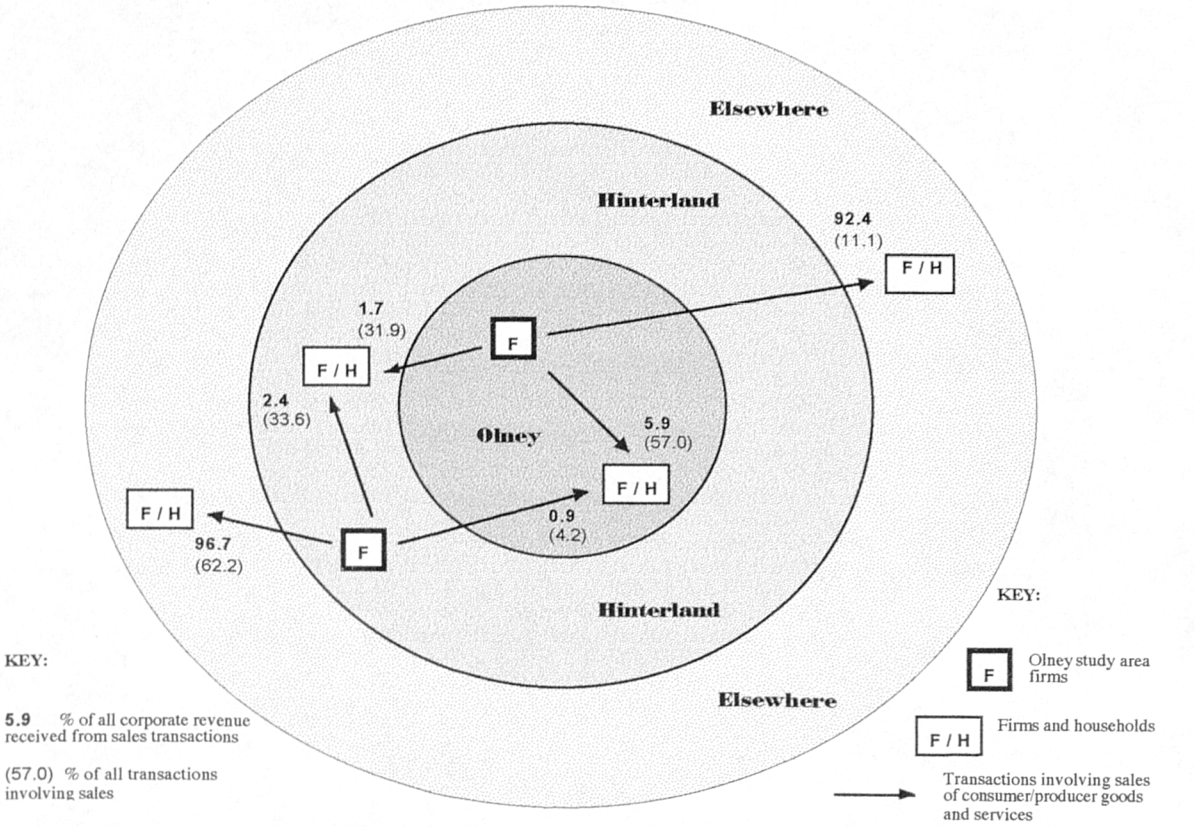



**Figure 6.7: Flows of firm outputs in and around the Olney locality:** given by proportion of transactions by value and number

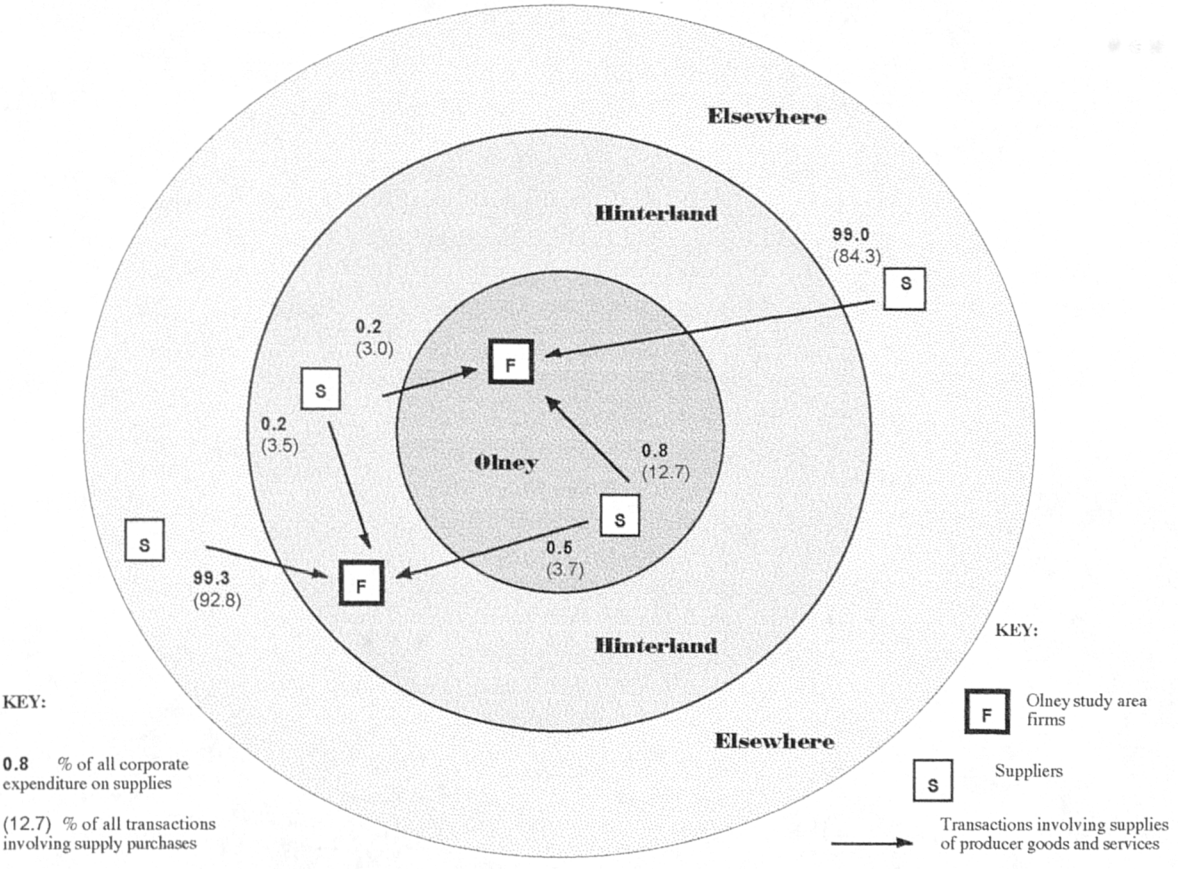



**Figure 6.8: Flows of firm inputs in and around the Olney locality:** given by proportion of transactions by value and number

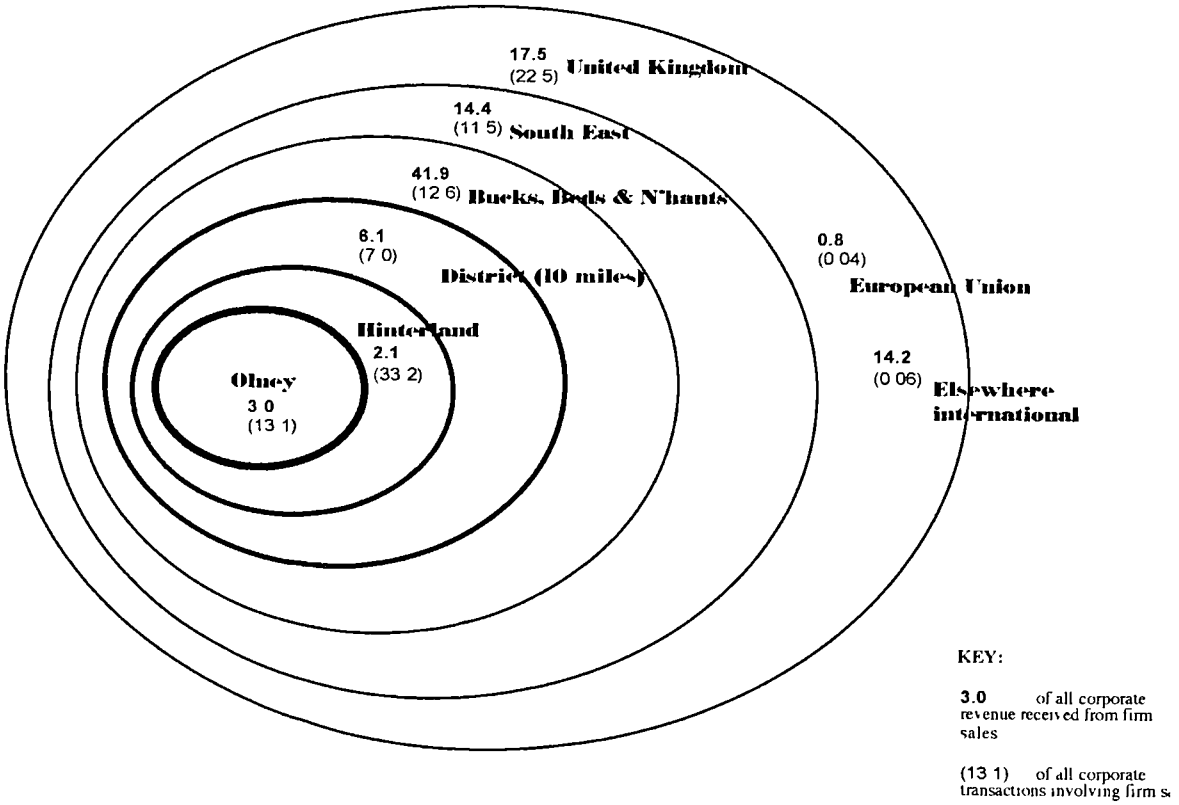



**Figure 6.9:** **The 'economic footprint' of Olney study area firms:** given by the proportion of output transactions by value and number

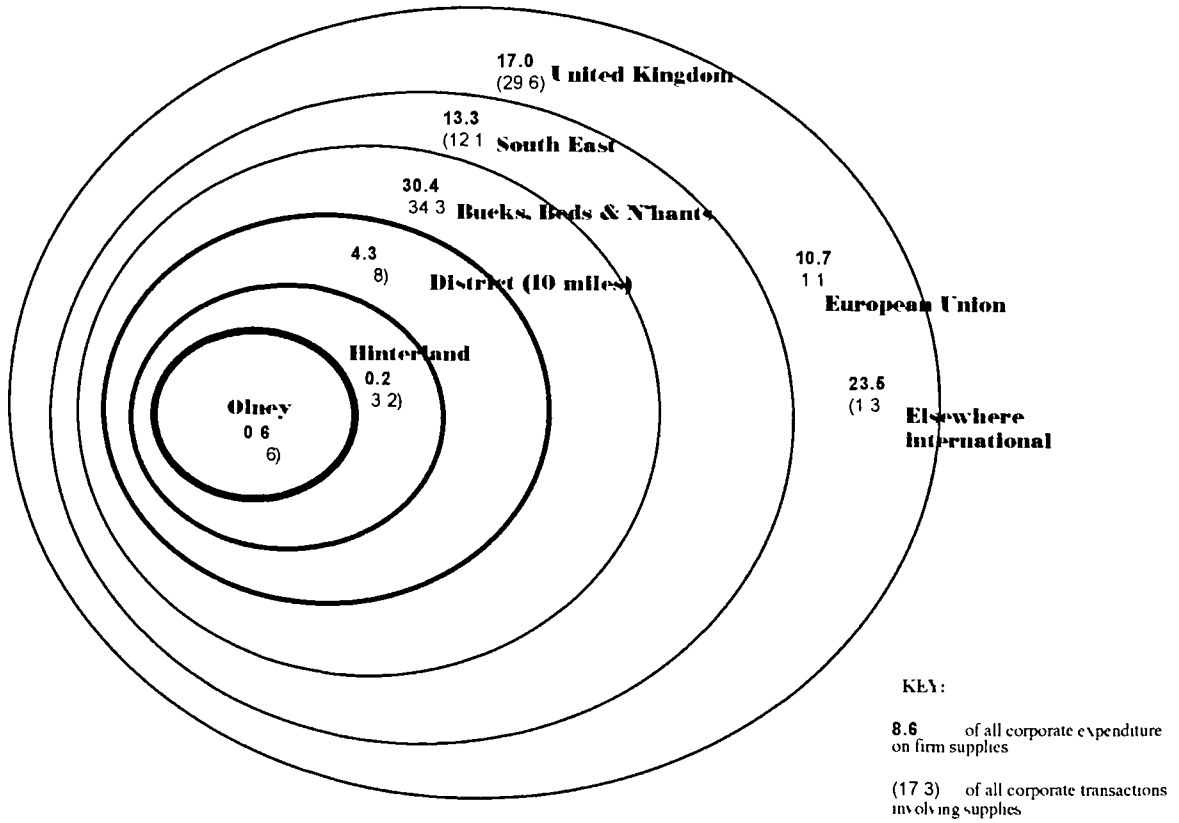



**Figure 6.10:** **The 'economic footprint' of Olney study area firms:** given by the proportion of input transactions by value and number

## 6.2 Economic integration into locality

The chapter now moves on to test the first phase of operational hypotheses developed in Chapter Three. This section begins by addressing the first set of hypotheses presented in Figure 6.11, which are concerned with a direct comparison between the two study areas in terms of local corporate integration. It then moves on to test the remaining hypotheses using bi-variate non-parametric statistical techniques, before developing multivariate prediction models to assess the relative importance of each firm type on the strength of local integration.

| | |
|---|---|
| $H_0^1$ | There is no significant difference in the proportion of corporate revenue received from sales to customers based within the respective (i) localities and (ii) districts between 'remote' and 'accessible' rural firms. |
| $H_a^1$ | There is a significant difference in the proportion of corporate revenue received from sales to customers based within the respective (i) localities and (ii) districts, with 'accessible' rural firms exhibiting the highest proportions. |
| $H_0^2$ | There is no significant difference in the proportion of corporate expenditure on supplies sourced within the respective (i) localities and (ii) districts between 'remote' and 'accessible' rural firms. |
| $H_a^2$ | There is a significant difference in the proportion of corporate expenditure on supplies sourced within the respective (i) localities and (ii) districts, with 'accessible' rural firms exhibiting the highest proportions. |

**Figure 6.11: Operational hypotheses:** developed to compare 'accessible' and 'remote' rural settlements in respect of local corporate economic integration

The methodology allows the hypotheses to be tested in two ways. First, we can examine the *absolute* proportions of sales revenue and corporate expenditure which is attributed to (i) *the locality* and (ii) *the district.* This is equivalent to the type of data presented in Figures 6.3 to 6.10. The absolute proportions are derived by, first, calculating the sum of all corporate revenue and expenditure for both town and hinterland firms and, second, calculating the percentage of total revenue and expenditure that is attributed to the

respective geographical areas. In the case of the data presented in Table 6.1, however, the values are calculated in order to represent *all* firms surveyed in each of the two study areas.

| Transaction type | Kingsbridge | *n* | Olney | *n* |
|---|---|---|---|---|
| **(i) LOCALITY** | | | | |
| Sales (Outputs) | 38.2 | *120* | 5.1 | *70* |
| Supplies (Inputs) | 14.0 | *116* | 0.8 | *62* |
| **(ii) DISTRICT** | | | | |
| Sales (Outputs) | 56.4 | *120* | 11.2 | *70* |
| Supplies (Inputs) | 22.0 | *116* | 5.1 | *62* |

**Table 6.1: Economic integration of settlements to locality:** *Absolute* proportions of corporate revenue and expenditure attributed to the local economy

As the data presented in Table 6.1 indicates, in absolute terms, Kingsbridge is much more strongly integrated into its locality in the case of both inputs and outputs. 38.2% of all corporate sales revenue is received from customers within the locality and 14.0% of all expenditure on inputs goes to suppliers located within the town and its surrounding hinterland. In comparison, the data for Olney is 5.1% and 0.8% respectively, which clearly illustrates that the settlement is much less integrated into its locality. In the case of district level integration, the picture is very similar: 56.4% for sales revenue in Kingsbridge compares with 11.2% in Olney and 22.0% for expenditure compares with 5.1% respectively.

It is interesting to note that the Olney district accounts for over twice the amount of sales revenue and over six times the amount of supply expenditure than does the immediate locality. Comparatively, in the 'remote' rural study area, the proportion of revenue and expenditure attributed to locality increases by 1.5 times when the boundary of the local economy is extended to include the district. There is also a third key finding presented by

the data in Table 6.1 regarding the contemporary role of small towns in the rural economy. Both Kingsbridge and Olney account for a higher proportion of local firms' sales revenue than they do supply expenditure. This reinforces the argument put forward in the previous section that small towns act more as a market for sales than as a source of inputs to their local firms in the contemporary rural economy.

This method of analysis presents some very clear findings regarding the degree of local economic integration in the two study areas. However, it does not allow us to test the hypotheses statistically, nor predict the probability of the same result being obtained for a different sample from the same population. In light of this, the second method involves calculating the *mean* proportions of revenue and expenditure attributed to the local economy for all businesses in each study area, and applying a non-parametric Mann-Whitney U test to examine the significance of the result.

The results of this analysis reinforce the findings revealed by the data in Table 6.1. In terms of the proportion of sales revenue and expenditure on supplies, firms in and around Kingsbridge show significantly stronger ties to both the locality and the district than do those in and around Olney, results which are highly significant beyond the 99% level. This leads us to reject all four null hypotheses presented in Figure 6.11. However, the direction of these differences are not as expected because in all cases it is the settlement in the 'remote' rural area which exhibits the highest proportions of revenue and expenditure attributed to the local economy. We can therefore conclude from the analysis that the settlement in the 'remote' rural area is more strongly integrated into its locality than is the settlement in the 'accessible' rural area.

| Transaction type | Kingsbridge | *n* | Olney | *n* | Probability for *U* test $H_{o:} p^1 = p^2$ * |
|---|---|---|---|---|---|
| **(i) LOCALITY** | | | | | |
| Sales | 41.9 | *128* | 24.3 | *81* | **0.0001** |
| Supplies | 23.8 | *125* | 8.6 | *76* | **0.0001** |
| **(ii) DISTRICT** | | | | | |
| **Sales** | 60.7 | *128* | 39.3 | *81* | **0.0002** |
| **Supplies** | 34.9 | *125* | 23.1 | *76* | **0.0015** |

* 2 tailed probability

**Table 6.2: Economic integration of settlements to locality:** *Mean* proportions of corporate revenue and expenditure attributed to the local economy[2]

The data also allows us to statistically compare the degree of local economic integration between town and hinterland firms in the respective localities. In the same way, we can examine the mean proportions of corporate revenue and expenditure attributed to the respective local economies for town establishments in comparison to that for hinterland establishments. Table 6.3 presents the results of the Mann-Whitney U tests for comparisons relating to the degree of local economic integration within the immediate locality. The results of this analysis illustrate some very interesting findings. Whereas Kingsbridge is evidently more strongly integrated into its immediate local economy in terms of corporate activity, both settlements show a key similarity in that town firms are more strongly integrated to locality than are hinterland firms in terms of sales.

[2] The values on *n* are different to those in Table 6.1 due to variations in the amount of data provided in the questionnaire. Data in this table relates to the key dependent variables from question 13, for which there was a higher response, and thus less missing data, than for questions 10, 11 and 12 (see Appendix I).

| Transaction group | Study area | Location | Mean | Mean rank | *n* | Probability* $H_0$: I = II |
|---|---|---|---|---|---|---|
| **SALES** | **Kingsbridge** | Town (I) | 50.6 | 73.6 | *54* | **0.0169** |
| | | Hinterland (II) | 35.5 | 57.9 | *74* | |
| | **Olney** | Town (I) | 34.5 | 46.5 | *44* | **0.0135** |
| | | Hinterland (II) | 12.1 | 34.5 | *37* | |
| **SUPPLIES** | **Kingsbridge** | Town (I) | 20.3 | 58.2 | *54* | 0.1920 |
| | | Hinterland (II) | 26.4 | 66.7 | *71* | |
| | **Olney** | Town (I) | 11.0 | 38.0 | *39* | 0.8252 |
| | | Hinterland (II) | 6.0 | 39.0 | *37* | |

* 2-tailed probability

**Table 6.3: Economic integration of firms to locality:** Mean proportions of corporate revenue and expenditure attributed to the immediate locality

A further similarity is indicated by the fact there is no significant difference between town and hinterland firms in respect of the proportion of supply expenditure attributed to locality. However, it is worth noting that in the 'remote' rural area, hinterland firms appear to exhibit stronger ties to locality in terms of supply purchases, a finding which conforms to the data presented in Table 6.1 based on absolute proportions.

An equivalent set of results is presented for district level economic integration in Table 6.4. In this case, we find some slightly different results. Again, firms located in Olney itself attribute a significantly higher proportion of sales revenue to the local economy than do hinterland firms, although at this level there is no significant difference between town and hinterland firms in the 'remote' rural locality. Similarly again, hinterland firms in the Kingsbridge locality source a higher proportion of supplies from the district than do firms located in the town itself, although the 2-tailed probability is not significant to the 90% level.

| Transaction group | Study area | Location | Mean | Mean rank | *n* | Probability* $H_0$: I = II |
|---|---|---|---|---|---|---|
| SALES | **Kingsbridge** | Town (I) | 67.9 | 70.7 | 54 | 0.1002 |
| | | Hinterland (II) | 55.5 | 60.0 | 74 | |
| | **Olney** | Town (I) | 51.6 | 46.9 | 44 | **0.0107** |
| | | Hinterland (II) | 24.7 | 34.0 | 37 | |
| SUPPLIES | **Kingsbridge** | Town (I) | 29.6 | 57.4 | 54 | 0.1301 |
| | | Hinterland (II) | 38.9 | 67.3 | 71 | |
| | **Olney** | Town (I) | 25.4 | 37.9 | 39 | 0.7968 |
| | | Hinterland (II) | 20.6 | 39.2 | 37 | |

* 2-tailed probability

**Table 6.4:** **Economic integration of firms to locality:** Mean proportions of corporate revenue and expenditure attributed to the district

### 6.2.1 Further hypotheses testing

In this section further bi-variate analysis is presented to test the remaining operational hypotheses developed in section 3.4. For each hypothesis, a non-parametric Mann-Whitney U test is employed to test the strength of economic integration to (i) the locality; and (ii) the district in each study area. The dependent variables are again based on mean proportions of corporate sales revenue and supply expenditure attributed to the respective geographical areas. The results of the analyses are presented by the data in Tables 6.5, 6.6, 6.7 and 6.8.

| KINGS (Sales) | (i) Locality | | | | | | | (i) District | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Firm type (Group)** | ***n*** | **Mean** | **St. Dev** | **Mean rank** | **U** | **Z** | **Probability $H_0$: I = II** | ***n*** | **Mean** | **St. Dev** | **Mean rank** | **U** | **Z** | **Probability $H_0$: I = II** |
| **Firm size:** | *127* | **42.2** | **37.0** | | | | | *127* | **60.4** | **39.7** | | | | |
| Small firms (I) | *90* | 43.1 | 37.9 | 64.8 | 1594.0 | -.3792 | 0.3523* | *90* | 61.7 | 39.8 | 65.5 | 1526.5 | -.7479 | 0.22725* |
| Large firms (II) | *37* | 39.9 | 35.1 | 62.0 | | | | *37* | 57.3 | 39.9 | 60.3 | | | |
| **Firm independence:** | *127* | **41.7** | **37.1** | | | | | *127* | **60.4** | **39.7** | | | | |
| Independent firms (I) | *108* | 41.6 | 37.6 | 63.6 | 982.0 | -.2995 | 0.7645** | *108* | 61.3 | 40.1 | 64.8 | 944.5 | -.5614 | 0.2873* |
| Branch plants (II) | *19* | 42.2 | 34.8 | 66.3 | | | | *19* | 55.3 | 38.1 | 59.7 | | | |
| **Firm age:** | *128* | **41.9** | **37.0** | | | | | *128* | **60.7** | **39.7** | | | | |
| Newly established firms (I) | *26* | 40.9 | 35.1 | 63.1 | 1289.5 | -.2177 | 0.8277** | *26* | 59.2 | 40.5 | 60.8 | 1230.0 | -.5791 | 0.5625** |
| Mature firms (II) | *102* | 42.1 | 37.6 | 64.8 | | | | *102* | 61.1 | 39.7 | 65.4 | | | |
| **Technological base:** | *115* | **41.6** | **37.0** | | | | | *115* | **61.8** | **39.4** | | | | |
| Traditional firms (I) | *94* | 41.6 | 37.2 | 58.1 | 982.5 | -.0328 | 0.4869* | *94* | 62.5 | 39.3 | 58.6 | 934.5 | -.3878 | 0.6982** |
| New technology firms (II) | *21* | 41.3 | 37.2 | 57.8 | | | | *21* | 58.5 | 40.7 | 55.5 | | | |
| **Firm SIC:** | *74* | **52.0** | **36.1** | | | | | *74* | **69.4** | **36.3** | | | | |
| Service sector firms (I) | *60* | 56.5 | 35.7 | 40.0 | 272.0 | -2.0522 | **0.0201*** | *60* | 74.5 | 33.9 | 40.2 | 256.5 | -2.3157 | **0.0103*** |
| Manufacturing firms (II) | *14* | 32.8 | 32.2 | 26.9 | | | | *14* | 47.6 | 39.0 | 25.8 | | | |
| **Firm SIC:** | *49* | **41.9** | **37.0** | | | | | *49* | **60.7** | **39.7** | | | | |
| Consumer service firms (I) | *37* | 65.2 | 33.5 | 28.6 | 90.0 | -3.0982 | **0.0001*** | *37* | 83.1 | 23.9 | 29.3 | 62.5 | -3.8469 | **0.0001*** |
| Producer service firms (II) | *12* | 27.3 | 34.5 | 14.0 | | | | *12* | 32.6 | 41.4 | 11.7 | | | |
| **Firm SIC:** | *128* | **41. 9** | **37.0** | | | | | *128* | **60.7** | **39.7** | | | | |
| Non-Agricultural firms (I) | *99* | 48.7 | 35.7 | 71.6 | 735.0 | -4.0150 | **0.0001*** | *99* | 66.6 | 37.7 | 69.4 | 950.5 | -2.8120 | **0.0025*** |
| Agricultural firms (II) | *29* | 18.7 | 32.3 | 40.3 | | | | *29* | 40.7 | 40.2 | 47.8 | | | |

* 1-tailed probability ** 2-tailed probability

**Table 6.5: Local economic integration of Kingsbridge firms:** Bi-variate analysis of corporate revenue levels attributed to the local economy

| KINGS (Supplies) | (i) Locality | | | | | | | (i) District | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Firm type (Group)** | *n* | **Mean** | **St. Dev** | **Mean rank** | **U** | **Z** | **Probability $H_0$: I = II** | *n* | **Mean** | **St. Dev** | **Mean rank** | **U** | **Z** | **Probability $H_0$: I = II** |
| **Firm size:** | *125* | **23.8** | **28.0** | | | | | *125* | **34.9** | **34.6** | | | | |
| Small firms (I) | *89* | 24.7 | 28.1 | 64.3 | 1486.0 | -.6380 | 0.2618* | *89* | 36.7 | 34.9 | 64.6 | 1458. | -.7856 | 0.2161* |
| Large firms (II) | *36* | 21.5 | 28.0 | 59.8 | | | | *36* | 30.4 | 33.9 | 59.0 | 5 | | |
| **Firm independence:** | *124* | **24.0** | **28.1** | | | | | *124* | **35.1** | **34.6** | | | | |
| Independent firms (I) | *106* | 26.2 | 29.2 | 65.2 | 671.0 | -2.0255 | **0.0214*** | *106* | 39.0 | 35.4 | 66.5 | 533.0 | -2.9987 | **0.0014*** |
| Branch plants (II) | *18* | 10.6 | 14.4 | 46.8 | | | | *18* | 12.4 | 17.5 | 39.1 | | | |
| **Firm age:** | *125* | **23.8** | **28.0** | | | | | *125* | **34.9** | **34.6** | | | | |
| Newly established firms (I) | *25* | 23.9 | 28.6 | 61.0 | 1200.5 | -.3082 | 0.3789* | *25* | 32.0 | 36.8 | 58.1 | 1128. | -.7530 | 0.4515** |
| Mature firms (II) | *100* | 23.8 | 28.0 | 63.5 | | | | *100* | 35.6 | 34.2 | 64.2 | 5 | | |
| **Technological base:** | *112* | **24.5** | 28.1 | | | | | *112* | **36.2** | **35.0** | | | | |
| Traditional firms (I) | *94* | 24.7 | 28.5 | 56.8 | 820.0 | -.2076 | 0.4178* | *94* | 37.4 | 34.8 | 57.8 | 722.5 | -.9821 | 0.1630* |
| New technology firms (II) | *18* | 23.4 | 26.8 | 55.1 | | | | *18* | 30.0 | 36.1 | 49.6 | | | |
| **Firm SIC:** | *72* | **20.4** | **26.0** | | | | | *72* | **30.4** | **33.0** | | | | |
| Service sector firms (I) | *57* | 22.0 | 27.1 | 37.1 | 395.0 | -.4552 | 0.3245* | *57* | 32.9 | 33.8 | 37.6 | 366.0 | -.8565 | 0.1959* |
| Manufacturing firms (II) | *15* | 14.2 | 20.3 | 34.3 | | | | *15* | 20.9 | 28.8 | 32.4 | | | |
| **Firm SIC:** | *47* | **23.8** | **28.0** | | | | | *47* | **34.9** | **34.6** | | | | |
| Consumer service firms (I) | *35* | 23.6 | 30.2 | 23.8 | 204.5 | -.13671 | 0.4454* | *35* | 32.9 | 34.9 | 24.3 | 198.5 | -.2837 | 0.3883* |
| Producer service firms (II) | *12* | 20.7 | 24.2 | 24.5 | | | | *12* | 26.6 | 29.8 | 23.0 | | | |
| **Firm SIC:** | *125* | **23.8** | **28.0** | | | | | *125* | **34.9** | **34.6** | | | | |
| Non-Agricultural firms (I) | *97* | 23.0 | 28.0 | 61.7 | 1235.0 | -.7348 | 0.4625** | *97* | 33.2 | 34.4 | 61.2 | 1180. | -1.0554 | 0.2913** |
| Agricultural firms (II) | *28* | 26.6 | 28.3 | 67.4 | | | | *28* | 40.8 | 35.4 | 69.3 | 5 | | |

* 1-tailed probability ** 2 tailed probability

**Table 6.6:** **Local economic integration of Kingsbridge firms:** Bi-variate analysis of corporate expenditure levels attributed to the local economy

The data presented in Table 6.5 illustrates that for the Kingsbridge data set, a total of six out of fourteen null hypotheses are rejected, four beyond the 99% level and two beyond the 95% significance level. The direction of the results also means that the relevant alternative hypotheses are accepted, with findings conforming to that of existing empirical evidence. The results indicate that, in terms of downstream linkages, service sector, consumer service and non-agricultural firms are more strongly integrated into the local economy than are manufacturing, producer service and agricultural firms respectively. The results also indicate that there is no statistically significant variation between the immediate local and district wide economies. However, the *p* values do indicate slightly more variation between the economic behaviour of comparable firm types within the district, particularly in the case of independent firms versus branch plants and newly established versus mature firms.

In terms of linkages involving supply purchases, the results lead to the rejection of only two of the fourteen hypotheses in the Kingsbridge data set. In this 'remote' rural area, independently owned firms attribute a significantly higher proportion of corporate expenditure to both the locality and the district than do national and international branch plants; results which are significant beyond the 95% level and 99% significance level respectively. The results also reflect the fact there is, again, more variation between firm types in terms of local sourcing within the district compared to the locality, particularly in the case of traditional firms versus those delivering 'intangible' services via the telecommunications network (p=0.1630).

| OLNEY (Sales) | (i) Locality | | | | | | | (i) District | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Firm type (Group)** | ***n*** | **Mean** | **St. Dev** | **Mean rank** | **U** | **Z** | **Probability $H_0$: I = II** | ***n*** | **Mean** | **St. Dev** | **Mean rank** | **U** | **Z** | **Probability $H_0$: I = II** |
| **Firm size:** | ***81*** | **24.3** | **35.6** | | | | | ***81*** | **39.3** | **40.8** | | | | |
| Small firms (I) | *58* | 23.2 | 33.4 | 41.2 | 656.5 | -.1186 | 0.9056** | *58* | 41.4 | 40.0 | 42.2 | 599.0 | -.7356 | 0.2310* |
| Large firms (II) | *23* | 27.0 | 41.4 | 40.5 | | | | *23* | 34.1 | 43.2 | 38.0 | | | |
| **Firm independence:** | ***81*** | **24.3** | **35.6** | | | | | ***81*** | **39.3** | **40.8** | | | | |
| Independent firms (I) | *69* | 25.5 | 36.1 | 41.7 | 365.0 | -.7025 | 0.2412* | *69* | 41.0 | 41.0 | 42.0 | 348.0 | -.9063 | 0.1824* |
| Branch plants (II) | *12* | 17.5 | 33.3 | 36.9 | | | | *12* | 29.7 | 39.9 | 35.5 | | | |
| **Firm age:** | ***81*** | **24.3** | **35.6** | | | | | ***81*** | **39.3** | **40.8** | | | | |
| Newly established firms (I) | *35* | 19.6 | 33.6 | 36.3 | 640.0 | -1.6963 | **0.0898**** | *35* | 34.2 | 40.1 | 37.6 | 687.5 | -1.1570 | 0.2473** |
| Mature firms (II) | *46* | 27.9 | 37.0 | 44.6 | | | | *46* | 43.2 | 41.4 | 43.6 | | | |
| **Technological base:** | ***70*** | **21.9** | **34.8** | | | | | ***70*** | **37.2** | **39.3** | | | | |
| Traditional firms (I) | *62* | 23.2 | 36.2 | 35.9 | 221.5 | -.5339 | 0.2967* | *62* | 37.0 | 39.7 | 35.5 | 246.0 | -.0381 | 0.9696** |
| New technology firms (II) | *8* | 12.2 | 21.1 | 32.2 | | | | *8* | 38.3 | 39.3 | 35.8 | | | |
| **Firm SIC:** | ***58*** | **24.5** | **35.4** | | | | | ***58*** | **38.0** | **39.4** | | | | |
| Service sector firms (I) | *48* | 24.7 | 35.3 | 29.6 | 235.0 | -.1109 | 0.4559* | *48* | 39.3 | 40.1 | 29.7 | 230.0 | -.2122 | 0.4160* |
| Manufacturing firms (II) | *10* | 23.5 | 37.6 | 29.0 | | | | *10* | 31.7 | 37.6 | 28.5 | | | |
| **Firm SIC:** | ***30*** | **24.3** | **35.6** | | | | | ***30*** | **39.3** | **40.8** | | | | |
| Consumer service firms (I) | *12* | 53.8 | 39.3 | 23.6 | 10.5 | -4.4838 | **0.0000*** | *12* | 67.1 | 33.9 | 22.1 | 28.5 | -3.4938 | **0.0003*** |
| Producer service firms (II) | *18* | 4.4 | 14.6 | 10.1 | | | | *18* | 18.6 | 32.4 | 11.1 | | | |
| **Firm SIC:** | ***81*** | **24.3** | **35.6** | | | | | ***81*** | **39.3** | **40.8** | | | | |
| Non-Agricultural firms (I) | *75* | 25.9 | 36.5 | 41.6 | 180.5 | -.8653 | 0.1934* | *75* | 40.8 | 41.5 | 41.6 | 183.5 | -.7730 | 0.2198* |
| Agricultural firms (II) | *6* | 4.0 | 4.9 | 33.6 | | | | *6* | 20.8 | 27.3 | 34.1 | | | |

* 1-tailed probability ** 2-tailed probability

**Table 6.7:** **Local economic integration of Olney firms:** Bi-variate analysis of corporate revenue levels attributed to the local economy

| OLNEY (Supplies) | (i) Locality | | | | | | | (i) District | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Firm type (Group)** | ***n*** | **Mean** | **St. Dev** | **Mean rank** | **U** | **Z** | **Probability $H_0$: I = II** | **n** | **Mean** | **St. Dev** | **Mean rank** | **U** | **Z** | **Probability $H_0$: I = II** |
| **Firm size:** | *76* | **8.6** | **17.8** | | | | | *76* | **23.1** | **32.4** | | | | |
| Small firms (I) | *53* | 9.5 | 17.8 | 40.6 | 496.5 | -1.3921 | **0.0820*** | *53* | 26.2 | 33.2 | 41.2 | 467.0 | -1.6636 | **0.0481*** |
| Large firms (II) | *23* | 6.5 | 18.0 | 33.6 | | | | *23* | 15.8 | 29.8 | 32.3 | | | |
| **Firm independence:** | *76* | **8.6** | **17.8** | | | | | *76* | **23.1** | **32.4** | | | | |
| Independent firms (I) | *65* | 7.5 | 16.4 | 37.5 | 294.0 | -1.0215 | 0.3070** | *65* | 23.0 | 32.6 | 38.7 | 347.0 | -.1601 | 0.8728** |
| Branch plants (II) | *11* | 14.8 | 24.3 | 44.3 | | | | *11* | 23.2 | 32.6 | 37.6 | | | |
| **Firm age:** | *76* | **8.6** | **17.8** | | | | | *76* | **23.1** | **32.4** | | | | |
| Newly established firms (I) | *31* | 10.9 | 24.0 | 37.8 | 677.5 | -.2303 | 0.4089* | *31* | 23.5 | 35.3 | 38.0 | 682.0 | -.1692 | 0.4329* |
| Mature firms (II) | *45* | 7.0 | 11.8 | 38.9 | | | | *45* | 22.8 | 30.6 | 38.8 | | | |
| **Technological base:** | *67* | **6.7** | **15.1** | | | | | *76* | **20.1** | **29.2** | | | | |
| Traditional firms (I) | *60* | 6.1 | 14.1 | 33.8 | 196.5 | -.3036 | 0.7614** | *64* | 18.7 | 28.3 | 33.2 | 162.0 | -1.0180 | 0.3087** |
| New technology firms (II) | *7* | 12.7 | 22.6 | 35.9 | | | | *12* | 32.4 | 35.7 | 40.9 | | | |
| **Firm SIC:** | *54* | **6.7** | **16.4** | | | | | *54* | **19.6** | **31.3** | | | | |
| Service sector firms (I) | *44* | 5.1 | 11.8 | 26.2 | 161.5 | -1.5046 | 0.1324** | *44* | 19.3 | 31.8 | 27.0 | 196.0 | -.5671 | 0.5706** |
| Manufacturing firms (II) | *10* | 13.4 | 29.3 | 33.6 | | | | *10* | 21.0 | 30.7 | 29.9 | | | |
| **Firm SIC:** | *27* | **8.6** | **17.8** | | | | | *27* | **23.1** | **32.4** | | | | |
| Consumer service firms (I) | *10* | 6.3 | 11.5 | 14.7 | 78.0 | -.4355 | 0.3316* | *10* | 22.6 | 33.3 | 15.1 | 74.5 | -.5596 | 0.2879* |
| Producer service firms (II) | *17* | 1.6 | 3.8 | 13.6 | | | | *17* | 11.2 | 24.8 | 13.4 | | | |
| **Firm SIC:** | *76* | **8.6** | **17.8** | | | | | *76* | **23.1** | **32.4** | | | | |
| Non-Agricultural firms (I) | *70* | 8.6 | 18.4 | 37.8 | 163.0 | -.9865 | 0.1620* | *70* | 22.7 | 32.9 | 37.8 | 161.5 | -.9646 | 0.3347** |
| Agricultural firms (II) | *6* | 8.0 | 7.9 | 46.3 | | | | *6* | 27.5 | 27.2 | 46.6 | | | |

* 1-tailed probability ** 2-tailed probability

**Table 6.8:** **Local economic integration of Olney firms:** Bi-variate analysis of corporate expenditure levels attributed to the local economy

In terms of locally made sales in the Olney study area, we find less variation in economic behaviour between firm types in comparison to the 'remote' rural study area, which is logical given the degree of local integration of the settlements as a whole. Consumer service firms are more strongly tied to both the immediate locality and the district in terms of sales than are producer services, results which are highly significant beyond the 99% level. There is also a third null hypothesis rejected by the comparison between firms of differing age, although the direction of the difference does not equate with existing empirical evidence of economic linkages. In this case it is the more well established firms which exhibit stronger ties to locality in comparison to newly established firms ($p<0.01$). However, this result is not sustained when the boundary of the local economy is extended to include the district. Although there is no significant difference between small and large firms in terms of local sales, there is more variation in economic behaviour between the two firm types within the district in comparison to the within the immediate locality, with small firms exhibiting the stronger ties ($p=0.2310$).

In the case of upstream linkages in the 'accessible' rural area, only two null hypotheses are rejected, a fact which highlights the importance of very small firms in respect of sourcing supplies in both the immediate locality ($p<0.1$) and the district ($p<0.05$). It is also interesting to note that those firms delivering 'intangible' goods and services via the telecommunications network appear to be more strongly tied to locality in terms of supply purchases than more traditional firms, although the results are not statistically significant.

## 6.3 Multivariate analysis: development of prediction models

The bivariate analysis has allowed specific hypotheses to be tested about the systematic variation in the strength of local economic linkages between different types of firm. However, the data allows the hypotheses to be explored further, and key characteristics of

locally integrated firms in the study areas to be identified. To achieve this, a series of logistic regression models are fitted to the data, with all dependent variables representing a distinction between strong and weak levels of local economic integration. The aim is to examine the relationship between firm type and the strength of integration to locality. More importantly, it is to identify the 'relative importance' of firm types to achieving strong integration to locality. In other words, how much does each firm characteristic contribute to the ability to predict strength of local integration, and which variables are better, or worse, predictors of the strength of local integration?

As discussed in section 4.7, the logistic regression prediction model directly estimates the probability of an event occurring, in this case the 'event' being a strong level of economic integration to locality. For the reasons described in section 4.6, the dependent variables used in bi-variate analysis, based on proportions of local sales revenue and supply expenditure are transformed into dichotomous variables representing weak integration (0) vs. strong integration (1). These are illustrated in Figure 6.12.

**Y(SALES):**

0 = Below mean* proportion of sales revenue attributed to locality

1= Above mean* proportion of sales revenue attributed to locality

**Y(SUPPLIES):**

0 = Below mean* proportion of supply expenditure attributed to locality

1= Above mean* proportion of supply expenditure attributed to locality

(* mean for entire sample)

The 'event' (Y=1) therefore represents strong economic integration into locality.

**Figure 6.12: Derivation of dependent variables for multivariate analysis**

The independent variables $(X_1, X_2 \ldots X_k)$ are also dichotomous, representing in each case an important firm type identified in the literature and/or previous analysis versus all other firms in the sample[3]. As discussed in section 4.7.1, this follows a method of specification employed by Russell (1997) in modelling the geographic effects on British voting behaviour. The logistic regression model is then used to predict the probability that firms will exhibit strong economic integration into their local economy[4].

### 6.3.1 Specification of prediction models

A model building strategy, as suggested by Hosmer Lemeshow (1989), was followed in order to produce a series of prediction models which were as accurate, robust and reliable as possible[5]. The strategy included testing for collinearity, zero cells, influential cases and a process for including interaction terms to avoid nonadditivity. A total of eight models are presented, four relating to each study area, representing analysis of economic integration into (i) the locality, and (ii) the district, by way of (a) sales revenue and (b) expenditure on supplies.

### 6.3.2 Collinearity diagnostics

Menard (1995) provides a useful method of testing for collinearity among predictor variables. This involves using a linear regression model to obtain tolerance statistics and $R^2$ values to check that none of the independent variables is a perfect linear combination of the others. The results of these tests are presented in Table 6.9.

[3] See Appendix P for derivation of independent variables.

[4] *Local economy* is operationalised in section 3.3.2, and involves analysis of economic integration into two sets of designated geographical areas termed (i) the *locality* and (ii) the *district.*

[5] The model specification process is set out in Appendix L.

| TERM | I | II | III | IV | V | VI | VII | VII |
|---|---|---|---|---|---|---|---|---|
| Agricultural (vs. other) | .57 | .55 | .53 | .55 | - | - | .87 | - |
| | (.45) | (.47) | (.50) | (.48) | | | (.13) | |
| Service sector (vs. other) | - | .27 | .46 | .23 | - | - | .37 | - |
| | | (.74) | (.56) | (.77) | | | (.55) | |
| Consumer service (vs. other) | .67 | .34 | - | .27 | .56 | .81 | - | - |
| | (.35) | (.67) | | (.72) | (.41) | (.19) | | |
| Business service (vs. other) | .80 | - | .64 | - | .89 | .76 | .36 | .83 |
| | (.17) | | (.29) | | (.14) | (.23) | (.52) | (.13) |
| Manufacturing (vs. other) | .74 | .71 | .68 | .70 | - | .81 | - | .84 |
| | (.26) | (.30) | (.31) | (.30) | | (.14) | | (.08) |
| Town firms (vs. other) | .82 | .82 | .66 | .82 | .96 | .90 | - | - |
| | (.19) | (.18) | (.36) | (.18) | (.03) | (.08) | | |
| New technology (vs. other) | - | - | - | - | - | - | - | - |
| Small firms (vs. large firms) | .87 | .92 | .85 | .88 | - | .81 | .85 | .88 |
| | (.15) | (.07) | (.16) | (.15) | | (.17) | (.14) | (.15) |
| Independent (vs. other) | .92 | .92 | .92 | .93 | .97 | .91 | .95 | .89 |
| | (.09) | (.08) | (.09) | (.08) | (.05) | (.17) | (.14) | (.14) |
| New firms (vs. mature firms) | .83 | - | .43 | .80 | .59 | .89 | - | - |
| | (.16) | | (.60) | (.18) | (.39) | (.12) | | |
| New cons. service (vs. other) ($X_{10}$* $X_3$) | - | - | - | - | .49 | - | - | - |
| | | | | | (.46) | | | |
| New town firms (vs. other) ($X_{10}$* $X_6$) | - | - | .42 | - | -- | - | - | - |
| | | | (.62) | | | | | |

**Table 6.9:** **Results of testing for collinearity between independent variables:** for all prediction models (I - VIII)[6]

The collinearity diagnostics presented in Table 6.9 indicate that, although there is evidence of some collinearity between predictors, levels of collinearity are not high enough to cause problems in terms of model specification. According to Menard (1995), only tolerance levels less than .20 and $R^2$ values more than .80 are cause for concern. Therefore, in respect of collinearity, inferences can be drawn from the models with a high degree of confidence.

[6] Results show tolerance statistics with $R^2$ values given in parenthesis. It is important to note that the variable distinguishing between those firms delivering intangible goods and services via the telecommunications network and traditional firms (NEWDEL) was removed from all prediction models during the specification process. This was largely due to unsubstantive significance, although this variable did suffer from a higher incidence of zero cells in comparison to other variables and, on inspection of the data, it was also found that there was a higher degree of missing economic data associated with this variable in the case of both surveys. Indeed, this could be explained by the very nature of such firms, in that they may not be able to estimate the spatial distribution of their transactions so easily due to use of the electronic medium.

### 6.3.3 Model diagnostics

Careful analysis of appropriate residuals were carried out for all prediction models. This resulted in an average removal of 3% of cases per model, with most problem cases being those for which the model worked poorly, revealed by studentised residuals outside Menard's (1995) threshold of plus or minus two. Some cases were also removed on the basis that they exerted more than their fair share of influence on the estimated model parameters, revealed by dis-proportionate *dbeta* and *leverage* values. (See Appendix M for a full explanation).

### 6.3.4 Goodness-of-fit and predictive efficiency

As described in Appendix M the most important indicators of good model fit are a statistically significant Model Chi-Square and an insignificant *p* value for Hosmer and Lemeshow's (1989) Goodness-of-fit test. On the basis of these statistics, all prediction models developed exhibit excellent model fit. Further goodness of fit statistics are also provided for each model: the Deviation Chi-Square *(-2 Log Likelihood)* and *Goodness of Fit,* both which should be insignificant for good model fit. Various $R^2$ values analogous to that produced by OLS linear regression and general factorial ANOVA, are also provided. Values range from 0.12 to 0.58, indicating moderately weak to moderately strong associations between the variance of the dependent variable and relevant predictors across all models. Finally, measures of predictive efficiency are provided in the form of lambda *p* values and binomial *d* statistics. All models are found to exhibit a reduction in the error of prediction as a result of fitting the model. Likewise, all *d* statistics are significant beyond the 95% level, apart from Model IV which is significant beyond the 90% level. Therefore, in all of the eight cases, the model significantly improves our ability to predict the classification of cases into values of the dependent variable.

### 6.3.5 External validation

Following the suggestions of Hair *et al.* (1998), steps were taken to externally validate models only where the number of cases exceeded 100. However, given the restrictions on sample size, it was not felt that dividing the data set into analysis and holdout samples was a viable option, particularly given that interaction terms were included in some models. However, to examine if the relevant models were performing in an over-optimistic manner on the development data set, samples were subsequently divided into two validation samples, one containing 60% of observations and one containing 40% (following the advice of Hair *et al.* 1998). Goodness of fit and predictive efficiency measures were then calculated and compared to the development data set models.

The results of the validation exercises, presented in Table 6.10, are encouraging. Certainly in the case of models I and II it is not apparent that the developed models are performing in an over-optimistic manner. Model Chi-Squares and predictive efficiency statistics are roughly comparable, and in both cases $R^2$ values are actually lower than in the case of the smaller validation sample. The model Chi-Square for model III is more significant in the case of the development model, although both validation samples remain significant to the 90% level. Indeed, variations in $R^2$ values and classifications do not give cause for concern. A similar situation exists in the case of model IV, although on the basis of the majority of the measures presented, the developed model appears to be performing in a slightly pessimistic manner in comparison to the two validation samples, particularly in the case of predictive efficiency.

| Model I | Sig.Model Chi-Square | $R_L^2$ | Cases correctly classified | lambda-*p* | Sig. Binomial *d* |
|---|---|---|---|---|---|
| **Development set** | **0.0000** | **.22** | **74.40%** | **.47** | **0.0000** |
| Sample A (60%) | 0.0150 | .19 | 70.27% | .31 | 0.0102 |
| Sample B (40%) | 0.0024 | .34 | 72.55% | .50 | 0.0000 |
| **Model II Development set** | **0.0000** | **.30** | **76.03%** | **.58** | **0.0000** |
| Sample A (60%) | 0.0002 | .29 | 75.00% | .57 | 0.0000 |
| Sample B (40%) | 0.0006 | .37 | 79.59% | .63 | 0.0000 |
| **Model III Development set** | **0.0312** | **.12** | **71.66%** | **.20** | **0.0228** |
| Sample A (60%) | 0.0783 | .23 | 77.08% | .26 | 0.0918 |
| Sample B (40%) | 0.0887 | .12 | 68.05% | .20 | 0.0582 |
| **Model IV Development set** | **0.0033** | **.14** | **66.39%** | **.15** | **0.0668** |
| Sample A (60%) | 0.0540 | .15 | 69.86% | .35 | 0.0017 |
| Sample B (40%) | 0.0439 | .27 | 77.55% | .21 | 0.0045 |

**Table 6.10: Results of external validation for all prediction models**

### 6.3.6 Results from prediction models

Results from all prediction models are presented in Tables 6.11 to 6.18. Given its accuracy (Menard, 1995), the Likelihood Ratio test is used to evaluate statistical significance of the contribution of each of the independent variables to the model. As recommended by Hosmer and Lemeshow (1989), indicator contrasts, using dummy variable coding for independent variables, are employed to obtain correctly specified odds ratios and interaction effects. A constant is included in all models.

| GOODNESS OF FIT | Value | d.f | Significance |
|---|---|---|---|
| -2 Log Likelihood | 134.175 | 116 | >0.050 |
| Model Chi-Square | 38.912 | 8 | 0.00001 |
| Goodness of Fit | 121.481 | 116 | >0.250 |
| Hosmer and Lemeshow Goodness-of-Fit Test | 4.1251 | 8 | 0.8457 |
| $R_L^2$ | 0.22 | | |
| Cox and Snell $R^2$ | 0.27 | | |
| Nagelkerke $R^2$ | 0.36 | | |

| PREDICTIVE EFFICIENCY | Predicted Group | | |
|---|---|---|---|
| **Observed Group** | **0** | **1** | **Percent Correct** |
| **0 (below mean)** | 49 | 16 | 75.38% |
| **1 (above mean)** | 16 | 44 | 73.33% |
| **Overall Correct** | | | **74.40** |
| lambda-*p* | | 0.47 | |
| Binomial *d* | | 5.5 | P=0.0000 |

| TERMS IN THE MODEL | ß | LR test | d.f | Sig. Of LR | Exp (ß) |
|---|---|---|---|---|---|
| New (vs. Mature) | -.5479 | .975 | 1 | 0.3235 | .5781 |
| Agricultural (vs. Other) | -2.0442 | 9.388 | 1 | 0.0022 | .1295 |
| Consumer Service (vs. Other) | 1.3974 | 7.973 | 1 | 0.0047 | 4.0446 |
| Business Service (vs. Other) | -.5961 | 1.018 | 1 | 0.3130 | .5510 |
| Manufacturing (vs. Other) | -.6479 | .863 | 1 | 0.3530 | .5231 |
| Town (vs. Hinterland) | .4637 | 1.025 | 1 | 0.3114 | 1.5899 |
| Small (vs. Large) | .7685 | 2.353 | 1 | 0.1250 | 2.1566 |
| Independent (vs. Other) | .6452 | 1.188 | 1 | 0.2757 | 1.9064 |

**Table 6.11:** **Model I:** Strong versus weak local integration prediction model for Kingsbridge firms: according to sales attributed to the immediate locality

The results from Model I show that firms receiving a higher than average proportion of sales revenue from the Kingsbridge locality are most likely to be 1) non-agricultural firms and 2) consumer services. Put another way, we can say that those least likely to be strongly

integrated are agricultural establishments and those most likely to be strongly tied to locality are consumer service firms. Interpreting the odds ratios in the last column of the table, the model predicts that agricultural firms will reduce the odds of achieving a strong level of local sales integration by 87% and consumer services will increase the odds by 300% in comparison to all other firm types. It is also worth noting that the workforce size variable falls just outside the 90% significance level, indicating that small firms are also associated with a relatively strong level of local sales integration within this geographical boundary.

The goodness of fit statistics illustrate that the model fits the data extremely well. The model Chi-Square is highly significant and the Hosmer and Lemeshow goodness of fit statistic is not, both indicating excellent model fit. The model predicts to 74%, and is therefore approximately 26% more reliable at classifying an observation into a category of the dependent variable than is random guessing. Lambda-*p* indicates a moderately strong reduction in the error of prediction as a result of model fitting, and the highly significant *d* statistic indicates that the classification on the dependent variable is strongly related to the values of the independent variables. $R^2$ values range from .22 for $R_L^2$ and .36 for Nagelkerke, indicating a moderate association between the strength of local sales integration and firm type. On the basis of the Nagelkerke measure, 36% of the variance in the dependent variable can be explained by the independent variables.

The data in Table 6.12 presents an equivalent prediction model based on firm outputs attributed to the Kingsbridge district. Again, the model fits the data extremely well and is highly efficient at predicting the classification of cases. The Nagelkerke $R^2$ indicates that 45% of the variance in the dependent variable can be explained by the predictors, and lambda *p* shows a 44% reduction in the error of prediction as a result of model fitting.

| GOODNESS OF FIT | Value | d.f | Significance |
|---|---|---|---|
| -2 Log Likelihood | 116.041 | 113 | >0.250 |
| Model Chi-Square | 49.304 | 7 | 0.0000 |
| Goodness of Fit | 108.776 | 113 | >0.250 |
| Hosmer and Lemeshow Goodness-of-Fit Test | 2.7230 | 8 | 0.9505 |
| $R_L^2$ | 0.30 | | |
| Cox and Snell $R^2$ | 0.34 | | |
| Nagelkerke $R^2$ | 0.45 | | |

| PREDICTIVE EFFICIENCY | Predicted Group | | |
|---|---|---|---|
| **Observed Group** | **0** | **1** | **Percent Correct** |
| **0 (below mean)** | 45 | 7 | 86.54 |
| **1 (above mean)** | 22 | 47 | 68.12 |
| **Overall Correct** | | | **76.03** |
| lambda-*p* | | 0.44 | |
| Binomial *d* | | 4.2 | P=0.0001 |

| TERMS IN THE MODEL | ß | LR test | d.f | Sig. Of LR | Exp (ß) |
|---|---|---|---|---|---|
| Agricultural (vs. Other) | -1.7091 | 6.904 | 1 | 0.0086 | .1810 |
| Service (vs. Other) | -1.2109 | 2.309 | 1 | 0.1286 | .2979 |
| Consumer Service (vs. Other) | 3.6000 | 18.219 | 1 | 0.0000 | 36.5970 |
| Manufacturing (vs. Other) | -1.3542 | 3.215 | 1 | 0.0730 | .2582 |
| Town (vs. Hinterland) | .2922 | .295 | 1 | 0.5867 | 1.3394 |
| Small (vs. Large) | 1.3807 | 6.046 | 1 | 0.0139 | 3.9778 |
| Independent (vs. Other) | 2.0029 | 7.558 | 1 | 0.0060 | 7.4106 |

**Table 6.12:** **Model II:** Strong versus weak local integration prediction model for Kingsbridge firms: according to sales attributed to the district

The coefficients indicate that there is a higher degree of variation in terms of economic behaviour between firm types at this geographical level. Agricultural firms continue to reduce the odds of local integration, although consumer services gain in importance, being

36 times more likely to be strongly integrated to the district than all other firm types. We then find two further characteristics which are of significant importance to generating income within the district. Following the lead of consumer services, independent firms increase the odds of local integration by over 600% and very small firms by just under 300%. Interestingly, we also find that manufacturing firms significantly reduce the odds of strong local integration at this level by 75%, whereas the variable is not a significant predictor within the immediate locality. This may indicate that manufacturing firms located in a 'remote' rural area such as Kingsbridge tend to make the majority of sales either very locally or much further afield, by passing the intermediate district level economy.

Moving on to the case of local economic integration related to inputs in the 'remote' rural locality, we find that firms most likely to attribute a higher than average proportion of supply expenditure to the locality are independent, locally owned establishments. This clarifies the results of the bi-variate analysis. However, fitting a prediction model to the data highlights two further important findings. First, it is evident that manufacturing establishments reduce the likelihood of achieving strong ties to locality in terms of inputs. The model predicts that, in a 'remote' rural area such as Kingsbridge, independent firms increase the odds of achieving strong local integration by 900% in comparison to national and international branches, and manufacturing establishments decrease the odds by 80% in comparison to all other firm types.

| GOODNESS OF FIT | Value | d.f | Significance |
|---|---|---|---|
| -2 Log Likelihood | 139.358 | 110 | >0.050 |
| Model Chi-Square | 18.360 | 9 | 0.0312 |
| Goodness of Fit | 112.167 | 110 | >0.250 |
| Hosmer and Lemeshow Goodness-of-Fit Test | 4.6789 | 7 | 0.6991 |
| $R_L^2$ | 0.12 | | |
| Cox and Snell $R^2$ | 0.14 | | |
| Nagelkerke $R^2$ | 0.19 | | |

| PREDICTIVE EFFICIENCY | Predicted Group | | |
|---|---|---|---|
| **Observed Group** | **0** | **1** | **Percent Correct** |
| **0 (below mean)** | 66 | 10 | 86.84 |
| **1 (above mean)** | 25 | 19 | 45.45 |
| **Overall Correct** | | | **71.66** |
| lambda-*p* | | 0.20 | |
| Binomial *d* | | 2.0 | P=0.0228 |

| TERMS IN THE MODEL | ß | LR test | d.f | Sig. Of LR | Exp (ß) |
|---|---|---|---|---|---|
| New (vs. Mature) | -.5998 | .565 | 1 | 0.4524 | .5489 |
| Agricultural (vs. Other) | .6169 | .932 | 1 | 0.3344 | 1.8531 |
| Services (vs. Other) | -.3820 | .426 | 1 | 0.5410 | .6825 |
| Business Service (vs. Other) | -.3600 | .283 | 1 | 0.5945 | .6977 |
| Manufacturing (vs. Other) | -1.6518 | 3.468 | 1 | 0.0626 | .1917 |
| Town (vs. Hinterland) | -.8309 | 2.598 | 1 | 0.1070 | .4357 |
| Small (vs. Large) | .5009 | .984 | 1 | 0.3212 | 1.6503 |
| Independent (vs. Other) | 2.3467 | 7.490 | 1 | 0.0062 | 10.4511 |
| New Town (vs. Other) | 2.1217 | 3.966 | 1 | 0.0464 | 8.3452 |
| $(X_{10} * X_6)$ | | | | | |

**Table 6.13:** **Model III:** Strong versus weak local integration prediction model for Kingsbridge firms: according to supplies attributed to the immediate locality

There is also a second finding revealed by the interaction between age and location which indicates that newly established firms located in the town are also associated with a strong level of local integration. This effect can be explored further by examining the interaction matrix constructed in Table 6.13a. Following a method described by Russell (1997), odds ratios are calculated to examine the effect of this interaction in relation to its three comparator groups.

| INTERACTION MATRIX | Town firms | Hinterland firms |
|---|---|---|
| **New firms** | 2.1217 | -.5998 |
| **Mature firms** | -.8309 | 0.00 |

| Comparator group | Coefficients to add | Cumulative ß | Exp (ß) |
|---|---|---|---|
| New hinterland firms | 2.12 + -.83 | 1.29 | 3.63 |
| Mature town firms | 2.12 + -.60 | 1.52 | 4.57 |
| Mature hinterland firms | 2.12 + -.83 + -.60 | 0.69 | 1.99 |

**Table 6.13a: Interaction matrix for newly established firms located in the town**

In comparison to equivalent firms located in the hinterland, newly established town firms increase the odds of strong local integration through sourcing by 260%. Likewise, in comparison to more well established town firms, these establishments are four and a half times more likely to exhibit a strong degree of local integration. However, in relation to the third comparator group, mature hinterland firms, the odds ratio is considerably smaller, indicating the importance of these firms also. Further analysis of the data reveals that 43% of well established hinterland firms are in fact agricultural, and 22% are consumer services such as small village shops. The results effectively imply that these firms source more locally than other firm types in the hinterland.

Again, the model fits the data well and the significant Binomial *d* statistic indicates a high degree of predictive efficiency. In this case there is only a moderately weak association between the dependent and independent variables as only 19% of the variance in the dependent variable is explained by the predictors. We can therefore note that the strength of local integration in terms of inputs is less influenced by firm type than in the case of outputs.

The results presented in Table 6.14 illustrate that, when the boundary of the local economy is extended to include the district, a slightly higher degree of variance in the strength of local integration is explained by firm characteristics. $R^2$ values are in the range of between 14% and 23%, and again we find evidence of good model fit. This model performs slightly less well at classifying observations into values of the dependent variable, being only 16.4% more reliable than is random guessing. However, the binomial *d* statistic is significant beyond the 90% level, which indicates that the model does significantly improve our ability to predict the classification of cases.

Interpreting the model coefficients, we again find that independent establishments increase the odds of local sourcing and manufacturing firms decrease the likelihood. However, the extension of locality to include the district also reveals the importance of very small firms to achieving strong local integration, with such firms being almost two and a half times more likely to source a higher than average proportion of inputs from within the district than larger firms. Finally, it is evident that firms in the service sector reduce the odds of strong local integration at this geographical level, although this finding is only marginally significant at the 90% level.

| GOODNESS OF FIT | Value | d.f | Significance |
|---|---|---|---|
| -2 Log Likelihood | 140.492 | 113 | >0.050 |
| Model Chi-Square | 23.053 | 8 | 0.0033 |
| Goodness of Fit | 114.982 | 113 | >0.100 |
| Hosmer and Lemeshow Goodness-of-Fit Test | 6.3393 | 8 | 0.6093 |
| $R_L^2$ | 0.14 | | |
| Cox and Snell $R^2$ | 0.17 | | |
| Nagelkerke $R^2$ | 0.23 | | |

| PREDICTIVE EFFICIENCY | Predicted Group | | |
|---|---|---|---|
| **Observed Group** | **0** | **1** | **Percent Correct** |
| **0 (below mean)** | 51 | 23 | 68.29 |
| **1 (above mean)** | 18 | 30 | 62.50 |
| **Overall Correct** | | | **66.39** |
| lambda-*p* | | 0.15 | |
| Binomial *d* | | 1.5 | 0.0668 |

| TERMS IN THE MODEL | ß | LR test | d.f | Sig. Of LR | Exp (ß) |
|---|---|---|---|---|---|
| New (vs. Mature) | -.5003 | .666 | 1 | 0.4144 | .6064 |
| Agricultural (vs. Other) | -.7529 | 1.404 | 1 | 0.2360 | .4710 |
| Services (vs. Other) | -1.5257 | 2.732 | 1 | 0.0984 | .2175 |
| Consumer Service (vs. Other) | 1.2993 | 2.130 | 1 | 0.1444 | 3.6666 |
| Manufacturing (vs. Other) | -1.9577 | 5.478 | 1 | 0.0193 | .1412 |
| Town (vs. Hinterland) | -.3879 | .702 | 1 | 0.4022 | .6785 |
| Small (vs. Large) | .8833 | 3.243 | 1 | 0.0717 | 2.4188 |
| Independent (vs. Other) | 2.3807 | 8.376 | 1 | 0.0038 | 10.8123 |

**Table 6.14:** **Model IV:** Strong versus weak local integration prediction model for Kingsbridge firms: according to supplies attributed to the district

Moving on to the 'accessible' rural locality, the first observation is that, in terms of sales linkages, there is a moderately strong association between the strength of local integration and firm type. $R^2$ values indicate that between 44% and 58% of the variation in the

dependent variable is explained by the predictor variables. In other words, inclusion of the independent variables reduces badness of fit by 58%. Goodness of fit is again extremely good, in fact more so than in the case of the Kingsbridge models. A highly significant model Chi-Square indicates excellent model fit, and the Hosmer and Lemeshow test indicates no significant difference between observed and predicted classifications. The model presented in Table 6.15 is approximately 34% more accurate at classifying observations into categories of the dependent variable than would be achieved through random guessing, and measures of predictive efficiency are on a par with those for goodness of fit.

The results of this prediction model indicate some very interesting findings regarding local business activity in and around Olney. Firstly, as in the case of Kingsbridge, consumer services are associated with a strong level of local sales integration. However, the effect is considerably stronger in the 'accessible' rural area: consumer services are 108 times more likely to be strongly integrated to locality than are all other firm types. A direct implication for local planning development is suggested by the model in that town firms are thirty seven times more likely to receive a higher than average proportion of sales revenue from the immediate locality than are hinterland firms. The influence of business service establishments on local income generation is also very clear. The model predicts that business services will decrease the odds of achieving a strong level of local sales integration by 95%.

| GOODNESS OF FIT | Value | d.f | Significance |
|---|---|---|---|
| -2 Log Likelihood | 48.732 | 68 | >0.950 |
| Model Chi-Square | 38.255 | 6 | 0.0000 |
| Goodness of Fit | 47.277 | 68 | >0.950 |
| Hosmer and Lemeshow Goodness-of-Fit Test | .7997 | 7 | 0.9974 |
| $R_L^2$ | 0.44 | | |
| Cox and Snell $R^2$ | 0.40 | | |
| Nagelkerke $R^2$ | 0.58 | | |

| PREDICTIVE EFFICIENCY | Predicted Group | | |
|---|---|---|---|
| **Observed Group** | **0** | **1** | **Percent Correct** |
| **0 (below mean)** | 49 | 6 | 89.09 |
| **1 (above mean)** | 6 | 14 | 70.00 |
| **Overall Correct** | | | **84.00** |
| **lambda-*p*** | | 0.40 | |
| **Binomial *d*** | | 2.2 | P=0.0139 |

| TERMS IN THE MODEL | ß | LR test | d.f | Sig. Of LR | Exp (ß) |
|---|---|---|---|---|---|
| New (vs. Mature) | 1.2826 | 1.725 | 1 | 0.1890 | 3.6060 |
| Consumer Service (vs. Other) | 4.6841 | 19.544 | 1 | 0.0000 | 108.2163 |
| Business Service (vs. Other) | -3.0873 | 11.452 | 1 | 0.0007 | .0456 |
| Town (vs. Hinterland) | 3.6271 | 15.308 | 1 | 0.0001 | 37.6021 |
| Independent (vs. Other) | 2.1555 | 4.159 | 1 | 0.0414 | 8.6326 |
| New Consumer Services (vs. other) ($X_{10} * X_3$) | -6.0887 | 11.905 | 1 | 0.0006 | .0023 |

**Table 6.15:** **Model V:** Strong versus weak local integration prediction model for Olney firms: according to sales attributed to the immediate locality

There is also a very interesting finding revealed through the interaction between this variable and firm age, which suggest that the likelihood of achieving a strong level of local

integration is decreased when consumer services are newly established[7]. This interaction effect is explored further in Table 6.15a.

| INTERACTION MATRIX | Consumer services | Other firms |
|---|---|---|
| **New firms** | -6.0887 | 1.2826 |
| **Mature firms** | 4.6841 | 0.00 |

| Comparator group | Coefficients to add | Cumulative ß | Exp (ß) |
|---|---|---|---|
| New non-consumer servs | -6.1 + 4.7 | -1.4046 | 0.25 |
| Mature consumer services | -6.1 + 1.3 | -4.8061 | 0.01 |
| Mature non-consumer servs | -6.1 + 1.3 + 4.7 | -0.122 | 0.89 |

**Table 6.15a: Interaction matrix for newly established consumer services**

The cumulative coefficients illustrate that newly established consumer services reduce the odds of being strongly integrated to locality in terms of sales by 99.99% in comparison to well established consumer services, and 75% in comparison to other types of newly established firm. This could suggest one of two things. First, that there is a time lag between consumer service establishments setting up in business and becoming strongly integrated into the locality in terms of sales. Second, it could suggest that the contemporary nature of consumer services setting up in the locality are having a significant impact on the spatial nature of local economic activity in this sector. Further investigation of the data reveals that the latter is true. Of the twelve newly established consumer services, three quarters are in fact consumer / business services, which serve both market niches. Examples include a will writing firm, an architect, an interior design firm and a cafe which also charters its catering service to outside clients. Only one firm is in fact a retail establishment.

[7] Defined as a firm that has been in existence at the present location for up to six years (See Appendix C).

| GOODNESS OF FIT | Value | d.f | Significance |
|---|---|---|---|
| -2 Log Likelihood | 70.319 | 69 | >0.250 |
| Model Chi-Square | 34.221 | 7 | 0.0000 |
| Goodness of Fit | 71.608 | 69 | >0.250 |
| Hosmer and Lemeshow Goodness-of-Fit Test | 3.7507 | 8 | 0.8789 |
| $R_L^2$ | 0.33 | | |
| Cox and Snell $R^2$ | 0.36 | | |
| Nagelkerke $R^2$ | 0.48 | | |

| PREDICTIVE EFFICIENCY | Predicted Group | | |
|---|---|---|---|
| **Observed Group** | **0** | **1** | **Percent Correct** |
| **0 (below mean)** | 38 | 7 | 84.44 |
| **1 (above mean)** | 9 | 23 | 71.88 |
| **Overall Correct** | | | **79.22** |
| lambda-p | | 0.50 | |
| Binomial d | | 3.8 | p=0.0001 |

| TERMS IN THE MODEL | ß | LR test | d.f | Sig. Of LR | Exp (ß) |
|---|---|---|---|---|---|
| New (vs. Mature) | -.3356 | .268 | 1 | 0.6046 | .7149 |
| Consumer Service (vs. Other) | 1.7341 | 6.408 | 1 | 0.0114 | 5.6638 |
| Business Service (vs. Other) | -2.3212 | 11.002 | 1 | 0.0009 | 10.1883 |
| Manufacturing (vs. Other) | -1.4380 | 2.349 | 1 | 0.1254 | .2269 |
| Town (vs. Hinterland) | 2.5876 | 17.639 | 1 | 0.0000 | 13.2984 |
| Small (vs. large) | 1.7207 | 5.438 | 1 | 0.0197 | 5.5884 |
| Independent (vs. Other) | .4194 | .238 | 1 | 0.6257 | 1.5211 |

**Table 6.16:** **Model VI:** Strong versus weak local integration prediction model for Olney firms: according to sales attributed to the district

In terms of downstream linkages to the Olney district, a similar pattern of economic behaviour is evident, although in this case the influence of consumer services becomes secondary to that of location and the strongly negative impact of business services on local income generation. There is also a clear influence revealed by the relative size of firms at

this level of locality. Very small firms are five and a half times more likely to attribute a higher than average proportion of sales revenue to the district than are larger firms, a finding which conforms more strongly with existing empirical evidence of economic linkages. Goodness of fit and predictive efficiency measures indicate that the model performs extremely well at classifying observations into values of the dependent variable with the included predictors. $R_L^2$, Cox and Snell and Nagelkerke values indicate a moderately strong association between the strength of local sales integration to the district and firm type.

The model presented in Table 6.17 relates to local integration in terms of the purchase of inputs in the 'accessible' rural area. Again, the highly significant model Chi-Square and insignificant Hosmer and Lemeshow value indicate that the model fits the data well. Up to 44% of the variance in strength of integration can be attributed to firm type and the model predicts to 88.7%, implying that it is 38.7% more reliable at classifying an observation into a category of the dependent variable than is random guessing. The most significant contributor to the model is the variable based on workforce size. The model predicts that, in an accessible rural area such as Olney, small firms with a workforce size of less than 5 employees will increase the likelihood of being strongly tied to locality by over fifty five times in comparison to larger firms.

Contrary to the case of output linkages in the Olney locality, the model indicates that independent firms actually decrease the likelihood of attributing a higher than average proportion of expenditure on supplies to the locality. The direction of this result warrants further investigation of the data. This reveals that 40% of the firms in the 'other' category are classified into (Y=1): two software companies, a local authority institution and a pluriactive farm business. In comparison, 16% of independent firms are classified into (Y=1), consisting of two construction firms, two farm holdings, three consumer services,

two business services and a leisure firm. However, the relatively small number of firms in the former category mean that the findings presented are not substantial enough to warrant any firm conclusions to be drawn from the data, although it does pose an interesting question with regard to further work in this area.

| GOODNESS OF FIT | Value | d.f | Significance |
|---|---|---|---|
| -2 Log Likelihood | 47.661 | 65 | >0.950 |
| Model Chi-Square | 22.838 | 5 | 0.0004 |
| Goodness of Fit | 60.715 | 65 | >0.250 |
| Hosmer and Lemeshow Goodness-of-Fit Test | .3076 | 5 | 0.9975 |
| $R_L^2$ | 0.32 | | |
| Cox and Snell $R^2$ | 0.28 | | |
| Nagelkerke $R^2$ | 0.44 | | |

| PREDICTIVE EFFICIENCY | Predicted | Group | |
|---|---|---|---|
| **Observed Group** | **0** | **1** | **Percent Correct** |
| **0 (below mean)** | 55 | 2 | 96.49 |
| **1 (above mean)** | 6 | 8 | 57.14 |
| **Overall Correct** | | | **88.73** |
| **lambda-*p*** | | 0.43 | |
| **Binomial *d*** | | 1.9 | 0.0281 |

| TERMS IN THE MODEL | ß | LR test | d.f | Sig. Of LR | Exp (ß) |
|---|---|---|---|---|---|
| Agricultural vs. Other | .3794 | .120 | 1 | 0.7290 | 1.4614 |
| Services vs. Other | -.9024 | .612 | 1 | 0.4341 | .4056 |
| Business Services vs. Other | 2.1069 | 1.696 | 1 | 0.1929 | 8.2228 |
| Small vs. Large | 4.0349 | 11.836 | 1 | 0.0006 | 56.5400 |
| Independent vs. Other | -2.9915 | 6.816 | 1 | 0.0090 | .0502 |

**Table 6.17:** **Model VII:** Strong versus weak local integration prediction model for Olney firms: according to supplies attributed to the immediate locality

The final prediction model relates to the strength of upstream linkages to the district.

| GOODNESS OF FIT | Value | d.f | Significance |
|---|---|---|---|
| -2 Log Likelihood | 71.383 | 67 | >0.250 |
| Model Chi-Square | 18.825 | 4 | 0.0009 |
| Goodness of Fit | 61.502 | 67 | >0.250 |
| Hosmer and Lemeshow Goodness-of-Fit Test | 1.2114 | 5 | 0.9438 |
| $R_L^2$ | 0.21 | | |
| Cox and Snell $R^2$ | 0.23 | | |
| Nagelkerke $R^2$ | 0.32 | | |

| PREDICTIVE EFFICIENCY | Predicted Group | | |
|---|---|---|---|
| **Observed Group** | **0** | **1** | **Percent Correct** |
| **0 (below mean)** | 40 | 9 | 81.63 |
| **1 (above mean)** | 7 | 16 | 69.57 |
| **Overall Correct** | | | **77.77** |
| **lambda-*p*** | | 0.30 | |
| **Binomial *d*** | | 1.8 | 0.0359 |

| TERMS IN THE MODEL | ß | LR test | d.f | Sig. Of LR | Exp (ß) |
|---|---|---|---|---|---|
| Business Service (vs. Other) | -1.5440 | 6.315 | 1 | 0.0120 | .2135 |
| Manufacturing (vs. Other) | -1.1799 | 1.552 | 1 | 0.2128 | 3.2542 |
| Small vs. Large | 3.6141 | 15.760 | 1 | 0.0001 | 37.1162 |
| Independent vs. Other | -1.2543 | 1.823 | 1 | 0.1770 | .2853 |

**Table 6.18:** **Model VIII:** Strong versus weak local integration prediction model for Olney firms: according to supplies attributed to the district

In this case the effect associated with firm ownership is not statistically significant, although again, the influence of very small firms on local integration is clear. Interestingly at this geographical level, we find that business services significantly reduce the odds of sourcing an above average proportion of supplies from the locality, by 79% in comparison

to all other firms. Given the sign on the relevant coefficient in Model VII, it is likely that business services located in an 'accessible' rural area such as Olney tend to source a significant proportion of supplies either in their local town, or in nearby regional centres, but not in rural hinterlands of settlements.

As with all other prediction models developed, goodness of fit is excellent and predictive efficiency measures indicate that the classification on the dependent variable is strongly related to the values of the predictor variables. $R^2$ values indicate a moderate association between the variance in the dependent variable and relevant predictors. Likewise, the value of lambda-*p* indicates a moderate reduction in the error of prediction as a result of fitting the model.

### 6.3.7 Summary of results

The results of all eight prediction models developed in the previous section are summarised in Table 6.19. The data presented indicates the predictor variables that are statistically significant, the direction of the relationship with the relevant dependent variable, and their statistical significance. In so doing, the summary of results clearly illustrates those firm characteristics that are good predictors of the strength of local integration and those that are not. A full discussion of these results, including an assessment of their implications for rural development policy, is contained in Chapter Nine.

| Firm | Kings Locality | | Kings District | | Olney Locality | | Olney District | |
|---|---|---|---|---|---|---|---|---|
| **Predictor** | **Sales** | **Supplies** | **Sales** | **Supplies** | **Sales** | **Supplies** | **Sales** | **Supplies** |
| New firms | | | | | | | | |
| Agricultural firms | -*** | | -*** | | | | | |
| Consumer services | +*** | | +*** | | +*** | | +** | |
| Business services | | | | | -*** | | -*** | -** |
| Service sector firms | | | | -* | | | | |
| Manufacturing firms | | -* | -* | -** | | | | |
| Town firms | | | | | +*** | | +*** | |
| Small firms | | | +** | +* | | +*** | +** | +*** |
| Independent firms | | +*** | +*** | +*** | +** | | | |
| New town firms | | +** | | | | | | |
| New cons. services | | | | | -*** | | | |

**Table 6.19: Summary of results from prediction models:** Influence of firm characteristics on the likelihood of strong local integration in the 'remote' and 'accessible' case study areas[1]

[1] + Increase in the likelihood of strong local integration
- Decrease in the likelihood of strong local integration

Statistical significance: *** 99%; ** 95%; * 90%

# CHAPTER SEVEN

# SPATIAL PATTERNS OF ECONOMIC ACTIVITY AND INTEGRATION INTO LOCALITY: HOUSEHOLDS

## 7.0 Introduction

The purpose of this chapter is to fulfil part of the main aims of the project: to examine, in more detail, the contemporary functions of the small town in the rural economy; and to advise policy makers of the potential role such towns can play in promoting rural development. This achieved through an in-depth empirical analysis of the spatial data obtained from the household surveys in both study areas. It begins by examining the flows of goods and services in and around the respective localities before presenting a comprehensive descriptive analysis of the spatial data relating to both low and high order economic transactions. As with the case of the corporate data, the results illustrate both the spatial distribution of economic activity in and around the two localities, and the relationship between the settlements and the local, regional, national and international economies. The chapter then moves on to test the second set of research hypotheses developed from the literature, this time comparing the strength of local economic integration between different types of household. Multivariate prediction models are then developed which allow the hypotheses to be explored further, the results of which have direct implications for development policy in the two localities.

## 7.1 Spatial patterns of economic activity

The aim of this initial section is to assess the relationship between the two settlements and their respective local, regional, national and international economies, this time in terms of consumer activity. In turn, this allows the degree of local economic integration of the settlements to be considered. The data presented in this section deals with economic transactions on aggregate, and is thus concerned with *absolute* proportions of low order and high order transactions, as opposed to *mean* proportions which are used for analysis in the following sections comparing different types of household. All descriptive results in this section are presented diagrammatically in order to display the spatial data effectively. Figures 7.1 to 7.6 are situated in the main text adjacent to related discussion. Reference is also made to Figures 7.1A through to 7.8A, which are situated in Appendix O.

### 7.1.1 Flows of consumer goods and services in and around the localities

The spatial data presented in Figure 7.1 indicates that Kingsbridge is an important retail centre to its local inhabitants, being the location for 59.4% of total consumption expenditure and 83.0 % of all transactions by town residents and 44.1 % and 42.0% for hinterland residents respectively. This would indicate that the average transaction value purchases made within the town is lower for town residents than it is for their hinterland counterparts. A likely reason for this is that hinterland residents make 32.0% of all transactions in their local village, although the low cost nature of these purchases is reflected by the fact that this accounts for only 12.0% of all consumption expenditure. Income leakage out of the locality is attributed slightly more to hinterland than to town residents, although the greater difference is the fact that town households make fewer trips outside the immediate locality which are of a higher value in comparison to their hinterland counterparts.

The equivalent data for Olney is presented in Figure 7.2 and illustrates some interesting contrasts between the two settlements in terms of economic activity. Olney accounts for only 29.7% of all consumption expenditure and 59.3% of all transactions made by town residents, which indicates that while the town remains a significant retail centre to those who live in its immediate vicinity, it is much less so than is Kingsbridge. Moreover, the settlement clearly has much less of a sphere of influence than does the 'remote' rural settlement. Only 9.9% of consumption expenditure by hinterland residents is attributed to the town, which is only slightly more than is attributed to their local village. In fact, these households actually carry out a higher proportion of all transactions in their local village than they do in Olney itself, 27.5% in comparison to 17.1%. The relative accessibility of the settlement to nearby urban centres is also evident when considering the proportion of income that is effectively leaking out of the local economy. Town residents carry out 36.8% of all transactions outside the locality, accounting for 67.8% of all consumption expenditure. In the case of hinterland residents these figures rise to 55.4% and 81.7% respectively which is, once again, approximately twice that for equivalent households in the 'remote' rural area.

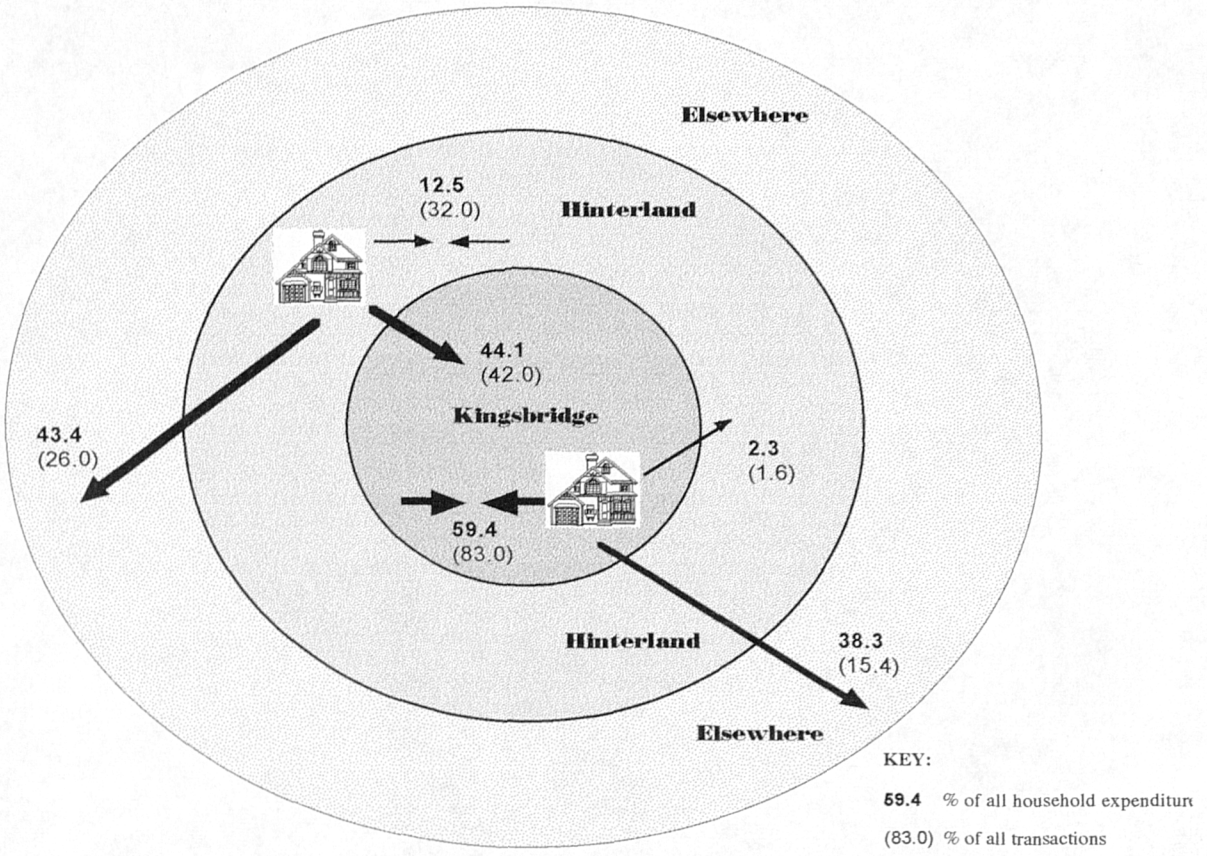



**Figure 7.1:** **Flows of consumer goods and services in and around the Kingsbridge locality:** given by proportions of transactions by value and number

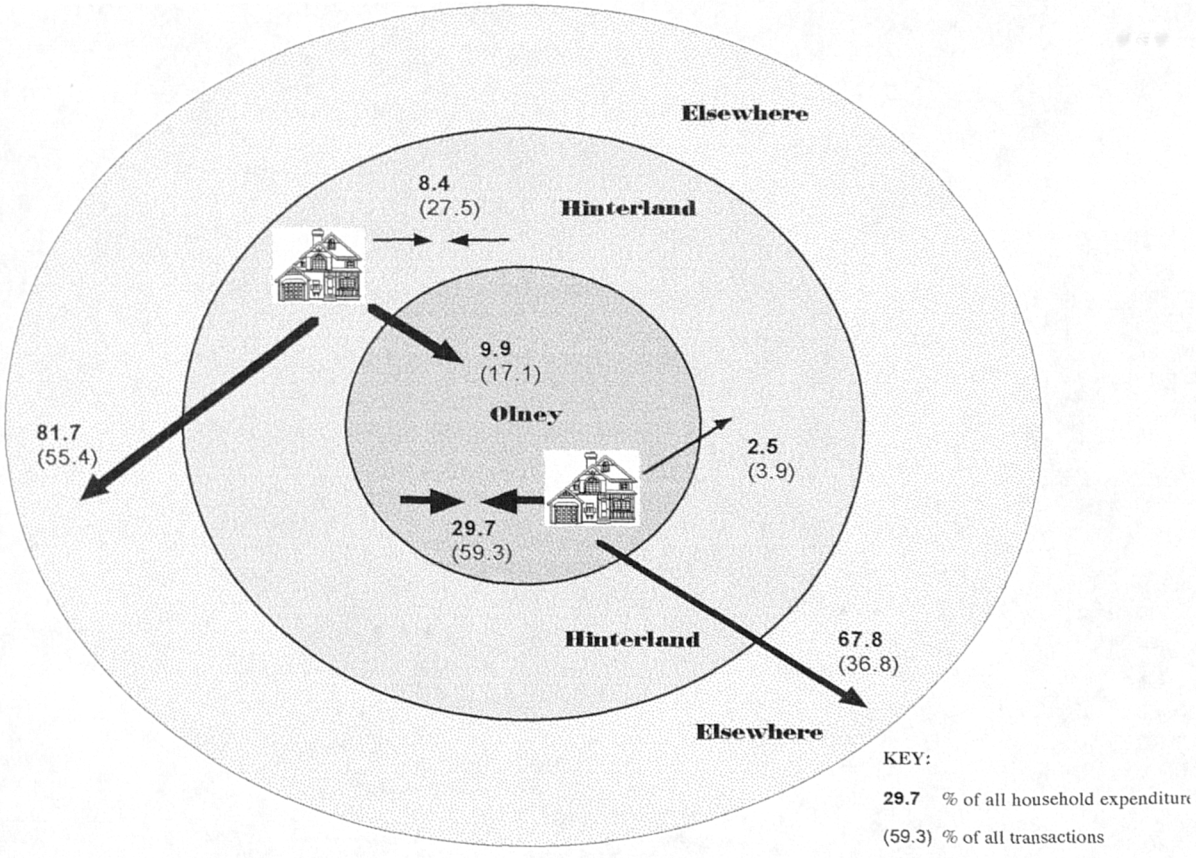



**Figure 7.2:** **Flows of consumer goods and services in and around the Olney locality:** given by proportions of transactions by value and number

### 7.1.2 Spatial patterns of low order transactions

Figures 7.3 and 7.4 illustrate the 'economic footprint' of the settlements in terms of consumer activity patterns relating to the purchase of low order goods and services. The data presented in Figure 7.3 illustrates that the major edge-of-town supermarket in Kingsbridge accounts for a significant proportion of all low order consumption expenditure by those living in the study area: 46.1% in fact. The mean value of each shopping trip is also higher, indicated by the proportion of all low order shopping trips. At only 21.7% this is less than half that for Kingsbridge town centre which accounts for only 25.8% of all consumption expenditure on low order goods and services.

Referring to Figures 7.1A and 7.2A we find that town residents spend over double the amount of all low order expenditure in the town centre than do hinterland residents: 36.3% in comparison to 15.5%. They also make just over three times as many low order trips to the town centre. Likewise, the supermarket also accounts for a higher proportion of town residents' low order spend, although the difference is much less marked: 48.3% in comparison to 43.9%. However, despite the fact that the major supermarket is an edge-of-town site, town residents make only marginally more trips to it than do hinterland residents. This may imply that the majority of customers visit the supermarket by car, irrespective of whether they are within close proximity to it or further afield.

On aggregate, the remainder of the district accounts for 12.1% of all low order consumption expenditure and 8.8% of all trips which, as expected rises to 15.9% and 11.8% respectively for hinterland residents and falls to 8.3% and 6.2% for town residents. As was discussed in section 6.4.3, the proportion of all low order consumption expenditure which is attributed to the regional centre of Plymouth (4.2%) is likely to be associated with combining shopping activity with the work journey.

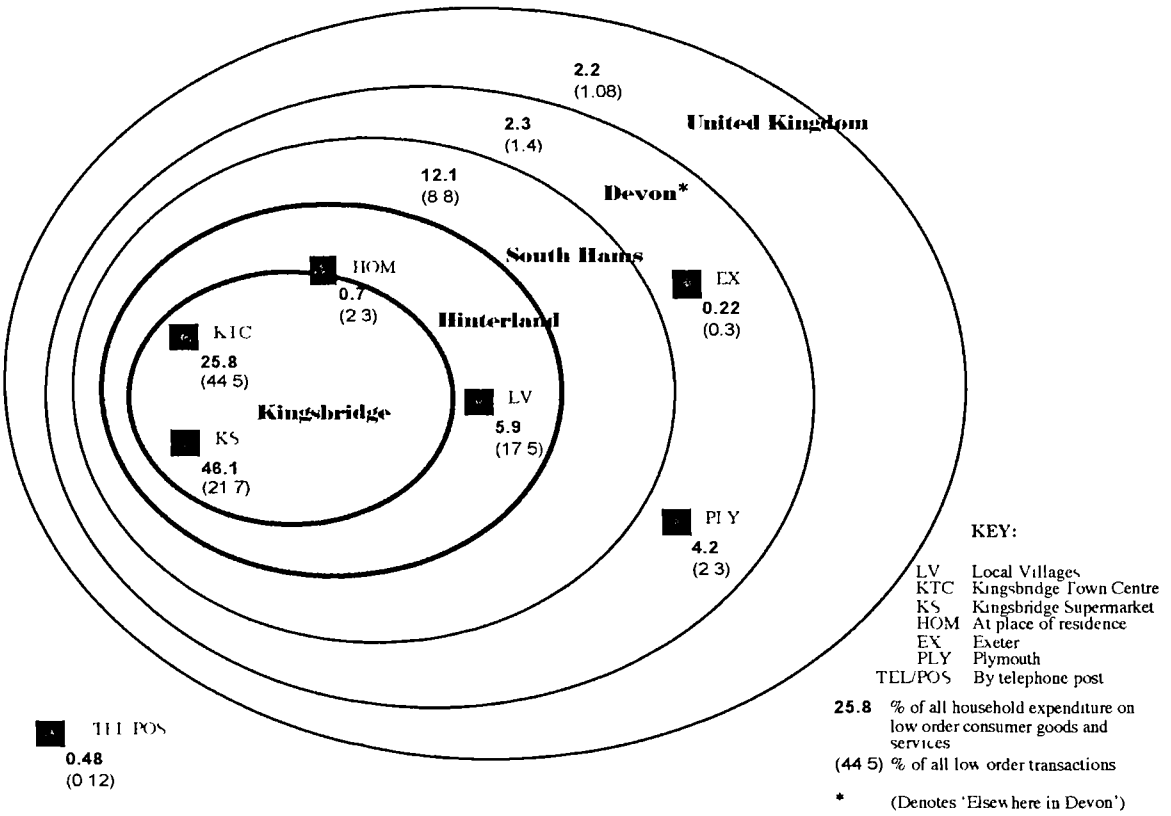



**Figure 7.3:** **The 'economic footprint' of Kingsbridge households:** given by the proportion of low order transactions by value and number

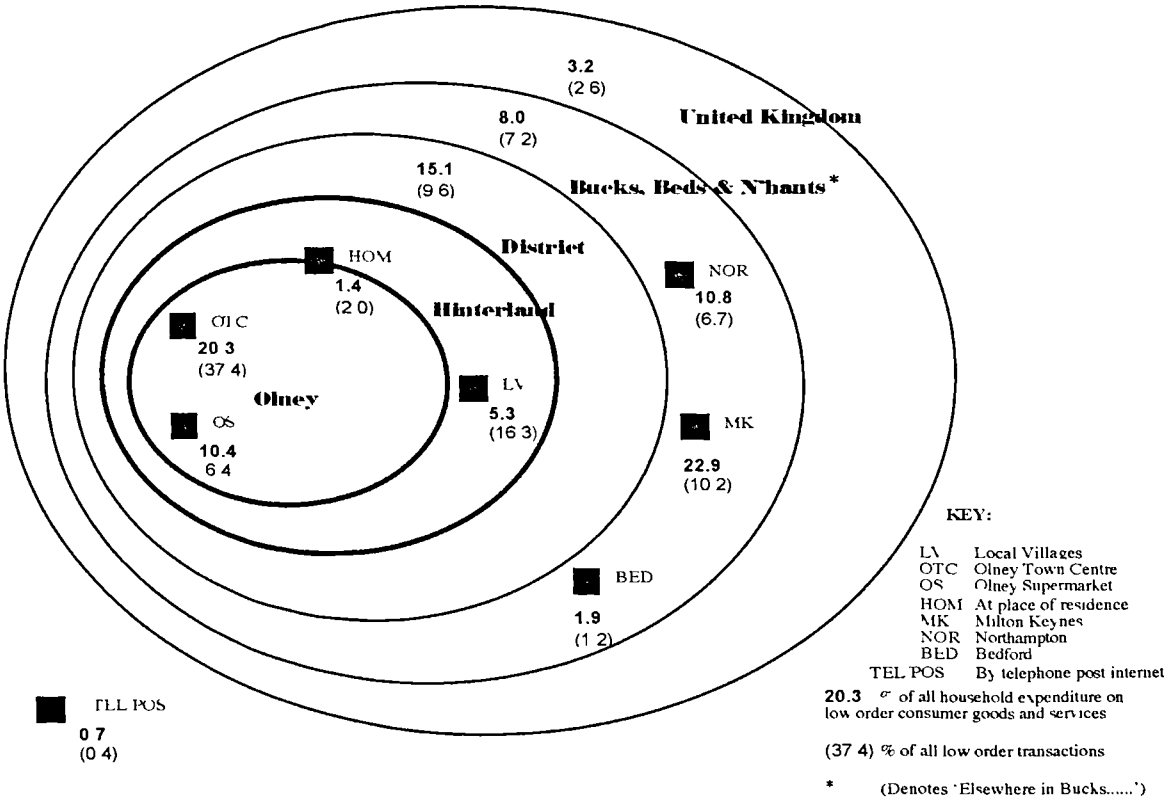



**Figure 7.4:** **The 'economic footprint' of Olney households:** given by the proportion of low order transactions by value and number

The first key point to note from Figure 7.4 is that the supermarket in Olney appears to hold significantly less of the market share than does the equivalent store in Kingsbridge. Situated directly adjacent to the town centre, the supermarket accounts for only 10.4% of all consumption expenditure and 6.4% of all low order transactions. Referring to figures 7.5A and 7.6A we find that this pattern of activity differs only slightly for town and hinterland residents, although the latter evidently make fewer trips to the supermarket and spend more at each visit. However, it is not Olney town centre itself which accounts for the residual market share. Moving further out into the footprint we find that Milton Keynes and Northampton account for 22.9% and 10.8% of low order consumption expenditure respectively, patterns of activity, which may well be associated with combining shopping trips with the work journey. Interestingly, town residents tend to favour Milton Keynes as a low order centre and hinterland residents carry out more low order shopping trips in Northampton. Again, this could be associated with local employment patterns, although it is likely to be partly explained by the shape of the study area, with the majority of hinterland residents situated to the north of Olney (See Appendix F). The footprint also reveals that 8.0% of consumption expenditure and 7.2% of all low order transactions are attributed to elsewhere in the three counties of Bucks, Beds and Northants which, as expected, increases to 11.1% and 11.7% respectively for hinterland residents and falls to 5.6% and 3.7% for those residents of Olney town.

This spatial data is a clear indication of the more widely dispersed activity patterns of households in the 'accessible' rural locality. However, if we consider the low order functions of the town centres themselves, the difference between the two settlements is not so striking. Kingsbridge town centre accounts for only 5.2% more of total low order spend than does Olney. Likewise, it accounts for only 7.1% more of all low order trips by residents in the study area. In fact, the key difference between the two localities in terms of low order activity patterns is the main supermarket that consumers go to. In Kingsbridge, it

is the edge of town store, whereas as in the 'accessible' rural area it is at the local regional centre. This may imply, therefore, that small town centre convenience stores are 'holding their own', despite the fact that they account for only a quarter of all low order expenditure by local residents. It may also imply that, in relative terms, edge-of-town supermarkets may not be such a threat to small town centres in 'accessible' rural areas because of the overriding influence of nearby regional centres.

### 7.1.3 Spatial patterns of high order transactions

Moving on to Figure 7.5, it is interesting to note that Kingsbridge town centre accounts for a higher proportion of local high order consumption expenditure than low order; 31.8% in comparison to 25.8% respectively. The data presented in Figures 7.2A and 7.4A reveals that this is largely due to the activity patterns of hinterland residents. In this case we find that the high order function is of comparably greater importance than the low order, accounting for 29.2% of all high order expenditure in comparison to 15.5% of the low order equivalent. In the case of town residents, there is little difference between the two. On balance, therefore, we might assert that the high order retail function of Kingsbridge town centre is of greater importance than the low order function, an observation which appears to be largely due to the influence of the edge-of-town supermarket (which stocks mainly low order goods). However, further analysis of the data is required before drawing any firm conclusions. It is perhaps surprising to note that the surrounding villages account for as much as 9.0% of all local high order consumption expenditure, a figure which rises to 14.3% in the case of hinterland households (see Figure 7.4A). This is likely to be due to the purchase of horticultural goods, and of high order services such as gardening, plumbing and vehicle servicing.

Moving further out into the 'footprint', we find that the remainder of the district accounts for 15.2% of all high order consumption expenditure and 13.2% of all high order trips, indicating that the average transaction value increases with distance travelled. This observation is consistent with Christallers' Central Place Theory and is further supported by the ratios between financial value and number of transactions evident in the Devon and UK sectors. An exception to this is the nearest regional centre of Plymouth, where 13.9% of high order consumption expenditure is associated with 17.7% of all respective transactions. Again, this may well be due to journey 'chaining' activities of commuters into the centre noted in previous sections.

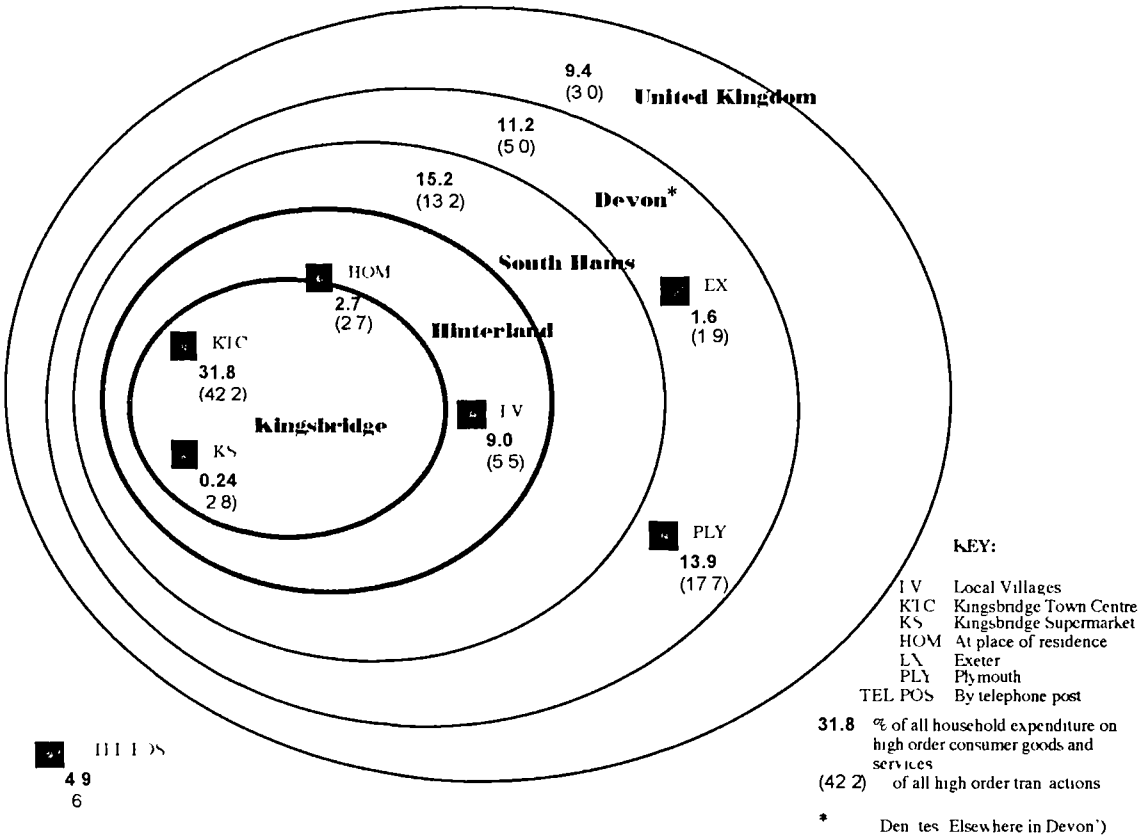



**Figure 7.5:** **The 'economic footprint' of Kingsbridge households:** given by the proportion of high order transactions by value and number

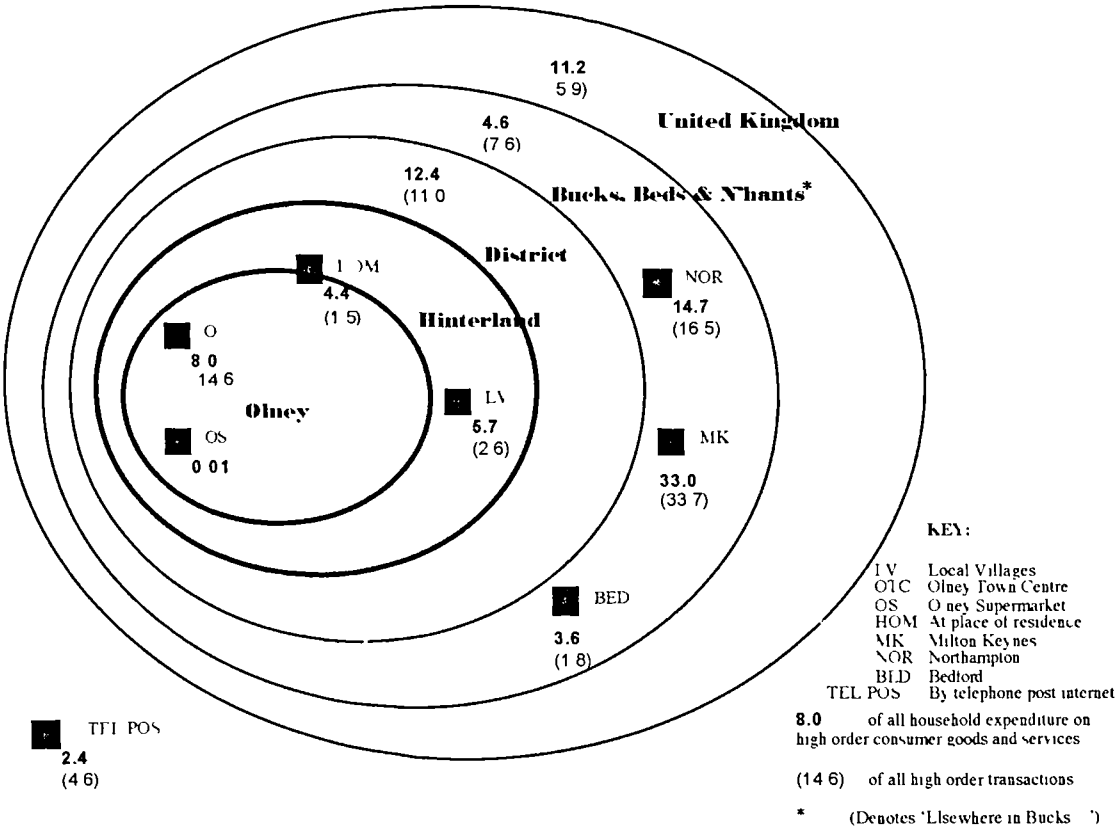



**Figure 7.6:** **The 'economic footprint' of Olney households:** given by the proportion of high order transactions by value and number

Figure 7.6 illustrates the 'economic footprint' of Olney in terms of high order consumption and activity patterns. It can be seen from the data that Olney town centre accounts for only 8.0% of all high order consumption expenditure of local residents, which helps to paint a clearer picture of the function of the town in the local economy. The data in Figures 7.7A and 7.8A indicate that this rises to 13.9% for Olney residents, although it falls to only 3.5% for residents of the hinterland. Again, the influence of the three regional centres, particularly Milton Keynes and Northampton, is evident as we move further out into the footprint. Milton Keynes accounts for 33.0% of all high order consumption expenditure and an equivalent proportion of all related transactions. In fact, this rises to 51.8% and 46.1% respectively for town residents, which illustrates the popularity of the 'regional shopping centre' located in the city. As expected, Northampton is a more utilised centre by hinterland residents for the reasons noted in the previous section. Interestingly, these households also attribute 16.5% of all high order consumption expenditure to locations elsewhere in the United Kingdom, possibly to Birmingham, which is located approximately 50 miles North West of Northampton.

The spatial data indicates that, in terms of the high order function, there is a considerable difference between the two case study towns. The proportion of high order goods and services purchased in Olney town centre is much smaller than in Kingsbridge. Thus, with the supermarket of no real significance in this sector, the 'pull' of nearby regional centres is crucial to its functionality.

## 7.2 Economic integration into locality

The chapter now moves on to test the second phase of operational hypotheses developed in section 3.4. The analysis begins by addressing the first set of hypotheses presented in Figure 7.7, which are concerned with a direct comparison between the two settlements in

terms of local consumer integration. It then moves on to test the remaining hypotheses using bi-variate non-parametric statistical techniques, before developing multivariate prediction models to assess the relative importance of each household type on the strength of local integration.

| | |
|---|---|
| $H_0^1$ | There is no significant difference in the proportion of low order consumption expenditure attributed to the respective (i) localities and (ii) districts between 'remote' and 'accessible' rural households. |
| $H_a^1$ | There is a significant difference in the proportion of low order consumption expenditure attributed to the respective (i) localities and (ii) districts, with 'remote' rural households exhibiting the highest proportions. |
| $H_0^2$ | There is no significant difference in the proportion of high order consumption expenditure attributed to the respective (i) localities and (ii) districts between 'remote' and 'accessible' rural households. |
| $H_a^2$ | There is a significant difference in the proportion of high order consumption expenditure attributed to the respective (i) localities and (ii) districts, with 'remote' rural households exhibiting the highest proportions. |

**Figure 7.7: Operational hypotheses:** developed to compare 'remote' and 'accessible' rural settlements in respect of local consumer economic integration

As is the case of the analysis presented in section 6.2, the hypotheses can be tested in two ways. First, we can examine the *absolute* proportions of low order and high order expenditure which is attributed to (i) *the locality* and (ii) *the district*. This is equivalent to the type of data presented in Figures 7.1 to 7.6. The absolute proportions are derived by, first, calculating the sum of all low and high order expenditure for all households surveyed in the study areas and, second, calculating the percentage of total expenditure which is attributed to the respective geographical areas.

Table 7.1 presents the results of this analysis. As in the case of corporate activity, it is evident that Kingsbridge is much more strongly integrated to its locality, particularly in respect of high order goods and services. Residents of the Kingsbridge study area attribute 77.8% of low order and 41.1.0% of high order consumption expenditure to the immediate

locality, in comparison to 36.0% and 13.7% respectively for equivalent households in the 'accessible' rural locality.

| Transaction type | Kingsbridge | *n* | Olney | *n* |
|---|---|---|---|---|
| **(i) LOCALITY** | | | | |
| **Low order** | 77.8 | *341* | 36.0 | *272* |
| **High order** | 41.1 | *341* | 13.7 | *272* |
| **(ii) DISTRICT** | | | | |
| **Low order** | 89.9 | *341* | 51.1 | *272* |
| **High order** | 56.3 | *341* | 26.1 | *272* |

**Table 7.1: Economic integration of settlements to locality:** *Absolute* proportions of low and high order expenditure attributed to the local economy

A similar scenario exists for the degree of economic integration into the district, although the differences are not quite so marked. In the case of low order purchases, 89.9% of attributed consumption expenditure compares to 51.1%, and when the boundary of the local economy is extended to include the district 56.3% of expenditure on high order goods and services compares to 26.1% in the 'accessible' locality. It is also worth noting that the two study areas account for a higher proportion of low order consumption expenditure than they do high order which is a further indication of the way in which the settlements function in their respective local economies[1]. This method of analysis presents some very clear findings regarding the degree of local economic integration into the two study areas. However, it does not allow us to test the hypotheses statistically, nor predict the probability of the same result being obtained for a different sample from the same population. In light of this, the second method involves calculating the *mean* proportions of low and high order consumption expenditure attributed to the local economy for all households in each study

[1]The study area includes the town centre, supermarket and surrounding local villages. In section 5.3.3 it was found that purchases of high order goods and services made up a greater proportion of all expenditure in Kingsbridge town centre than did low order purchases. Thus, the data in Table 7.1 clearly illustrates the influence of the edge-of-town supermarket, both on local expenditure patterns and on the functionality of the settlement in its local economy.

area, and applying a non-parametric Mann-Whitney U test to examine the significance of the result. The results of this analysis are presented by the data in Table 7.2.

| Transaction type | Kingsbridge | *n* | Olney | *n* | Probability for *U* test $H_{0:} p^1 = p^2$ * |
|---|---|---|---|---|---|
| **(i) LOCALITY** | | | | | |
| Low order | 80.9 | *340* | 37.7 | *271* | **0.0000** |
| High order | 49.6 | *301* | 15.2 | *247* | **0.0000** |
| **(ii) DISTRICT** | | | | | |
| Low order | 91.2 | *340* | 52.6 | *271* | **0.0000** |
| High order | 63.7 | *301* | 29.3 | *247* | **0.0000** |

* 1 tailed probability

**Table 7.2: Economic integration of settlements to locality:** *Mean* of low and high order expenditure attributed to the local economy[2]

The results of statistical analysis presented in Table 7.2 clarify those revealed by the data in Table 7.1, and is so doing produce some very conclusive findings with regard to the differences between the two settlements in terms of local economic integration. In respect of both low and high order consumption expenditure, households in and around Kingsbridge show significantly stronger ties to both the locality and the district than do those in and around Olney, results which are highly significant beyond the 99% level. This leads us to reject both $H_0^1$ and $H_0^2$ and conclude that the settlement in the 'remote' rural area is more strongly integrated to its locality than the settlement in the 'accessible' rural area.

[2] The variation in sample size from Table 7.1 is due to the fact that some households did not report any expenditure on the respective goods and services over the previous 30 days at the time of completing the questionnaire. Due to the fact that, in theory, every household makes both low and high order purchases at some time, this effectively results in missing data.

### 7.2.1 Further hypotheses testing

In this section further bi-variate analysis is presented to test the remaining operational hypotheses developed in section 3.4. For each hypothesis, a non-parametric Mann-Whitney U test is employed to test the strength of economic integration to (i) the locality and (ii) the district in each study area. The dependent variables are again based on mean proportions of low and high order consumption expenditure attributed to the respective geographical areas. The results of the analyses are presented by the data in Tables 7.3, 7.4, 7.5 and 7.6.

The data presented in Table 7.3 illustrates that, in terms of low order consumption expenditure, household activity patterns in the Kingsbridge study area conform strongly to that of existing empirical evidence. Lower income groups, lower social groups, non-car owners, local employees, town households and indigenous residents all exhibit significantly stronger ties to locality than do their relevant counterparts. Only two out of the fourteen null hypotheses are accepted, although the relevant probabilities indicate that there is less variation between town and hinterland households in terms of low order expenditure at the district level. The key finding from this set of results is that family stage is not a predictor of local consumer integration when considered in isolation from all other factors. A second major observation is there is little distinction between the immediate locality and the district in terms of the differences in economic activity patterns by local consumers.

Moving on to Table 7.4, the first point to note is that there are fewer variables showing statistically significant differences in terms of the proportion of high order consumption expenditure within the local economy. However, car ownership is again a very important predictor when considered in isolation, with access to the private car being a key reason for more widely dispersed activity patterns.

| KINGS (low order) | (i) Locality | | | | | | | (ii) District | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Household type (Group)** | ***n*** | **Mean** | **St. Dev** | **Mean rank** | **U** | **Z** | **Probability $H_0$: I = II** | ***n*** | **Mean** | **St. Dev** | **Mean rank** | **U** | **Z** | **Probability $H_0$: I = II** |
| **Family stage:** | *340* | **80.9** | **29.1** | | | | | *340* | **91.2** | **21.2** | | | | |
| Ret/young families (I) | *164* | 83.2 | 26.9 | 175.9 | 13554. | -.9986 | 0.1590* | *164* | 91.1 | 21.7 | 172.3 | 14144. | -.3664 | 0.7141** |
| Other stages (II) | *176* | 78.8 | 30.9 | 165.5 | 5 | | | *176* | 91.3 | 20.7 | 168.9 | 5 | | |
| **Income group:** | *320* | **80.8** | **29.3** | | | | | *320* | **91.0** | **21.7** | | | | |
| Lower (I) | *166* | 84.9 | 28.0 | 180.6 | 9439.0 | -4.163 | **0.0001*** | *166* | 93.4 | 20.2 | 173.9 | 10559. | -3.107 | **0.0010*** |
| Higher (II) | *154* | 76.3 | 30.0 | 138.8 | | | | *154* | 88.4 | 23.0 | 146.1 | 5 | | |
| **Social class:** | **190** | **80.6** | **29.0** | | | | | *190* | **92.6** | **18.0** | | | | |
| Lower (I) | 49 | 89.1 | 20.2 | 113.49 | 2573.0 | -2.724 | **0.0032*** | *49* | 97.3 | 14.7 | 105.3 | 2973.0 | -1.652 | **0.0493*** |
| Higher (II) | 141 | 77.7 | 30.9 | 89.25 | | | | *141* | 90.8 | 20.1 | 92.1 | | | |
| **Car ownership:** | *335* | **80.7** | **29.2** | | | | | *335* | **91.1** | **21.3** | | | | |
| Non-car owners (I) | *41* | 94.5 | 16.9 | 232.3 | 3391.0 | -4.676 | **0.0001*** | *41* | 97.2 | 7.6 | 195.7 | 4889.5 | -2.255 | **0.0121*** |
| Car owners (II) | *294* | 78.8 | 30.1 | 159.0 | | | | *294* | 90.2 | 22.4 | 164.1 | | | |
| **Workplace** | *151* | **81.7** | **28.1** | | | | | *151* | **91.6** | **19.9** | | | | |
| Local employees (I) | *111* | 85.6 | 24.4 | 81.7 | 1584.5 | -2.755 | **0.0030*** | *111* | 93.3 | 18.3 | 79.8 | 1795.0 | -2.037 | **0.0208*** |
| Commuters (II) | *40* | 70.8 | 34.7 | 60.1 | | | | *40* | 86.9 | 23.4 | 65.4 | | | |
| **Household location** | *340* | **80.9** | **29.1** | | | | | *340* | **91.2** | **21.2** | | | | |
| Town (I) | *169* | 87.7 | 21.1 | 190.8 | 11016. | -3.904 | **0.0001*** | *169* | 94.3 | 14.8 | 177.9 | 13207. | -1.5825 | **0.0568*** |
| Hinterland (II) | *171* | 74.1 | 34.0 | 150.4 | 5 | | | *171* | 88.1 | 25.6 | 163.2 | 0 | | |
| **Length of residence** | *340* | **80.9** | **29.1** | | | | | *340* | **91.2** | **21.2** | | | | |
| Indigenous (I) | *73* | 86.2 | 25.1 | 190.6 | 8279.5 | -2.030 | **0.0212*** | *73* | 95.1 | 15.8 | 186.3 | 8593.0 | -1.787 | **0.0370*** |
| Newcomers (II) | *267* | 79.4 | 30.0 | 165.0 | | | | *267* | 90.1 | 22.3 | 166.2 | | | |

* 1-tailed probability ** 2-tailed probability

**Table 7.3: Local economic integration of Kingsbridge households:** Bi-variate analysis of low order expenditure attributed to the local economy

| KINGS (high order) | (i) Locality | | | | | | | (ii) District | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Household type (Group)** | ***n*** | **Mean** | **St. Dev** | **Mean rank** | **U** | **Z** | **Probability $H_0$: I = II** | ***n*** | **Mean** | **St. Dev** | **Mean rank** | **U** | **Z** | **Probability $H_0$: I = II** |
| **Family stage:** | ***301*** | **49.6** | **39.8** | | | | | ***301*** | **63.7** | **38.5** | | | | |
| Ret/young families (I) | *142* | 55.9 | 40.8 | 165.3 | 9265.0 | -2.702 | **0.0035*** | *142* | 73.2 | 35.5 | 173.6 | 8080.5 | -4.355 | **0.0001*** |
| Other stages (II) | *159* | 43.9 | 38.2 | 138.3 | | | | *159* | 55.3 | 39.2 | 130.8 | | | |
| **Income group:** | ***283*** | **48.7** | **39.9** | | | | | ***283*** | **62.9** | **38.7** | | | | |
| Lower (I) | *135* | 50.3 | 41.5 | 146.0 | 9448.0 | -.7930 | 0.2139* | *135* | 66.9 | 39.4 | 153.7 | 8406.0 | -2.353 | **0.0093*** |
| Higher (II) | *148* | 47.3 | 38.4 | 138.3 | | | | *148* | 59.2 | 37.9 | 131.3 | | | |
| **Social class:** | ***172*** | **45.9** | **38.5** | | | | | ***172*** | **56.7** | **38.3** | | | | |
| Lower (I) | *38* | 55.6 | 41.5 | 101.2 | 1988.0 | -2.069 | **0.0193*** | *38* | 66.1 | 38.5 | 100.8 | 2001.5 | -2.031 | **0.0212*** |
| Higher (II) | *134* | 43.1 | 37.4 | 82.3 | | | | *134* | 54.0 | 38.0 | 82.4 | | | |
| **Car ownership:** | ***296*** | **49.1** | **39.7** | | | | | ***296*** | **63.8** | **38.4** | | | | |
| Non-car owners (I) | *25* | 72.6 | 35.3 | 204.7 | 1983.5 | -3.450 | **0.0003*** | *25* | 80.4 | 30.7 | 186.0 | 2449.5 | -2.3432 | **0.0096*** |
| Car owners (II) | *271* | 47.3 | 39.5 | 143.3 | | | | *271* | 62.3 | 38.7 | 145.0 | | | |
| **Workplace** | ***138*** | **42.5** | **38.0** | | | | | ***138*** | **53.6** | **38.9** | | | | |
| Local employees (I) | *102* | 45.2 | 38.8 | 72.6 | 1516.5 | -1.555 | **0.0600*** | *102* | 55.8 | 39.2 | 71.9 | 1594.5 | -1.1804 | 0.1189* |
| Commuters (II) | *36* | 34.6 | 35.2 | 60.6 | | | | *36* | 47.3 | 38.0 | 62.8 | | | |
| **Household location** | ***301*** | **49.6** | **39.8** | | | | | ***301*** | **63.7** | **38.5** | | | | |
| Town (I) | *146* | 54.1 | 39.8 | 162.5 | 9635.0 | -2.240 | **0.0126*** | *146* | 63.2 | 38.5 | 151.1 | 1129.5 | -.0224 | 0.9822** |
| Hinterland (II) | *155* | 45.3 | 39.5 | 140.2 | | | | *155* | 64.3 | 38.5 | 150.9 | | | |
| **Length of residence** | ***301*** | **49.6** | **39.8** | | | | | ***301*** | **63.7** | **38.5** | | | | |
| Indigenous (I) | *61* | 55.3 | 40.8 | 164.3 | 6508.5 | -1.346 | **0.0893*** | *61* | 65.0 | 40.3 | 154.9 | 7081.0 | -.4028 | 0.3436* |
| Newcomers (II) | *240* | 48.1 | 39.5 | 147.6 | | | | *240* | 63.4 | 38.1 | 150.0 | | | |

* 1-tailed probability ** 2-tailed probability

**Table 7.4: Local economic integration of Kingsbridge households:** Bi-variate analysis of high order expenditure attributed to the local economy

Interestingly, family stage is an important predictor of local integration when considered in terms of high order consumer activity; retired households and young families are more strongly tied to both the locality and district, results which are highly significant beyond the 99% level. This is likely to be partially accounted for by the strong association between family stage and the level of car ownership: 20.1% of this household group do not own a car, as opposed to 6.9% in the case of other family stages [*].

Apart from social class, which is consistent at both geographical levels, we find four important variations in economic behaviour where high order purchases are concerned. First, although there is no significant difference between the strength of integration into the locality between income groups, this changes when the boundary is extended to include the district, with lower income groups attributing a significantly higher proportion of expenditure to the local economy than those on higher incomes. It would therefore follow that higher income households are making more use of Devon's regional centres, such as Plymouth, Torquay and Exeter for high order trips, most likely due to a higher prevalence of car ownership among them. Indeed, further analysis of the data reveals that 83% of the higher income group most commonly use a car for shopping trips, in comparison to only 59% of the lower income group. Second, there is an inverse scenario in the case of town versus hinterland households. Although town residents are more strongly integrated into the immediate locality than those residing in the hinterland, there is almost no difference between the two groups when the boundary of the local economy is extended to include the district. This is logical given that there are no other settlements in the South Hams district which have high order functions any more important than that of Kingsbridge. Third, indigenous residents appear to be more strongly tied to their locality than newcomers, although this is not the case when the boundary of the local economy is extended to include the district. Indeed, this result illustrates the preference for indigenous households

to shop for high order goods in their local town as opposed to other market towns in the district.

Finally, the results of the bi-variate analysis indicate that households where the key shopper works within the Kingsbridge study area are more strongly tied to the locality than those where this individual commutes outside it to work. However, this does not follow for high order purchases in the district. Thus, the findings would appear to indicate that it is the purchase of low order goods and services that are more commonly associated with the work journey, with high order purchases demanding independent trips solely for that purpose. However, further analysis is required to assess the relative importance of this variable before drawing any firm conclusions.

Moving on to the equivalent analysis for the 'accessible' locality, we find less variation between household type with respect to local economic integration, which is logical given the degree of integration into locality of the settlement as a whole. In the case of low order integration into the immediate locality, the analysis leads us to reject four out of the seven null hypotheses, with each result following the same direction as that indicated in the literature. Non-car owners, local employees, town residents and indigenous households all show significantly stronger ties to the locality than do their respective comparator groups, results which are all significant beyond the 99% level. When the boundary of the local economy is extended to include the district, bi-variate analysis produces a similar set of results, although at this geographical level there is no significant difference in the strength of local integration between town and hinterland residents. Unlike the 'remote' rural locality, there is no significant difference between income and social groups in respect of integration into the local economy.

| OLNEY (low order) | (i) Locality | | | | | | | (ii) District | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Household type (Group)** | ***n*** | **Mean** | **St. Dev** | **Mean rank** | **U** | **Z** | **Probability $H_0$: I = II** | ***n*** | **Mean** | **St. Dev** | **Mean rank** | **U** | **Z** | **Probability $H_0$: I = II** |
| **Family stage:** | *270* | **37.7** | **34.8** | | | | | *270* | **52.6** | **37.7** | | | | |
| Ret/young families (I) | *107* | 41.8 | 37.9 | 141.4 | 8086.0 | -1.012 | 0.1559* | *107* | 53.4 | 38.9 | 136.6 | 8598.5 | -1.949 | 0.4228* |
| Other stages (II) | *163* | 35.0 | 32.3 | 131.6 | | | | *163* | 52.1 | 36.9 | 134.8 | | | |
| **Income group:** | *258* | **36.5** | **34.1** | | | | | *258* | **51.9** | **37.3** | | | | |
| Lower (I) | *60* | 36.3 | 36.9 | 127.2 | 5800.5 | -.2756 | 0.7828** | *60* | 51.2 | 40.2 | 128.7 | 5894.5 | -.0901 | 0.9282** |
| Higher (II) | *198* | 36.6 | 33.4 | 130.2 | | | | *198* | 52.1 | 36.5 | 129.7 | | | |
| **Social class:** | *203* | **36.5** | **32.8** | | | | | *203* | **51.4** | **36.4** | | | | |
| Lower (I) | *28* | 41.3 | 34.6 | 110.8 | 2203.0 | -.8560 | 0.1960* | *28* | 56.9 | 38.0 | 114.2 | 2109.0 | -1.183 | 0.1184* |
| Higher (II) | *175* | 35.7 | 32.5 | 100.6 | | | | *175* | 50.5 | 36.1 | 100.1 | | | |
| **Car ownership:** | *268* | **37.9** | **34.8** | | | | | *268* | **53.0** | **37.6** | | | | |
| Non-car owners (I) | *20* | 59.4 | 43.6 | 173.7 | 1697.0 | -2.349 | **0.0094*** | *20* | 67.4 | 41.1 | 165.2 | 1866.5 | -1.845 | **0.0325*** |
| Car owners (II) | *248* | 36.2 | 33.5 | 131.3 | | | | *248* | 51.8 | 37.1 | 132.0 | | | |
| **Workplace** | *157* | **35.9** | **32.7** | | | | | *157* | **51.2** | **36.4** | | | | |
| Local employees (I) | *42* | 43.2 | 31.1 | 93.0 | 1826.0 | -2.336 | **0.0098*** | *42* | 58.7 | 35.3 | 90.0 | 1951.0 | -1.844 | **0.0326*** |
| Commuters (II) | *115* | 33.2 | 33.0 | 73.9 | | | | *115* | 48.5 | 36.6 | 75.0 | | | |
| **Household location** | *268* | **37.5** | **34.7** | | | | | *268* | **52.2** | **37.6** | | | | |
| Town (I) | *139* | 46.8 | 35.3 | 157.8 | 5721.5 | -5.119 | **0.0000*** | *139* | 54.4 | 36.0 | 140.0 | 8208.0 | -1.1981 | 0.1155* |
| Hinterland (II) | *129* | 27.5 | 31.2 | 109.4 | | | | *129* | 49.9 | 39.3 | 128.6 | | | |
| **Length of residence** | *271* | **37.7** | **34.7** | | | | | *271* | **52.6** | **37.6** | | | | |
| Indigenous (I) | *45* | 51.9 | 38.6 | 161.8 | 3925.5 | -2.416 | **0.0079*** | *45* | 67.1 | 36.7 | 166.8 | 3701.0 | -2.890 | **0.0019*** |
| Newcomers (II) | *226* | 34.9 | 33.2 | 130.9 | | | | *226* | 49.7 | 37.2 | 129.9 | | | |

* 1-tailed probability ** 2-tailed probability

**Table 7.5: Local economic integration of Olney households:** Bi-variate analysis of low order expenditure attributed to the local economy

| OLNEY (high order) | (i) Locality | | | | | | | (ii) District | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Household type (Group)** | ***n*** | **Mean** | **St. Dev** | **Mean rank** | **U** | **Z** | **Probability $H_0$: I = II** | ***n*** | **Mean** | **St. Dev** | **Mean rank** | **U** | **Z** | **Probability $H_0$: I = II** |
| **Family stage:** | *246* | **15.2** | **28.7** | | | | | *246* | **29.4** | **37.4** | | | | |
| Ret/young families (I) | *95* | 16.9 | 30.9 | 127.0 | 6835.5 | -.7210 | 0.2355* | *95* | 28.1 | 36.7 | 120.4 | 6874.5 | -.5717 | 0.5675** |
| Other stages (II) | *151* | 14.1 | 27.3 | 121.3 | | | | *151* | 30.2 | 38.0 | 125.5 | | | |
| **Income group:** | *237* | **15.0** | **28.6** | | | | | *237* | **29.4** | **37.7** | | | | |
| Lower (I) | *51* | 20.4 | 36.5 | 121.8 | 4599.5 | -.1105 | 0.3499* | *51* | 32.2 | 42.7 | 118.1 | 4697.0 | -.1105 | 0.4560* |
| Higher (II) | *186* | 13.6 | 26.0 | 118.2 | | | | *186* | 28.6 | 36.3 | 119.3 | | | |
| **Social class:** | *191* | **13.3** | **25.7** | | | | | *191* | **27.6** | **35.6** | | | | |
| Lower (I) | *25* | 7.5 | 24.9 | 75.0 | 1550.0 | -2.379 | **0.0173**** | *25* | 22.1 | 38.9 | 77.3 | 1606.5 | -1.889 | **0.0588**** |
| Higher (II) | *166* | 14.2 | 25.8 | 99.2 | | | | *166* | 28.4 | 35.1 | 98.8 | | | |
| **Car ownership:** | *245* | **15.2** | **28.7** | | | | | *245* | **29.5** | **37.5** | | | | |
| Non-car owners (I) | *16* | 22.1 | 39.8 | 128.5 | 1744.0 | -.3728 | 0.3547* | *16* | 28.4 | 43.8 | 112.9 | 1670.5 | -.6139 | 0.5393** |
| Car owners (II) | *229* | 14.7 | 27.9 | 122.6 | | | | *229* | 29.5 | 37.1 | 123.7 | | | |
| **Workplace** | *147* | **12.4** | **24.9** | | | | | *147* | **27.8** | **36.1** | | | | |
| Local employees (I) | *38* | 22.1 | 30.7 | 88.3 | 1527.5 | -2.885 | **0.0019*** | *38* | 36.6 | 40.4 | 83.1 | 1726.5 | -1.592 | **0.0557*** |
| Commuters (II) | *109* | 9.1 | 21.8 | 69.0 | | | | *109* | 24.8 | 34.1 | 70.8 | | | |
| **Household location** | *244* | **15.1** | **28.6** | | | | | *244* | **29.4** | **37.5** | | | | |
| Town (I) | *123* | 18.6 | 30.8 | 134.3 | 5992.0 | -3.059 | **0.0011*** | *123* | 28.5 | 36.5 | 124.7 | 7167.0 | -.5190 | 0.6037** |
| Hinterland (II) | *121* | 11.6 | 25.9 | 110.5 | | | | *121* | 30.3 | 38.6 | 120.2 | | | |
| **Length of residence** | *247* | **15.2** | **28.6** | | | | | *247* | **29.3** | **37.4** | | | | |
| Indigenous (I) | *39* | 18.4 | 34.5 | 125.3 | 4004.0 | -.1473 | 0.4415* | *39* | 40.8 | 43.8 | 143.3 | 3304.0 | -1.914 | **0.0279*** |
| Newcomers (II) | *208* | 14.6 | 27.5 | 123.8 | | | | *208* | 27.1 | 35.7 | 120.4 | | | |

* 1-tailed probability ** 2-tailed probability

**Table 7.6: Local economic integration of Olney households:** Bi-variate analysis of high order expenditure attributed to the local economy

Moving on to the analysis involving mean proportions of high order consumption expenditure, the most interesting finding is that local employees continue to exhibit stronger ties to the local economy. This result is statistically significant at both the locality and district levels, although in the case of the latter it is only significant beyond the 90% level. In the case of the 'accessible' locality it would therefore appear that high order purchasing patterns are also strongly influenced by workplace, although again further analysis is required before drawing any firm conclusions.

Although there is a significant difference between social groups in respect of local ties, the results do not conform to that of existing empirical evidence. The results indicate that, in the 'accessible' rural locality, residents in the higher social groups are more strongly integrated into both the locality and the district with respect to high order consumption expenditure than are those in the lower social groups. In terms of household characteristics this represents one of the most surprising contrasts between the two study areas. It would appear that those residents in the two lowest social groups make the majority of high order purchases in adjacent regional centres, and not in their local town as they do in the 'remote' rural area. However, an important point to note is such groups make up a minority of the population in the Olney locality, whereas in Kingsbridge there is a more even spread across groups.

The results presented by the data in Table 7.6 lead to the rejection of two further null hypotheses developed in section 3.4, both which conform to existing empirical evidence found in the literature. Town households exhibit significantly stronger ties to the immediate locality than do their hinterland counterparts, although this is not sustained when the boundary of the local economy is extended to include the district. In fact, hinterland residents attribute a slightly higher proportion of consumption expenditure to the district, which is logical given the spatial proximity of relevant firms to the place of

residence. In the case of the indigineity variable the picture is reversed, with indigenous residents showing significantly stronger ties to the district, but not to the immediate locality. This would imply that indigineity may be an important predictor with regard to fostering economic development in the villages and hamlets of the peri-urban fringe. However, more conclusive judgement will be left until the variable is modelled alongside other important predictors of local integration.

## 7.3 Multivariate analysis: development of prediction models

The bi-variate analysis has allowed specific hypotheses to be tested about the systematic variation in the strength of local economic linkages between different types of household. However, the data allows the hypotheses to be explored further and key characteristics of locally integrated households in the study areas to be identified. As in the case of the analysis involving firm types presented in section 6.3, a series of logistic regression models are fitted to the data, with all dependent variables representing a distinction between strong and weak levels of local economic integration. The aim is to examine the relationship between household type and the strength of integration to locality. More importantly, it is to identify the 'relative importance' of household types to achieving strong integration to locality. In other words, how much does each household characteristic contribute to the ability to predict the strength of local integration, and which variables are better, or worse, predictors of the strength of local integration?

For reasons described in section 4.6, the dependent variables used in bi-variate analysis, based on proportions of consumption expenditure on low and high order goods and services, are transformed into dichotomous variables representing weak integration (0) vs. strong integration (1). These are illustrated in Figure 7.8.

**Y(LOW ORDER):**
0 = Below mean* proportion of consumption expenditure attributed to locality / district

1= Above mean* proportion of consumption expenditure attributed to locality / district

**Y(HIGH ORDER):**
0 = Below mean* proportion of consumption expenditure attributed to locality / district

1= Above mean* proportion of consumption expenditure attributed to locality / district

(* mean for entire sample)

The 'event' (Y=1) therefore represents strong economic integration into locality.

**Figure 7.8: Derivation of dependent variables for multivariate analysis**

The independent variables $(X_1, X_2 \ldots X_k)$ are also dichotomous, representing in each case an important household type identified in the literature versus a relevant comparator[3]. As discussed in section 4.7.1, this follows a method of specification employed by Russell (1997) in modelling the geographic effects on British voting behaviour. The logistic regression model is then used to predict the probability that households will exhibit strong economic integration into their local economy[4].

### 7.3.1 Specification of prediction models

A model building strategy, as suggested by Hosmer Lemeshow (1989), was followed in order to produce a series of prediction models which are as accurate, robust and reliable as possible[5]. The strategy included testing for collinearity, zero cells, influential cases and a process for including interaction terms to avoid nonadditivity. A total of eight models are presented, four relating to each study area, representing analysis of economic integration

[3] See Appendix P for derivation of independent variables.

[4] *Local economy* is operationalised in section 3.3.2, and involves analysis of economic integration into two sets of designated geographical areas termed (i) the *locality* and (ii) the *district.*

[5] The model specification process followed is set out in section 4.7.1

into (i) the locality, and (ii) the district, by way of consumption expenditure on (a) low order goods and services; and (b) high order goods and services in each case.

### 7.3.2 Collinearity diagnostics

Following model specification, a linear regression model was fitted to the data to obtain tolerance statistics and $R^2$ values for each predictor when treated as the dependent variable with all other predictors as independents (Menard, 1995). The resultant collinearity diagnostics are presented in Table 7.7.

| TERM | I | II | III | IV | V | VI | VII | VII |
|---|---|---|---|---|---|---|---|---|
| Non car owners (vs. car owners) | .86 | .84 | .93 | .96 | .85 | .88 | .87 | .82 |
| | (.13) | (.15) | (.15) | (.05) | (.14) | (.11) | (.15) | (.17) |
| Commuters (vs. other) | .67 | .83 | .86 | .87 | .58 | .69 | .66 | .60 |
| | (.32) | (.16) | (.14) | (.13) | (.41) | (.30) | (.33) | (.39) |
| Retired / young fam (vs. other) | - | .78 | .53 | .83 | .71 | - | .72 | .71 |
| | | (.22) | (.49) | (.18) | (.28) | | (.29) | (.28) |
| Lower income (vs. higher) | .72 | .83 | .35 | - | .56 | .62 | .55 | .56 |
| | (.27) | (.17) | (.65) | | (.43) | (.37) | (.45) | (.43) |
| Indigenous (vs. newcomers) | .91 | .97 | .89 | .91 | .53 | .85 | .87 | .49 |
| | (.08) | (.03) | (.06) | (.07) | (.46) | (.14) | (.13) | (.50) |
| Town (vs. hinterland) | .95 | .95 | .96 | - | .96 | .96 | .95 | .94 |
| | (.04) | (.05) | (.03) | | (.03) | (.03) | (.03) | (.05) |
| Low social (vs. other) | .85 | - | .84 | .92 | .75 | .84 | .78 | .75 |
| | (.14) | | (.24) | (.08) | (.24) | (.15) | (.21) | (.24) |
| Low y commuters (vs. other) | .66 | - | | - | - | - | - | - |
| ($X_5 * X_2$) | (.33) | | | | | | | |
| Low y Ret /Yng Fam (vs. other) | - | - | .25 | - | - | - | - | - |
| ($X_1 * X_2$) | | | (.77) | | | | | |
| Indigenous commuters (vs. other) | - | - | - | - | .51 | - | - | .46 |
| ($X_5 * X_7$) | | | | | (.48) | | | (.53) |

**Table 7.7: Results of testing for collinearity between independent variables:** for all prediction models (I - VIII)[6]

[7] Results show tolerance statistics with $R^2$ values given in parenthesis

The collinearity diagnostics indicate that, although there is evidence of some collinearity between predictors, particularly in the case of the interaction between income group and family stage, levels of collinearity are not high enough to cause problems in terms of model specification. According to Menard (1995), only tolerance levels less than .20 and $R^2$ values more than .80 are cause for concern. Therefore, in respect of collinearity, inferences can be drawn from the models with a high degree of confidence.

### 7.3.3 Model diagnostics

Careful analysis of appropriate residuals were carried out for all prediction models. In the case of all models, there were very few highly influential cases identified, with most problem cases being those for which the model worked poorly, revealed by studentised residuals outside Menard's (1995) threshold of plus or minus two. Following identification of such outliers, an average of 4.2% of cases were removed from the four Kingsbridge models and 4.7% from the models relating to the Olney data set.

### 7.3.4 Goodness-of-fit and predictive efficiency

As described in Appendix M, the most important indicators of good model fit are a statistically significant Model Chi-Square and an insignificant *p* value for Hosmer and Lemeshow's (1989) Goodness-of-fit test. On the basis of these statistics, all prediction models developed exhibit excellent model fit. Further goodness of fit statistics are also provided for each model: the Deviation Chi-Square *(-2 Log Likelihood)* and *Goodness of Fit,* both which should be insignificant for good model fit. Various $R^2$ values analogous to that produced by OLS linear regression and general factorial ANOVA, are also provided.

$R^2$ values range from .07 to .37, indicating weak to moderately strong associations between the variance of the dependent variable and relevant predictors across all models. On average, $R^2$ values are lower than in the case of the business models presented in section 6.3.6, which is in itself an interesting point for discussion. All household models are found to exhibit a reduction in the error of prediction as a result of fitting the model. Likewise, all *d* statistics are highly significant beyond the 99% level, apart from two which are significant beyond the 95% level, indicating that all prediction models significantly improve our ability to predict the classification of cases into values of the dependent variable.

### 7.3.5 External validation

Following the suggestions of Hair *et al.* (1998), steps were taken to externally validate all household models as each contained over 100 cases. To examine if the relevant models were performing in an over-optimistic manner on the development data set, samples were subsequently divided into two validation samples, one containing 60% of observations and one 40% (Hair *et al.* 1998). Goodness of fit and predictive efficiency measures were then calculated and compared to the development data set models. The results of the exercise, presented in Table 7.8, indicate no real causes for concern. None of the eight models appear to be performing in an over optimistic manner, either in respect of model fit or predictive efficiency. In fact, in the case of Model III, $R^2$ and lambda *p* values are actually lower for the development set than for the two validation samples, indicating a slightly pessimistic development model. The key point to note is that, although there are some variations between the relevant measures, most likely caused by a reduction in sample size in the validation models, all comparative Model Chi-Squares are statistically significant and no major variations exist between $R_L^2$ and lambda-*p* values.

| Model I | Sig. Model Chi-Square | $R_L^2$ | Cases correctly classified | lambda-*p* | Sig. Binomial *d* |
|---|---|---|---|---|---|
| Development set | 0.0000 | 0.15 | 73.22 | 0.63 | 0.0000 |
| Sample A (60%) | 0.0001 | 0.17 | 72.03 | 0.62 | 0.0000 |
| Sample B (40%) | 0.0115 | 0.15 | 71.43 | 0.60 | 0.0000 |
| **Model II** | | | | | |
| Development set | 0.0000 | 0.15 | 80.93 | 0.76 | 0.0000 |
| Sample A (60%) | 0.0296 | 0.11 | 82.14 | 0.78 | 0.0000 |
| Sample B (40%) | 0.0142 | 0.16 | 76.84 | 0.71 | 0.0000 |
| **Model III** | | | | | |
| Development set | 0.0000 | 0.14 | 65.17 | 0.25 | 0.0003 |
| Sample A (60%) | 0.0009 | 0.16 | 64.46 | 0.28 | 0.0008 |
| Sample B (40%) | 0.0000 | 0.40 | 77.33 | 0.54 | 0.0000 |
| **Model IV** | | | | | |
| Development set | 0.0000 | 0.10 | 66.21 | 0.43 | 0.0000 |
| Sample A (60%) | 0.0002 | 0.13 | 68.94 | 0.55 | 0.0000 |
| Sample B (40%) | 0.0499 | 0.07 | 65.12 | 0.47 | 0.0000 |
| **Model V** | | | | | |
| Development set | 0.0000 | 0.25 | 76.34 | 0.27 | 0.0096 |
| Sample A (60%) | 0.0000 | 0.31 | 81.74 | 0.22 | 0.0853 |
| Sample B (40%) | 0.0059 | 0.29 | 74.60 | 0.23 | 0.0582 |
| **Model VI** | | | | | |
| Development set | 0.0068 | 0.07 | 59.89 | 0.18 | 0.0069 |
| Sample A (60%) | 0.0523 | 0.04 | 64.81 | 0.24 | 0.0110 |
| Sample B (40%) | 0.0945 | 0.12 | 62.12 | 0.22 | 0.0516 |
| **Model VII** | | | | | |
| Development set | 0.0000 | 0.20 | 83.63 | 0.20 | 0.0294 |
| Sample A (60%) | 0.0027 | 0.21 | 85.29 | 0.29 | 0.0681 |
| Sample B (40%) | 0.0012 | 0.40 | 86.21 | 0.33 | 0.0951 |
| **Model VIII** | | | | | |
| Development set | 0.0001 | 0.18 | 78.75 | 0.21 | 0.0436 |
| Sample A (60%) | 0.0021 | 0.22 | 81.25 | 0.28 | 0.0594 |
| Sample B (40%) | 0.0995 | 0.11 | 81.43 | 0.15 | 0.0853 |

**Table 7.8: Results of external validation for all prediction models**

### 7.3.6 Results from prediction models

Results from all prediction models are presented in Tables 7.9 to 7.16. Given its accuracy (Menard, 1995), the Likelihood Ratio test is used to evaluate statistical significance of the contribution of each of the independent variables to the model. As recommended by Hosmer and Lemeshow (1989), indicator contrasts, using dummy variable coding for independent variables, are employed to obtain correctly specified odds ratios and interaction effects. A constant is included in all models.

The data in Table 7.9 presents a local integration prediction model for Kingsbridge households according to low order consumption expenditure which is attributed to the immediate locality. The goodness of fit statistics indicate that the model fits the data extremely well. The Model Chi-Square is highly significant and the Hosmer and Lemeshow goodness of fit statistic is not, both indicating excellent model fit. As a prediction tool, the model is also highly efficient. With 83% of cases correctly classified, the model is approximately 33% more reliable at classifying an observation into a category of the dependent variable than is random guessing. Lambda-*p* indicates a moderately strong reduction in the error of prediction as a result of model fitting and the Binomial *d,* statistic indicates that the classification on the dependent variable is strongly related to values of the predictors. $R_L^2$ indicates a moderately weak association between the strength of local economic integration and household type, although the Nagelkerke measure indicates that 23% of the variance in the dependent variable can be explained by the predictor variables.

| GOODNESS OF FIT | Value | d.f | Significance |
|---|---|---|---|
| -2 Log Likelihood | 236.344 | 231 | |
| Model Chi-Square | 41.394 | 7 | 0.0000 |
| Goodness of Fit | 203.333 | 231 | |
| Hosmer and Lemeshow Goodness-of-Fit Test | 3.2836 | 7 | 0.8576 |
| $R_L^2$ | 0.15 | | |
| Cox and Snell $R^2$ | 0.16 | | |
| Nagelkerke $R^2$ | 0.23 | | |

| PREDICTIVE EFFICIENCY | Predicted Group | | |
|---|---|---|---|
| **Observed Group** | **0** | **1** | **Percent Correct** |
| **0 (below mean)** | 34 | 30 | 53.13 |
| **1 (above mean)** | 10 | 165 | 94.29 |
| **Overall Correct** | | | **83.26** |
| lambda p | | 0.31 | |
| Binomial d | | 2.97 | P=0.001 |

| TERMS IN THE MODEL | ß | LR test | d.f | Sig. Of LR | Exp (ß) |
|---|---|---|---|---|---|
| Non car owners (vs. car owners) | 2.2194 | 7.203 | 1 | 0.0073 | 9.2017 |
| Indigenous (vs. newcomers) | .9266 | 3.667 | 1 | 0.0555 | 2.5260 |
| Town (vs. hinterland) | .7324 | 5.231 | 1 | 0.0222 | 2.0801 |
| Lower income (vs. higher) | .5105 | 1.930 | 1 | 0.1647 | 1.6661 |
| Low social (vs. other) | 1.7756 | 5.209 | 1 | 0.0225 | 5.9040 |
| Commuters (vs. other) | -.2885 | .404 | 1 | 0.5252 | .7494 |
| Lower income commuters (vs. other) ($X_5 * X_2$) | -2.1909 | 5.495 | 1 | 0.0191 | .1118 |

**Table 7.9:** **Model I:** Strong versus weak local integration prediction model for Kingsbridge households: according to low order consumption expenditure attributed to the immediate locality

The results from Model I illustrate that households most likely to attribute a higher than average proportion of low order consumption expenditure to the immediate locality are those which do not own a car, followed by town residents and those in low social groups.

The model predicts that non-car owners increase the likelihood of achieving strong integration to locality by 820% in comparison to those households which own at least one car. Town residents increase the odds by just over 100% in comparison to those residing in the hinterland, and households in the lower social groups increase the likelihood of achieving a strong level of integration to locality by almost 500% in comparison to all other households. We also find that indigenous residents are two and a half times more likely to be strongly integrated to locality than are those residents who have moved to the Kingsbridge area at some point in their lives.

These findings confirm that of the bi-variate analysis and help us to identify the relative importance of the included predictors. However, fitting a multivariate model also reveals another important finding which is illustrated by the interaction between workplace and income group. Despite the independent effect of income level revealed through the bi-variate analysis, the results indicate that low income households where the person who does the majority of the household shopping works outside the study area, actually reduce the odds of being strongly integrated to locality, by 88% in comparison to all other households. The interaction matrix presented in Table 7.9a helps to explore this further.

| INTERACTION MATRIX | Lower income | Higher income |
|---|---|---|
| **Commuters** | -2.1909 | -.2885 |
| **Other / local** | .5105 | 0.00 |

| Comparator group | Coefficients to add | Cumulative ß | Exp (ß) |
|---|---|---|---|
| High income commuters | -2.19 + 0.51 | -1.6804 | .190 |
| Low income other | -2.19 + -.29 | -2.4794 | .080 |
| High income other | -2.19 + -.29 + 0.51 | -1.9689 | .140 |

**Table 7.9a: Interaction matrix for commuters in the lower income group**

Of the three comparator groups, we find that the greatest difference is between low income commuters and other low income households, where the workplace effect evidently reduces the likelihood of attributing a higher than average proportion of low order consumption expenditure to the study area by over 90%. Following this is the comparison between low income commuters and other households in the higher income groups, where the magnitude of the odds ratio falls to 85%. Finally, low income commuters reduce the odds of being strongly integrated to locality by 80% in comparison to commuters in the higher income groups. Thus, although the lower income groups are independently associated with a strong level of low order integration to locality, this is reversed in cases where the key shopper works outside the locality. However, the findings indicate that, in terms of low order purchases at this geographical level, the same pattern of activity does not hold for those commuters in higher income groups.

Moving on to low order consumption expenditure which is attributed to the district, the first key observation is that there is considerably less variation in the strength of local integration between household type when all predictors are modelled together. This is logical given the extension of the geographical boundary and the relatively small range[7] associated with low order goods, which are of a relatively low price and are purchased frequently. Related to this point is the fact that car ownership is not a significant predictor at this level. Car owners are more likely to travel outside the immediate locality to make low order purchases, but they are not more likely to travel outside the district than their less mobile counterparts to make such purchases. Interestingly, the workplace of the key purchaser is of no statistical significance at the district level, which is also logical given that the variable distinguishes between those working in the immediate locality and elsewhere, and not the district and elsewhere.

[7]See section 1.3.2 for a discussion of this concept.

| GOODNESS OF FIT | Value | d.f | Significance |
|---|---|---|---|
| -2 Log Likelihood | 195.858 | 229 | |
| Model Chi-Square | 34.102 | 6 | 0.0000 |
| Goodness of Fit | 230.401 | 229 | |
| Hosmer and Lemeshow Goodness-of-Fit Test | 4.7641 | 7 | 0.6887 |
| $R_L^2$ | 0.15 | | |
| Cox and Snell $R^2$ | 0.14 | | |
| Nagelkerke $R^2$ | 0.22 | | |

| PREDICTIVE EFFICIENCY | Predicted Group | | |
|---|---|---|---|
| **Observed Group** | **0** | **1** | **Percent Correct** |
| **0 (below mean)** | 25 | 20 | 55.55 |
| **1 (above mean)** | 5 | 186 | 97.38 |
| **Overall Correct** | | | **89.41** |
| lambda-*p* | | 0.44 | |
| Binomial *d* | | 3.13 | 0.001 |

| TERMS IN THE MODEL | ß | LR test | d.f | Sig. Of LR | Exp (ß) |
|---|---|---|---|---|---|
| Non-car owners (vs. car owners) | .7172 | .510 | 1 | 0.4753 | 2.0486 |
| Retired / young fam (vs. other) | .2667 | .464 | 1 | 0.4955 | 1.3057 |
| Lower income (vs. higher) | 1.7289 | 17.201 | 1 | 0.0000 | 5.6347 |
| Indigenous (vs. newcomers) | .3900 | .618 | 1 | 0.4318 | 1.4770 |
| Town (vs. hinterland) | .6633 | 3.309 | 1 | 0.0689 | 1.9413 |
| Commuters (vs. other) | -.4389 | .966 | 1 | 0.3257 | .6447 |

**Table 7.10:** **Model II:** Strong versus weak local integration prediction model for Kingsbridge households: according to low order consumption expenditure attributed to the district

Further results indicate that those households most likely to be associated with a higher than average proportion of low order consumption expenditure attributed to the district are 1) low income households and 2) town residents. The model predicts that low income households increase the odds of being strongly integrated to the district by 460% in

comparison to those in higher income groups, a result which is highly significant beyond the 99% level. Town residents increase the likelihood by just over 90% in comparison to hinterland residents, although this predictor is only significant to the 90% level.

Again, the model fits the data extremely well, indicated by the highly significant Model Chi-square and insignificant Hosmer and Lemeshow statistic. $R^2$ values are consistent with those for Model I, indicating a moderately weak association between the strength of low order integration into the local economy and household type. The model predicts to 89% which suggests that it is 39% more reliable at classifying an observation into a category of the dependent variable than is random guessing. The highly significant Binomial *d* statistic indicates that the classification on the dependent variable is strongly related to the values of the independent variables, accepting the alternative hypothesis that the proportion of errors with the model is significantly less than the proportion of errors without the model. Likewise, the value of lambda *p* indicates a moderately strong reduction in the error of prediction as a result of model fitting.

The data presented in Table 7.11 illustrates the third prediction model, which relates to economic integration according to high order consumption expenditure attributed to the locality. As in the case of the previous two, the model performs well, both in terms of goodness of fit and predictive efficiency. $R^2$ values are between .14 and .24, indicating a moderately weak association between the strength of high order integration and household type. Lambda *p* indicates a moderately strong reduction in the error of prediction as a result of model fitting and Binomial *d* indicates that the classification on the dependent variable is strongly related to the values of the independent variables.

| GOODNESS OF FIT | Value | d.f | Significance |
|---|---|---|---|
| -2 Log Likelihood | 237.815 | 192 | |
| Model Chi-Square | 39.989 | 8 | 0.0000 |
| Goodness of Fit | 205.587 | 192 | |
| Hosmer and Lemeshow Goodness-of-Fit Test | 5.4835 | 7 | 0.6012 |
| $R_L^2$ | 0.14 | | |
| Cox and Snell $R^2$ | 0.18 | | |
| Nagelkerke $R^2$ | 0.24 | | |

| PREDICTIVE EFFICIENCY | Predicted Group | | |
|---|---|---|---|
| **Observed Group** | **0** | **1** | **Percent Correct** |
| **0 (below mean)** | 63 | 44 | 58.88 |
| **1 (above mean)** | 26 | 68 | 72.34 |
| **Overall Correct** | | | **65.17** |
| lambda-*p* | | 0.35 | |
| Binomial *d* | | 5.11 | P=0.0000 |

| TERMS IN THE MODEL | ß | LR test | d.f | Sig. Of LR | Exp (ß) |
|---|---|---|---|---|---|
| Non-car owners (vs. car owners) | 2.7115 | 8.879 | 1 | 0.0029 | 15.0515 |
| Retired / young fam (vs. other) | .0934 | .053 | 1 | .8178 | 1.0979 |
| Lower income (vs. higher) | -2.0850 | 11.198 | 1 | 0.0008 | .1243 |
| Indigenous (vs. newcomers) | .5352 | 1.495 | 1 | 0.2215 | 1.7079 |
| Town (vs. hinterland) | .2992 | .894 | 1 | 0.3445 | 1.3488 |
| Low social (vs. other) | -.6243 | 1.145 | 1 | 0.2846 | .5356 |
| Commuters (vs. other) | -1.1034 | 4.887 | 1 | 0.0271 | .3317 |
| Low income Ret /YF (vs. other) | 2.3137 | 9.478 | 1 | 0.0021 | 10.1113 |
| $(X_1 * X_2)$ | | | | | |

**Table 7.11:** **Model III:** Strong versus weak local integration prediction model for Kingsbridge households: according to high order consumption expenditure attributed to the immediate locality

Interpreting the coefficients, we find that households who do not own a private car are fifteen times more likely to be strongly integrated to their immediate locality by way of

high order purchases than are those who own at least one car. This finding is comparable to low order economic activity at the same geographical level. Interestingly, we also find that those who work within the immediate locality are more likely to spend a higher than average proportion of high order consumption expenditure in the area. The model predicts that commuters outside of the study area reduce the odds of local integration by 66% in comparison to households where the key shopper works locally. This provides further confirmation that fostering initiatives to provide employment opportunities for local residents is in the interest of local economic growth.

A very interesting finding is also revealed which is in fact contrary to existing empirical evidence. Lower income groups actually reduce the likelihood of being strongly integrated to locality through high order purchases, by almost 88% in comparison to higher income groups. This could be explained by the higher premium often paid for high order consumer goods in smaller town centres, a factor which is related not only to economies of scale but also that small retail outlets often specialise in higher quality items to serve a specific market niche. Lower income groups may therefore travel further to purchase high order consumer goods at a lower price and related quality. However, the interaction between income group and family stage reveals that this is not the case when the lower income household consists of retired occupants or families with young dependants. Such households are in fact ten times *more* likely to attribute a higher than average proportion of high order consumption expenditure to the immediate locality than are all other groups. Indeed, the importance of this specific group is revealed further by the interaction matrix presented in Table 7.11a.

| INTERACTION MATRIX | Lower income | Higher income |
|---|---|---|
| **Retired / young families** | 2.3137 | .0934 |
| **Other family stages** | -2.0850 | 0.00 |

| Comparator group | Coefficients to add | Cumulative ß | Exp (ß) |
|---|---|---|---|
| Higher y Ret young fam | 2.31 + -2.09 | .2287 | 1.26 |
| Lower y other stages | 2.31+ .0934 | 2.4071 | 11.10 |
| Higher y other stages | 2.31 + -2.09 + .09 | .3221 | 1.38 |

**Table 7.11a: Interaction matrix for retired and young families in low income groups**

Retired households and those with young dependants on lower incomes are eleven times more likely to attribute an above average proportion of high order consumption expenditure to the locality than are those on comparable incomes in other stages of the lifecycle. In comparison to higher income groups in other stages of the lifecycle, low income retired and young families increase the odds of achieving strong integration to locality by 38% and in comparison to the equivalent family stage on higher incomes the group increase the likelihood by 26%. The interaction matrix confirms two things. First, that retired residents and those with young dependants are only strongly tied to locality with respect to high order purchases when they fall into the lower income bracket; and second, that higher income households are only strongly tied to locality when they are either adults which are all of working age or are families with dependants aged between eight and sixteen years old.

The final model relating to the Kingsbridge data set is presented in Table 7.12. When the boundary of the local economy is extended to include the district we find that car ownership and workplace are no longer statistically significant predictors of the strength of local high order integration. A key characteristic illustrated by the model is family stage, which indicates that retired households and those with young dependants increase the

likelihood of attributing an above average proportion of high order consumption expenditure to the district by 223%.

| GOODNESS OF FIT | Value | d.f | Significance |
|---|---|---|---|
| -2 Log Likelihood | 266.282 | 213 | |
| Model Chi-Square | 29.595 | 5 | 0.0000 |
| Goodness of Fit | 215.075 | 213 | |
| Hosmer and Lemeshow Goodness-of-Fit Test | 2.2420 | 5 | 0.8147 |
| $R_L^2$ | 0.10 | | |
| Cox and Snell $R^2$ | 0.13 | | |
| Nagelkerke $R^2$ | 0.17 | | |

| PREDICTIVE EFFICIENCY | Predicted Group | | |
|---|---|---|---|
| **Observed Group** | **0** | **1** | **Percent Correct** |
| **0 (below mean)** | 47 | 42 | 52.81 |
| **1 (above mean)** | 32 | 98 | 75.38 |
| **Overall Correct** | | | **66.21** |
| lambda-*p* | | 0.17 | |
| Binomial *d* | | 2.41 | P=0.008 |

| TERMS IN THE MODEL | ß | LR test | d.f | Sig. Of LR | Exp (ß) |
|---|---|---|---|---|---|
| Non-car owners (vs. car owners) | 1.1752 | 2.686 | 1 | 0.1012 | 3.2388 |
| Commuters (vs. other) | -.5145 | 1.566 | 1 | 0.2107 | .5978 |
| Retired / young fam (vs. other) | 1.1743 | 14.165 | 1 | 0.0002 | 3.2358 |
| Indigenous (vs. newcomers) | .9082 | 4.667 | 1 | 0.0308 | 2.4798 |
| Low social (vs. other) | .1650 | .103 | 1 | 0.7481 | .8479 |

**Table 7.12:** **Model IV:** Strong versus weak local integration prediction model for Kingsbridge households: according to high order consumption expenditure attributed to the district

Interestingly, indigenous households are also more strongly tied to the district in terms of high order purchases than are those residents who have moved to the Kingsbridge area at

some point in their lives. This, together with the results of Model I, illustrates some very interesting findings regarding indigeneity and economic integration. Indigenous residents are strongly integrated into the immediate locality by way of low order purchases and into the district by way of high order economic activity, behaviour which does in fact reflect a more traditional pattern of economic activity.

The model itself performs well as a prediction tool, exhibiting both excellent model fit and predictive efficiency. $R^2$ values indicate a slightly weaker association between the strength of local integration and household type than in the case of previous models. The Nagelkerke value indicates that 17% of the variance in the dependent variable can be explained by the independent variables. The significance of the binomial *d* statistic accepts the alternative hypothesis that the proportion of errors with the model is significantly less than the proportion of errors without the model.

Moving on to the 'accessible' locality, Model V relates to low order consumption expenditure by Olney households which is attributed to the immediate locality. The Model Chi-square is highly significant and the Hosmer and Lemeshow Goodness-of-Fit test is not, both indicating excellent model fit. $R^2$ indicate that between 25% and 37% of the variance in the dependent variable is explained by the relevant predictors. In terms of predictive efficiency, the model is approximately 26% more accurate at classifying observations into categories of the dependent variable than would be achieved through random guessing. Lambda-*p* indicates a moderate reduction in error as a resulting of fitting the model and the highly significant *d* statistic is a strong indication that the model significantly improves our ability to predict the classification of observations.

| GOODNESS OF FIT | Value | d.f | Significance |
|---|---|---|---|
| -2 Log Likelihood | 175.985 | 177 | |
| Model Chi-Square | 57.928 | 8 | 0.0000 |
| Goodness of Fit | 179.056 | 177 | |
| Hosmer and Lemeshow Goodness-of-Fit Test | 8.1182 | 7 | 0.3223 |
| $R_L^2$ | 0.25 | | |
| Cox and Snell $R^2$ | 0.27 | | |
| Nagelkerke $R^2$ | 0.37 | | |

| PREDICTIVE EFFICIENCY | Predicted Group | | |
|---|---|---|---|
| **Observed Group** | **0** | **1** | **Percent Correct** |
| **0 (below mean)** | 115 | 11 | 91.27 |
| **1 (above mean)** | 33 | 27 | 45.00 |
| **Overall Correct** | | | **76.34** |
| **lambda-*p*** | | 0.27 | |
| **Binomial *d*** | | 2.34 | p=0.0096 |

| TERMS IN THE MODEL | ß | LR test | d.f | Sig. Of LR | Exp (ß) |
|---|---|---|---|---|---|
| Non car owners (vs. car owners) | 3.0010 | 12.537 | 1 | 0.0004 | 20.1049 |
| Commuters (vs. other) | -.3591 | .720 | 1 | 0.3960 | .6983 |
| Retired / young fam (vs. other) | .3594 | .741 | 1 | 0.3893 | 1.4324 |
| Lower income (vs. higher) | -1.0605 | 3.054 | 1 | 0.0805 | .3463 |
| Indigenous (vs. newcomers) | 1.0662 | 5.014 | 1 | 0.0251 | 2.9043 |
| Town (vs. hinterland) | 1.8709 | 24.555 | 1 | 0.0000 | 6.4939 |

**Table 7.13:** **Model V:** Strong versus weak local integration prediction model for Olney households: according to low order consumption expenditure attributed to the immediate locality

The results of the model indicate that there are three strong predictors of local integration: place of residence, indigineity and car ownership. In fact, non-car owners are over twenty times more likely to attribute a higher than average proportion of low order consumption expenditure to the locality than are car-owning households. Interestingly, we also find that

those households in the three lower income groups reduce the likelihood of strong local integration, by almost 65% in comparison to higher income groups, a finding which is contrary to that of existing empirical evidence.

The prediction model presented in Table 7.14 indicates that the degree of integration into the district through expenditure on low order goods and services is less influenced by household characteristics. Relevant $R^2$ values, which range from .07 to .12, indicate only a weak association between the variation in the dependent variable and included predictors. However, the excellent model fit, and high degree of predictive efficiency indicated by the significance of the binomial *d* statistic suggests that the results of the model are worth some consideration.

The likelihood ratio statistics indicate that there are two significant predictors of strong local integration to the district by way of low order consumption expenditure. These are attributed to car ownership and indigeneity. Interpreting the coefficients, we find that non-car owners are ten times more likely to spend an above average proportion of consumption expenditure on low order goods and services within the district than are those households who own at least one car. In the same way, indigenous residents increase the likelihood of strong local integration by almost 200% in comparison to newcomers to the area. In effect, these two household characteristics can be viewed as important tools through which to foster the well being of small scale retail outlets, such as village shops, in the peri-urban fringe.

| GOODNESS OF FIT | Value | d.f | Significance |
|---|---|---|---|
| -2 Log Likelihood | 241.415 | 180 | |
| Model Chi-Square | 17.774 | 6 | 0.0068 |
| Goodness of Fit | 183.815 | 180 | |
| Hosmer and Lemeshow Goodness-of-Fit Test | 1.6015 | 6 | 0.9525 |
| $R_L^2$ | 0.07 | | |
| Cox and Snell $R^2$ | 0.09 | | |
| Nagelkerke $R^2$ | 0.12 | | |

| PREDICTIVE EFFICIENCY | Predicted Group | | |
|---|---|---|---|
| **Observed Group** | **0** | **1** | **Percent Correct** |
| **0 (below mean)** | 69 | 26 | 72.63 |
| **1 (above mean)** | 49 | 43 | 46.74 |
| **Overall Correct** | | | 59.89 |
| lambda-*p* | | 0.18 | |
| Binomial *d* | | 2.46 | 0.0069 |

| TERMS IN THE MODEL | ß | LR test | d.f | Sig. Of LR | Exp (ß) |
|---|---|---|---|---|---|
| Non-car owners (vs. car owners) | 2.3071 | 6.876 | 1 | 0.0087 | 10.0449 |
| Commuters (vs. other) | -.5506 | 2.209 | 1 | 0.1372 | .5766 |
| Lower income (vs. higher) | -.7074 | 2.051 | 1 | 0.1521 | .4929 |
| Indigenous (vs. newcomers) | 1.0985 | 5.599 | 1 | 0.0180 | 2.9997 |
| Town (vs. hinterland) | -.1714 | .302 | 1 | 0.5824 | .8425 |
| Low social (vs. other) | .2323 | .151 | 1 | 0.6972 | 1.2615 |

**Table 7.14:** **Model VI:** Strong versus weak local integration prediction model for Olney households: according to low order consumption expenditure attributed to the district

The data presented in Table 7.15 presents a third strong versus weak prediction model for Olney households, this time according to high order consumption expenditure attributed to the immediate locality.

| GOODNESS OF FIT | Value | d.f | Significance |
|---|---|---|---|
| -2 Log Likelihood | 142.768 | 163 | |
| Model Chi-Square | 35.852 | 7 | 0.0000 |
| Goodness of Fit | 142.625 | 163 | |
| Hosmer and Lemeshow Goodness-of-Fit Test | 5.0011 | 8 | 0.7575 |
| $R_L^2$ | 0.20 | | |
| Cox and Snell $R^2$ | 0.19 | | |
| Nagelkerke $R^2$ | 0.29 | | |

| PREDICTIVE EFFICIENCY | Predicted Group | | |
|---|---|---|---|
| **Observed Group** | **0** | **1** | **Percent Correct** |
| **0 (below mean)** | 127 | 7 | 94.78 |
| **1 (above mean)** | 21 | 16 | 43.24 |
| **Overall Correct** | | | **83.63** |
| **lambda-*p*** | | 0.24 | |
| **Binomial *d*** | | 1.89 | p=0.0294 |

| TERMS IN THE MODEL | ß | LR test | d.f | Sig. Of LR | Exp (ß) |
|---|---|---|---|---|---|
| Non-car owners (vs. car owners) | -1.3456 | 1.338 | 1 | .2474 | .2604 |
| Commuters (vs. other) | -1.3203 | 7.372 | 1 | 0.0066 | .2670 |
| Retired / young fam (vs. other) | .9929 | 4.161 | 1 | 0.0414 | 2.6990 |
| Lower income (vs. higher) | -.3105 | .232 | 1 | 0.6297 | .7331 |
| Indigenous (vs. newcomers) | .9080 | 2.409 | 1 | 0.1206 | 2.4794 |
| Town (vs. hinterland) | 1.7363 | 15.249 | 1 | 0.0001 | 5.6764 |
| Low social (vs. other) | -2.2248 | 5.614 | 1 | 0.0178 | .1081 |

**Table 7.15:** **Model VII:** Strong versus weak local integration prediction model for Olney households: according to high order consumption expenditure attributed to the immediate locality

Interpreting the likelihood ratio statistics and associated odds ratios, we find four important predictors of high order integration at this geographical level. Again, town residences are a key characteristic, increasing the likelihood of strong integration into locality by just over

460% in comparison to those households located in the hinterland of the settlement. Interestingly, workplace also appears to be an important factor to be considered, with those households where the key shopper commutes outside the locality reducing the odds of achieving a strong level of integration into locality by 73%. This also reflects the pattern of economic behaviour in the 'remote' rural locality, and suggests that in the 'accessible' rural area, combining the work journey with other forms of economic activity is associated with both low and high order purchases.

Although indigeneity is not a significant predictor of strong local integration in this model, family stage is, with the coefficients indicating that retired households and families with young dependants are one and a half times more likely to attribute an above average proportion of high order consumption expenditure to the immediate locality than other stages in the family lifecycle. There is also a finding illustrated by the model which does not conform with existing empirical evidence of consumer activity patterns, and in fact confirms the results of the bi-variate analysis. The data suggests that those residents in the lower social groups reduce the likelihood of being strongly integrated into their locality by almost 90% in comparison to all other households. This could suggest that such households are more likely to make trips to high order centres for respective purchases, rather than shop in their local lower order settlement. However, it is important note that such groups make up a minority in the 'accessible' rural study area and this must be taken into account when drawing out the implications of the findings for development policy in the area.

The model itself fits the data extremely well, given by the highly significant Model Chi-Square and inverse result of the Hosmer and Lemeshow Test. Likewise, the model exhibits a high degree of predictive efficiency, being almost 34% more reliable at classifying an observation into a category of the dependent variable than is random guessing. Lambda-p

indicates a moderate reduction in the error of prediction as a result of model fitting, a value which equates closely to that of the Nagelkerke $R^2$, indicating that there is a moderate association between the strength of local high order integration and household type.

The final prediction model developed in this section relates to high order consumption expenditure in the case where the boundary of the local economy is extended to include the district. Measures of goodness of fit and predictive efficiency are on a par with other models fitted to the Olney data set. $R^2$ values indicate that between 18% and 27% of the variance in the dependent variable can be explained by the included predictors, and lambda-*p* shows a moderate reduction in the error of prediction as a result of model fitting. The binomial *d* statistic is significant beyond the 95% level, thus accepting the alternative hypothesis that the proportion of errors with the model is significantly less than the proportion of errors without the model.

Interpreting the coefficients we find that, as in the case of high order integration into the locality, retired households and families with dependants where the youngest is aged seven years or less increase the odds of being strongly integrated into the district, by almost 250% in comparison to other stages in the family lifecycle. Likewise, households where the key shopper works outside the study area reduce the likelihood of attributing an above average proportion of high order consumption expenditure to the district by almost 67% in comparison to all other households. Again, we find that indigeneity is an important predictor of local integration at this geographical level, with local residents being over three and half times more likely to make an above average level of high order purchases within the district than newcomers to the area.

| GOODNESS OF FIT | Value | d.f | Significance |
|---|---|---|---|
| -2 Log Likelihood | 153.567 | 151 | |
| Model Chi-Square | 32.677 | 8 | 0.0001 |
| Goodness of Fit | 130.977 | 151 | |
| Hosmer and Lemeshow Goodness-of-Fit Test | 15.1128 | 8 | 0.0570 |
| $R_L^2$ | 0.18 | | |
| Cox and Snell $R^2$ | 0.19 | | |
| Nagelkerke $R^2$ | 0.27 | | |

| PREDICTIVE EFFICIENCY | Predicted Group | | |
|---|---|---|---|
| **Observed Group** | **0** | **1** | **Percent Correct** |
| **0 (below mean)** | 104 | 13 | 88.89 |
| **1 (above mean)** | 21 | 22 | 51.16 |
| **Overall Correct** | | | **78.75** |
| lambda-*p* | | 0.21 | |
| Binomial *d* | | 1.71 | p=0.0436 |

| TERMS IN THE MODEL | ß | LR test | d.f | Sig. Of LR | Exp (ß) |
|---|---|---|---|---|---|
| Non-car owners (vs. car owners) | -.1767 | .040 | 1 | 0.8413 | .8381 |
| Commuters (vs. other) | -1.1011 | 6.099 | 1 | 0.0135 | .3325 |
| Retired / young fam (vs. other) | 1.2445 | 7.327 | 1 | 0.0068 | 3.4711 |
| Lower income (vs. higher) | -.8440 | 2.064 | 1 | 0.1508 | .4300 |
| Indigenous (vs. newcomers) | 1.2790 | 6.182 | 1 | 0.0129 | 3.5932 |
| Town (vs. hinterland) | .2498 | .392 | 1 | 0.5314 | 1.2838 |
| Low social (vs. other) | -.3828 | .265 | 1 | 0.6066 | .6819 |

**Table 7.16:** **Model VIII:** Strong versus weak local integration prediction model for Olney households: according to high order consumption expenditure attributed to the district

### 7.3.7 Summary of results

The results of all eight prediction models developed in the previous section are summarised in Table 7.17. As in the previous chapter, the data presented indicates the predictor variables that are statistically significant, the direction of the relationship with the relevant dependent variable and their statistical significance. In so doing, the summary of results clearly illustrates those household characteristics that are good predictors of the strength of local integration and those that are not. A full discussion of these results, including a detailed assessment of their implications for rural development policy, is contained in following chapter.

| Household | Kings | Locality | Kings | District | Olney | Locality | Olney | District |
|---|---|---|---|---|---|---|---|---|
| **Predictor** | **Low order** | **High order** | **Low order** | **High order** | **Low order** | **High order** | **Low order** | **High order** |
| Non-car owners | +*** | +*** | | | +*** | | +*** | |
| Commuters | | -** | | | | -*** | | -** |
| Retired / young fam | | | | +*** | | +** | | +*** |
| Lower income | | -*** | +*** | | -* | | | |
| Indigenous | +* | | | +** | +** | | +** | +** |
| Town households | +** | | +* | | +*** | +*** | | |
| Low social | +** | | | | | -** | | |
| Low y commuters | -** | | | | | | | |
| Low y Ret /Yng Fam | | +*** | | | | | | |

**Table 7.17: Summary of results from prediction models:** Influence of household characteristics on the likelihood of strong local integration in the 'remote' and 'accessible' case study areas[1]

[1] + Increase in the likelihood of strong local integration
- Decrease in the likelihood of strong local integration

Statistical significance: *** 99%; ** 95%; * 90%

# CHAPTER EIGHT

# DISCUSSION AND CONCLUSIONS

## 8.0 Introduction

The purpose of this chapter is to fulfil the aims of the study: to examine the contemporary functions of the small town and to advise policy makers on the potential role such towns can play in rural development. The approach taken is to present an in-depth discussion of the key findings in relation to existing literature, and to draw out their implications for development policy at local, national and European level. The chapter then moves on to discuss the limitations of the study, and to identify areas of further work that could be undertaken. Finally, the headline conclusions are drawn, both in terms of the substantive findings and contribution to methodological development in this field.

## 8.1 Substantive findings

A discussion of the substantive findings is divided into three main sections. The first focuses on the contemporary functions of the small town, drawing mainly on the descriptive findings. In the second section the results of the bi-variate analysis are discussed in relation to contemporary literature. Thirdly, the findings of the econometric analysis are drawn upon to present an in-depth discussion and synthesis of the key issues.

### 8.1.1 Contemporary functions of the small town

The findings suggest that the key functions of small town centres to the business community in all rural areas are banking and postal services. Likewise, to the residential

community, food and grocery provision continues to play an important role, as does the local newsagent. Hudson's (1976) definition of the small 'market town', emphasising the purchase and sale of agricultural surpluses and consumer goods, would therefore be more usefully replaced with the 'provision of low order consumer services to both the enterprise and consumer sectors' for the small 'market' town. There are further similarities between the two towns revealed by the study, although they tend to coincide more with observations about rural areas in general as opposed to small towns. In accordance with the findings of North and Smallbone (1993), both locations are characterised by very small firms. Likewise, there is a strong prevalence of independent, locally owned firms in both study areas, again a typical characteristic of the rural economy noted by Keeble *et al.* (1992). Interestingly, both towns appear to act more as a market for sales than as a source of inputs to local firms; implying that there is no longer an equal balance between upstream and downstream linkages between the towns and their surrounding areas. This is likely to be a legacy of the globalisation processes described by Cooke (1989) as well as the decline in local sourcing by the agricultural sector noted by Errington (1991) due to technological change and increased specialisation.

However, there are a number of important functional differences evident between the two towns which support the view of Cloke and Park (1985) that demographic size alone is not a sufficient method of classifying settlements. Indeed, structural differences between the two case study areas question the usefulness of population thresholds to classify settlements, such as those suggested by Green (1971) and the RDC (1992). In terms of economic structure, the findings conform to those of Keeble *et al.* (1992) by illuminating systematic differences between 'remote' and 'accessible' rural areas. The Kingsbridge study area is typically characterised by firms serving consumer, retailing, tourist and agricultural markets, whereas a higher proportion of firms in and around Olney specialise in market niches created by increasing business and technological complexity. Further,

there is a higher level of international investment associated with this town and the 'accessible' locality has attracted considerably more business start-ups in recent years than has the Kingsbridge area. The descriptive findings also indicate some interesting variations between the two localities in terms of demographic structure. A reflection of South Devon as a whole, Kingsbridge is a popular retirement haven whereas the overall trend in the 'accessible' locality is towards a younger population, particularly families with young dependants.

The similarity between the two town centres in respect of low order provision is itself associated with consumer preference for the edge-of-town supermarket in the 'remote' locality and nearby regional centres in the 'accessible' rural area. Thus, the impacts of large-scale retail developments on small towns are likely to be partially dependent on the proximity of rural settlements to urban centres. Likewise, although the high order sector accounts for the greatest proportion of consumption expenditure in Kingsbridge, the relative accessibility of Olney to nearby regional centres clearly undermines the high order function of the town. Thus, the 'pull' of nearby regional centres is again a crucial factor to the functional development of the town. Given that the functional role of settlements is clearly a more useful method of classification than is population size, it therefore follows that it is a more realistic criterion on which to base policy recommendations.

### 8.1.2 Independent findings in relation to contemporary literature

Results of the bi-variate analysis indicate that the 'remote' rural town is more strongly integrated into its local economy than is the 'accessible' town. These findings are consistent for upstream and downstream linkages in the case of firms; for low order and high order consumption in the case of households; and for both geographical levels of the economy studied. However, the pattern of integration by firms in the respective localities

conflicts with the existing empirical evidence of Curran and Storey (1993) who found that firms in 'remote' rural areas were reaching outside their locality for sales. A possible reason for the discrepancy may be the fact that, by focusing on small towns, the findings are influenced by the strong representation of retail consumer services in the town centres, which by their very nature are likely to make a significant proportion of sales locally. Indeed, the fact that firms located in both towns are shown to have more spatially proximate markets, but not suppliers, than respective hinterland firms may well support this. However, it is only firms located in Olney that show stronger ties to the district level economy than hinterland firms, a reflection not only of the relative lack of village retail services in the 'accessible' area, but also the predominance of business services in the hinterland.

In respect of integration by households in the study areas, the findings conform to those suggested by Cloke *et al's.* (1994) studies of convenience shopping, which illustrated that residents of 'remote' rural areas had more spatially proximate shopping patterns than those of 'accessible' rural areas. Further, the results indicate that the patterns of economic activity noted by these authors are also relevant to other forms of low order purchase, as well as to consumption expenditure associated with high order goods and services. The existing empirical evidence is complemented by the present findings that town residents have more spatially proximate low and high order shopping patterns than do hinterland residents in both study areas, clarifying the evidence presented by Errington (1994a) with reference to the Lambourn valley. However, the relatively strong degree of integration exhibited by town residents in Kingsbridge is influential over a wider geographical level, suggesting that the town has a greater sphere of influence in terms of low order activity than its 'accessible' counterpart. Thus, in terms of the spatial distribution of both corporate and consumer economic activity, the findings clearly demonstrate that the strength of local

economic integration is a function of proximity to the small town itself as well as to neighbouring urban centres.

Further results of the bi-variate analysis indicate that the strength of local economic integration is also a function of the economic and demographic structure of the respective localities. The findings of Curran and Blackburn (1994) and Errington (1994a), who found that small firms have more spatially proximate markets than larger establishments, are not upheld by the initial findings of this study. Likewise, Harrison's (1993) suggestion that small farms exhibit stronger ties to locality due to relative scale economies and associated transport costs can only be extended to other firm types in the 'accessible' locality, and here only in the case of upstream linkages. A similar pattern is applicable to the influence of ownership on local integration, except in this case it is only the independent firms in the 'remote' study area that source more locally than national and international branches. The findings therefore complement those of Gripaios *et al.* (1989) and Dobson (1985), although show a discrepancy with Errington's (1994a) suggestion that independent firms have more spatially proximate markets in the peri-urban fringe.

Further similarities and discrepancies are found between the present findings and those in the existing literature. The clearest difference is between consumer and business services, which conform with the findings of Curran and Blackburn (1994), Williams (1994) and Errington (1994a) that the former have stronger ties to their locality in terms of sales. The only other significant finding in the 'accessible' locality is the influence of firm age on market proximity. However, the direction conflicts with Curran and Blackburn's (1994) assertion that newer businesses are more likely to begin by serving local customers, and only develop a wider geographical customer base as they become more established. This may not only be an indication of the difference between rural and urban markets, but may also be related to the fact that an increasing number of firms in the peri-urban fringe are

serving business service market niches. In the 'remote' locality, economic structure proves to be a slightly more influential determinant of local integration, but only in the case of downstream linkages. The differences revealed between services and manufacturing firms clarify those of Williams' (1994) study of Fenland firm markets. This illustrates a key similarity between two 'remote' rural areas of England in that services have more spatially proximate markets than do manufacturing establishments in both locations. However, the findings do not support Williams' (1994) assertion that services have higher multiplier effects than firms in other sectors because a greater percentage of their inputs are sourced locally. Errington's (1994a) findings that agricultural firms have weaker ties to locality in terms of sales are also found to be applicable to the Kingsbridge study area. In fact, the results of the bi-variate analysis reveal that this pattern of activity is relevant over a wider geographical area, and is a characteristic of the 'remote' rural economy in general, and not just the small town. Moreover, the findings do not support evidence presented by Harrison (1993) of the relatively strong links between the agricultural industry and small towns in the Reading province.

The degree of local integration in both study areas conforms strongly to the nature economic activity patterns suggested in the literature, indicating that travel patterns are a useful indicator of the spatial distribution of consumer economic activity. In the 'remote' rural area, it is clear that, as an independent measure, car ownership is key to keeping transactions local, confirming the arguments of Root *et al.* (1996) and Cairns (1995) with respect to independent travel. Likewise, the related influence of household income proves to be important in Kingsbridge, although has no independent influence over activity patterns in the 'accessible' locality. This finding is contrary to the positive relationship between disposable income and personal mileage observed by Stokes (1995). Dix's (1977) assertion that retired residents and young families exhibit more spatially proximate activity patterns than other stages of the lifecycle are only upheld by this study with respect to high

order purchases. Similarly, the argument that lower social groups tend to shop more locally, as put forward by Cairns (1995), is clarified in the 'remote' rural area at both geographical levels of analysis, but is only relevant with respect to high order purchasing activity in the 'accessible' area.

Further key findings of the bi-variate analysis in the study areas reveal the importance of indigeneity to local integration, confirming the findings of Errington (1994b) who argues that many newcomers to 'accessible' rural areas will retain the shopping habits of their recent urban past. The findings illustrate that Errington's (1994b) observations are also applicable to the 'remote' rural area, which indicates a further implication of the counterurbanisation processes noted by Cloke (1979), Champion (1989) and Marsden *et al.* (1993). Following the patterns of economic activity suggested by Stabler and Rounds (1997) and Errington (1997b), workplace also appears to have an important independent influence over the spatial nature of consumer activity. Commuting outside the locality to work has a clear influence over the relative proximity of both low and high order purchasing activity in the study areas. This is likely to be associated with the propensity to combine shopping trips with the work journey, as is noted by Cairns (1995). Importantly, it is evident that, in rural areas, this pattern of activity is not restricted to low order purchases as was previously expected, thus indicating the secondary influence of high order centres on the equivalent functional role of smaller settlements.

### 8.1.3 Modelling the local economy

Empirical evidence of linkages in contemporary literature is substantially developed in this study by the attempts to model economic behaviour in the respective local economies. The results of the econometric approach, used to identify key characteristics of locally integrated case study establishments, illustrate the importance of multivariate modelling to

effective policy formulation. In this context, a key finding of the study is the evident decline of agricultural integration into the local economy. Focusing on the small town as a case study unit is a particularly fruitful approach in that these settlements were traditionally the focal point of agricultural activity in the rural economy (See for example Hoskins, 1972). However, the results clearly indicate that this is no longer the case. Agricultural firms are not associated with a strong level of local integration in either case study area. Further, in terms of market orientation in the 'remote' locality, the agricultural sector is a significant predictor of weak local integration at both geographical levels of the rural economy analysed. This scenario may well be a legacy of the move towards technological specialisation in the agricultural sector noted by Errington (1991) and Murray *et al.* (1996). It also suggests that, although farms may have strong independent linkages to small towns in certain areas, as indicated by Harrison (1993), in relative terms the agricultural sector is less tied to locality than other types of business.

The fact that serving the agricultural community is no longer the primary function of small towns implies that the CAP is no longer likely to provide a useful method of supporting local communities. A decline in local sourcing and a reduction in the amount of agricultural produce processed and marketed locally will have important multiplier effects in terms of employment and income generation. As Errington *et al.* (1996) illustrate, the potential impacts on small towns of a reduction in agricultural employment is likely to be greater than the upstream effects. Thus, the findings support a move towards a more integrated policy framework, an aspect of the discussion that is returned to in the following section. Obviously, an important consideration, which requires further analysis in this case, is the secondary effects of income generation associated with the distribution of expenditure by the farm household. Such an analysis would require the construction of a Social Accounting Matrix (SAM) to explore the income and employment multipliers in more detail. Indeed, a drawback of the household study is that it does not distinguish farm

households from other types of resident. Distinguishing between pluriactive and full-time farms may have also been advantageous in this respect. Although a secondary source of employment may help to subsidise the farm income, it could result in the further demise of local linkages, for example through commuting patterns.

The focus on the rural economy as a whole in the present study is partly a reflection of the diversified nature of economic activity in rural areas as a result of restructuring processes, such as those discussed by Marsden *et al.* (1993). Indeed, the results of the econometric analysis further illustrate the importance of a number of other firm characteristics to income generation in defined localities. A key finding of the multivariate analysis is the importance of very small firms in the local economy, particularly in the case of the 'accessible' locality. Given the results of the bi-variate analysis, this finding clearly illustrates the importance of modelling firm characteristics alongside other predictors of local integration. As a strong predictor of local sourcing, small establishments represent a group of firms that prevent income leakage out of the local economy, thus having potentially higher multiplier effects than larger establishments. Such firms are also shown to have more spatially proximate markets, particularly in the case of the 'accessible' rural area. Although this means that they generate less income from external sources, there is further potential for local multiplier effects in that the spending power of their customers is not being 'leaked' outside the locality.

The patterns of activity observed in the present research indicate an important variation between small firms in rural areas and those in more urban districts, which according to Curran and Blackburn (1994) tend to adopt more of a sectoral as opposed to territorial approach to sourcing. As small firms are a key feature of the rural economy (North and Smallbone, 1993), this implies that the 'local economy' approach to facilitating development may prove more successful than sectoral measures. It also places emphasis on

the need to overcome the difficulties often experienced by small enterprises noted by Keeble *et al.* (1992), such as their ability to acquire new skills and to adopt new technologies.

Firm ownership also proves to be an important predictor of local integration, particularly in the 'remote' locality where independent locally owned firms exhibit more spatially proximate markets, as well as a strong propensity to source their inputs locally. The key advantages to local multipliers of promoting local business start-ups are therefore clear, although there is obviously a relevant argument for allowing outside investment into the area on the basis of local employment creation. However, the findings identify further differences between the two types of rural area that are worth some consideration. Initially, they suggest that external investment may be more detrimental to local income generation in the 'remote' locality. Indeed, in relative terms this maybe true, but given the overall level of integration of Olney into its local economy, the results of the econometric analysis are also a reflection of the trends towards globalisation which have evidently had a greater impact in the peri-urban area.

One of the key structural differences between the two localities is the prevalence of business services in the Olney study area, and as the results of the logistic regression indicate, such firms not only serve more distant markets but are also detrimental to local multipliers in respect of input purchasing. Thus, revenues from external sources are not being compensated for by the generation of income within the locality. The message is further amplified by the fact that the majority of such firms are located in the hinterland of the settlement, and that town locations in the locality are a key predictor of strong local integration at both geographical levels. As information and communications technology (ICT) continues to evolve, business services are becoming increasingly able to locate in more peripheral locations. Therefore, policy makers may do well to address the possible

impacts that business services could have on local multipliers in more 'remote' rural areas. Indeed, the situation has been further exacerbated in Olney by the fact that more newly established firms have been serving both business and consumer service market niches, but have continued to reflect the spatial activity patterns of the former.

Consumer services themselves prove to be very important predictors of local integration in both study areas, which in turn presents a clear role for the towns in their respective rural economies. Although consumer services do not source more locally than other firm types, their spatially proximate markets suggest that they allow a significant proportion of household incomes to be spent locally. Whether this income be derived from local employment or from employment outside the locality, it implies that this sector is beneficial in preventing income leakage out of the local economy. In turn, the ability of consumer services to capitalise on their local market signifies the importance of recognising those characteristics of consumers that are most likely to shop locally. Therefore, in terms of securing a viable role for the small town, our population may well be its greatest asset, and one that points towards formulating an appropriate development 'mix' for individual case study localities.

Arguably one of the most interesting findings of modelling the household characteristics is that indigenous residents appear to more strongly tied to their locality than newcomers in both case study locations. Indeed, in the 'accessible' locality this characteristic is important at both geographical levels of the local economy, and for both low and high order purchases. There may be a number of reasons for this pattern of behaviour. Those residents who have lived in the area all of their lives may feel a stronger sense of loyalty to their community and are therefore more keen to support their local economy. It could be that indigenous residents have a greater knowledge of the local area, or take a greater interest in it, and as a result tend to shop and access services more locally. The more spatially

proximate activity patterns may also be directly related to travel behaviour. Dix (1977) suggests that younger adults living in the area in which they grew up have fairly localised travel patterns, in contrast to newcomers whose needs for more elaborate travel patterns are a reflection of the journeys designed to maintain family and friendship ties. Indeed, patterns of behaviour by newcomers may be the overriding influence, particularly in the 'accessible' rural area where the group are more likely to maintain the shopping habits of their urban past.

Interestingly, the results of the logistic regression on the Kingsbridge data set appear to indicate that indigeneity is associated with a more traditional pattern of economic behaviour. Residents who have lived in the area all their lives are more strongly integrated into their locality in terms of low order purchases, and exhibit stronger ties to the district in terms of high order economic activity. Prior to more contemporary developments in transport and communications, it is likely that residents of Kingsbridge would have travelled to neighbouring market towns in the South Hams to purchase any high order goods or access any services which weren't available in their home town. Of course, this aspect needs to be explored in other case study localities before drawing any firm conclusions, although the findings do substantially develop existing literary comment on the subject. Moreover, they also point towards the need for policy makers to devise strategies to prevent the outward migration of young adults from rural areas, a strong feature of rural society in recent decades documented by many, including Newby (1985); Cloke (1979); Champion (1989) and Marsden *et al.* (1993). This aspect of policy is also firmly embedded in the debate surrounding sustainability in rural areas, and is a key feature of programmes for integrated economic revitalisation in rural areas such as those described by Flint (2000). Indeed, there is further scope to combine this aspect of the present research with a comparable study of rural business activity currently being undertaken by Mills (1999; 2000). The findings of an investigation involving similar case

study towns in Cornwall and Oxfordshire suggests that the indigeneity of owner/managers forms an important explanatory variable in a model examining patterns of local sourcing in the business service sector. Thus, there is scope to inform the debate on the potential of indigeneity to help revitalise small towns and local economies from the point of view of both consumer and enterprise sectors.

Given that the primary function of the small town is associated with low order service provision, it is important to note the potential influence that retired households and adults with young dependants can have in helping to promote local high order activity patterns. These two family stages show a consistent pattern of behaviour in both study areas, with the combined variable being a predictor of strong local integration in terms of high order purchases at both geographical levels of the local economy. As such, the findings may have implications for development not only in small towns but also in the wider countryside. However, the variable specification, which follows the patterns of behaviour suggested in the literature, presents a shortfall that would benefit from further analysis. For example, specifying the two characteristics separately may indicate that one is a more important predictor of local integration than the other.

Retired households are an interesting stage of the lifecycle in that they bring non-market sources of capital into the localities in which they reside. In turn, this capital indirectly helps to develop local public service provision, as well as injecting a source of income into the economy that has not been generated within it. Thus, if the potential multiplier effects of consumption expenditure by retired residents are relatively high, there is a clear added advantage to facilitating development for this group. Further, there may also potential advantages for regional development in facilitating the generation of finance companies that, with an appropriate marketing structure, may be able to generate a useful source of regional funds by investing pension funds more locally. However, there is clearly a

threshold at which diminishing returns from retirement development would set in, particularly in the light of strategies to prevent younger members of the population from leaving the area.

The interaction between the family stage predictor and that based on income level presents a further consideration with regard to this area. Contrary to initial expectations, a low household income is not a key predictor of spatially proximate activity patterns as is suggested by the travel and transport literature. However, there is clear influence of this characteristic in cases where the household is retired or is a family with young dependants, which in turn implies that the type of residential development may also be an important factor in a strategy to facilitate local economic growth. Again, further case studies would be needed before drawing any firm conclusions. Lower income households are only more strongly integrated into the 'district' level of the Kingsbridge economy, implying that this may be a more influential characteristic in the wider rural economy. Further, the fact that higher income households are more strongly integrated into the 'locality' in both study areas may well indicate an important feature of small town service provision. Such households may be able to afford the higher premiums enforced by scale economies in small town centres, or may simply wish to shop more locally to obtain goods of a higher quality, or serving a specific niche market. This is particularly relevant in Kingsbridge where income level has a strong influence on the spatial proximity of high order purchases, and it obviously has important implications for strategies aiming to diversify the nature of small town centre functions.

Workplace clearly has an important influence on the spatial proximity of shopping patterns in both case study areas. However, when this variable is modelled alongside other household characteristics, the workplace of the key shopper is a strong predictor of local high order integration, and not wholly convenience purchases as was initially expected.

This is particularly strong in the 'accessible' locality where the influence of outward commuting from the study area extends to both geographical levels of the local economy. The findings therefore provide contrary evidence to the argument of Armstrong and Taylor (1993), who suggest that commuters will spend very little of their income in the local area in which they work. These authors suggest that local multipliers will be weaker in 'accessible' areas because of inward commuting and the higher propensity for local workers to shop in nearby urban centres, thus overlooking the potential secondary effects of commuting. Indeed, given the proximity of Olney to three major labour markets providing high order retail functions, the observed pattern is not so surprising. Further, it complements the fact that, despite Olney's relative accessibility, its low order functions remain on a par with those of Kingsbridge. In the 'remote' study area, commuting is not such an influential predictor. Nevertheless, it remains important and the findings also indicate that workplace is more directly related to the proximity of shopping patterns. Further, the interaction between the commuting and income predictors indicates that in lower income households, the influence of workplace can be extended to low order purchases. This may be because in such households, the key shopper is the only economically active member and is therefore more likely to combine the work journey with convenience shopping.

The findings have two key implications in terms of development policy. First, it would appear that the provision of local employment in the study areas would help to facilitate local income generation as well as the development of high order retail activity in both town centres. Second, they support Errington's (1997b) contention that the maintenance of rural employment supports the sustainability of communities by securing the continued use of local shops and facilities. Moreover, the argument for providing local employment close to residential areas is also relevant to sustainable policies designed to reduce traffic movements, and therefore pollution, in rural areas. In both study areas, a higher proportion

of those living and working in the town make their journey to work on foot as opposed to by car. Thus, the study findings help to clarify the guidance contained in PPG 13 *(A guide to Better Practice: reducing the need to ravel through land use and transport planning)* towards combining residential and employment development, as well as suggesting that this approach to planning will be in the interest of local economic growth in small towns. However, it is important to recognise that the findings are based only the commuting patterns of one household member in each case; the individual who most commonly does the household shopping. Likewise, the distinction is made only between those commuting outside the study areas and those working within them. Thus, further exploration of this variable would be preferable, including the relative impacts of all household members commuting patterns as well a more detailed analysis of the relationship between distance travelled to work and the proportion of income which is 'leaked' out of the locality.

As already implied, the potential of planning and development policies to create 'balanced' and sustainable communities will largely be a function of the success of integrated measures to reduce reliance on the private car in rural areas. This is further augmented by the clear influence that car ownership has on the spatial distribution of economic activity in both study areas, and again, we see some variation between the two. In Kingsbridge, car ownership has a strong influence on the spatial proximity of low and high order purchases within the immediate locality. However, in Olney, while the variable is a predictor of strong local integration at both geographical levels, this is only relevant to low order purchasing activity. Given this information it is possible to start informing the debate on integrated rural policies in a fairly direct way. The findings clarify the argument of Cairns (1995) that if people own a car, they will use it, certainly in the case of shopping trips. Thus, car ownership itself is crucial, both in respect of reducing emissions and facilitating local income generation. Realistically, this can only be translated into policies to reduce dependence on the private car. However, this is a complex issue, not least because of the

inevitable association between access to local services and the need to own and use a private car. Apart from the argument for a better public transport system in rural areas, which needs to form an integral part of any move towards developing sustainable communities, a key consideration must also be the appropriate spatial distribution of development in rural areas. In other words, whether it is more beneficial to focus development in small towns or the surrounding countryside.

The relative proximity of households and firms to the respective town centres is shown to be an important predictor of local economic integration, and as such there are some implications for national and regional planning policy. In the case of the 'remote' locality, town residents are more strongly tied to locality in terms of low order purchases, a pattern that is evident at both geographical levels of the local economy. It is therefore in the interest of local multipliers to facilitate residential development in the town itself as opposed to on green-field sites in the surrounding countryside. Given the increased propensity for such residents to carry out shopping trips on foot, there are further advantages in terms of reducing $CO_2$ emissions. However, in terms of corporate activity, there is no distinction between town and hinterland firms in terms of local integration. Thus, from this point of view it may be just as beneficial to grant planning applications for business use in the open countryside, particularly in cases where the development is small scale, independently owned, and facilitates home working.

In the 'accessible' locality, the case for concentrated development in the town is stronger. Town residents have much more spatially proximate activity patterns than their hinterland counterparts, in terms of both low and high order activity. Likewise firms located in the town are more likely to benefit local multipliers through their more spatially proximate markets. Again, the relative environmental benefits of granting planning applications in the town are self evident, particularly as the need to travel is effectively being reduced by both

sectors of the economy. Although not conclusive, the findings illustrate that Planning Policy Guidance notes such as PPG 7 *(The Countryside - environmental quality and social and economic development)* and PPG 13 *(A guide to Better Practice: reducing the need to travel through land use and transport planning)*, need to be more regionally, and possibly locally, focused to take account of variations between different types of rural area. In turn, conflicts of interest between PPG's can be avoided and a more effective integrated approach to planning and policy can be implemented.

## 8.2 Theoretical aspects of the study findings

While Olney remains a significant retail centre to those who live in its immediate vicinity, it is much less so than is Kingsbridge. Moreover, the settlement clearly has much less of a sphere of influence than does the 'remote' rural settlement. In other words, the relative size of the 'hinterland' served by Olney is smaller than that of Kingsbridge in that the strength of economic linkages between town and countryside are weaker. These variations in spatial activity show the weaknesses in Hudson's (1976) argument that a small town will commonly serve a rural community immediately tributary to it. However, the influence of commuting patterns in the 'accessible' rural area illustrates an interesting conflict with regard to the towns' sphere of influence in the economy. The strong association between place of work and place of residence means that the employment catchment of the 'remote' locality is smaller, serving a 'district' wide hinterland in comparison to Olney, which draws it labour from a hinterland equivalent to 'county' level. Conversely, there is also a trend towards both outward commuting of local residents and inward commuting of local employees in the 'accessible' locality, a further contributor to income leakage out of the area. In both study areas, outward commuting is commonly associated with professional, managerial and intermediate occupations, reflecting the association between settlement size and employment functions in the occupation hierarchy. Thus, the findings reveal an

employment analogy to the location of low and high order provision in Christaller's Central Place Theory. In the same way that high order goods and services have a longer range than low order, professional and managerial employees are also prepared to commute further to work. Indeed, it is evident in Olney that this not only creates a higher proportion of 'lower order' occupations in the town, but also creates a source of income 'leakage' out of the locality due to the relative association between transport costs and increasing salaries. Therefore, Christaller's theory needs to take account of new forms of rural employment and the commuting patterns associated with them. The regular hexagonal lattice postulated to demonstrate the hierarchy of 'central places' and their spheres of influence relates to the range of goods and services. However, a settlement's sphere of influence is clearly influenced by the contemporary relations between 'central places' as a result of commuting.

It is also evident from the findings that journey 'chaining' has an important impact on local activity patterns, clarifying the findings of MacIver and Dickinson (1992) and Cairns (1995). Particularly in the case of the 'remote' locality, there is a positive correlation between the propensity to combine shopping trips with the work journey and distance travelled to work. Further, it is also found that this can result in an inverse relationship between distance and transaction value, thus conflicting with the theory of Central Place. By considering the opportunity cost of travel rather than distance as the key measure of interest, we could effectively reinstate Christaller's theory to take account of commuting patterns and the effect of journey 'chaining' in contemporary spatial geography. The opportunity cost of travelling to another centre may prove more realistic than the distance travelled to a centre because it is possible to take account of trips made for more than one purpose, which alter the relationship between costs of transportation and frequency of consumption.

Through analysis of transactions involving goods and services, the results of the study appear to conform to the principles of threshold population and range. In the case of economic activity patterns by both local consumers and enterprises, we find that the average transaction value tends to increase with distance travelled. Thus, the maximum distance people are prepared to travel increases with the value of the purchase, and being small settlements, the case study towns are characterised by relatively frequent transactions that are of a low value. This inevitably results in high externalities relative to the amount of income generated, which has important implications for local transport policy, and points towards the need for further work to establish the environmental impacts of production and consumption patterns in rural areas. It also favours an integrated policy approach where the social and environmental costs of economic development are a key consideration. Further, the findings indicate that the principles of threshold population and range can be readily extended to intermediate goods where patterns of input purchasing by local enterprises and inter-firm sales reflect that of low and high order consumer behaviour.

The spatial analyses confirm the ambiguities noted by Curran and Blackburn (1994) and Goodwin (1989) with respect to the local economy debate. Olney's 'travel to work area' could not be described as a boundary forming an *integrated* set of economic activities, nor could it be easily combined with the Urry's (1990) 'travel to shop area'. On the other hand, the relative spatial proximity of economic activities in the 'remote' locality may allow a more meaningful designation of the 'local economy', although Goodwin's (1989) argument that no economy is spatially bounded is certainly borne out by the findings of this study. Indeed, the results of the econometric analysis also support this. In both study areas, the variations in economic activity between different firm types and socio-economic groups is not consistent across different geographical levels of the 'local economy'. Thus, the observations support those of Sacraceno (1994) who considers that the territorial approach allows a better analysis of demographic and economic trends than the traditional

separation between rural and urban. According to Sacraceno (1994), the 'local economy' approach, *'which considers territorial systems in its articulation of cities of different sizes with a diversified countryside'*, explains the present logic of spatial differentiation. Indeed, the differences observed between the present case study areas support this argument. Perhaps most importantly, the study illustrates the significance of not limiting analysis of the local economy to one defined area. Although the fact that economic processes are constituted in a particular place does not necessarily make them local (Goodwin, 1989), policy is still able to focus on fairly specific designations of the 'local economy', and capitalise on the spatial nature of economic activity both within and around defined geographical areas. Indeed, the data indicates that, contrary to expectation, Sacraceno's (1994) 'local economy' approach appears to be fairly well adapted to a 'remote' rural area of England. As this author explains, a local economy needs a sufficiently rich environment in terms of people and economic activities to survive, an attribute that could be usefully applied to the Kingsbridge study area but not the 'accessible' locality due to its level interdependence with the rest of the economy.

## 8.3 Implications for rural development

According to Leon (1999), the question of rural development lies at the confluence of an internal concern for local growth and an external concern for regional development. The implications of the present study effectively span both of these categories. At one level we can consider the factors which can help to promote local growth using the characteristics of firm and household identified as being strongly integrated into their locality. At a further level, it is possible to take account of how 'pockets' of local growth can facilitate development at the regional level using small towns as focal points for rural development. As such, the implications can be viewed in terms of formulating a 'value creation strategy', requiring intervention as the incentives provided by the market are insufficient. Without

intervention, market failures will inevitably occur when private transactions between agents fail to produce the best outcome for society as a whole. For example, there may be wider costs or benefits to society associated with a good or its production which are not reflected in its market price (Cabinet Office, 2000). Indeed, locational factors are themselves good examples of externalities. Thus, as Leon (1999) argues, rural development can be considered to some extent as a public good, production of which is assured by a collective effort stimulating those economic factors favourable to dispersion.

The implications of this study are highly relevant to policies that aim to maximise local economic linkages in rural areas. Indeed, there is a clear case for preventing income leakage out of the local economy and for facilitating local expenditure to assist income and employment multipliers. As Keane (1997) states, if income is 'leaking' out of the local economy, both consumer and firm expenditure is reflected in terms of reduced profits (incomes) and lower levels of employment within the area. In the context of a small town, where the activity patterns of both producers and consumers are fundamental to its economic well being, this argument becomes particularly important. However, it is important not to overstate the value of local integration, particularly in respect of downstream linkages. For example, Massey (1988) argues that, in order to grow, an economy needs to bring in additional income by selling abroad, or in the case of a regional or local economy, by selling outside the area. The central point of Massey's (1988) *Export Base Theory* is that the size of the local market is ultimately determined by the income brought into the area by 'basic' industries, therefore the growth of the 'dependent' sector is also determined by the 'basic' industries[1]. However, assuming that strong local upstream and downstream linkages are beneficial to economic development, the following policy options can be considered. Of course, the policy maker will also be interested in local employment patterns in order to take induced effects into consideration. The findings

[1] Basic industries export outside the area; dependent industries serve the local market.

related to the influence of commuting on local expenditure patterns go some way to fulfilling this, although ultimately there is a need for further work to examine the induced effects of local employment in more detail.

Whilst it is assumed that local economic growth is the primary aim of policy, reference is also made to the concept of sustainable development, which involves '*meeting the needs of the present without compromising the ability of future generations to meet their own needs*' (Bruntland Report, 1997). The ultimate aim of this discussion is to inform, and thus raise the level of, debate in the policy decision making process. The potential role of small towns in rural development can be considered at two levels. First, there are the spatial considerations of the town itself, and the influence that this may have on policy formulation at a national and European level. Second, which has been the primary focus of this study, is knowledge about the appropriate 'mix' of firms and households in the case study towns that can be used to inform policy at the local level.

The findings clearly illustrate that the town in the 'remote' rural locality is more strongly integrated to into its local economy than the town in the 'accessible' rural area, both in terms of consumer and corporate activity. Therefore, if the CAP does evolve into a Common Agricultural and Rural Policy (CARP), then small towns such as Kingsbridge are likely to be an appropriate focus for European or national policy interventions because the benefits are more likely to 'trickle down' into the surrounding countryside. The design of such interventions is an issue in itself, but could usefully involve targeting those establishments that will facilitate the trickle down effect further. Kingsbridge therefore represents a useful 'subpole' (EC, 1988) in which it would be favourable to assist development, capitalising on the diffusion process which could take growth out to other places (Morris, 1998). Olney, on the other hand, would not diffuse the benefits of intervention to its surrounding rural economy to the same degree. The exaggerated patterns

of inward and outward commuting would also need to be considered if a growth pole policy were to be applied, both in respect of direct and induced employment effects. In 'accessible' rural areas it may prove more efficient to allocate resources in regional centres, so as to assist small towns through trickle down effects to the wider rural economy.

If policy makers do decide to focus on small or medium sized towns as a focus for intervention (See DETR, 1999), then the location of such towns must be a key consideration. Indeed, the study findings highlight the potential problems of implementing growth pole policies without first carrying out adequate primary research to establish the suitability of relevant centres. Whilst the findings of the present research are fairly conclusive, this indicates the need for further case studies to be undertaken, perhaps directly incorporating rural typologies, such as those suggested by Cloke (1977), Craig (1987; 1988) or Hodge and Monk (1991) as a basis for differentiation. Using the methodology in the present study, an 'integration index' could then be developed to serve as functional indicator for use by the European Commission and the Countryside Agency to identify suitable intermediate centres.

The basic principle behind drawing out implications for rural development at the local level is to capitalise on those firm and household characteristics predicted by the econometric models to be more strongly integrated into their locality than are others. The approach therefore is to illustrate, very simply, the development 'mix' appropriate to facilitating local economic growth at two geographical levels in each of the study area locations. The first focuses on the immediate locality. At a basic level, this can be considered as a possible strategy to help secure the future vitality of the case study towns by capitalising on those human and economic resources that are more likely to sustain local economic growth. By stressing that the most successful town-based projects also meet the

needs of their rural hinterland, the policy options could be built into strategies to help revitalise small town centres, such as those developed by the Urban and Economic Development Group (URBED, 1999) and Action for Market Towns (1997). Indeed, the findings of the present research, which illustrate the contemporary functions of small towns, has already started to inform the debate in these national forums, as well as helping to inform decisions undertaken at local level by Local Authorities and NGO's in the study areas. Whilst the majority of existing initiatives focus essentially on the *form* of town centres, the present study provides a wealth of data relating to the *function* of the settlements, thus providing a valuable source of information to those engaged in formulating planning and marketing strategies for small town centres.

Development policies at this level are also particularly relevant to strategies concerned with sustainable rural economic revitalisation. As already discussed, an important element of this is the need to combine residential with employment development as part of an attempt to link economic, social and environmental factors to strengthen the overall fabric of a community. Flint (2000) argues that only way rural areas can become sustainable is to reverse the flow of human and financial capital from an outward to an inward trend, which can only be achieved through economic transformations. In other words, focusing on methods to facilitate strong local linkages should form an integral part of policies aimed at promoting sustainable rural development. Flint (2000) provides a useful integrated sustainability model to which this policy framework could be applied. Further aspects of the present study are also of relevance to Flint's model, including reversing the loss of youth resources from communities, developing town centres to preserve landscape diversity and reducing car ownership levels to address pollution to control. Moreover, the findings illustrate that methods to facilitate local economic integration go hand in hand with those designed to create sustainable communities, and thus provide a useful basis on which to formulate an integrated set of policy measures.

The second level of the development mix is aimed at promoting local economic growth within the district level of the local economy. In the same way, this can be considered as a model to help implement a more integrated rural policy; using the towns as focal points for development initiatives, with more emphasis on the trickle down effects into the surrounding countryside. As already discussed, Kingsbridge presents a more viable option for this type of policy because of its relative strength of integration into the local economy. Nevertheless, the Olney model serves to illustrate possible options for facilitating income generation within the district.

Table 8.1 presents a development mix model for the 'remote' and 'accessible' case study areas. The information attempts to present a synthesis based on the substantive findings of the modelling process, thus identifying the salient characteristics that could possibly be manipulated by planning and development initiatives. These characteristics are divided into firm and household sectors, and are presented in order of importance based on the capacity to generate local income.

In the 'remote' rural area, a useful policy to facilitate local income generation would be to promote independent firm ownership in the study area, as well as consumer services. Focusing on the household sector, measures to reduce car ownership levels would favour local economic growth, as would the development of new residential areas in the town itself as opposed to in the immediate hinterland. Combining residential development with that to create employment would also represent a useful policy in the context of small town initiatives. A key initiative in both areas, and to meet both policy aims would be to devise strategies to foster the growth of the indigenous community, for example by re-addressing patterns of youth out-migration from rural areas.

| 'Remote' | **Locality:** Small town policies | **District:** Growth pole policies |
|---|---|---|
| | 1) Independently owned firms<br>2) Consumer services | 1) Independently owned firms<br>2) Small firms<br>3) Consumer services |
| | 1) Car ownership reduction<br>2) Residential town development<br>3) Foster indigenous community<br>4) Local employment provision | 4) Deter manufacturing firms<br><br>1) Retired / young families<br>2) Lower income housing<br>3) Residential town development<br>4) Foster indigenous community |
| **'Accessible'** | **Locality:** Small town policies | **District:** Growth pole policies |
| | 1) Small firms<br>2) Consumer services<br>3) Enterprise town development<br>4) Independently owned firms | 1) Small firms<br>2) Deter business services<br>3) Enterprise town development<br>4) Consumer services |
| | 1) Residential town development<br>2) Local employment provision<br>3) Car ownership reduction<br>4) Foster indigenous community<br>5) Retired / young families | 1) Foster indigenous community<br>2) Car ownership reduction<br>3) Retired / young families<br>4) Local employment provision |

**Table 8.1: Development mix model for the 'remote' and 'accessible' case study areas**

In the 'accessible' area, a primary target for policy could be to focus on the development of small firms. There is also a very strong case for focusing both employment and residential development in the town itself as opposed to fostering a more scattered distribution of new development. Further, the need for local policy to slow the trend towards business service activity is also evident. Again, car ownership reduction measures would be a useful

objective for local transport initiatives, as would providing residential development for retired residents and young adults with dependants.

In developing tools to implement the above policies, one option would be to consider the recommendations in the context of Armstrong and Taylor's (1993) regional micro policy options. The options described fall into two broad categories; those aimed at the reallocation of capital and those aimed at the reallocation of labour. The primary reason for the use of such instruments is to create employment, although some of the instruments could be usefully adapted to policies aimed at inducing growth through local income and employment multipliers. Examples of capital reallocation instruments include imposing capital taxes and subsidies in certain areas or on specific sectors, or introducing administrative controls, for example through the relaxation of planning regulations in certain sectors. Options for the spatial reallocation of labour are likely to be not as effective in this area, although there may be scope to apply occupational retraining schemes and education policies to help retain the indigenous community. Likewise, mobility and migration policies may have a place in helping retired segments of the population to locate in favourable areas.

Armstrong and Taylor's (1993) policy options provide only one example of the way in which tools could be developed by practitioners to address the policy recommendations of the present research. As these authors note, local government involvement in economic development policy has grown rapidly in the last decade. For example, investment subsidies are an important component of district council policy instruments, just as they are at national or EC level. Obviously, there are many more issues to be considered. The recommendations also have implications for planning policy guidance at regional and national levels, as well as for development control at the local and district level. Likewise, there are initiatives that need to be addressed by national transport policy; for example, an

obvious way of reducing car ownership would be to subsidise public transport in rural areas. This in itself illustrates further the need for an integrated set of policy measures to meet the objectives of rural development in the contemporary arena.

## 8.4 Methodological considerations

A discussion on the relative merits of the research methodology can be approached from the point of view of both data collection and data analysis. The response rates to the four surveys were fairly respectable given the relative complexity of the required information, particularly in the case of the Kingsbridge study. This not only illustrates the usefulness of employing postal surveys to collect economic data, but also reflects the success of the questionnaire designs, sampling frames, and the efforts made to encourage response including the covering letters and press releases. Further, the quality of the data obtained supports the argument of Frankfort-Nachmias and Nachmias (1992) that postal surveys are particularly useful where questions require a considered, rather than immediate response. Moreover, the attempts to validate the collected data indicate that self-completion methods are a useful tool with which to collect spatial data of a financial nature from both consumers and enterprises. The results of the validation exercises indicate that the methodology employed in the present study could be usefully replicated in other case study areas. However, given that validation methods were only carried out in one study area, it would certainly be useful to replicate them elsewhere, particularly given their proven use as a tool to help develop methodology in this field.

The household questionnaire proved to be the most successful of the survey instruments, which perhaps reflects the relative ease of collecting consumer spatial data compared to that of firms. A key improvement to the household survey would be to include a map to overcome any confusion over geographical boundaries and improve the accuracy of the

collected data; likewise, the same applies for the business survey. The business questionnaire suffered three main pitfalls revealed through the validation exercise that need to be considered when interpreting the results. First, it did not attempt to distinguish between production and distribution and therefore only yields information relating to the first round of transactions in the economy[2]. A second related point is that it did not gain information on sub-contracting between firms, and thus overlooks a secondary impact of local business activity. Finally, and of less consequence, is that the business questionnaire would benefit from a specific reference to the role of grants and subsidies in the economic activity patterns of the firm, a point which is particularly relevant to the agricultural sector.

In terms of validation methods, the financial records analysis proved to be a useful adaptation of Harrison's (1993) spatial tracking technique and would require no real modifications to enable successful replication. Obviously, any further studies would benefit from an extension of the time available to record the information at each firm visit, and if possible it would be preferable to co-ordinate recorded and estimated information in respect of the time periods accruing to each set of transactions. The design of the transactions log could certainly be improved and would require some minor refinements to avoid further problems with missing data by ensuring that transaction groups could be clearly distinguished from one another.

The analytical methodology represents a useful example of the ways in which it is possible to overcome the restrictions imposed by data that does not conform to the strict assumptions of parametric quantitative methods. The logistic regression models were developed because the original dependent variables, based on proportions of revenue and expenditure attributed to the local economy, violated the assumptions of conventional linear models. As a result, the key characteristics of firms and households were modelled

[2] This aspect of the study is discussed in more detail in the following section.

against a dichotomous, as opposed to a continuous variable. This loss of potentially useful information may well explain the relatively low value of $R^2$ observed in some of the models, and represents the main drawback of the study's analytical methodology. In turn, the somewhat restrictive nature of the modelling process should be borne in mind when interpreting the findings and considering the policy implications of the study. Further, although dichotomising the predictor variables enabled a number of firm and household characteristics to be modelled using relatively small sample sizes, this also represents an effective loss of information and is therefore a likely contributory factor to the relatively low $R^2$ values.

Further reasons for small deviations in the dependent variable are that the models may have omitted some important predictors of local integration. For example, in the case of the business analysis, the relative small sample size associated with new technology firms resulted in the omission of this variable from all models. As ICT develops, it is likely that this characteristic will form an important policy consideration in developing local economies in the future. Likewise, in the case of consumers, the number of cars may prove to be important, and not just car ownership itself. Inaccuracy in the measurement of the dependent variables may have also affected the explanatory potential of the included predictors, a factor that highlights the importance of addressing the ways in which the methodology can be improved in any further studies. An obvious improvement would be to increase the sample sizes in any future attempts at similar econometric modelling. This would not only enable a more detailed breakdown of predictors, but would also facilitate greater explanatory power through enabling probit models, such as log linear analysis, to be fitted to the data as opposed to logit models. In this way, the dependent variables could be broken down into more than two categories. Given the problems experienced with transforming the data to meet the assumptions of OLS regression, it is unlikely that a continuous dependent variable could be employed unless proportions of consumption and

expenditure were substituted for absolute values. However, this would present a different set of implications to the policy maker. Delineating further boundaries of the 'local economy' in future studies may also improve the explanatory power of firm and household characteristics, perhaps by adding 'county' and 'regional' levels of integration into the dependent set.

It is important to recognise that the results of the modelling process may well represent a very accurate indication of the degree to which local economic integration is influenced by the characteristics of firms and households. As it stands, the present research builds upon previous studies (For example, Curran and Blackburn, 1994; Keeble *et al.* 1992; and Harrison, 1993) which have tended to consider the characteristics in isolation from one another. Furthermore, in policy terms, the value of the results must not be underestimated when we consider the potential multiplier effects of a first round linkage. Thus, the $R^2$ value is not as critical as it might be in other forms of econometric model. Indeed, despite its drawbacks, the relative success of the analytical methodology should not be overlooked. The included measures indicate that all models are extremely efficient, and the rigour of the model fitting process, including the detail of its goodness of fit and predictive efficiency statistics, illustrate that the study provides a useful addition to the econometric literature. Some existing examples of logistic modelling (for example Russel, 1997; and Lussier, 1995) fail to present some of the key measures recommended in the quantitative methods literature. This not only questions their potential use, but also points to the need for researchers to recognise the potential pitfalls of logit analysis when modelling social science data.

## 8.5 Some suggestions for further work

As already mentioned, a key drawback of the study is that it effectively concentrates on the first round of transactions between local establishments and the rest of the economy. Despite knowledge about the industrial classification of firms, the distinction is not always made between the retail and distribution of the goods in question. In the same way, the spatial distribution of expenditure derived from firms' profits is also overlooked. Although there is information about employee salaries, resident salaries, place of work and household income, this information is not integrated into the main spatial data set. Thus, a direct link is not made between the indirect and induced effects of local production. Nor is it made between the exogenous influences on domestic sector employment (i.e. income earned outside the locality but spent on domestic services within the locality) and patterns of consumption expenditure. However, as Armstrong and Taylor (1993) explain, one should not underestimate the importance of measuring first round leakage's in the economy because the first round of expenditure is usually relatively large to second and subsequent rounds of expenditure. Indeed, the present study makes a useful contribution to the debate, not least because a methodology has been developed which facilitates accurate measurement of linkages, as well as the fact that both production and consumption patterns have been measured for the case study localities.

A useful way forward would be to assess the spatial distribution of the relevant multipliers, both within the two localities and between them and the rest of the economy. Constructing an input-output model, as described by Armstrong and Taylor (1993) is one option to further explore the web of linkages in the economy. However, as and Midmore and Harrison-Mayfield (1996) explain, the standard input-output model takes into account only Type I effects, which are the indirect impacts of changes in final demand from production industries on other production industries. Changes in household demand are aggregated

with the rest of final demand and so are exogenous to the system. In order to measure not only Type I effects, but also Type II effects (direct, indirect and induced effects) it would be necessary to incorporate the households into Social Accounting Matrix (SAM). Like an input-output table, each account in the matrix is represented by both a row and a column where a single entry in the matrix, $r_{ij}$ represents an expenditure item of account *j* and an income receipt of account *i*. However, whilst the input-output table only includes detailed information on the production sphere of the economy, a SAM extends the focus to include factor, household, government, capital and 'rest of world' accounts. As such, it yields a complete, consistent and comprehensive picture of how all the various actors in the economy interact at a certain point in time. (Roberts, 1998).

The construction of SAM's for the localities in the present study would require the collection of supplementary data in the two study areas. Ideally, household questionnaires would need to be sent to the employees of respondents in the business samples and business questionnaires sent to the employers of residents in the household samples. Further information relating to corporate taxes and subsidies, household savings and government transfers, such as pensions and social security payments, would also be required. Alternatively, the existing primary data would have to be supplemented by data from secondary sources such as the Census of Employment, the Population Census, the Agricultural Census and the Family Expenditure Survey. The construction of SAM's would represent a useful extension of the present study, not least because it would overcome the drawback of considering firm and houschold transactions in isolation from one another. More importantly, it would provide further insights into the strength, structure and distribution of linkages in the economy through multiplier decomposition. As Roberts (1998) explains, this involves imposing the assumption of fixed prices and Leontief technology and behaviour on the way in which the values in the SAM are generated. Further, it would serve as a useful illustration of how regional accounting methods can be

applied to small-scale case study localities, particularly if the SAM's were constructed using additional survey data. However, it may be more realistic to pursue this approach in further case studies, incorporating modifications to the existing survey instruments and sampling procedures to accommodate the requirements of the SAM.

A notable characteristic of the SAM is that it would require a consideration of the absolute values of transactions, as opposed to just the proportions that were employed as the main indicator of local integration in the present research. Indeed, a key feature of the study is that it leaves a wealth of data that has not yet been utilised to its full potential. Analysis of the absolute values of transactions recorded by the surveys could also be incorporated into an equivalent econometric approach to identify key characteristics of locally integrated establishments. Obviously, such an analysis would have a different remit to the one presented here. For example, it may be in the interest of the local Chamber of Commerce to know how much is being spent in local shops by the resident population, and how this differs between the socio-economic groups in order that town centre marketing strategies can be formulated. In the same way, detailed information relating to the number of transactions could be drawn upon further, and again incorporated into an econometric approach. A large number of small transactions in the local area could be considered as representing stronger ties than a few high value transactions, thus the dependency on the local area may be greater. However, as Harrison (1993) points out, this is a matter of subjective opinion. The data relating to the number of transactions is likely to be of more value in identifying the implications of economic activity for traffic movements in the study areas. In turn, the results from such an analysis could feed into local and regional transport policies, for example by aiming to promote the use of alternative forms of transport in cases where the opportunity cost of economic activity is highest.

A limitation of the business analysis is that no attempt was made to isolate retail establishments from other consumer services. To an extent, this represents a drawback because one could argue that retail establishments, by their very nature, are likely to have more spatially proximate markets than other types of firm. It may therefore prove useful to consider the downstream linkages of non-retail consumer services separately from retail establishments. Given the findings of the household survey, it would also be interesting to divide retail firms into low and high order establishments, to provide a comparison between the two data sets. The argument for a separate analysis of upstream linkages by retail firms may also be of importance to the sustainability debate. As Roberts (1998) notes, the significance of the links related to household expenditure depends not only on the level and pattern of consumption but also on the degree to which local retailers stock local products.

A useful line of qualitative enquiry would be to assess the influence of non-market externalities in local economic processes, such as the role of networking (Szarka, 1989) and civil society (McIlwaine, 1998) on firm behaviour. Following the example of Curran and Blackburn (1994), local embeddedness (Granovetter, 1985) could be viewed in the context of local economic integration in order to present a more comprehensive picture to the policy makers. For example, it would be useful to consider whether small towns are, or have the potential to become, networking 'nodes' that lessen the degree of isolation in the surrounding countryside. In turn, strategies to develop networking activity could be integrated with those aimed at addressing local income generation, drawing on the influence of the 'non-contractual elements of contracts' (Yeung, 1995) in the managerial decision making process. Indeed, much contemporary development literature focuses on the role of non-market links between agents, which highlights the drawback of limiting studies of the local economy to an analysis of market transactions. (See for example, Porter's (1990) work competitive advantage and business clusters; Putnam's (1993) work

on social capital; and Reimer's (1997) study of the role of informal networking on rural employment). Further, research into the contemporary role of small towns could be usefully incorporated into studies aiming to assess the reasons for differential performance in rural areas (See Bryden and Munro, 1999 for further discussion). An obvious related agenda exists to inform the local versus global debate in the context of rural economic performance, an area that appears to be somewhat neglected in the development literature.

As this is essentially a preliminary study of rural-urban linkages, the most important agenda for further research in this field is the need to replicate case studies across the country and as rural policy moves further towards Brussels, across Europe. As already discussed, a valid and reliable methodology has been developed in this study to aid in the replication process, although incorporating synthetic as well as econometric methods of analysis is likely to prove a more fruitful approach if resources allow. Indeed, as Leon (1999) notes, the combination of synthetic and econometric approaches in rural development research seems promising. In the medium term, a useful aim of future research would be to build up a typology of settlements based on their contemporary functions and level of economic integration, so that more generalisations can be made to aid in the process of policy formulation.

## 8.6 Conclusions

This study has examined the contemporary functions of two small towns in England, one located in a 'remote' rural area of South West England, and one located in the more 'accessible' South East. By highlighting systematic differences between the two study areas, the findings indicate that demographic size alone is not a sufficient method of classifying settlements, and that the functional role of towns is a more realistic criterion on which to base policy recommendations. The key function of small towns in their local

economy appears to be the provision of low order goods and services to the consumer and enterprise sectors, although the high order function is more important in the 'remote' area due to its relatively inaccessibility to regional centres. Local expenditure patterns reveal that the impact of large edge-of-town supermarkets on small town centres is likely to be partially dependent on their proximity to urban areas, which siphon off low order demand to a greater extent. Both towns act more as a market for sales than as a source of inputs to their local firms, and Kingsbridge serves its rural business community more readily in terms of local sourcing than does Olney.

Olney has less of a sphere of influence than Kingsbridge in terms of economic transactions, although it has a wider employment catchment due to both inward and outward commuting patterns. Therefore, the study confirms the ambiguities noted in the literature with regard to defining the 'local economy'. Further, the differences indicate that the local case study approach allows a better analysis than a simple division between rural and urban. Results of the spatial analysis conform to the principles of threshold population and range, although it is clear that a reinstatement of Central Place Theory would need to take account of the effects of commuting and journey 'chaining', which alter the relationship between transport costs and frequency of consumption.

The study clearly indicates that local economic integration is a function of economic and demographic structure as well as proximity to urban centres. Some variation is found between the present findings and existing empirical evidence of economic linkages, some of which can be attributed to differences between rural and urban economic processes. Further, data relating to rural travel patterns proves to be a useful indicator of the spatial distribution of consumer economic activity when socio-economic characteristics are considered in isolation from one another. The present research builds upon previous studies by modelling firm and household characteristics alongside other predictors of local

integration. There are also advantages in the fact that it considers both consumption and production patterns in the same localities. The findings of the econometric analysis illustrate the importance of multivariate modelling to effective policy formulation, and the implications for rural development are drawn out in the context of an internal concern for local growth and an external concern for regional development.

Kingsbridge is found to be more strongly integrated into its local economy than is Olney in terms of consumer and corporate economic activity. Therefore, if the CAP does evolve into a more integrated CARP, small towns like Kingsbridge are likely to be a more appropriate focus for interventions because the benefits are more likely to trickle down into the surrounding countryside. Moreover, the study highlights the importance of carrying out in-depth case study research into local economic processes to establish the suitability of intermediate centres for growth pole policies. A suitable development mix is proposed for each of the study areas, based around capitalising on those human and economic resources that are more likely to sustain local economic growth. The recommendations could be considered in the context of regional policies aimed at the reallocation of labour and capital, and have further implications for planning policy guidance, local development control and national transport policy. In the 'accessible' area there is a strong case for the concentration of development in Olney itself, whereas in the 'remote' locality, a more scattered distribution of business development is likely to be just as beneficial in terms of facilitating local growth.

The study reveals no evidence of strong linkages between agricultural firms and small towns, as suggested by Harrison (1993), a finding that further clarifies the decline in the importance of agriculture in the rural economy. Moreover, as serving the agricultural community is no longer the primary function of the small town, it is likely that the CAP will no longer provide a useful method of supporting rural communities. The importance of

very small firms in the local economy is clear, particularly in the case of the 'accessible' rural area where the territorial approach to local sourcing compares to a more sectoral approach by such firms in urban areas. Independent ownership is also an important predictor of local integration, especially in the 'remote' locality. More pronounced trends towards globalisation in the peri-urban area also reflect the predominance of producer services, which carry out very little of their business in the local area. This highlights the need for further research into the attributes of this sector, as developments in ICT allow business services to locate in more peripheral locations. Consumer services present a clear role for small towns, although a drawback of this study is that retail establishments are not distinguished from other consumer services.

A key finding of the study is the clear role that the indigenous community can play in facilitating local economic growth in and around small towns, which points towards the need for youth retention strategies in rural areas. Car ownership is also a significant contributor of income leakage out of localities, highlighting the need to reduce the reliance on the private car in rural areas to facilitate local economic growth as well as to reduce $CO_2$ emissions. Income leakage through combining shopping trips with the journey is not confined simply to convenience purchases as originally anticipated, but is strongly related to high order purchases. This is particularly relevant in the 'accessible' locality where outward commuting to regional centres is a predominant activity. This provides a clear argument for providing local employment close to residential areas, which ties in with the complementary way in which the recommendations of the present study can be integrated into models for sustainable economic revitalisation in rural areas.

Attempts to validate the data indicate that self-completion methods are a useful tool with which to collect spatial data relating to transactions from both firms and households, with the collection of consumption related data proving to be the most straight forward. With a

few minor improvements the methodology could therefore be usefully replicated in other case study areas. The analytical methodology provides an illustration of the ways in which it is possible to overcome the restrictions imposed by data that doesn't conform to the assumptions of parametric methods. Furthermore, the study presents a comprehensive example of logistic modelling, incorporating measures of performance often overlooked by social science researchers.

The main improvement in a future studies would be to increase the sample size to allow the use of probit as opposed to logit modelling techniques. Econometric methods could also be combined with synthetic approaches to assess the spatial distribution of income and employment multipliers by constructing to SAM to give a complete picture of how the various actors in the economy interact. With the collection of additional survey data, it may also be possible to construct a SAM for the present case study localities. Further quantitative analysis of the existing data could be used to develop marketing strategies for small towns, and modelling linkages based on the number of transactions may prove valuable in identifying the implications of economic activity for traffic movements. The role of non-market externalities could also be viewed in the context of local economic integration, which in turn would help to examine the reasons for differential performance in rural areas.

In conclusion, the study represents a useful preliminary investigation of some rural-urban linkages. A valid and reliable methodology has been developed which could be used to replicate further case studies across the UK and Europe. Ultimately, an 'integration index' could be formulated to develop typologies of settlements in order that more generalisations can be made to aid the process of policy formulation.

# APPENDICES

(A) TRENDS IN NATIONAL HOUSEHOLD CONSUMPTION AND EXPENDITURE

(B) THE CONCEPTUAL MODEL

(C) OPERATIONALISATION OF INDEPENDENT VARIABLES

(D) CLASSIFICATION OF FAMILY STAGE AND SOCIAL CLASS

(E) TOWN SELECTION CENSUS DATA

(F) CASE STUDY AREA MAPS

(G) SURVEY PRESS RELEASES

(H) SURVEY COVERING LETTERS

(I) MAIN SURVEY INSTRUMENTS

(J) LIFESTAGE / FAMILYSTAGE CATEGORIES

(K) FIRMS THAT TOOK PART IN THE VALIDATION EXERCISE

(L) LOGISTIC REGRESSION SPECIFICATION PROCESS

(M) EVALUATION AND INTERPRETATION OF THE LOGISTIC REGRESSION MODELS

(N) 'ECONOMIC FOOTPRINTS': FIRMS

**(O)** 'ECONOMIC FOOTPRINTS': HOUSEHOLDS

(P) DERIVATION OF INDEPENDENT VARIABLES FOR PREDICTION MODELS

# Appendix A

## Trends in National household consumption and expenditure

The Wealth Report (Taylor Nelson, 1995) gives the national household average spend for 1994, which gives an indication of the breakdown in spending between various goods and services:

- Basic, unavoidable household costs account for 30% or all income of which a little over half relates to income tax and National Insurance contributions. Another large element of this sector is rent, local tax and water charges which account for nearly one third of basic costs.

- Essentials account for nearly 20% of all spend and saving. The main areas of such expenditure are food for the home - nearly 9% and clothing - over 4%. Post and telephone account for 1%.

- Home improvements account for 7.5% of the national household budget. The most important elements involving payments to contractors at 3% importance. Furniture accounts for 1.5% of the family budget.

- Medical costs and insurance each account for just under 15% of all spend and saving.

- Transport and travel takes up over 11% of the household budget. Most of this at nearly 10% concerns private transport costs. The purchase of vehicles accounts for over 3% of all spend and saving, petrol for over 2%, vehicle insurance for 1% and garage repairs for a similar 1%.

- Pub drinking accounts for 3.5% of the family budget with a further 1.5% concerning drinking in restaurants and clubs and at home.

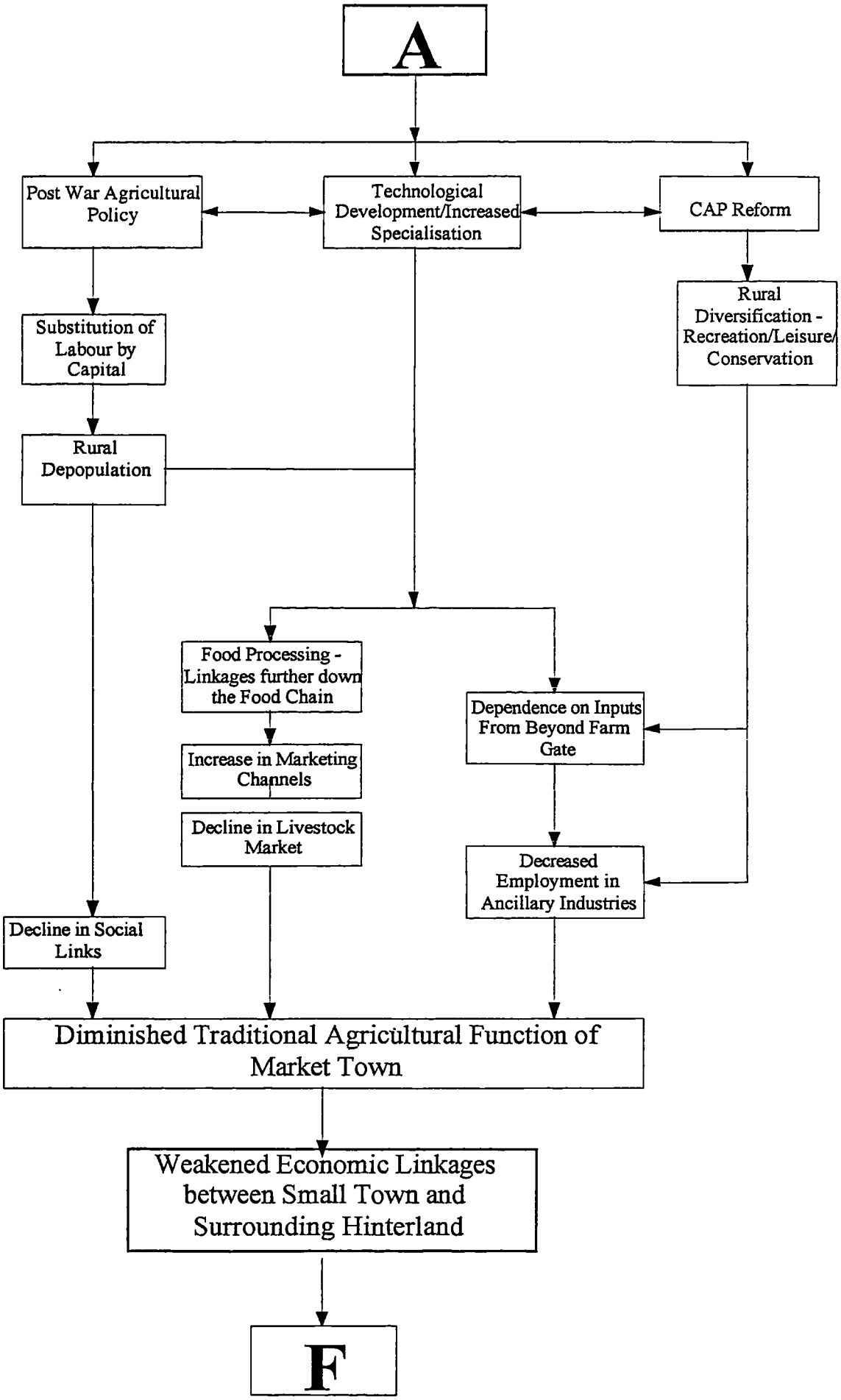
- Leisure/luxury items account for 16.5% of all spend and saving. Of this tobacco accounts for an average 2% of the family budget, meals out for 2%, confectionery 3%, holidays for nearly 3%, brown goods for nearly 2% and reading materials for 1%.

- Saving accounts for 5.5% of the national household budget. Life assurance premiums account for 2%, pension contributions for over 2% and the rest in cash saving into deposit accounts and investments.

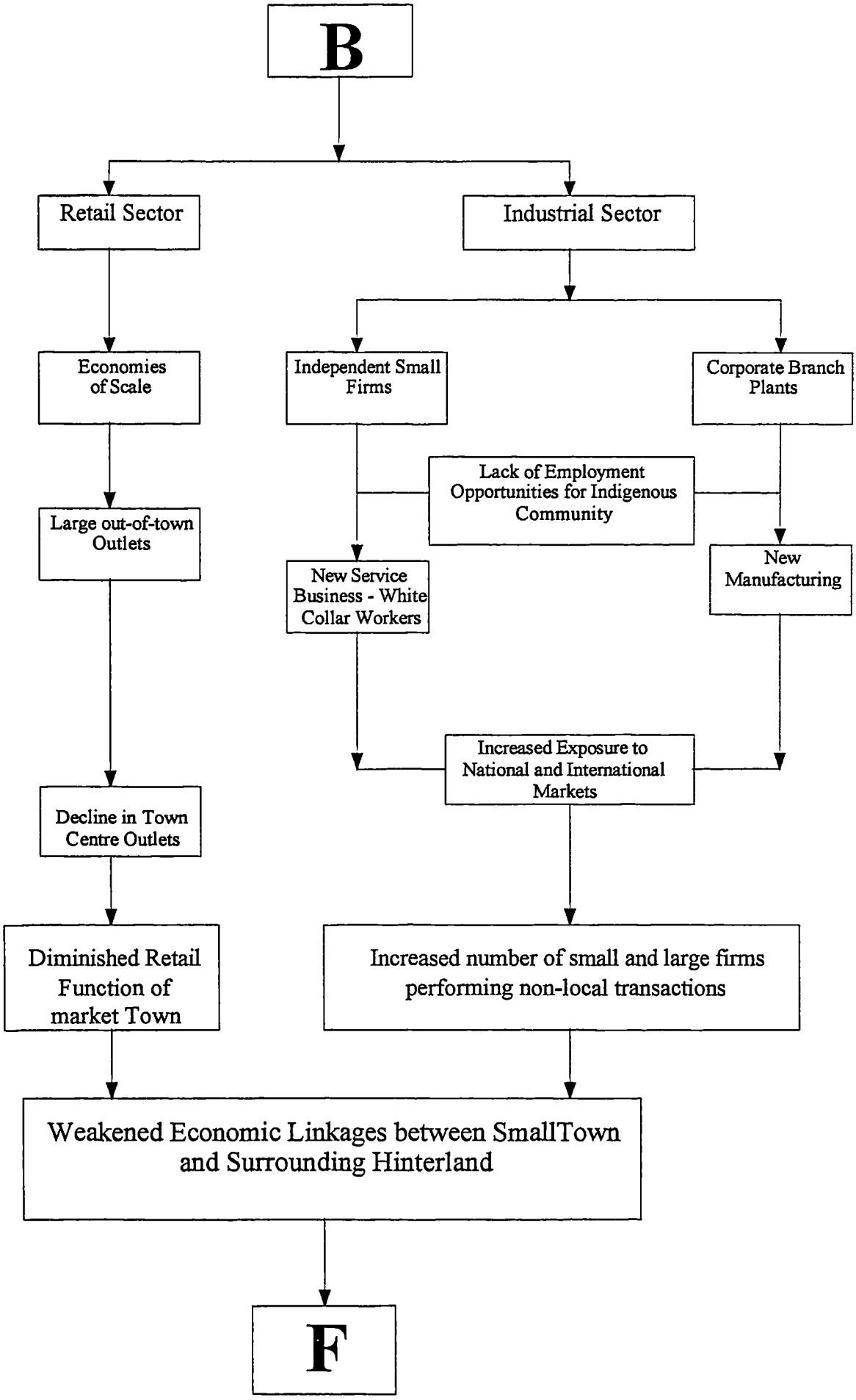
Source: Taylor Nelson (1994a Wealth Report)

# Appendix B

## The Conceptual Model




**Appendix B: The Conceptual Model**

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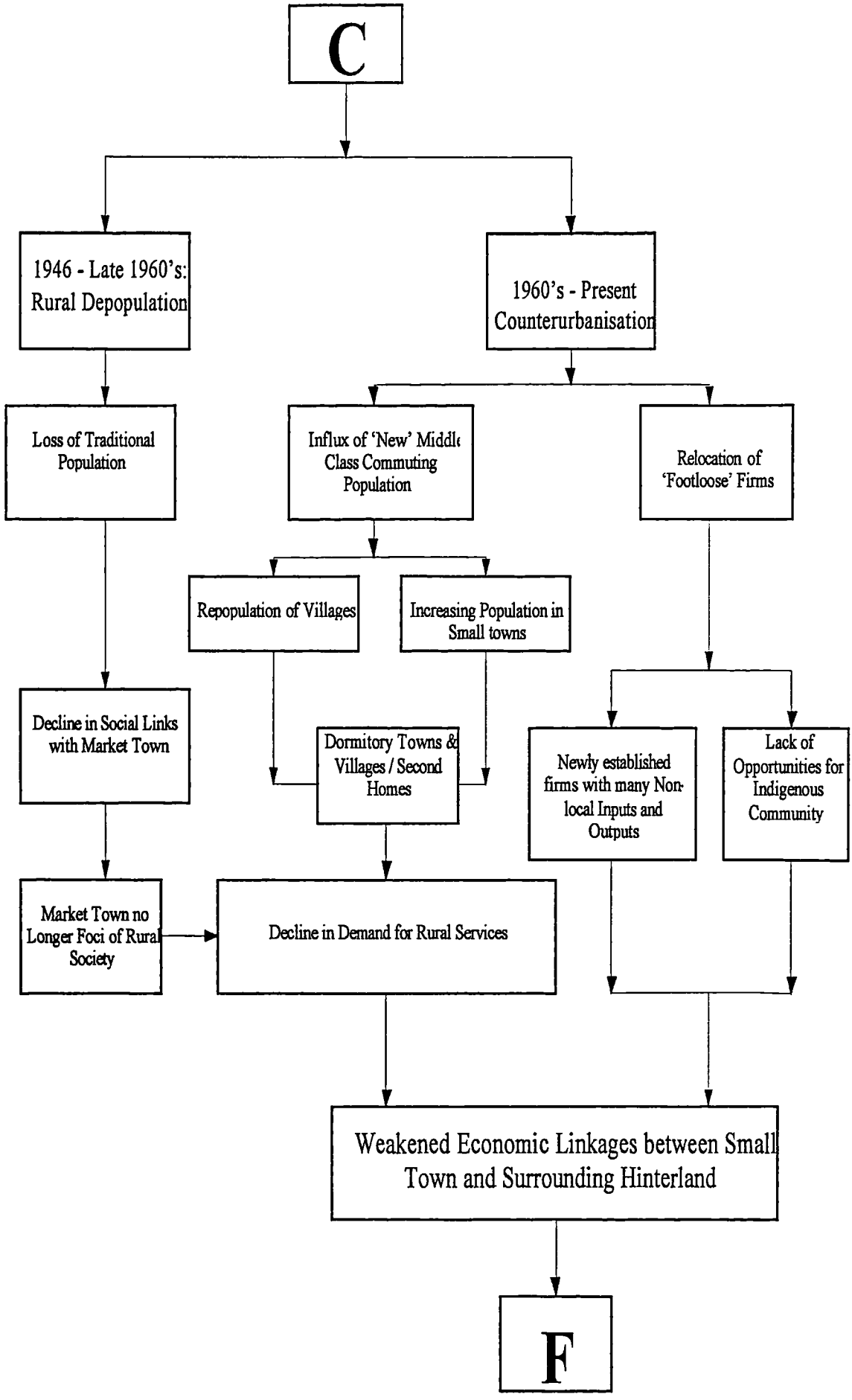


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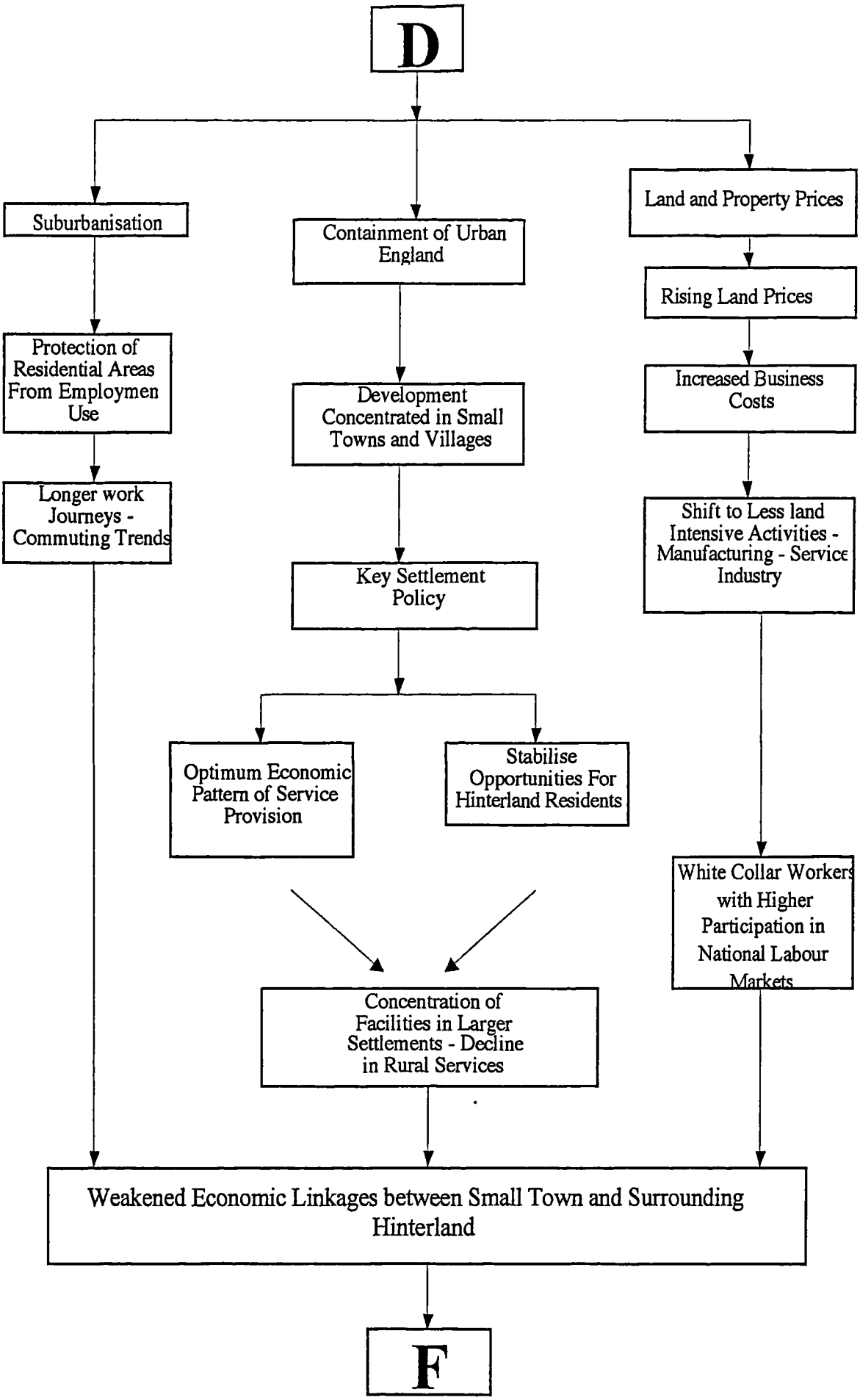


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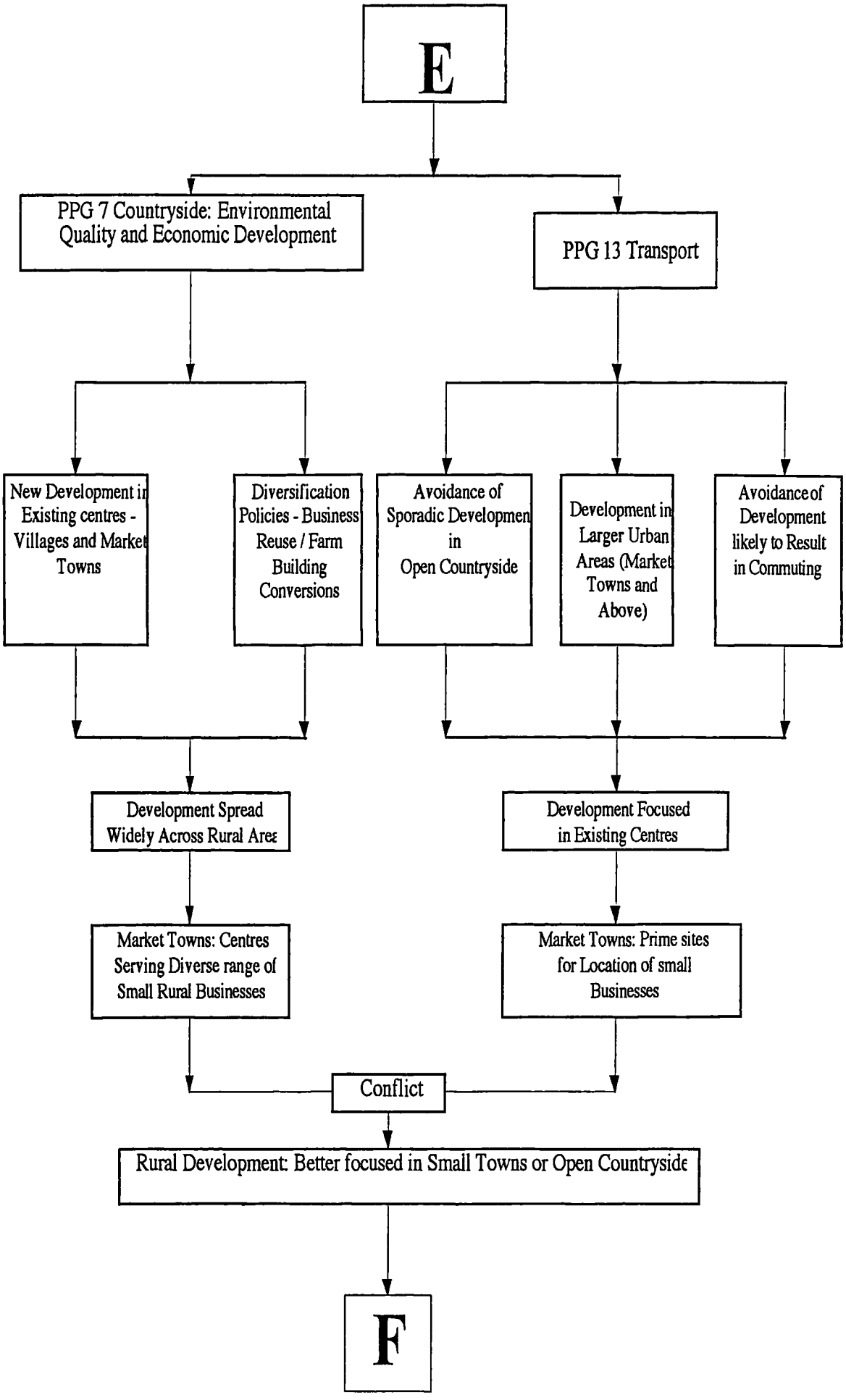


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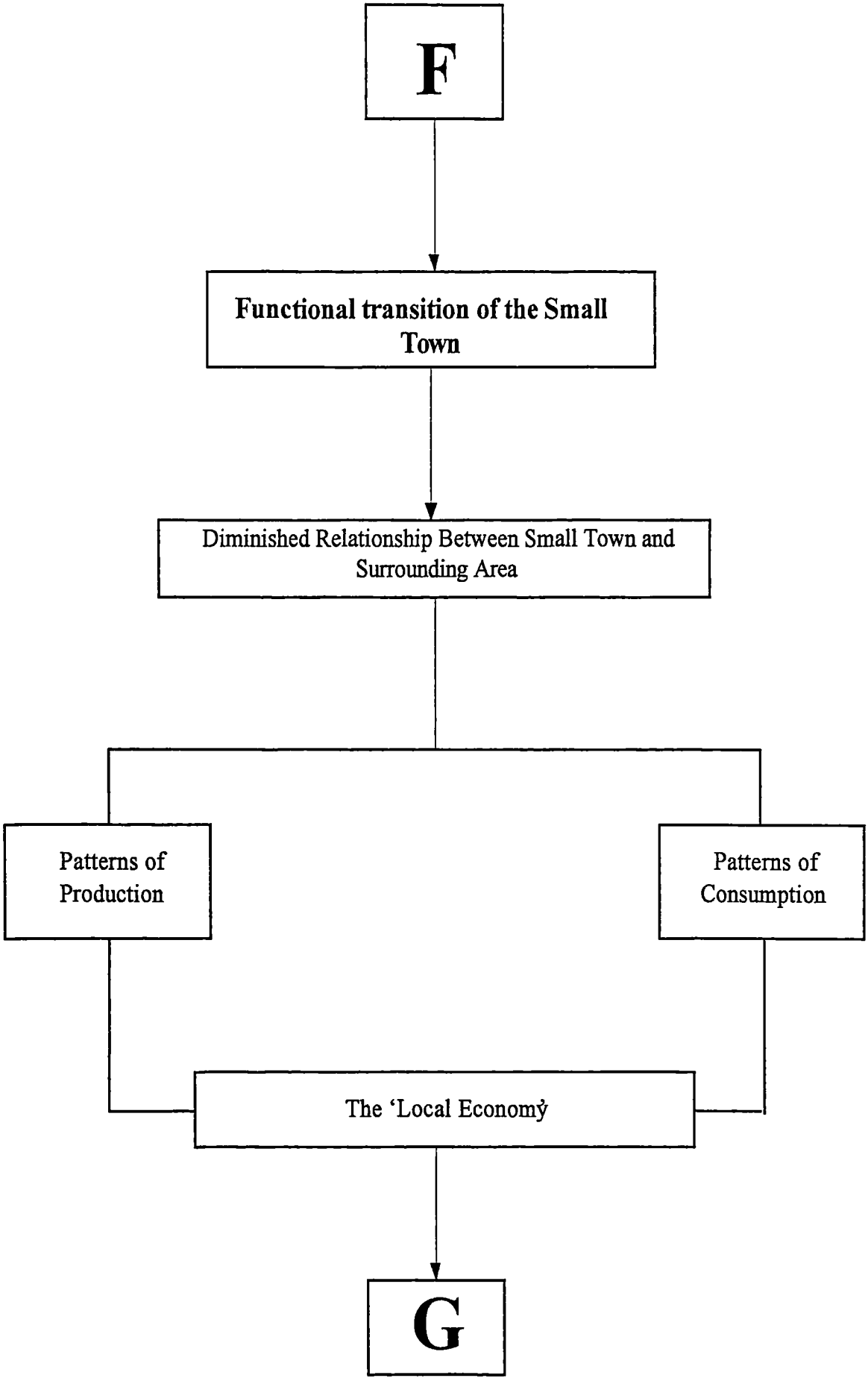


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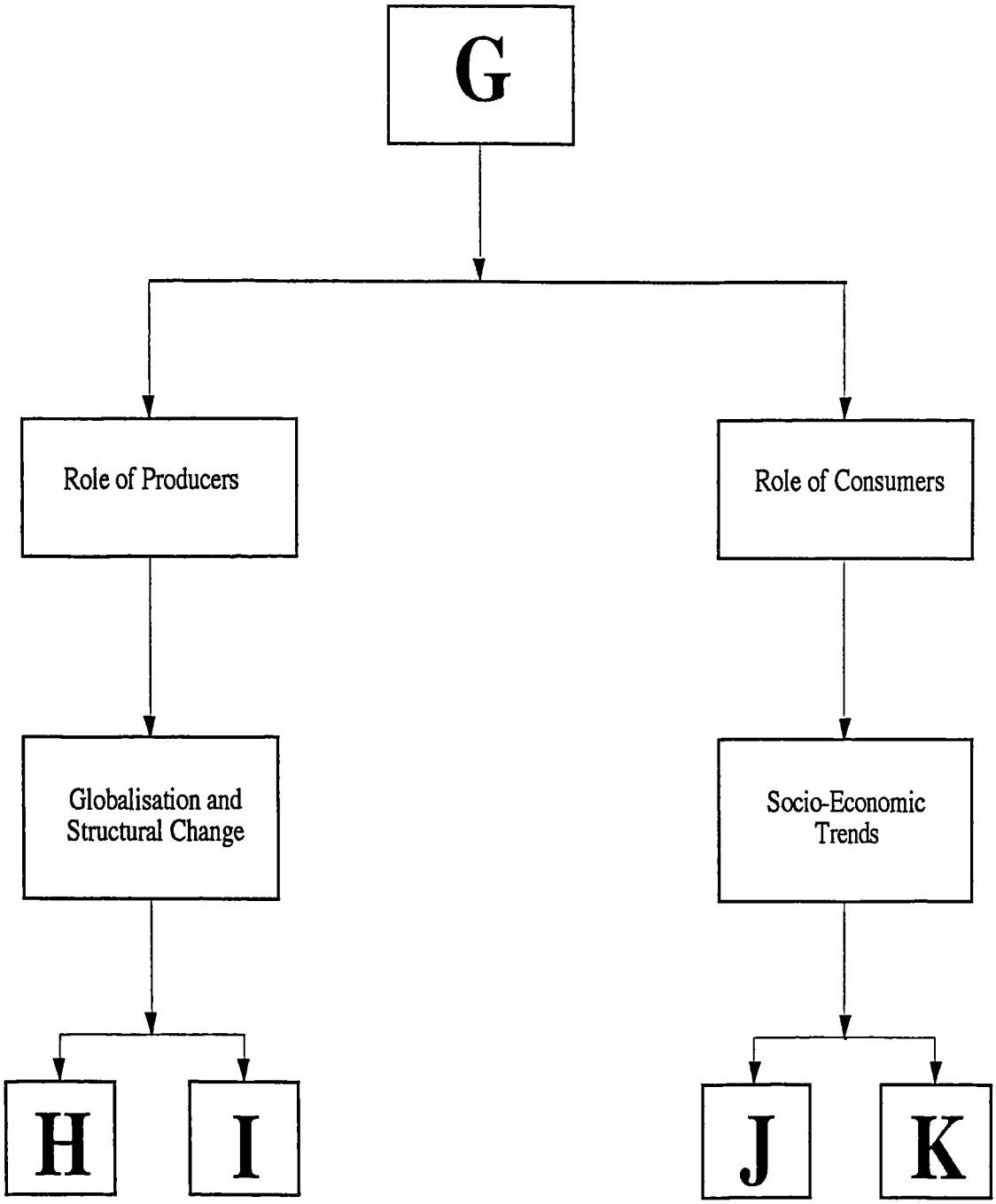


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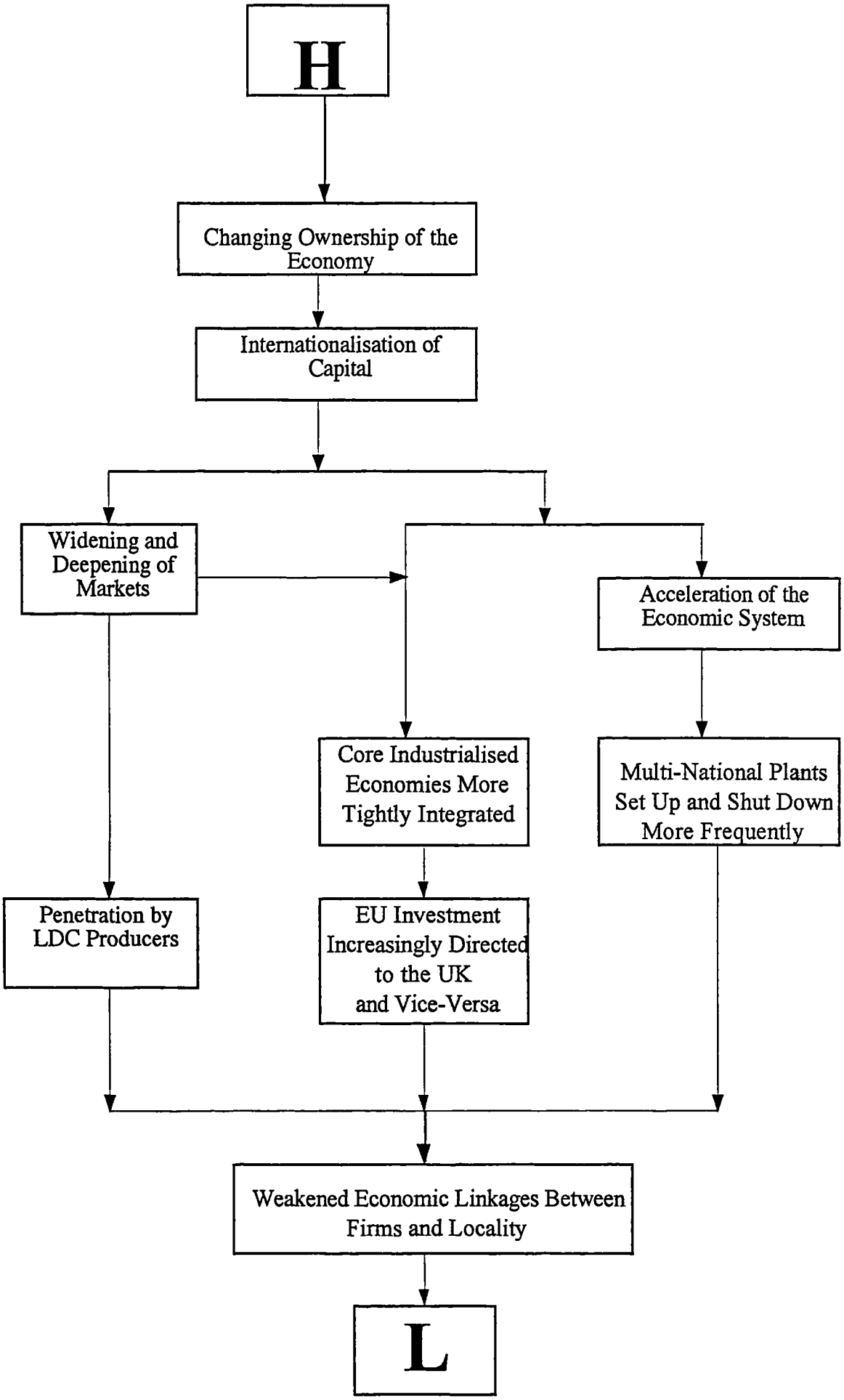


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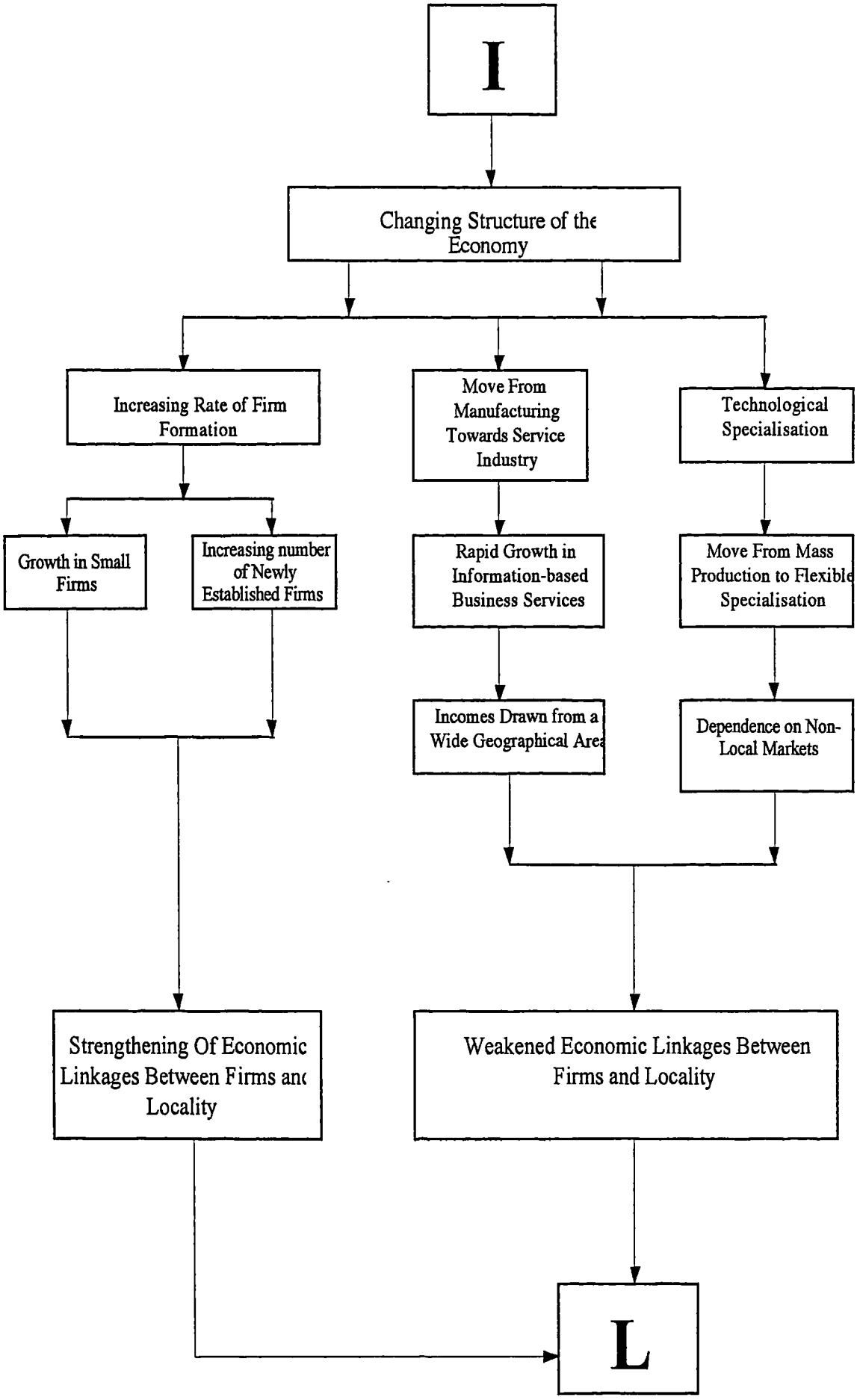


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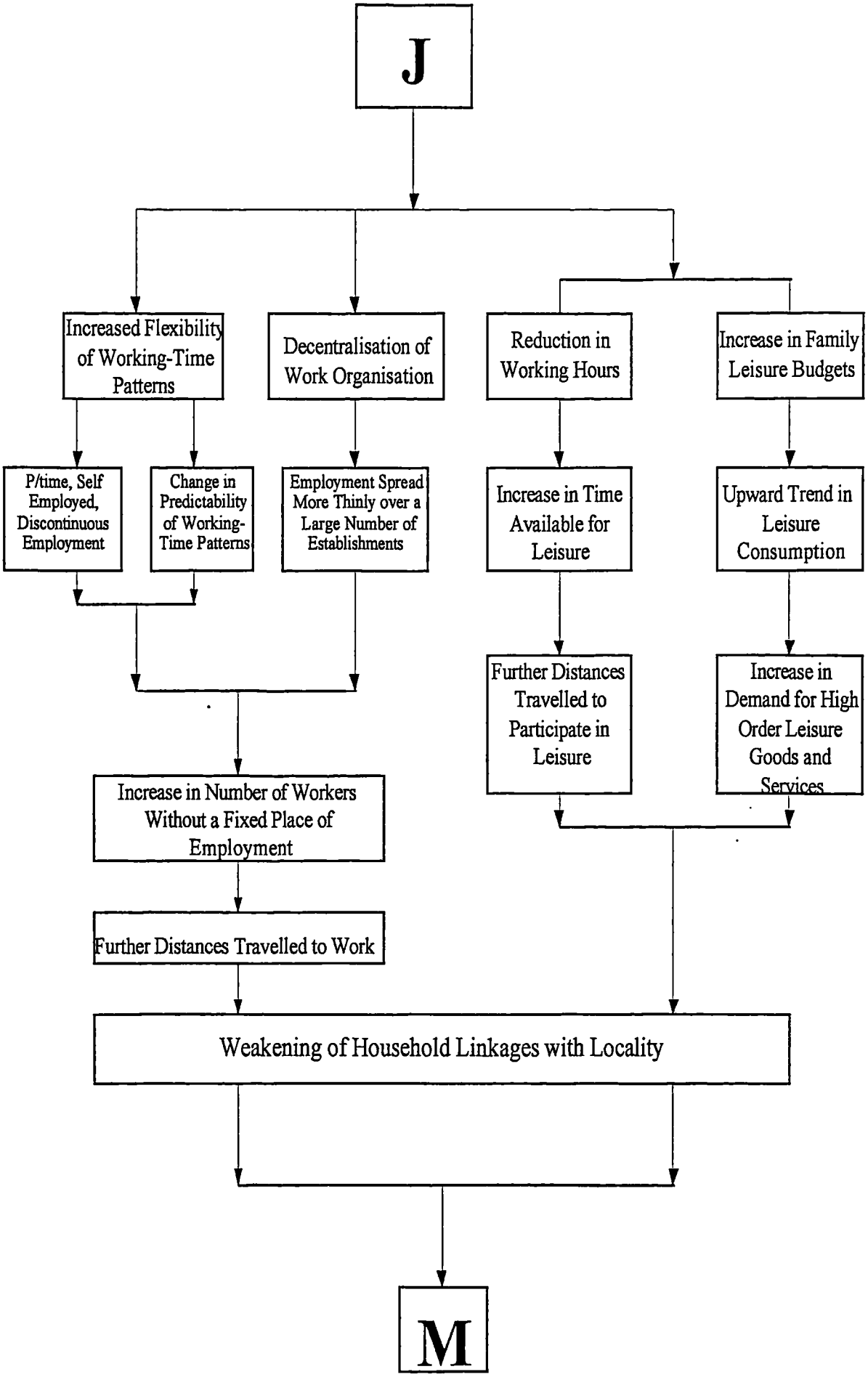


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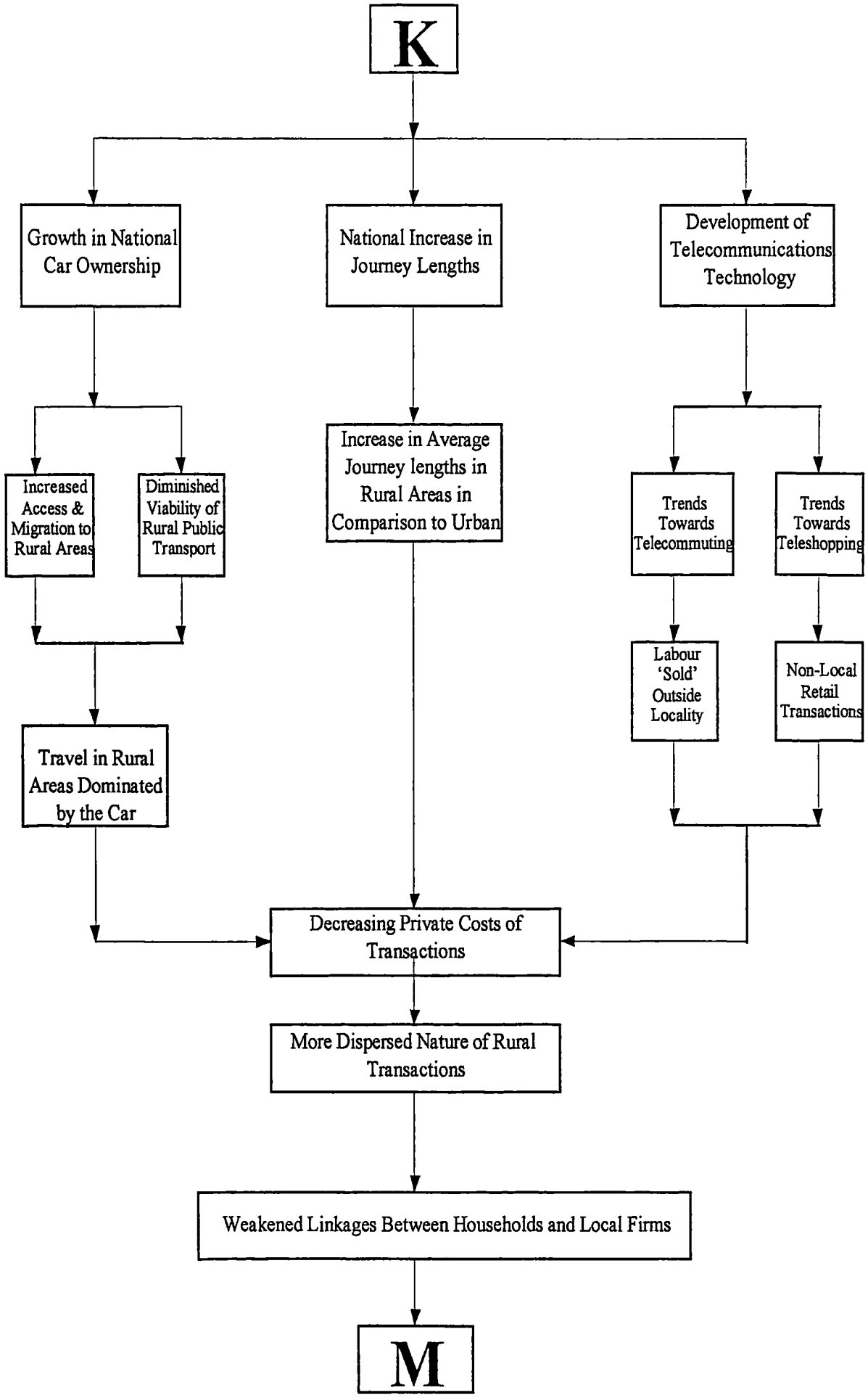


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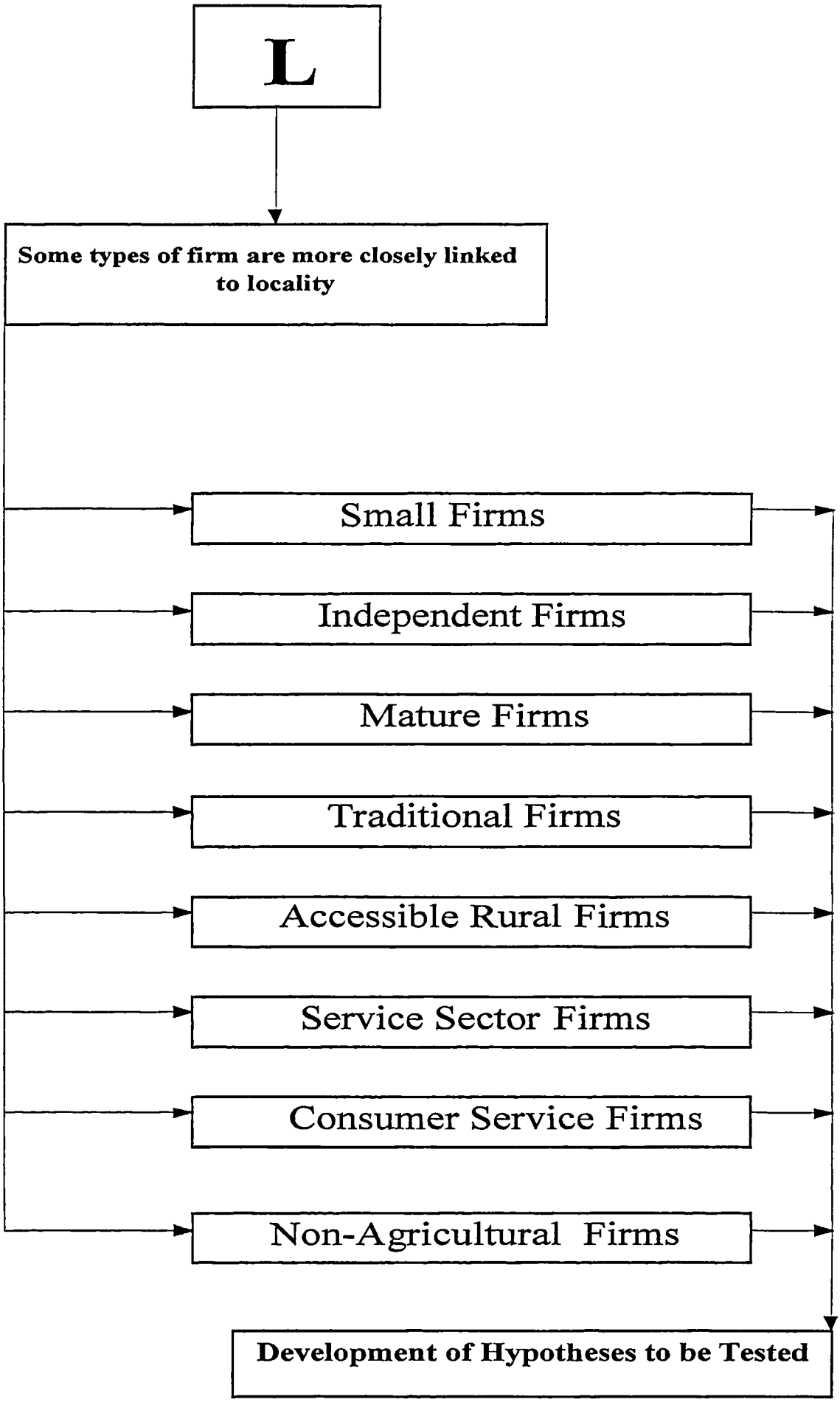


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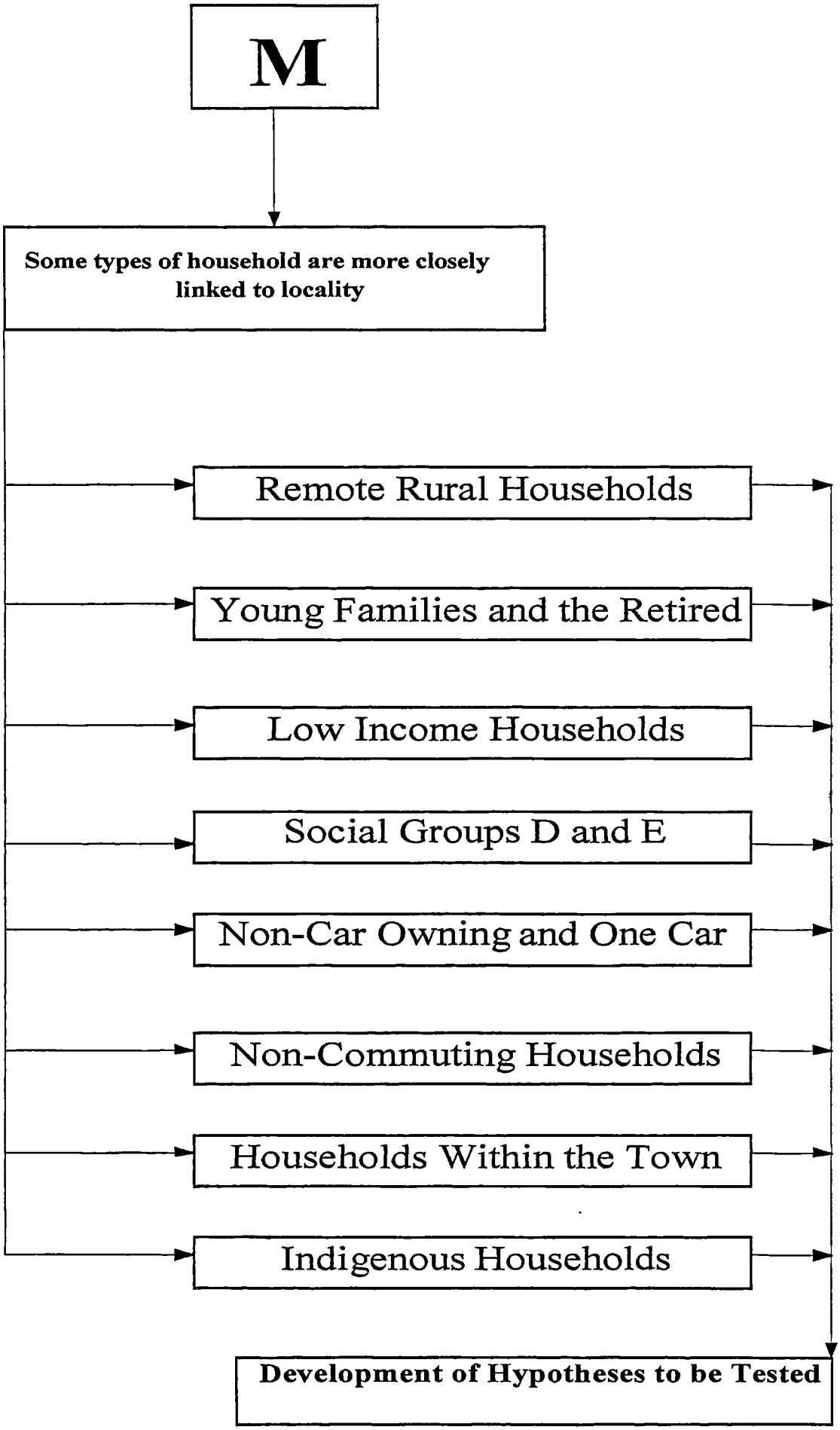



**The Conceptual Model (Cont.)**

# Appendix C

## Operationalisation of independent variables

*Analysis at firm level:*

**'Accessible' rural firms:** Those surveyed in the 'accessible' rural study area
**'Remote' rural firms:** Those surveyed in the 'remote' rural study area

**Small firms:** Firms with a workforce of five employees or less
**Large firms:** Firms with a workforce of more than five employees

**Independent firms:** Independent firms with no other sites
**Branch plants:** Firm headquarters or branches of either national or international companies

**Newly established firms:** Firms that have been in existence at the present location for up to six years
**Mature firms:** Firms that have been in existence at the present location for more than six years

**Traditional firms:** Firms producing and selling 'tangible' goods and services in the conventional way
**New technology firms:** Firms delivering 'intangible' products and services via the telecommunication network

**Service sector firms**: According to Standard Industrial Classification (SIC) 1992
**Manufacturing sector firms:** According to SIC 1992

**Consumer service firms:** Retail distribution, hotels and catering; repairs; Transport and communication
**Producer service firms:** Financial intermediation, real estate, renting & business activities; Wholesale distribution

**Agricultural firms:** All firms in the agricultural sector, including full and part time farms, pluriactive farms, agricultural ancillary services and horticultural growers.
**Non-agricultural firms:** All other types of firm

*Analysis at household level:*

**'Accessible' rural households:** Those surveyed in the 'accessible' rural study area
**'Remote' rural households:** Those surveyed in the 'remote' rural study area

**Young families and retired households:** Groups II and VI of Family Stage*
**Other stages in the family lifecycle:** Groups I, III, IV, V of Family Stage*

*According to Dix (1977) (See Appendix D)

**Low Income households:** Those with a total gross annual household income* less than £8,501
**Higher income households:** Those with a total gross annual household income* of £8,501 or more

* Following that employed by the *Family Expenditure Survey*

**Low social groups:** Groups IV and V of office for National Statistics (ONS) Social Class*
**Higher social groups:** Groups I, II, III(N) and III(M) of ONS Social Class*

* Based on ONS Classification of Occupations, 1990. See Appendix D.

**Households with no car:** Those households without a car or van
**Car owning households:** Those households with one or more cars/vans

**Locally based employees:** those households where the person who does the majority of the household shopping works in the study area
**Commuting households:** those households where the person who does the majority of the household shopping works outside the study area

**Town households:** those residing in the town itself, with an appropriate postcode according to council ward divisions
**Hinterland households:** those residing elsewhere in the study area

**Indigenous households:** Those who have resided in the case study areas all their lives
**Newcomers:** Those residents that have moved into the case study areas at some point during their lives

# Appendix D

## Classification of Family Stage and Social Class

### Family stage (Dix, 1977)

| | |
|---|---|
| Group I | Young adults without children |
| Group II | Families with dependent children, the youngest aged 7 years or less |
| Group III | Families with dependent children, the youngest aged 12 years or less |
| Group IV | Families with dependent children, the youngest aged 13 years or more |
| Group V | Family of adults, all of working age |
| Group VI | Elderly |

### Social Class (ONS Classification of Occupations, 1990)

| | |
|---|---|
| I | Professional etc. occupations |
| II | Managerial and technical occupations |
| III | Skilled occupations: (N) non-manual |
| III | Skilled occupations: (M) manual |
| IV | Partly skilled occupations |
| V | Unskilled occupations |

(Based on head of household / most significant indicator)

## Appendix E

## Town selection census data

1. Summary

2. Devon towns: Economic status of residents

3. Devon towns: Household dependency ratios, home ownership and car ownership

4. Buckinghamshire towns: Economic status of residents

5. Buckinghamshire towns: Household dependency ratios, home ownership and car ownership

# 1. Summary

## Devon

The settlements that appear to be most 'representative' of the county in terms of the relevant parameters are Kingsbridge and South Molton. Kingsbridge has the median proportion of economically active residents, households with dependants and households who own one car. It also equates most closely to the mean levels of the proportion of residents who are retired and the proportion of households who own their own home. South Molton has the mean proportions of full time employees, households renting accommodation and self employed workers. Dartmouth holds the median for home ownership ratios, and together with Totnes, has the mean proportion of economically active residents. In terms of car ownership, Budleigh Salterton appears to be fairly representative of the county, having median proportions of households with no car and two or more cars, although has a disproportionately high number of retired residents.

## Buckinghamshire

The settlements that appear to be most 'representative' of the county in terms of the relevant parameters are Olney and Winslow. Olney has the median proportion of economically active and retired residents. It also has the median proportion of economically active residents who are working full time and households with dependants. Winslow has the median proportion of households who rent accommodation and who own one car.

| TOWN | RESIDENTS | ECON ACTIVE | % | FULL TIME | % | PART TIME | % | S EMPLOYED | % | RETIRED | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TAVISTOCK | 9726 | 4671 | 48 | 2602 | 56 | 966 | 21 | 721 | 15 | 966 | 9.9 |
| HOLSWORTHY | 2610 | 1226 | 47 | 524 | 43 | 281 | 23 | 333 | 27 | 545 | 21 |
| OKEHAMPTON | 4463 | 2202 | 49 | 1212 | 55 | 439 | 20 | 394 | 18 | 821 | 18 |
| IVYBRIDGE | 9186 | 4861 | 53 | 3105 | 64 | 921 | 19 | 527 | 11 | 954 | 10 |
| KINGSBRIDGE | 4825 | 2142 | 44 | 1026 | 48 | 459 | 21 | 497 | 23 | 1112 | 23 |
| TOTNES | 6600 | 3089 | 47 | 1520 | 49 | 597 | 19 | 599 | 19 | 1503 | 23 |
| DARTMOUTH | 5286 | 2482 | 47 | 1572 | 63 | 453 | 18 | 564 | 23 | 1366 | 26 |
| SOUTH MOLTON | 4111 | 1992 | 48 | 1034 | 52 | 398 | 20 | 409 | 21 | 803 | 20 |
| ASHBURTON | 3457 | 1719 | 50 | 800 | 47 | 318 | 18 | 453 | 26 | 661 | 19 |
| BOVEY TRACEY | 5199 | 2475 | 48 | 1307 | 53 | 439 | 18 | 553 | 22 | 1322 | 25 |
| CHUDLEIGH | 4486 | 2308 | 51 | 1303 | 56 | 403 | 17 | 410 | 18 | 718 | 16 |
| HONITON | 8612 | 4047 | 47 | 2333 | 58 | 739 | 18 | 643 | 16 | 2039 | 24 |
| B. SALTERTON | 4398 | 1466 | 33 | 713 | 49 | 320 | 22 | 326 | 22 | 1785 | 41 |
| SEATON | 5848 | 2210 | 38 | 1086 | 49 | 447 | 20 | 490 | 22 | 2324 | 40 |
| CULLUMPTON | 6918 | 3431 | 50 | 1938 | 56 | 594 | 17 | 680 | 20 | 1021 | 15 |
| **MEAN** | **5715** | **2688.066667** | **47** | **1471.66667** | **53** | **518.266667** | **20** | **506.6** | **20** | **1196** | **22** |
| **MEDIAN** | **5199** | **2308** | **44** | **1303** | **53** | **447** | **19** | **497** | **21** | **1021** | **21** |

2. Devon towns: Economic status of residents

| TOWN | RESIDENTS | HOUSEHOLDS | H'H CHILD | % | OWNED | % | RENTED | % | NO CAR | % | 1 CAR | % | 2+ CARS | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAVISTOCK | 9726 | 4171 | 1188 | 28 | 1442 | 35 | 320 | 7.7 | 999 | 24 | 2008 | 48.1 | 1164 | 28 |
| HOLSWORTHY | 2610 | 1103 | 276 | 25 | 446 | 40 | 110 | 10 | 261 | 24 | 579 | 52.5 | 263 | 24 |
| OKEHAMPTON | 4463 | 1920 | 554 | 29 | 576 | 30 | 278 | 14 | 592 | 31 | 975 | 50.8 | 353 | 18 |
| IVYBRIDGE | 9186 | 3497 | 1498 | 43 | 597 | 17 | 134 | 3.8 | 440 | 13 | 1782 | 51 | 1275 | 36 |
| KINGSBRIDGE | 4825 | 2163 | 577 | 27 | 732 | 34 | 171 | 7.9 | 623 | 29 | 1107 | 51.2 | 433 | 20 |
| TOTNES | 6600 | 3095 | 755 | 24 | 957 | 31 | 366 | 12 | 980 | 32 | 1581 | 51.1 | 534 | 17 |
| DARTMOUTH | 5286 | 2522 | 592 | 23 | 844 | 33 | 254 | 10 | 884 | 35 | 1257 | 49.8 | 381 | 15 |
| SOUTH MOLTON | 4111 | 1750 | 507 | 29 | 561 | 32 | 148 | 8.5 | 483 | 28 | 893 | 51 | 374 | 21 |
| ASHBURTON | 3457 | 1503 | 416 | 28 | 474 | 32 | 179 | 12 | 359 | 24 | 712 | 47.4 | 432 | 29 |
| BOVEY TRACEY | 5199 | 2360 | 514 | 22 | 865 | 37 | 177 | 7.5 | 429 | 18 | 1203 | 51 | 728 | 31 |
| CHUDLEIGH | 4486 | 1832 | 572 | 31 | 449 | 25 | 191 | 10 | 338 | 18 | 867 | 47.3 | 627 | 34 |
| HONITON | 8612 | 3872 | 1009 | 26 | 1286 | 33 | 224 | 5.8 | 957 | 25 | 2162 | 55.8 | 753 | 19 |
| B. SALTERTON | 4398 | 2247 | 313 | 14 | 1272 | 57 | 141 | 6.3 | 564 | 25 | 1185 | 52.7 | 498 | 22 |
| SEATON | 5848 | 2983 | 425 | 14 | 1575 | 53 | 320 | 11 | 851 | 29 | 1651 | 55.3 | 481 | 16 |
| CULLUMPTON | 6918 | 2705 | 952 | 35 | 645 | 24 | 197 | 7.3 | 513 | 19 | 1359 | 50.2 | 833 | 31 |
| **MEAN** | **5715** | **2514.866667** | **676.53333** | **27** | **848.07** | **34** | **214** | **8.9** | **618.2** | **25** | **1288.1** | **51** | **608.6** | **24** |
| **MEDIAN** | **5199** | **2360** | **572** | **27** | **732** | **33** | **191** | **8.5** | **564** | **25** | **1203** | **51** | **498** | **22** |

3. Devon towns: Dependency ratios, home ownership and car ownership

| TOWN | RESIDENTS | ECON ACTIVE | % | FULL TIME | % | PART TIME | % | S EMPLOYED | % | RETIRED | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BUCKINGHAM | 10315 | 5545 | 53.8 | 3623 | 65 | 967 | 17 | 663 | 12 | 1169 | 11 |
| OLNEY | 5720 | 3183 | 55.6 | 2072 | 65 | 488 | 15 | 479 | 15 | 721 | 13 |
| HADDENHAM | 4659 | 2500 | 53.7 | 636 | 25 | 460 | 18 | 375 | 15 | 630 | 14 |
| WINSLOW | 4195 | 2234 | 53.3 | 1373 | 61 | 394 | 18 | 369 | 17 | 632 | 15 |
| WENDOVER | 8159 | 4886 | 59.9 | 3442 | 70 | 524 | 11 | 497 | 10 | 1098 | 13 |
| PRINCES RISBOROUGH | 7659 | 3818 | 49.8 | 3034 | 79 | 692 | 18 | 530 | 14 | 1483 | 19 |
| THAME | 10794 | 6154 | 57 | 4134 | 67 | 985 | 16 | 724 | 12 | 1104 | 10 |
| TRING | 12037 | 6711 | 55.8 | 4302 | 64 | 1169 | 17 | 870 | 13 | 1425 | 12 |
| **MEAN** | **7942.25** | **4378.875** | **54.9** | **2827** | **62** | **709.875** | **16** | **563.375** | **13** | **1032.75** | **13** |
| **MEDIAN** | **7909** | **4352** | **54.7** | **3238** | **65** | **608** | **17** | **513.5** | **13** | **1101** | **13** |

4. Buckinghamshire towns: Economic status of residents

| TOWN | RESIDENTS | HOUSEHOLDS | H'H CHILD | % | OWNED | % | RENTED | % | NO CAR | % | 1 CAR | % | 2+ CARS | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BUCKINGHAM | 10315 | 4056 | 1490 | 36.7 | 774 | 19 | 322 | 7.9 | 660 | 16 | 1785 | 44 | 1611 | 40 |
| OLNEY | 5720 | 2344 | 783 | 33.4 | 476 | 20 | 215 | 9.2 | 377 | 16 | 949 | 40 | 1023 | 44 |
| HADDENHAM | 4659 | 1827 | 644 | 35.2 | 489 | 27 | 87 | 4.8 | 268 | 15 | 744 | 41 | 815 | 45 |
| WINSLOW | 4195 | 1726 | 564 | 32.7 | 427 | 25 | 100 | 5.8 | 268 | 16 | 738 | 43 | 720 | 42 |
| WENDOVER | 8159 | 2874 | 926 | 32.2 | 715 | 25 | 219 | 7.6 | 564 | 20 | 1404 | 49 | 1006 | 35 |
| PRINCES RISBOROUGH | 7659 | 3208 | 840 | 26.2 | 950 | 30 | 146 | 4.6 | 721 | 22 | 1306 | 41 | 1181 | 37 |
| THAME | 10794 | 4319 | 1525 | 35.3 | 885 | 20 | 216 | 5 | 746 | 17 | 1840 | 43 | 1733 | 40 |
| TRING | 12037 | 4905 | 1614 | 32.9 | 1076 | 22 | 289 | 5.9 | 824 | 17 | 2126 | 43 | 2246 | 46 |
| **MEAN** | **7942.25** | **3157.375** | **1048.25** | **33.1** | **724** | **23** | **199.25** | **6.3** | **553.5** | **17** | **1361.5** | **43** | **1291.88** | **41** |
| **MEDIAN** | **7909** | **3041** | **883** | **33.2** | **744.5** | **23** | **215.5** | **5.8** | **612** | **17** | **1355** | **43** | **1102** | **41** |

5. Buckinghamshire towns: Dependency ratios, home ownership and car ownership

## Appendix F

## Case study area location maps

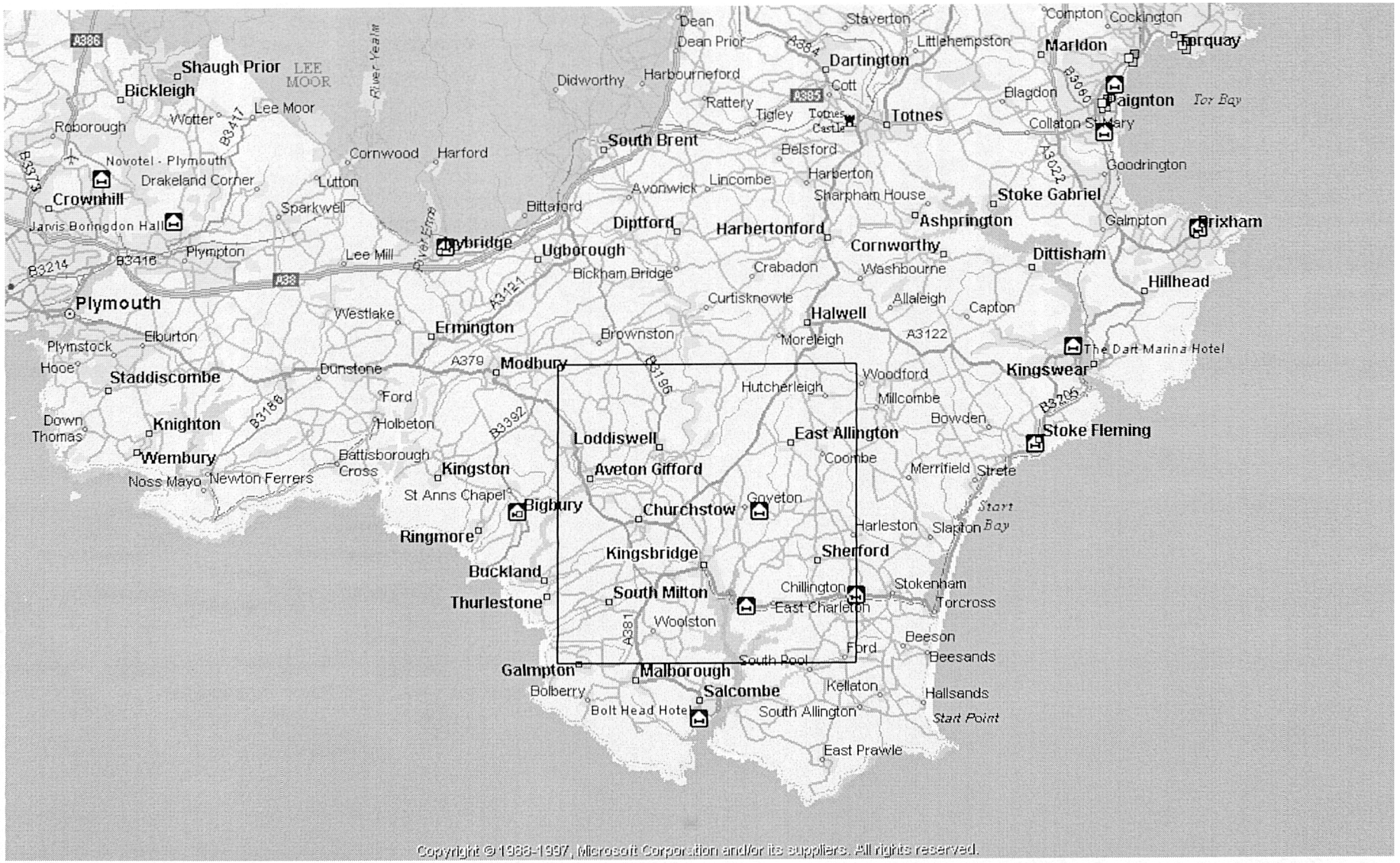
**Map 4A:** The Kingsbridge study area

**Map 4B:** The Olney study area

### Scale:

1 centimetre = 1.40 miles (2.25 km)

Each study area covers 49 square miles (78.9 $km^2$).



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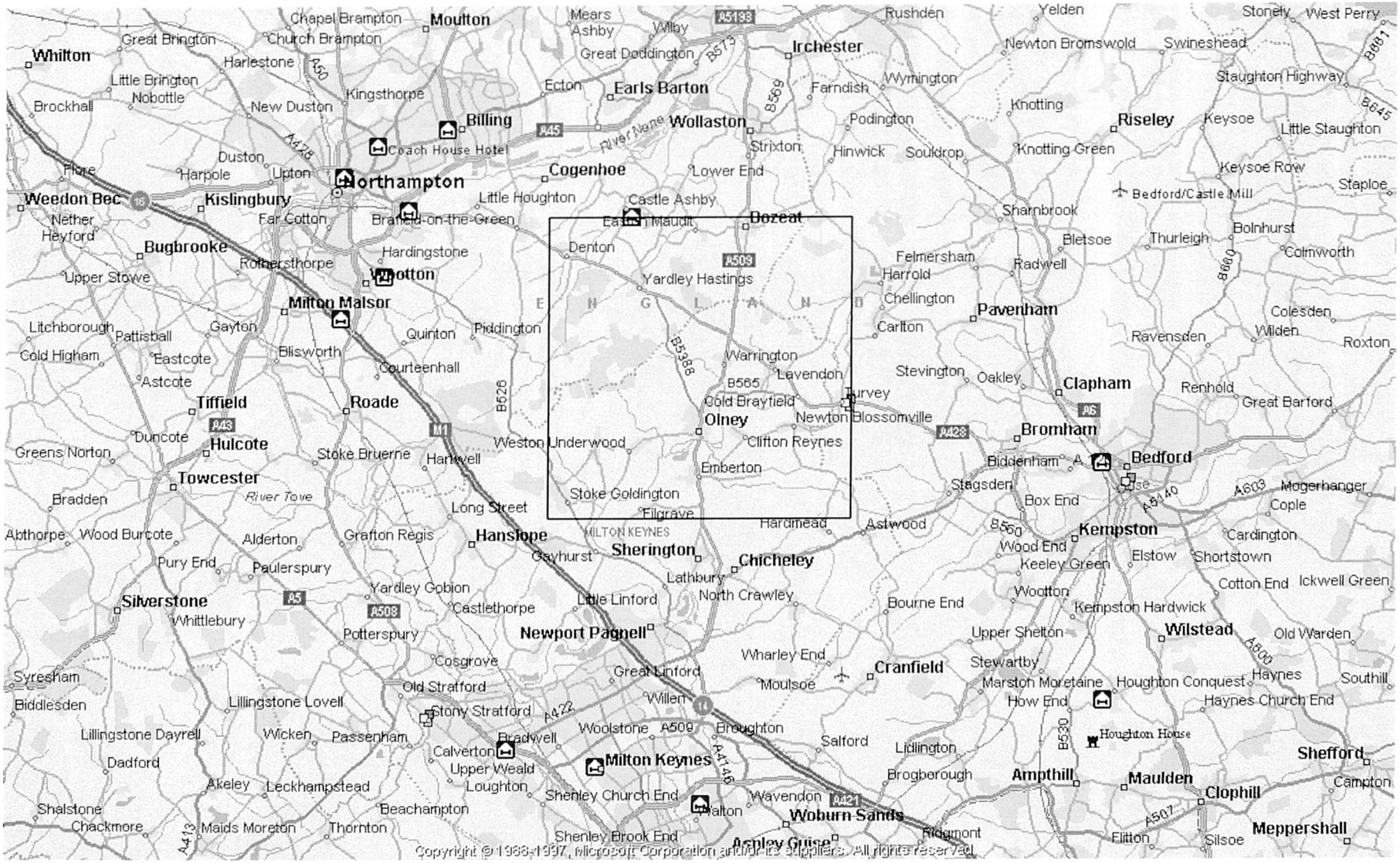
**Map 4A: The Kingsbridge study area**




**Map 4B: The Olney study area**

## Appendix G

## Copies of all survey press releases

| | |
|---|---|
| 1. *Western Morning News*: | Thursday March 5, 1998 |
| 2. *Kingsbridge Gazette*: | Friday March 6, 1998 |
| 3. *The Olney News*: | Volume 27, September 1998 |

Backing for fresh local produce

MOST of the letters published recently concerning



invented a wind generator which can run a light bulb.

It's one of several creations which won him a design and technology

in Dorset, which begins in September.

"He worked on the wind generator for about half a term and he

loc
to
the
art

# Probe into way of life in market towns

A STUDY to provide one of the most detailed pictures of the way people live and work in a Devon market town starts this week.

Around 1,500 people in the South Hams town of Kingsbridge will be sent a questionnaire asking how they work, travel and shop.

The questionnaire has been written by a research team at Plymouth University's Seale-Hayne Faculty, near Newton Abbot.

They want to know how modern living has affected market towns as the basis for any future action to revitalise local economies. The questionnaire will arrive by post at homes in the town in the next two days.

The initial questions will be followed up next month when some local residents will be asked to keep a diary of their travel and shopping patterns.

The same team is also carrying out research at Holsworthy, in North Devon.

# Millenr for chu

THE bellringers at Tavistock Parish Church were overjoyed last night to hear that they had been awarded £22,500 by the Millennium Commission towards the cost of augmenting their present peal of eight bells to 10.

The ringers at St Eustachius Church have been working for the past two years to raise the £47,000 needed for their project.

The scheme includes adding two new smaller bells as well as blocking up the sound outlets in the sides of the tower and adding a "sound lantern" on the top.

This will reduce the sound of the bells near the church but allow them to be heard further afield.

Generous donations from townsfolk and and fund-raising activities have raised £19,500. The grant from the Millennium Commission is subject to the bellringers raising a further £5,000.

This sum
by the paroch
the ringers h
by early Sept
ipated that w
bells will star

These will
Taylor & Co
cast the pres
1925.

Appeal
Mudge, who
sion scheme,
will turn an a
even more ir
added advant
musical six w
useful for trai

Many more
to meet the
bury's challe
the country s
neously on Ja

Mr Mudge,
tain, plans to

Maestro's Music Store
Award winning Saxophones from £399.00
Flutes & Clarinets from £199.00
Electric Guitar packages from £142.00
Large stocks Brass, Woodwind, Guitars, Amps, mail order music.
52 Ebrington St. Plymouth Tel. 01752 263069

# Gear trouble lay

ONE of the Westcountry's busiest lifeboats – Brixham's Marie Winstone – is heading for a repair yard after developing engine problems.

The 17-year-old Arun-class vessel needs to have a gearbox examined by experts. While she is away, the crew at the Torbay station will use the Duke of Atholl, one of the RNLI's reserve lifeboats which has been kept on stand-by at Falmouth.

A skeleton crew from the South Devon station picked her up from Cornwall on Monday after one of the Marie

Brixham lifebo
Smith said: "It's n
astrophic because
even with one eng

"But it was fel
properly looked a
as a precaution as
lifeboat which is n

"She's going up
yard on the Isle
tomorrow, when
crew to take her u

"But how long s
not know because

350

# Kingsbridge to be guinea pig for market town study

KINGSBRIDGE is to provide valuable information to help breathe new life into market towns.

The town will be studied as part of a national research programme aimed at providing policy makers with a blueprint for the revitalisation of English markets towns.

A salvo of 1,500 questionnaires has been sent to households and businesses to find out what makes the town tick.

Residents will be quizzed on subjects like the flow of goods, services and labour between Kingsbridge and its surrounding locality.

The research is being carried out by Paul Courtney, a postgraduate research student from the University of Plymouth's Seale-Hayne Faculty.

Backing has come from South Hams Council, Kingsbridge and District Chamber of Commerce and South Devon Business Link.

Mr Courtney says that similar surveys taking place in parts of Cornwall, Berkshire and Buckinghamshire, are producing a wealth of information for local authorities and policy makers to help improve local economies.

Professor Andrew Errington, head of the research team, hopes residents and business people will support the project.

'Kingsbridge is a unique historical market town and to ensure that it continues to act as an important shopping and trading centre serving the South Hams, we need to understand what makes it tick,' he explained.

'This isn't just about geraniums and car parking – we are going deeper than that and examining the function of the town in today's rural economy.

'All we ask is that our respondents take ten minutes of their time to complete the questionnaire and help us paint this all important picture.'

# Helicopte air cade

CADETS from Kingsbridge Air Training Corps had a pleasant surprise during a weekend survival and initiative exercise.

As well as a visit from Radio Devon's Howard James and a live link-up with Matt Woodley on *Saturday Matters*, they were met at Winkleigh airfield by a Sea-King helicopter from 22 Squa

At first t thought th copter was c tine call.

But it ha dropped ir them to th rendevous pc

For some cadets, it was time they h taken to the

One of th bridge con Corporal B.

# Mouth-watering occasio

PUBS, restaurants, shops and hotels looking for new ideas for the forthcoming season should look no further than the first ever local produce trade show being put on by the South Hams Food and Drink Association.

To be held at the Dartmouth Golf and Country Club next Monday between 11am and 4pm, the event promises to be a mouth-watering occasion.

The catering trade will have an opportunity to taste locally produced food and drink products and get ideas for new recipes and menus from the 20 producer/members of the South Hams Food and Drink Association. Exhibitors will include ice cream and yoghurt from Langage Farm, fudge and biscuits from Sherriffs of Kingsbridge, herbs and spices from Dartmouth Dips, salad dressings and oils from Taste Buds, cheeses from Ticklemore cheese, wine and cheese from Sharpham, oysters and other seafood from Avon Oysters, traditionally smoked products from the Dartmouth Smoke House, venison from Deer Force 10 on Scorriton Down.

There will be jams, pickles and preserves from Collacott Cooks and Heath Liqueurs fron and Gage w display, toge their fantast and, to wa down, three ers – Whitest Luscombe a Valley – wi present, alon Blackawton with its rang

# Darts take flight to ai

# *Olney - Part of National Market Towns Research*

Olney has been chosen to take part in a national programme of research aimed at providing policy makers with a solid agenda for the revitalisation of English market towns. The research is being carried out by Paul Courtney, a Postgraduate research student from Seale-Hayne Faculty, University of Plymouth.

Paul is sending out questionnaires to a total of £1,500 households and businesses in the Olney area, which are designed to record, as simply as possible, the flows of goods, services and labour between Olney and its surrounding locality. Similar surveys are also being carried out in parts of Cornwall, Berkshire and Devon, all of which are producing a wealth of information for use by local authorities and policy makers to help improve local economies and breathe life back into English market towns.

Professor Andrew Errington, head of the research team at Seale-Hayne, is extremely hopeful that as many residents and business people as possible will take part in the Olney survey, which is being administered by post in mid September. "Olney is a unique historical market town and to ensure that it continues to act as an important shopping and trading centre serving North Buckinghamshire we need to understand what 'makes it tick'. This isn't just about geraniums and car parking, we're going deeper than that and examining the function of the town in today's rural economy. All we ask is that our respondents take ten minutes of their time to complete the questionnaire and help us paint this all important picture."

Further information about the Olney survey or the national programme of market towns research being carried out at Seale-Hayne can be obtained from Paul Courtney at the Department of Land Use and Rural Management, University of Plymouth, Seale-Hayne Faculty, Newton Abbot, Devon, TQ12 6NQ. tel.: (01626 ) 325661.

# *Olney Floral Fiesta Annual General Meeting*

This year's Annual General Meeting of the Olney Floral Fiesta Committee starts at 8:00pm on Thursday 24th September 1998 at The Olney Centre. The Fiesta Committee are very keen to recruit anyone from in or around the town who has an interest in helping and taking part in the successful events which they run (e.g. The Annual Fireworks Display, the Raft Race, Fiesta Day itself, the ever popular Fiesta quizzes and so on). There is an excellent team spirit within the Committee, and it's certainly a good way to get to know a number of people very quickly! Representatives from other groups and organisations are also invited to attend to pass on any views or suggestions that they wish to.

A free cheese and wine buffet will be provided to all in attendance. We look forward to seeing you there.

The Mayor of Olney named Price
Rode a motorbike (his only vice)
The sight of his cleavage
Caused much unbelievage
But people would smile (which was nice)

## Appendix II

## Survey covering letters

| | |
|---|---|
| **Kingsbridge Business Survey** | **Sent 6th March 1998** |
| Reminders | Sent 20th March, 3rd April 1998 |
| **Kingsbridge Household survey** | **Sent 5th March 1998** |
| Reminders | Sent 20th March, 6th April 1998 |
| **Olney Business Survey** | **Sent 17th September 1998** |
| Reminder | Sent 1st October 1998 |
| **Olney Household survey** | **Sent 17th September 1998** |
| Reminder | Sent 1st October 1998 |

**Department of Land Use and Rural Management**
**Seale-Hayne**

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WWW http://sh.plym.ac.uk

Head of Department
**Martyn Warren** BSc MSc MIAgrM

6th March 1998

Dear Sir / Madam,

KINGSBRIDGE BUSINESS SURVEY

I am currently studying for a Ph.D at the University of Plymouth which is aimed at establishing the function of market towns in today's rural economy. As part of the research, I am undertaking a survey of households and businesses in the Kingsbridge district to help build up a picture of economic activity in the area.

The research has the full support of *South Hams District Council, Kingsbridge District Chamber of Commerce and South Devon Business Link*, all of which are key players in helping to improve the economic vitality of this unique rural area. The main purpose of the business survey is to examine the sources of inputs and the destination of outputs of firms located in and around Kingsbridge to assess how strongly they are linked to the local economy. With this information, we can help improve the vitality of this historical market town and be sure that it continues to act as an important commercial trading centre serving the South Hams, with the maximum benefit for the firms located in the area.

I would be extremely grateful if you would complete the enclosed questionnaire and return it in the prepaid envelope provided. Every completed questionnaire that is returned to me will make the research results more accurate and effective. It should not take long to complete and your assistance would be very much appreciated.

I would like to assure that all information collected will be treated in the strictest confidence and if you have any queries please do not hesitate to contact me on (01626) 325654.

Yours Sincerely

PAUL COURTNEY
Postgraduate Research Student

THE QUEEN'S ANNIVERSARY PRIZES
FOR HIGHER AND FURTHER EDUCATION
1994

**Department of Land Use and Rural Management**
**Seale-Hayne**

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Head of Department
**Martyn Warren** BSc MSc MIAgrM

20th March 1998

Dear Sir / Madam,

## KINGSBRIDGE BUSINESS SURVEY

I am currently studying for a Ph.D at the University of Plymouth which is aimed at establishing the function of market towns in today's rural economy. As part of the research, I am undertaking a survey of households and businesses in the Kingsbridge district to help build up a picture of economic activity in the area. The research has the full support of *South Hams District Council, Kingsbridge Chamber of Trade and South Devon Business Link*, all of which are key players in helping to improve the economic vitality of this unique rural area.

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Thank you very much for your time and I would like to assure that all information collected **will be treated in the strictest confidence.** If you have any queries please do not hesitate to contact me on (01626) 325654.

Yours Sincerely

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Postgraduate Research Student

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Head of Department
**Martyn Warren** BSc MSc MIAgrM

3rd April 1998

Dear Sir / Madam,

KINGSBRIDGE BUSINESS SURVEY

I am currently studying for a Ph.D at the University of Plymouth which is aimed at establishing the function of market towns in today's rural economy. In order to achieve this, I am undertaking a survey of households and businesses in the Kingsbridge district, research which has the full support of *South Hams District Council, Kingsbridge Chamber of Trade and South Devon Business Link.*

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Mr and Mrs N. Friend,
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Head of Department
**Martyn Warren** BSc MSc MIAgrM

5th March 1998

Dear Mr and Mrs Friend,

## KINGSBRIDGE HOUSEHOLD SURVEY

I am currently studying for a Ph.D at the University of Plymouth which is aimed at establishing the function of market towns in today's rural economy. As part of the research, I am undertaking a survey of households and businesses in the Kingsbridge district to help build up a picture of economic activity in the area.

The research has the full support of *South Hams District Council, Kingsbridge District Chamber of Commerce* and *South Devon Business Link*, all of which are key players in helping to improve the economic vitality of this unique rural area. The main purpose of the household survey is to examine the shopping and employment patterns in and around Kingsbridge. With this information, we can help improve the vitality of this historical market town and be sure that it continues to act as an important commercial retail centre serving the South Hams, with the maximum benefit for those who live and work in the area.

I would be extremely grateful if you would complete the enclosed questionnaire and return it in the prepaid envelope provided. Every completed questionnaire that is returned to me will make the research results more accurate and effective. It should not take long to complete and your assistance would be very much appreciated.

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Head of Department
**Martyn Warren** BSc MSc MIAgrM

20th March 1998

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Head of Department
**Martyn Warren** BSc MSc MIAgrM

6th April 1998

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Yours Sincerely

PAUL COURTNEY
Postgraduate Research Student

THE QUEEN'S ANNIVERSARY PRIZES
1994

OLNEY
CHAMBER OF TRADE

Chamber of Commerce
providing services through
BUSINESS LINK
MILTON KEYNES & NORTH BUCKS

UNIVERSITY OF PLYMOUTH
SEALE HAYNE

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Head of Department
**Martyn Warren** BSc MSc MIAgrM

17th September 1998

Dear Sir / Madam,

**OLNEY BUSINESS SURVEY**

I am currently studying for a Ph.D at the University of Plymouth which is aimed at establishing the function of market towns in today's rural economy. As part of the research, I am undertaking a survey of households and businesses in the Olney district to help build up a picture of economic activity in the area.

The research has the full support of *Milton Keynes - North Bucks Chamber of Commerce and its Business Link and Olney Chamber of Trade*, all of which are key players in helping to improve the economic vitality of this unique rural area. The main purpose of the business survey is to examine the sources of inputs and the destination of outputs of firms located in and around Olney to assess how strongly they are linked to the local economy. With this information, we can help improve the vitality of this historical market town and be sure that it continues to act as an important commercial trading centre serving North Buckinghamshire, with the maximum benefit for the firms located in the area.

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Yours Sincerely

PAUL COURTNEY
Postgraduate Research Student

SH5

OLNEY
CHAMBER OF TRADE

Chamber of Commerce
providing services through
BUSINESS LINK

UNIVERSITY OF PLYMOUTH
SEALE HAYNE

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Head of Department
**Martyn Warren** BSc MSc MIAgrM

1st October 1998

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OLNEY BUSINESS SURVEY

I am currently studying for a Ph.D at the University of Plymouth which is aimed at establishing the function of market towns in today's rural economy. As part of the research, I am undertaking a survey of households and businesses in the Olney district to help build up a picture of economic activity in the area.

Every completed questionnaire that is returned to me is **extremely valuable** in making the research results more accurate and effective. For this reason, I have enclosed a second copy of the questionnaire in the hope that you will return it and help us paint the all important picture of economic activity in the area. A second prepaid envelope is also enclosed for your convenience. The questionnaire should not take long to complete and your assistance would be very much appreciated.

Thank you very much for your time and I would like to assure that all information collected **will be treated in the strictest confidence.** If you have any queries please do not hesitate to contact me on (01626) 325661.

Yours Sincerely

PAUL COURTNEY
Postgraduate Research Student

SH5

OLNEY CHAMBER OF TRADE

Chamber of Commerce
providing services through
BUSINESS LINK

UNIVERSITY OF PLYMOUTH
SEALE HAYNE

**Department of Land Use and Rural Management**
**Seale-Hayne**

University of Plymouth
Newton Abbot
Devon TQ12 6NQ
United Kingdom

Tel 01626 325661
Fax 01626 325657
WWW http://sh.plym.ac.uk

Head of Department
**Martyn Warren** BSc MSc MIAgrM

Mr and Mrs F. Kitchener,
11 Austen Avenue,
Olney,
Bucks.

17th September 1998

Dear Mr and Mrs Kitchener,

**OLNEY HOUSEHOLD SURVEY**

I am currently studying for a Ph.D at the University of Plymouth which is aimed at establishing the function of market towns in today's rural economy. As part of the research, I am undertaking a survey of households and businesses in the Olney district to help build up a picture of economic activity in the area.

The research has the full support of *Olney Chamber of Trade and Milton Keynes - North Bucks Chamber of Commerce and its Business Link*, all of which are key players in helping to improve the economic vitality of this unique rural area. The main purpose of the household survey is to examine the shopping and employment patterns in and around Olney. With this information, we can help improve the vitality of this historical market town and be sure that it continues to act as an important commercial retail centre serving North Buckinghamshire, with the maximum benefit for those who live and work in the area.

I would be extremely grateful if you would complete the enclosed questionnaire and return it in the prepaid envelope provided. Every completed questionnaire that is returned to me will make the research results more accurate and effective. It should not take long to complete and your assistance would be very much appreciated.

I would like to assure you that all information collected **will be treated in the strictest confidence** and if you have any queries please do not hesitate to contact me on (01626) 325654.

Yours Sincerely

PAUL COURTNEY
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Head of Department
**Martyn Warren** BSc MSc MIAgrM

Mr and Mrs F. Kitchener,
11 Austen Avenue,
Olney,
Bucks.

1st October 1998

Dear Mr and Mrs Kitchener,

**OLNEY HOUSEHOLD SURVEY**

I am currently studying for a Ph.D at the University of Plymouth which is aimed at establishing the function of market towns in today's rural economy. In order to achieve this, I am undertaking a survey of households and businesses in the Olney district, research which has the full support of *Olney Chamber of Trade and Milton Keynes - North Bucks Chamber of Commerce and its Business Link.*

Every completed questionnaire that is returned to me is **extremely valuable** in making the research results more accurate and effective. For this reason, I have enclosed a second copy of the questionnaire in the hope that you will return it and help us paint the all important picture of economic activity in the area. A second prepaid envelope is also enclosed for your convenience.The questionnaire should not take long to complete and your assistance would be very much appreciated.

I would like to assure you that all information collected **will be treated in the strictest confidence** and if you have any queries please do not hesitate to contact me on (01626) 325654.

Yours Sincerely

PAUL COURTNEY
Postgraduate Research Student

## Appendix I

## Survey instruments

1. Kingsbridge Business Questionnaire

2. Kingsbridge Household Questionnaire

3. Kingsbridge Transaction Log

4. Olney Business Questionnaire

5. Olney Household Questionnaire

Kingsbridge Business Questionnaire Confidential

Case No:

Location:

We have designed this questionnaire to minimise the time it takes to complete.

To respond to each question simply fill in the gaps or tick the correct box.

All information provided will be treated in the strictest confidence.

For analysis purposes only

1

2

3

4

5

6

7

1. Please could you give a brief description of this firm's activities ?

_____

2. Which of the following descriptions most accurately fits this firm ?

| | | | |
|---|---|---|---|
| 1 Agriculture | ☐ | 5 Consumer/Business Service | ☐ |
| 2 Manufacturing | ☐ | 6 Primary Industry | ☐ |
| 3 Consumer Service | ☐ | 7 Construction | ☐ |
| 4 Business Service | ☐ | 8 Other: Specify_____ | ☐ |

3. Which of the following statements best describes the establishment ?

| | | | |
|---|---|---|---|
| 1 Independent firm with no other sites | ☐ | | |
| 2 Firm HQ with sites elsewhere in the UK | ☐ | 5 Branch of an international company | ☐ |
| 3 Firm HQ with sites abroad | ☐ | 6 Other: Specify _____ | ☐ |
| 4 Branch of a national company | ☐ | | |

4. How many people are employed at this address in total ? (including part-time and seasonal workers)

| | | | | | |
|---|---|---|---|---|---|
| 1 1-2 | ☐ | 2 3-5 | ☐ | 3 6 - 10 | ☐ |
| 4 11 - 19 | ☐ | 5 20 - 49 | ☐ | 6 More than 50 | ☐ |

5. How long has this business been in existence at this location ? (Including present and past ownership)

| | | | | | |
|---|---|---|---|---|---|
| 1 Less than 2 years | ☐ | 2 2-6 years | ☐ | 3 6-12 years | ☐ |
| 4 13-19 years | ☐ | 5 20 or more years | ☐ | | |

6. How many vehicles are operated from this address ?

| | | | | | | |
|---|---|---|---|---|---|---|
| Cars /vans | 1 None | ☐ | 2 1-5 | ☐ | 3 6-9 | ☐ |
| | 4 10 -14 | ☐ | 5 More than 15 | ☐ | | |
| Lorries | 1 None | ☐ | 2 1-5 | ☐ | 3 6-9 | ☐ |
| | 4 10 -14 | ☐ | 5 More than 15 | ☐ | | |

7. Is a mail order service operated from this address ?

1 Yes ☐ 2 No ☐

8. Which of the following forms of telecommunications does the firm have access to ?

| | 1 YES | 2 NO |
|---|---|---|
| 1 Telephone | ☐ | ☐ |
| 2 FAX machine | ☐ | ☐ |
| 3 Internet | ☐ | ☐ |

8

9. Are any of the firm's products or services: *a) sold* and *b) delivered* via these network s?

| | *SOLD* 1 Yes | 2 No | *DELIVERED* 1 Yes | 2 No |
|---|---|---|---|---|
| 1 Telephone | ☐ | ☐ | ☐ | ☐ |
| 2 FAX machine | ☐ | ☐ | ☐ | ☐ |
| 3 Internet | ☐ | ☐ | ☐ | ☐ |

9

MARKETS AND SUPPLIERS

*Questions 10 to 13 relate to the source of inputs and destination of outputs of the firm. This is the primary focus of the survey so please try to be as accurate as possible. All approximations are extremely valuable, so please try and complete the questions as fully as possible. Thank you.*

10. **In the most recent quarter,** what was the **approximate** number of business transactions carried carry out from this address which involved *a) the* **SALES** *of goods and/or services* and *b) the purchase of* **SUPPLIES** (including the purchase of raw materials and/or business services) ?

10a

*a)* _____ *business transactions involving sales of goods / services*

10b

*b)* _____ *business transactions involving purchase of supplies / business services*

11. **Approximately** how many of each of the above transactions were carried out with customers and suppliers located in the following regions ?

11a

| | a) *No. of Sales transactions* | *b) No. of Supply Purchases* |
|---|---|---|
| **In Kingsbridge** | _____ | _____ |
| **In a 4 mile radius outside Kingsbridge** | _____ | _____ |
| **Elsewhere in the South Hams** | _____ | _____ |
| **Elsewhere in Devon** | _____ | _____ |
| **Elsewhere in the South West** | _____ | _____ |
| **Elsewhere in the UK** | _____ | _____ |
| **Elsewhere in the European Union** | _____ | _____ |
| **In any other countries** | _____ | _____ |
| **TOTAL** | 9 a)_____ | 9 b)_____ |

11b

12. **In the most recent quarter,** what was the **approximate** total financial value of all business transactions carried out from this address involving *a) SALES* and *b)* **SUPPLIES** (including the value of debtors or creditors and the purchase value of raw materials and/or business services) ?

12a

*a)* £ _____ *received from sales of goods / services transactions*

12b

*b)* £ _____ *spent on the purchase of supplies / business services*

13. **Approximately** What percentage of the firm's a) SALES and b) SUPPLIES by *financial value* are to customers and from suppliers located in the following regions ?

13a

| | a) *% Sales by Value* | *b)% Supplies by Value* |
|---|---|---|
| In Kingsbridge | _____% | _____% |
| In a 4 mile radius outside Kingsbridge | _____% | _____% |
| Elsewhere in the South Hams | _____% | _____% |
| Elsewhere in Devon | _____% | _____% |
| Elsewhere in the South West | _____% | _____% |
| Elsewhere in the UK | _____% | _____% |
| Elsewhere in the European Union | _____% | _____% |
| In any other countries | _____% | _____% |
| TOTAL | 100 % | 100 % |

13b

14. Which of the following shops and facilities in Kingsbridge, if any, does the firm make regular use of (in connection with the business only) ?

14

| | Never | Once a week | Once a month | Once a year |
|---|---|---|---|---|
| Bank | ☐ | ☐ | ☐ | ☐ |
| Post Office | ☐ | ☐ | ☐ | ☐ |
| Accountant | ☐ | ☐ | ☐ | ☐ |
| Solicitors | ☐ | ☐ | ☐ | ☐ |
| Livestock market | ☐ | ☐ | ☐ | ☐ |
| Shops selling electrical goods | ☐ | ☐ | ☐ | ☐ |
| Printing Services | ☐ | ☐ | ☐ | ☐ |
| Garage(for vehicleservice/repair) | ☐ | ☐ | ☐ | ☐ |
| Hardware strore | ☐ | ☐ | ☐ | ☐ |

15. Could you please provide some brief information about yourself and up to 10 of the workforce employed at this address. If possible, please record information about staff in managerial, professional, skilled and semi or un-skilled positions:

15

| | 1 Yourself | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Position (eg manager, clerk) | | | | | |
| Full time/part time (ft/pt) | | | | | |
| Approx salary per anum (£) | | | | | |
| Place of residence (town) | | | | | |

| | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|
| Position (eg manager, clerk) | | | | | |
| Full time/part time (ft/pt) | | | | | |
| Approx salary per anum (£) | | | | | |
| Place of residence (town) | | | | | |

***Thank you for your time in completing this questionnaire, please return it in the prepaid envelope provided.***

Kingsbridge Household Questionnaire Confidential

Case No:

Location:

We have designed this questionnaire to minimise the time it takes to complete.

*Would the person who does the majority of the household shopping please complete this questionnaire. (By 'household' we mean one person living alone or a group of people living at the same address having meals prepared together and with common housekeeping)*

**To respond to each question simply fill in the gaps or tick the correct box.**

**All information provided will be treated in the strictest confidence.**

For analysis purposes only

1. How many people live in this household ? _____ 1

2. Could you please indicate the age group that each household member fits best, according to the number of people in each category below ? 2

| Adults | No. | Children | No. |
|---|---|---|---|
| 17-24 | __ | 0-7 | __ |
| 25-34 | __ | 8-12 | __ |
| 35-44 | __ | 13-16 | __ |
| 45-54 | __ | | |
| 55-64 | __ | | |
| 65+ | __ | | |

3. How many cars / vans do you have in this household ? _____ 3

4. Which Council Tax band does the property come under ? (If unknown, please select according to the approximate value of the property) 4

| | | | |
|---|---|---|---|
| 1 A (Up to £40,000) | ☐ | 5 E (£ 88,001-120,000 | ☐ |
| 2 B (£ 40,001-52,000) | ☐ | 6 F (£120,001-160,000) | ☐ |
| 3 C (£ 52,001-68,000) | ☐ | 7 G (160,001-320,000) | ☐ |
| 4 D (£ 68,001-88,000) | ☐ | 8 H (More than 320,000) | ☐ |

5. Have you lived in the Kingsbridge area all your life? 5

1 Yes ☐ 2 No ☐

If Yes, please go to Question 7

6. How long have you resided in the Kingsbridge area ? _____years 6

7. Does the household own or have access to: 7

| | | |
|---|---|---|
| 1 A Telephone | Yes ☐ | No ☐ |
| 2 A FAX machine | Yes ☐ | No ☐ |

a. Do you ever make any household purchases via: 7a

| | | |
|---|---|---|
| 1 Telephone | Yes ☐ | No ☐ |
| 2 FAX machine | Yes ☐ | No ☐ |

8. Does the household own or have access to a personal computer ? 8

1 Yes ☐ 2 No ☐

If No, please go to Question 10

9. Is there an INTERNET connection for your home computer ? 9

1 Yes ☐ 2 No ☐

a. If Yes, do you ever make household purchases via the INTERNET ?

1 Yes ☐ 2 No ☐

9a

10. Do you use a mail order catalogue for any household purchases ?

1 Yes ☐ 2 No ☐

10

## HOUSEHOLD PURCHASES OF GOODS AND SERVICES

*The following two questions relate to the spending and travel patterns associated with the most common household transactions. This is the main focus of the survey, so please try to be as accurate as possible. Thank you.*

Each question asks you simply to fill in:

1. The *approximate* expenditure on the various goods and services listed *over the last four weeks.*
2. The *approximate* number of times the household has made a purchase of the various goods and services listed *over the last four weeks.*
3. The *most common* place of purchase for each group of goods and services listed *using the key provided.*

11

### 11. *Purchases of Household Goods over the last four weeks*

| ITEM | Approx. Expenditure in last 4 weeks £ | Approx. Number of times Purchased in last 4 weeks | Most Common Place of Purchase (see key) |
|---|---|---|---|
| *Example:* Clothing & footwear | *£ 75* | *3* | *PLY* |
| Food/Groceries | | | |
| Newspapers/Magazines | | | |
| Confectionary | | | |
| Alcohol / tobacco | | | |
| Household hardware | | | |
| Books/CD's | | | |
| Clothing & footwear | | | |
| Gas & Electrical appliances | | | |
| Furniture & bedding | | | |
| Stationary & paper goods | | | |
| Cosmetics & hair products | | | |
| Sports / camping equipment | | | |
| Horticultural goods, plants | | | |
| Other (Please specify) | | | |

### Key to most common place of purchases:

| | | | |
|---|---|---|---|
| 1 Local Village | LV | 7 Elsewhere in Devon | DEV |
| 2 Kingsbridge Town Centre | KTC | 8 Elsewhere in the UK | UK |
| 3 Kingsbridge Supermarket | KS | 9 At home with visiting firm | HOM |
| 4 Elsewhere in the South Hams | SH | 10 By Telephone | TEL |
| 5 Plymouth | PLY | 11 By Post | POS |
| 6 Exeter | EX | 12 Via Internet | INT |

12. *Purchases of Household Services over the last four weeks*

| ITEM | Approx. Expenditure in last 4 weeks £ | Approx.Number of times Purchased in last 4 weeks | Most Common Place of Purchase (see key) |
|---|---|---|---|
| *Example:* Laundry & Cleaning | *£ 80* | *4* | *HOM* |
| Takeaway Food | | | |
| Restaurant Food/Drink | | | |
| Pub Food/Drink | | | |
| Hairdressing/beauty treatment | | | |
| Solicitor/professional | | | |
| Printing Services | | | |
| Laundry & Cleaning | | | |
| Building / Gardening | | | |
| Plumbing / Decorating | | | |
| Vehicle repairs & servicing | | | |
| Shoe / watch repair | | | |
| Cinema & theatre | | | |
| Sports admissions / activties | | | |
| Other (Please specify) | | | |

## Key to most common place of purchases:

| | | | |
|---|---|---|---|
| 1 Local Village | LV | 7 Elsewhere in Devon | DEV |
| 2 Kingsbridge Town Centre | KTC | 8 Elsewhere in the UK | UK |
| 3 Kingsbridge Supermarket | KS | 9 At home with visiting firm | HOM |
| 4 Elsewhere in the South Hams | SH | 10 By Telephone | TEL |
| 5 Plymouth | PLY | 11 By Post | POS |
| 6 Exeter | EX | 12 Via Internet | INT |

13. Which of the following modes of transport do you most commonly use for household shopping trips ?

| | | | |
|---|---|---|---|
| 1 Foot | ☐ | 5 Passenger in a car or van | ☐ |
| 2 Bicycle | ☐ | 6 Public transport | ☐ |
| 3 Motorbike/Moped | ☐ | 7 Private hire/company owned transport | ☐ |
| 4 Driving a car or van | ☐ | 8 Other: Specify_____ | ☐ |

14. Are you currently in employment ?

1 Yes ☐ 2 No ☐

**If No, please go to Question 16**

15. Is your job full-time or part-time ?

1 Full-time ☐ 2 Part-time (less than 30 hours per week) ☐

a. What is your job title ? (eg. sales assistant, clerk) _____

What industry is this in ? _____

12
13
14
15
15a

b.. Where is your place of work ?

Town _____
County _____

15b

c. What mode of transport do you use to get to work ?

| | | | |
|---|---|---|---|
| 1 On foot/bicycle | ☐ | 4 Passanger in a a car or van | ☐ |
| 2 Motorbike/scooter/moped | ☐ | 5 By public transport | ☐ |
| 3 Driving a car or van | ☐ | 6 Work at home | ☐ |

15c

d. Are shopping trips ever combined with your work journey ?

1 Yes ☐ 2 No ☐

15d

**Please go to Question 17**

16. Are you:

| | | | |
|---|---|---|---|
| 1 Registered Unemployed | ☐ | 4 Housewife or carer | ☐ |
| 2 In full-time education | ☐ | 5 Other: Specify_____ | ☐ |
| 3 Retired or permanently sick | ☐ | | |

16

17. Is there a second adult in the household who is currently in employment ?

1 Yes ☐ 2 No ☐

17

**If No, please go to Question 19**

18 Is their job full-time or part-time ?

1 Full-time ☐ 2 Part-time (less than 30 hours per week) ☐

18

a. What is their job title ? (eg. sales assistant, clerk) _____

What industry is this in ? _____

18a

b. Where is their place of work ?

Town _____
County _____

18b

c. What mode of transport is used to get to work ?

| | | | |
|---|---|---|---|
| 1 Foot/bicycle | ☐ | 4 Passanger in a car or van | ☐ |
| 2 Motorbike/scooter/moped | ☐ | 5 Public transport | ☐ |
| 3 Driving a car or van | ☐ | 6 Works at home | ☐ |

18c

d. Are shopping trips ever combined with their work journey ?

1 Yes ☐ 2 No ☐

18d

19. Which of the following best describes the total gross annual household income ? (i.e the total income from all working and non-working adults in the household, including any benefits, pensions and grants and before NI and Income tax contributions)

| | | | |
|---|---|---|---|
| 1 Less than £ 4,000 | ☐ | 4 £ 15,501 - £23,500 | ☐ |
| 2 £ 4,001 - £ 8,500 | ☐ | 5 £ 23,501 - 39,000 | ☐ |
| 3 £ 8,501 - £ 15,500 | ☐ | 6 More than £ 39,000 | ☐ |

19

***Thank you for taking the time to complete this questionnaire. Please return it in the prepaid envelope provided.***

Kingsbridge Transactions Log Confidential

The purpose of this log is for you to keep a record of the household purchases of goods and services made over the next two weeks. It has been carefully designed to be as quick and easy as possible to complete and should not take more than a few minutes each day to fill in.

To make them easier to record, the purchases are divided into groups. A *group* of purchases refers to any number of items purchased in, for example, *one* shopping trip to a supermarket, *one* visit to Kingsbridge, *one* telephone call to order goods from a mail order firm or perhaps *one* visit to your home by a plumber or gardener.

Two purchase groups are allocated for each of the 14 days. In Question 1 space is provided to jot down the value spent on each respective good or service purchased.

If a journey was made outside your home to make the set of purchases please answer Questions 2, 3, 4 and 5. If the purchase was made at home, for example by telephone, post, FAX. via the internet or from a visiting firm such as a plumber of gardener, please answer questions 2, 6 and 7.

Thank you very much for taking the time to complete the log. It is a very valuable tool to help us the determine the function and vitality of Kingsbridge's local economy. The information gained from it will be used to advise policy makers of appropriate Rural Development and Transport policies for this unique rural area.

If you could please return the completed log after two weeks in the accompanying prepaid envelope we would be very grateful.

Thank you for your time and assistance.

# DAY 1

## Shopping trip / purchase group 1

For analysis purposes only

1

1. What goods and/or services did you purchase on this occasion ?

| Goods | Value Spent £ | Services | Value Spent £ |
|---|---|---|---|
| Food/Groceries | | Takeaway Food | |
| Newspapers/Magazines | | Restaurant Food/Drink | |
| Confectionary | | Pub Food/Drink | |
| Alcohol / tobacco | | Hairdressing | |
| Household hardware | | Solicitor/Professional | |
| Books/CD's | | Printing Services | |
| Clothing & footwear | | Laundry & Cleaning | |
| Electrical Goods | | Building Services | |
| Furniture & bedding | | Vehicle repairs & servicing | |
| Other (please Specify) | | Other (Please Specify) | |
| | | | |

2

2. Did you make a journey outside your home to make these purchases ?

Yes ☐ No ☐

If No, go to Question 6.

3

3. Where did you make these purchases ?

| | | | |
|---|---|---|---|
| Local Village | ☐ | Exeter | ☐ |
| Kingsbridge Town Centre | ☐ | Elsewhere in Devon | ☐ |
| Kingsbridge Supermarket | ☐ | Elsewhere in the South West | ☐ |
| Elsewhere in the South Hams | ☐ | Elsewhere in the UK | ☐ |
| Plymouth | ☐ | | |

4

4. How did you travel there ?

| | | | |
|---|---|---|---|
| Foot | ☐ | Passenger in a car or van | ☐ |
| Bicycle | ☐ | Public transport | ☐ |
| Motorbike/Moped | ☐ | Private hire/company owned transport | ☐ |
| Driving a car or van | ☐ | Other: Specify_____ | ☐ |

5

5. Was the journey combined with that for other purposes ?

Yes ☐ No ☐

5a

If yes, was it combined with a journey made for:

| | | | | | |
|---|---|---|---|---|---|
| Work | ☐ | Medical/Care | ☐ | Other: Specify | |
| School/Education | ☐ | Social/Recreational | ☐ | _____ | ☐ |

6

6. Did you make these purchases :

| | | | |
|---|---|---|---|
| At home with visiting firm | ☐ | By Post | ☐ |
| By Telephone | ☐ | Via Internet | ☐ |

7

7. Where is the company which you purchased from based ? Town _____

County _____

# DAY 1

## Shopping trip / purchase group 2

For analysis purposes only

1. What goods and/or services did you purchase on this occasion ?

| Goods | Value Spent £ | Services | Value Spent £ |
|---|---|---|---|
| Food/Groceries | | Takeaway Food | |
| Newspapers/Magazines | | Restaurant Food/Drink | |
| Confectionary | | Pub Food/Drink | |
| Alcohol / tobacco | | Hairdressing | |
| Household hardware | | Solicitor/Professional | |
| Books/CD's | | Printing Services | |
| Clothing & footwear | | Laundry & Cleaning | |
| Gas & Electrical appliances | | Building Services | |
| Furniture & bedding | | Vehicle Repairs & Servicing | |
| Other (please Specify) | | Other (Please Specify) | |
| | | | |

1

2. Did you make a journey outside your home to make these purchases ?

Yes ☐ No ☐

2

**If No, go to Question 6.**

3

3. Where did you make these purchases ?

| | | | |
|---|---|---|---|
| Local Village | ☐ | Exeter | ☐ |
| Kingsbridge Town Centre | ☐ | Elsewhere in Devon | ☐ |
| Kingsbridge Supermarket | ☐ | Elsewhere in the South West | ☐ |
| Elsewhere in the South Hams | ☐ | Elsewhere in the UK | ☐ |
| Plymouth | ☐ | | |

4

4. How did you travel there ?

| | | | |
|---|---|---|---|
| Foot | ☐ | Passenger in a car or van | ☐ |
| Bicycle | ☐ | Public transport | ☐ |
| Motorbike/Moped | ☐ | Private hire/company owned transport | ☐ |
| Driving a car or van | ☐ | Other: Specify_____ | ☐ |

5

5. Was the journey combined with that for other purposes ?

Yes ☐ No ☐

5a

**If yes, was it combined with a journey made for:**

| | | | | | |
|---|---|---|---|---|---|
| Work | ☐ | Medical/Care | ☐ | Other: Specify | |
| School/Education | ☐ | Social/Recreational | ☐ | _____ | ☐ |

6

6. Did you make these purchases :

| | | | |
|---|---|---|---|
| At home with visiting firm | ☐ | By Post | ☐ |
| By Telephone | ☐ | Via Internet | ☐ |

7

7. Where is the company which you purchased from based ? Town _____

County _____

# DAY 2

## Shopping trip / purchase group 1

For analysis purposes only

1. What goods and/or services did you purchase on this occasion ?

| Goods | Value Spent £ | Services | Value Spent £ |
|---|---|---|---|
| Food/Groceries | | Takeaway Food | |
| Newspapers/Magazines | | Restaurant Food/Drink | |
| Confectionary | | Pub Food/Drink | |
| Alcohol / tobacco | | Hairdressing | |
| Household hardware | | Solicitor/Professional | |
| Books/CD's | | Printing Services | |
| Clothing & footwear | | Laundry & Cleaning | |
| Electrical Goods | | Building Services | |
| Furniture & bedding | | Vehicle repairs & servicing | |
| Other (please Specify) | | Other (Please Specify) | |
| | | | |

1

2. Did you make a journey outside your home to make these purchases ?

Yes ☐ No ☐

2

**If No, go to Question 6.**

3. Where did you make these purchases ?

| | | | |
|---|---|---|---|
| Local Village | ☐ | Exeter | ☐ |
| Kingsbridge Town Centre | ☐ | Elsewhere in Devon | ☐ |
| Kingsbridge Supermarket | ☐ | Elsewhere in the South West | ☐ |
| Elsewhere in the South Hams | ☐ | Elsewhere in the UK | ☐ |
| Plymouth | ☐ | | |

3

4. How did you travel there ?

| | | | |
|---|---|---|---|
| Foot | ☐ | Passenger in a car or van | ☐ |
| Bicycle | ☐ | Public transport | ☐ |
| Motorbike/Moped | ☐ | Private hire/company owned transport | ☐ |
| Driving a car or van | ☐ | Other: Specify_____ | ☐ |

4

5. Was the journey combined with that for other purposes ?

Yes ☐ No ☐

5

If yes, was it combined with a journey made for:

| | | | | | |
|---|---|---|---|---|---|
| Work | ☐ | Medical/Care | ☐ | Other: Specify | |
| School/Education | ☐ | Social/Recreational | ☐ | _____ | ☐ |

5a

6. Did you make these purchases :

| | | | |
|---|---|---|---|
| At home with visiting firm | ☐ | By Post | ☐ |
| By Telephone | ☐ | Via Internet | ☐ |

6

7. Where is the company which you purchased from based ? Town _____

County _____

7

## DAY 2
### Shopping trip / purchase group 2

For analysis purposes only

1

1. What goods and/or services did you purchase on this occasion ?

| Goods | Value Spent £ | Services | Value Spent £ |
|---|---|---|---|
| Food/Groceries | | Takeaway Food | |
| Newspapers/Magazines | | Restaurant Food/Drink | |
| Confectionary | | Pub Food/Drink | |
| Alcohol / tobacco | | Hairdressing | |
| Household hardware | | Solicitor/Professional | |
| Books/CD's | | Printing Services | |
| Clothing & footwear | | Laundry & Cleaning | |
| Gas & Electrical appliances | | Building Services | |
| Furniture & bedding | | Vehicle Repairs & Servicing | |
| Other (please Specify) | | Other (Please Specify) | |
| | | | |

2

2. Did you make a journey outside your home to make these purchases ?

Yes ☐ No ☐

If No, go to Question 6.

3

3. Where did you make these purchases ?

| | | | |
|---|---|---|---|
| Local Village | ☐ | Exeter | ☐ |
| Kingsbridge Town Centre | ☐ | Elsewhere in Devon | ☐ |
| Kingsbridge Supermarket | ☐ | Elsewhere in the South West | ☐ |
| Elsewhere in the South Hams | ☐ | Elsewhere in the UK | ☐ |
| Plymouth | ☐ | | |

4

4. How did you travel there ?

| | | | |
|---|---|---|---|
| Foot | ☐ | Passenger in a car or van | ☐ |
| Bicycle | ☐ | Public transport | ☐ |
| Motorbike/Moped | ☐ | Private hire/company owned transport | ☐ |
| Driving a car or van | ☐ | Other: Specify_____ | ☐ |

5

5. Was the journey combined with that for other purposes ?

Yes ☐ No ☐

5a

If yes, was it combined with a journey made for:

| | | | | | |
|---|---|---|---|---|---|
| Work | ☐ | Medical/Care | ☐ | Other: Specify | |
| School/Education | ☐ | Social/Recreational | ☐ | _____ | ☐ |

6

6. Did you make these purchases :

| | | | |
|---|---|---|---|
| At home with visiting firm | ☐ | By Post | ☐ |
| By Telephone | ☐ | Via Internet | ☐ |

7

7. Where is the company which you purchased from based ? Town _____

County _____

Olney Business Questionnaire Confidential

Case No:

Location:

We have designed this questionnaire to minimise the time it takes to complete.

To respond to each question simply fill in the gaps or tick the correct box.

All information provided will be treated in the strictest confidence.

For analysis purposes only

1. Please could you give a brief description of this firm's activities ?

_____

2. Which of the following descriptions most accurately fits this firm ?

| | | | |
|---|---|---|---|
| 1 Agriculture | ☐ | 5 Consumer/Business Service | ☐ |
| 2 Manufacturing | ☐ | 6 Primary Industry | ☐ |
| 3 Consumer Service | ☐ | 7 Construction | ☐ |
| 4 Business Service | ☐ | 8 Other: Specify_____ | ☐ |

3. Which of the following statements best describes the establishment ?

| | | | |
|---|---|---|---|
| 1 Independent firm with no other sites | ☐ | | |
| 2 Firm HQ with sites elsewhere in the UK | ☐ | 5 Branch of an international company | ☐ |
| 3 Firm HQ with sites abroad | ☐ | 6 Other: Specify _____ | ☐ |
| 4 Branch of a national company | ☐ | | |

4. How many people are employed at this address in total ? (including part-time and seasonal workers)

| | | | | | |
|---|---|---|---|---|---|
| 1 1-2 | ☐ | 2 3-5 | ☐ | 3 6 - 10 | ☐ |
| 4 11 - 19 | ☐ | 5 20 - 49 | ☐ | 6 More than 50 | ☐ |

5. How long has this business been in existence at this location ?
(Including present and past ownership)

| | | | | | |
|---|---|---|---|---|---|
| 1 Less than 2 years | ☐ | 2 2-6 years | ☐ | 3 7-12 years | ☐ |
| 4 13-19 years | ☐ | 5 20 or more years | ☐ | | |

6. How many vehicles are operated from this address ?

| | | | | | | |
|---|---|---|---|---|---|---|
| Cars /vans | 1 None | ☐ | 2 1-5 | ☐ | 3 6-9 | ☐ |
| | 4 10 -14 | ☐ | 5 More than 15 | ☐ | | |
| Lorries | 1 None | ☐ | 2 1-5 | ☐ | 3 6-9 | ☐ |
| | 4 10 -14 | ☐ | 5 More than 15 | ☐ | | |

7. Is a mail order service operated from this address ?

1 Yes ☐ 2 No ☐

1
2
3
4
5
6
7

8. Which of the following forms of telecommunications does the firm have access to ?

| | 1 YES | 2 NO |
|---|---|---|
| 1 Telephone | ☐ | ☐ |
| 2 FAX machine | ☐ | ☐ |
| 3 Internet | ☐ | ☐ |

8

9. Are any of the firm's products or services: *a) sold* and *b) delivered* via these network s?

| | *SOLD* 1 Yes | 2 No | *DELIVERED* 1 Yes | 2 No |
|---|---|---|---|---|
| 1 Telephone | ☐ | ☐ | ☐ | ☐ |
| 2 FAX machine | ☐ | ☐ | ☐ | ☐ |
| 3 Internet | ☐ | ☐ | ☐ | ☐ |

9

MARKETS AND SUPPLIERS

*Questions 10 to 13 relate to the source of inputs and destination of outputs of the firm. This is the primary focus of the survey so please try to be as accurate as possible. All approximations are extremely valuable, so please try and complete the questions as fully as possible. Thank you.*

10. **In the most recent quarter,** what was the **approximate** number of business transactions carried carry out from this address which involved *a) the* **SALES** *of goods and/or services* and *b) the purchase of* **SUPPLIES** (including the purchase of raw materials and/or business services) ?

*a)* _____ *business transactions involving sales of goods / services*

*b)* _____ *business transactions involving purchase of supplies / business services*

10a

10b

11. **Approximately** how many of each of the above transactions were carried out with customers and suppliers located in the following regions ?

| | a) *No. of Sales transactions* | *b) No. of Supply Purchases* |
|---|---|---|
| **In Olney** | _____ | _____ |
| **In a 4 mile radius outside Olney** | _____ | _____ |
| **Within a 10 mile radius of your firm** | _____ | _____ |
| **Elsewhere in Bucks, Beds, Northants** | _____ | _____ |
| **Elsewhere in the South East** | _____ | _____ |
| **Elsewhere in the UK** | _____ | _____ |
| **Elsewhere in the European Union** | _____ | _____ |
| **In any other countries** | _____ | _____ |
| TOTAL | 9 a)_____ | 9 b)_____ |

11a

11b

12. **In the most recent quarter,** what was the **approximate** total financial value of all business transactions carried out from this address involving *a) SALES* and *b)* **SUPPLIES** (including the value of debtors or creditors and the purchase value of raw materials and/or business services) ?

*a)* £ _____ *received from sales of goods / services transactions*

*b)* £ _____ *spent on the purchase of supplies / business services*

12a

12b

13. Approximately What percentage of the firm's a) SALES and b) SUPPLIES by *financial value* are to customers and from suppliers located in the following regions ?

13a

| | a) % *Sales by Value* | b)% *Supplies by Value* |
|---|---|---|
| In Olney | _____% | _____% |
| In a 4 mile radius outside Olney | _____% | _____% |
| Within a 10 mile radius of your firm | _____% | _____% |
| Elsewhere in Bucks, Beds, Northants | _____% | _____% |
| Elsewhere in the South East | _____% | _____% |
| Elsewhere in the UK | _____% | _____% |
| Elsewhere in the European Union | _____% | _____% |
| In any other countries | _____% | _____% |
| TOTAL | 100 ___% | 100 ___% |

13b

14. Which of the following shops and facilities in Olney, if any, does the firm make regular use of (in connection with the business only) ?

14

| | Never | Once a week | Once a month | Once a year |
|---|---|---|---|---|
| Bank | ☐ | ☐ | ☐ | ☐ |
| Post Office | ☐ | ☐ | ☐ | ☐ |
| Accountant | ☐ | ☐ | ☐ | ☐ |
| Solicitors | ☐ | ☐ | ☐ | ☐ |
| Livestock market | ☐ | ☐ | ☐ | ☐ |
| Shops selling electrical goods | ☐ | ☐ | ☐ | ☐ |
| Printing Services | ☐ | ☐ | ☐ | ☐ |
| Garage(for vehicleservice/repair) | ☐ | ☐ | ☐ | ☐ |
| Hardware strore | ☐ | ☐ | ☐ | ☐ |

15. Could you please provide some brief information about yourself and up to 10 of the workforce employed at this address. If possible, please record information about staff in managerial, professional, skilled and semi or un-skilled positions:

15

| | 1 Yourself | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Position (eg manager, clerk) | | | | | |
| Full time/part time (ft/pt) | | | | | |
| Approx salary per anum (£) | | | | | |
| Place of residence (town) | | | | | |

| | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|
| Position (eg manager, clerk) | | | | | |
| Full time/part time (ft/pt) | | | | | |
| Approx salary per anum (£) | | | | | |
| Place of residence (town) | | | | | |

***Thank you for your time in completing this questionnaire, please return it in the prepaid envelope provided.***

Olney Household Questionnaire Confidential Case No:

Location:

We have designed this questionnaire to minimise the time it takes to complete.

*Would the person who does the majority of the household shopping please complete this questionnaire. (By 'household' we mean one person living alone or a group of people living at the same address having meals prepared together and with common housekeeping)*

To respond to each question simply fill in the gaps or tick the correct box.

All information provided will be treated in the strictest confidence.

For analysis purposes only

1. How many people live in this household ? _____ 1

2. Could you please indicate the age group that each household member fits best, according to the number of people in each category below ? 2

| Adults | No. | Children | No. |
|---|---|---|---|
| 17-24 | __ | 0-7 | __ |
| 25-34 | __ | 8-12 | __ |
| 35-44 | __ | 13-16 | __ |
| 45-54 | __ | | |
| 55-64 | __ | | |
| 65+ | __ | | |

3. How many cars / vans do you have in this household ? _____ 3

4. Which Council Tax band does the property come under ? (If unknown, please select according to the approximate value of the property) 4

| | | | |
|---|---|---|---|
| 1 A (Up to £40,000) | ☐ | 5 E (£ 88,001-120,000 | ☐ |
| 2 B (£ 40,001-52,000) | ☐ | 6 F (£120,001-160,000) | ☐ |
| 3 C (£ 52,001-68,000) | ☐ | 7 G (160,001-320,000) | ☐ |
| 4 D (£ 68,001-88,000) | ☐ | 8 H (More than 320,000) | ☐ |

5. Have you lived in the Olney area all your life? 5

1 Yes ☐ 2 No ☐

If Yes, please go to Question 7

6. How long have you resided in the Olney area ? _____years 6

7. Does the household own or have access to: 7

| | | | | |
|---|---|---|---|---|
| 1 A Telephone | Yes | ☐ | No | ☐ |
| 2 A FAX machine | Yes | ☐ | No | ☐ |

a. Do you ever make any household purchases via: 7a

| | | | | |
|---|---|---|---|---|
| 1 Telephone | Yes | ☐ | No | ☐ |
| 2 FAX machine | Yes | ☐ | No | ☐ |

8. Does the household own or have access to a personal computer ? 8

1 Yes ☐ 2 No ☐

If No, please go to Question 10

9. Is there an INTERNET connection for your home computer ? 9

1 Yes ☐ 2 No ☐

a. If Yes, do you ever make household purchases via the INTERNET ?

9a

1 Yes ☐ 2 No ☐

10. Do you use a mail order catalogue for any household purchases ?

10

1 Yes ☐ 2 No ☐

## HOUSEHOLD PURCHASES OF GOODS AND SERVICES

*The following two questions relate to the spending and travel patterns associated with the most common household transactions. This is the main focus of the survey, so please try to be as accurate as possible. Thank you.*

Each question asks you simply to fill in:

1. The *approximate* expenditure on the various goods and services listed *over the last four weeks.*
2. The *approximate* number of times the household has made a purchase of the various goods and services listed *over the last four weeks.*
3. The *most common* place of purchase for each group of goods and services listed *using the key provided.*

11

### 11. *Purchases of Household Goods over the last four weeks*

| ITEM | Approx. Expenditure in last 4 weeks £ | Approx. Number of times Purchased in last 4 weeks | Most Common Place of Purchase (see key) |
|---|---|---|---|
| *Example:* Clothing & footwear | *£ 75* | *3* | *MK* |
| Food/Groceries | | | |
| Newspapers/Magazines | | | |
| Confectionary | | | |
| Alcohol / tobacco | | | |
| Household hardware | | | |
| Books/CD's | | | |
| Clothing & footwear | | | |
| Gas & Electrical appliances | | | |
| Furniture & bedding | | | |
| Stationary & paper goods | | | |
| Cosmetics & hair products | | | |
| Sports / camping equipment | | | |
| Horticultural goods, plants | | | |
| Other (Please specify) | | | |

### Key to most common place of purchases:

| | | | |
|---|---|---|---|
| 1 Local Village | LV | 7 Elsewhere in Bucks, Beds, Northants | COU |
| 2 Olney Town Centre | OTC | 8 Elsewhere in the UK | UK |
| 3 OlneySupermarket | OS | 9 At home with visiting firm | HOM |
| 4 Within a 10 mile radius of residence | TEN | 10 By Telephone | TEL |
| 5 Milton Keynes | MK | 11 By Post | POS |
| 6 Northampton | NOR | 12 Via Internet | INT |
| 7 Bedford | BED | | |

12. *Purchases of Household Services over the last four weeks*

| ITEM | Approx. Expenditure in last 4 weeks £ | Approx.Number of times Purchased in last 4 weeks | Most Common Place of Purchase (see key) |
|---|---|---|---|
| *Example:* Laundry & Cleaning | *£ 80* | *4* | *HOM* |
| Takeaway Food | | | |
| Restaurant Food/Drink | | | |
| Pub Food/Drink | | | |
| Hairdressing/beauty treatment | | | |
| Solicitor/professional | | | |
| Printing Services | | | |
| Laundry & Cleaning | | | |
| Building / Gardening | | | |
| Plumbing / Decorating | | | |
| Vehicle repairs & servicing | | | |
| Shoe / watch repair | | | |
| Cinema & theatre | | | |
| Sports admissions / activties | | | |
| Other (Please specify) | | | |

**Key to most common place of purchases:**

| | | | |
|---|---|---|---|
| 1 Local Village | LV | 7 Elsewhere in Bucks, Beds, Northants | COU |
| 2 Olney Town Centre | OTC | 8 Elsewhere in the UK | UK |
| 3 OlneySupermarket | OS | 9 At home with visiting firm | HOM |
| 4 Within a 10 mile radius of residence | TEN | 10 By Telephone | TEL |
| 5 Milton Keynes | MK | 11 By Post | POS |
| 6 Northampton | NOR | 12 Via Internet | INT |
| 7 Bedford | BED | | |

12

13. Which of the following modes of transport do you most commonly use for household shopping trips ?

| | | | |
|---|---|---|---|
| 1 Foot | ☐ | 5 Passenger in a car or van | ☐ |
| 2 Bicycle | ☐ | 6 Public transport | ☐ |
| 3 Motorbike/Moped | ☐ | 7 Private hire/company owned transport | ☐ |
| 4 Driving a car or van | ☐ | 8 Other: Specify_____ | ☐ |

13

14. Are you currently in employment ?

1 Yes ☐ 2 No ☐

14

*If No, please go to Question 16*

15. Is your job full-time or part-time ?

1 Full-time ☐ 2 Part-time (less than 30 hours per week) ☐

15

a. What is your job title ? (eg. sales assistant, clerk) _____

What industry is this in ? _____

15a

b.. Where is your place of work ?

Town _____
County _____

15b

c. What mode of transport do you use to get to work ?

15c

| | | | |
|---|---|---|---|
| 1 On foot/bicycle | ☐ | 4 Passanger in a a car or van | ☐ |
| 2 Motorbike/scooter/moped | ☐ | 5 By public transport | ☐ |
| 3 Driving a car or van | ☐ | 6 Work at home | ☐ |

d. Are shopping trips ever combined with your work journey ?

15d

1 Yes ☐ 2 No ☐

**Please go to Question 17**

16. Are you:

16

| | | | |
|---|---|---|---|
| 1 Registered Unemployed | ☐ | 4 Housewife or carer | ☐ |
| 2 In full-time education | ☐ | 5 Other: Specify_____ | ☐ |
| 3 Retired or permanently sick | ☐ | | |

17. Is there a second adult in the household who is currently in employment ?

17

1 Yes ☐ 2 No ☐

**If No, please go to Question 19**

18 Is their job full-time or part-time ?

18

1 Full-time ☐ 2 Part-time (less than 30 hours per week) ☐

a. What is their job title ? (eg. sales assistant, clerk) _____

18a

What industry is this in ? _____

b. Where is their place of work ?

18b

Town _____
County _____

c. What mode of transport is used to get to work ?

18c

| | | | |
|---|---|---|---|
| 1 Foot/bicycle | ☐ | 4 Passanger in a car or van | ☐ |
| 2 Motorbike/scooter/moped | ☐ | 5 Public transport | ☐ |
| 3 Driving a car or van | ☐ | 6 Works at home | ☐ |

d. Are shopping trips ever combined with their work journey ?

18d

1 Yes ☐ 2 No ☐

19. Which of the following best describes the total gross annual household income ? (i.e the total income from all working and non-working adults in the household, including any benefits, pensions and grants and before NI and Income tax contributions)

19

| | | | |
|---|---|---|---|
| 1 Less than £ 4,000 | ☐ | 4 £ 15,501 - £23,500 | ☐ |
| 2 £ 4,001 - £ 8,500 | ☐ | 5 £ 23,501 - 39,000 | ☐ |
| 3 £ 8,501 - £ 15,500 | ☐ | 6 More than £ 39,000 | ☐ |

***Thank you for taking the time to complete this questionnaire. Please return it in the prepaid envelope provided.***

# Appendix J
# Lifestage / family stage categories

**Family stage (Dix, 1977)**

| | |
|---|---|
| Group I | Young adults without children |
| Group II | Families with dependent children, the youngest aged 7 years or less |
| Group III | Families with dependent children, the youngest aged 12 years or less |
| Group IV | Families with dependent children, the youngest aged 13 years or more |
| Group V | Family of adults, all of working age |
| Group VI | Elderly |

**Lifestage (Office for National Statistics, 1991)**

| | |
|---|---|
| Group I | Young adults (16-24) without children |
| Group II | Families with dependent children, the youngest aged 4 years or less |
| Group III | Families with dependent children, the youngest aged 10 years or less |
| Group IV | Families with dependent children, the youngest aged 11 years or more |
| Group V | Family of adults, all of working age |
| Group VI | Elderly (Pensionable age and over) |

## Appendix K

## Firms that took part in the validation exercise

1 **Centry Farm, Kingsbridge.**

SIC: Agriculture

2 **The Lunchbox, 7 Church street, Kingsbridge.**

SIC: Consumer service

3 **M.D Screen Prints, 3 Stile Orchard, Loddiswell, Kingsbridge.**

SIC: Manufacturing

4 South Milton Post Office, South Milton, Kingsbridge

SIC: Consumer service

5 **Venn Farm, East Allington, Totnes.**

SIC: Agriculture

6 **Avon Bridge Machinery, Aveton Gifford, Kingsbridge**

SIC: Consumer / business service

7 **ACC Auto Services, Wallingford House, Wallingford Road, Kingsbridge.**

SIC: Consumer / business service

8 **1st Class Roofing, Units 4-5, Orchard Meadow, Chillington.**

SIC: Construction

9 **Tumbly, Galmpton, Kingsbridge.**

SIC: Construction

10 **Norton Farm, Kingsbridge.**

SIC: Agriculture

11 **D & J Eastley, Homefield, Coles Cross, East Allington, Totnes.**

SIC: Construction

12 **Mix it Slurry Stirrers, Little Chillaton, Loddiswell, Kingsbridge**

SIC: Agriculture

13 **NIS Thompson, Centurion Works, Union Road, Kingsbridge.**

SIC: Consumer service

14 **Ceramet Dental Laboratory, 59 Church Street, Kingsbridge.**

SIC: Business service

# Appendix L

## Logistic Regression model specification process

*i) Careful univariate analysis of each variable*

The model building process began with careful univariate analysis of each variable, using Chi square tests to examine the association between each of the predictor variables and the relevant dependent variables. This allowed unsubstantive variables to be identified from the start but, more importantly, it allowed variables with zero cell counts to be identified. Given that all independent variables were dichotomous, and recoding was not an option, those which would inevitably cause numerical problems (indicated by inflated standard errors and resulting invalid statistical inferences) could therefore be removed from the start.

*ii) Selection of variables for multi-variate analysis*

According the Hosmer and Lemeshow (1989), any variable whose univariate test has a p-value less than 0.25 should be considered as a candidate for the multivariate model along with all variables of known importance. Use of the 0.25 level as a screening criterion for selection of candidate variables is based on the work by Bendel and Afifi (1977) on linear regression and Micky and Greenland (1989) on logistic regression. One school of thought argues for the inclusion of all scientifically relevant variables into the multivariate model, regardless of the results of univariate analysis, because weakly associated predictors can become important when taken together. However, as Hosmer and Lemeshow (1989) argue, the appropriateness of the decision to begin a multivariate model with all possible variables depends on the overall sample size and the number of observations in each outcome group relative to the total number of candidate variables:

*When the data are adequate to support such an analysis it may be useful to begin the multivariate modelling from this point. However, when the data are inadequate, this approach can produce a numerically unstable multivariate model....In this case we should elect a subset of variables based on the results of the univariate analyses and refine the definition of "scientifically relevant"*

(Hosmer and Lemeshow, 1989: 86 87).

Based upon this advice, the following strategy for variable selection was taken:

1. Carry out univariate analysis of all independent variables.

2. Fit a model with all variables included, regardless of univariate results.

3. Examine coefficients, standard errors and Wald statistics. If model is stable, proceed with all relevant variables included. If model is unstable (identified by inflated coefficients, standard errors and very high significance levels of the wald statistic), remove variables which are of questionable importance.

4. Re-fit model with questionable variables removed. Examine coefficients to check that model is numerically stable.

*iii) Verification of importance of included variables*

This stage in the model building process was concerned with, firstly examining the Wald statistic for each variable, and secondly, comparing each of the estimated coefficients with the coefficient from a univariate model containing only that variable. Hosmer and Lemeshow suggest that variables that do not contribute to the model based on these criteria should be eliminated and a new model fit. New models were also compared to old models through the Likelihood Ratio test. In particular, concern was given to those variables whose coefficients had changed markedly in magnitude, indicating the importance of one or more of the excluded variables. This process of deleting, refitting and verifying continued until it appeared that all important variables were included and those excluded were statistically unimportant. In some cases, marginally significant predictors were retained until the possibility of interaction terms had been explored.

*iv) Consideration of the need to include interaction terms among variables*

If there were any continuous scaled variables in the model it would have been appropriate at this stage to check for the assumption of linearity in the logit, but as all independent variables were categorical, there was no need to consider this assumption. The next step then was to consider the need for including interaction terms among the variables. In fact, testing for interaction effects is an important part of the process to ensure that another assumption of logistic regression is met: that of non-additivity. Nonadditivity occurs when

the change in the dependent variable associated with a one-unit change in the independent variable depends on the value of one of the other independent variables. As Menard (1995) notes, detection of nonadditivity is not as straight forward as detection of non-linearity in logistic regression:

*Unless theory provides some guidance, one is commonly left with the choice among assuming an additive model, testing for interaction effects that seem intuitively plausible, and testing for all possible interaction effects* (Menard, 1995: 65).

As with the case of selecting discrete variables, Hosmer and Lemeshow (1989) provide a very useful method of selecting and testing for interaction terms in a model. The strategy undertaken is illustrated below.

1. Consider the total number of interactions that may be formed for the variables in the model. Hosmer and Lemeshow recommend that only those interactions which we have prior reason to be concerned about or which make sense be formed and investigated. Given knowledge of the influence of sample size on the model fitting process, only two way interactions were considered in the case of the business analysis. Interaction terms with more than two variables would almost certainly have resulted in cells with too few cases to run meaningful analysis.

2. Assess the contribution (significance) of each interaction to the previously developed multivariate model. Following the advice of Hosmer and Lemeshow (1989), it sufficed to present the log likelihood, the likelihood ratio test statistic, G, for the current model versus the main effects model, the degrees of freedom for this test and its $p$ value. Of interest was how inclusion of interaction terms altered the point and interval estimates computed from the main effects model. As a general rule, an interaction needed to demonstrate at least a moderate level of statistical significance for this to occur.

3. Fit an additional model containing those interaction terms which demonstrate a moderate level of statistical significance. The aim here was to establish if an improvement in goodness-of-fit had occurred as a result on inclusion of the interaction term(s). Menard (1995) illustrates that the statistical significance of the interaction effects is given by the statistical significance of the change in the model Chi-Square ($G_M$), and that the substantive significance is best evaluated by the magnitude of the change in the $R^2$ value. Attention was also paid to those interaction terms which caused standard errors to become

artificially inflated, indicating that the term was either highly unsubstantive or was causing numerical problems, perhaps through zero cell counts.

*v) Testing for collinearity*

Collinearity is a problem that arises when independent variables are correlated with one another. Perfect collinearity means that at least one independent variable is a perfect linear combination of the others. When this situation exists, it is impossible to obtain a unique estimate of regression coefficients. According to Menard (1995), low levels of collinearity are not generally problematic, but high levels of collinearity may pose problems. As a rough guideline, Menard (1995) recommends that unstandardised logistic regression coefficients greater than 2 be examined to determine whether collinearity is present, due to the fact that it does tend to produce coefficients that are unreasonably high. To ensure validity, all variables modelled were tested for collinearity. Menard presents two methods for detecting collinearity and suggests thresholds where levels of collinearity would become a problem and cause inefficient parameter estimates. In accordance with this, the following tests for collinearity were carried out:

1. A linear regression model was calculated using the same dependent and independent variables as used in the logistic regression model, allowing the tolerance statistic to be calculated. (Because the concern is with the relationship among the independent variables, the functional form of the model for the dependent variable is irrelevant to the estimation of collinearity). According to Menard (1995), a tolerance less than .20 is cause for concern and a tolerance less than .10 almost certainly indicates a serious collinearity problem.

2. As a second check, each independent variable was taken in turn and treated as the dependent variable in a linear regression model, with all other variables as independents. This allowed an $R^2$ value to be calculated for each one, to examine if any were a linear combination of the others. Menard (1995) suggests that an $R^2$ of .80 or more for at least one of the independent variables may cause problems.

*vi) Analysis of residuals*

As Menard (1995) explains, the principle purpose for analysing residuals in logistic regression is to identify cases for which the model works poorly, or cases that exert more than their share of influence on the estimated parameters of the model. This author

suggests that, as a general approach, it is appropriate to examine the *leverage*, the *studentised residual,* and *dbeta* as a precaution against mis-coded data and a guide to weakness in our conceptual models. These residuals were therefore examined for all prediction models developed, in accordance with the criteria set out below:

*Leverage:* This statistic is used to identify cases that have a disproportionate influence on the estimates of the logistic regression coefficients. According to Menard (1995), cases with leverage values several times the expected value of $(k + 1)/N$ (where $k$ represents the number of parameters in the model) are influential cases and deserve close attention.

*Studentized Residual:* This is a measure used to detect outliers. It is approximately equal to the deviance residual, which is the contribution of each case to the deviation statistic[1]. Outliers are observations which have unusually high or low values on one variable or an unusual combination of values on two or more variables. According to Menard (1995), studentised residuals less than -2 or greater than +2 indicate that a case may be a poor fit and warrant some concern. In the interests of specifying robust models detected outliers were removed from the analysis.

*Dbeta*: These values, which are provided for each separate parameter in the model, represent the standardised change in the regression coefficients attributable to the deletion of an individual observation. (The unstandardised version of this measure is termed Cook's distance). According to Menard (1995), large values of dbeta, especially values greater than 1, deserve closer examination. Residuals which exceed this threshold were also removed from the model.

As Menard (1995) shows, removal of outliers and influential cases creates more robust and valid models. Indeed, this was illustrated by the fact that, following the deletion of such observations, overall model fit did improve in most cases.

[1] This is a measure of overall goodness of fit for the model and is discussed in Appendix M.

# Appendix M

# Evaluation and interpretation of the Logistic Regression models

## i) Evaluation of the models

*a. Assessing goodness of fit*

The primary measures of assessing how well the model fits the data are the Model Chi-Square ($G_M$) and $R_L^2$, which are close parallels to *F* and $R^2$ in linear regression. $G_M$ provides a test of the null hypothesis that $ß_1=ß_2=ß_3.....ß_k = 0$. If significant, then we reject $H_O$ and conclude that information about the independent variables allows us to make better prediction about the dependent variable than we could make without the independent variables. In other words, a statistically significant Model Chi-Square ($G_M$) indicates that the model fits the data well.

Several analogues to the linear regression $R^2$ have been proposed for logistic regression. According to Menard (1995), the most natural choice is discussed as $R_L^2$ in Hosmer and Lemeshow (1989: 148). $R_L^2$ is a proportional reduction in the absolute value of the Log-Likelihood measure and is calculated by the equation: $R_L^2 = G_M/(D_O) = G_M/(G_M + D_M)$. It indicates by how much the inclusion of the independent variables in the model reduces the badness-of-fit $D_O$ Chi-Square statistic. The logistic regression output from SPSS provides two further measures comparable to $R^2$ in multiple regression. The Cox and Snell $R^2$ operates in the same manner, with higher values indicating greater model fit. However, according to Hair *et al* (1998), this measure is limited in that it cannot reach the maximum value of 1, so Nagelkerke proposed a modification that had a range of 0 to 1. According to Menard (1995), $R^2$ becomes substantively significant at <=.005 for a large sample, i.e. when the independent variables explain at least 1/2% of the variance in the dependent variable. For a small sample, an $R^2$ value of >= .40 is described as moderately strong.

A third key measure of model fit is the *Hosmer and Lemeshow Goodness-of-fit test,* which measures the correspondence of the actual and predicted values of the dependent variable (See Hosmer and Lemeshow, 1989). In this case, better model fit is indicated by a smaller difference in the observed and predicted classification. Thus, a good model fit is indicated by a non-significant Chi-Square value.

A secondary measures to those discussed above is the Log Likelihood, which is analogous to the error sum of squares (SSE) in linear regression. SPSS presents the log-likelihood as -2 Log Likelihood, multiplied by -2 in order to obtain a Chi-Square distribution. It is used as an indicator of how poorly the model fits with all of the independent variables in the equation and should therefore ideally not be statistically significant. The Goodness Of Fit index is also presented in the output which, according to Menard (1995), has some advantage over -2 Log Likelihood only when the number of possible combinations of the independent variables is approximately equal to the number of cases in the analysis. Again, a good model fit is indicated by a non-significant Chi-Square value.

When assessing model fit, attention was also paid to the possibility of complete separation. This problem occurs when the model is too successful in predicting the dependent variable with a set of predictors, producing an $R_L^2$ of 1. In this scenario, and in the case of quasi-complete separation where the value can be less than 1, logistic regression coefficients and their standard errors will tend to be extremely large (Menard, 1995).

*b. Assessing predictive efficiency of the models*

As Menard (1995) explains, in the case of prediction models such as those developed in this project, there are no *a priori* constraints on the number or proportion of cases predicted to have or not to have the specified characteristic. That is, there is nothing that constrains the marginal distributions of predicted and observed frequencies to be equal or unequal. All cases may in fact be predicted to belong to the same category, and the sample or population may be homogeneous. Likewise, Kennedy (1992) argues that the temptation to use the percentage of correct predictions as a measure of goodness of fit should be resisted because a feature of the logit is that the number of y=1 predictions it makes is equal to the number of y=1 observations in the data. A number of researchers, such as Lussier (1995) and Russell (1997), therefore simply report the results from their classification tables and evaluate their models using only a limited amount of goodness of fit measures. However, Menard (1995) shows that it is possible to be more accurate about

the predictive efficiency of a model, using two measures analogous to the model Chi-square and $R^2$.

The first of these, to measure substantive significance for a prediction model, is lambda-*p*. This is similar to Goodman and Kruskalls gamma for contingency tables involving nominal variables, but provides an index fist proposed by Ohlin and Duncan (1949). As Menard (1995) explains, lambda-*p* is a proportional reduction in error (PRE) measure like $R^2$ when it is positive but, if the model does worse than predicting the mode, it may be negative, indicating the proportional increase in error. The full range of possible values for lambda-*p* in tables with N cases is from 1-N to 1. Lambda-*p* is equal to the number of cases in the smaller observed category minus the number of cases incorrectly predicted by the model, divided by the number of cases in the smaller category (Menard, 1995: 35).

Finally, the expected errors for lambda-p can be used to calculate the binomial *d* statistic, an analogue to the F test for statistical significance of the model in terms of predictive efficiency. The test indicates whether the proportion incorrectly predicted with the model differs significantly from the proportion incorrectly predicted without the model. As Menard (1995) shows, to establish whether the prediction model improves our ability to predict the classification of cases, the one-tailed test is more appropriate. The staiistic is calculated by the following equation, where $P_e$ relates to the proportion of expected errors (errors without the model) and $p_e$ relates to the proportion of observed errors (errors with the model):

$$d = (P_e - p_e) \sqrt{P_e (1 - P_e)/N}$$

A significant value for the binomial *d* statistic indicates that the classification on the dependent variable is strongly related to the values of the independent variables, accepting the alternative hypothesis that the proportion of errors with the model is significantly less than the proportion of errors without the model[1]. In other words, a significant binomial *d* statistic improves our ability to predict the classification of cases.

[1]Statistical significance is calculated using standard normal distribution tables, and treating the *d* statistic as a *z* score because it approximates to a normal distribution.

*c. External validation*

Menard (1995) makes no reference to the need for cross validation of the model. However, Hosmer and Lemeshow (1989) suggest that in some situations it may be possible to exclude a sub sample of observations, develop a model based on the remaining subjects, and then test the model in the originally excluded subjects. In other situations it may be possible to obtain a new sample of data to assess goodness-of-fit of a previously developed model. According to these authors, the reason for considering this type of assessment is that sometimes models perform in an optimistic manner on the development data set, and validation may be especially important when the model is used to predict outcome for future subjects.

As Hair *et al* (1998) explain, if the sample is going to be divided into analysis and holdout samples for validation purposes it is essential that each sub-sample be of adequate size to support conclusions from the results. Although no hard and fast rules have been established it is suggested that the researcher would want at least 100 in the total sample to justify dividing in into two groups. In the present study, samples varied in size between 71 and 239. Where the number of observations exceeded 100, it was decided to fit the model on the entire sample, and then divide the sample into two random groups and assess goodness of fit on the two validation samples.

**ii) Interpretation of the models**

The most accurate method used to evaluate statistical significance of the independent variable's contribution is the likelihood ratio test (Menard, 1995) which is equal to Model Chi-square for the model with the variable minus that for the model without the variable. SPSS also calculates the Wald statistic to test for the statistical significance of the individual coefficients (which is a less computationally intensive alternative, equal to the square of the ratio of the coefficient to its standard error and tests if each coefficient is zero). As Menard (1995) notes, the disadvantage of the Wald statistic is that, for large ß, the estimated standard error is inflated, resulting in failure to reject the null hypothesis when the null hypothesis is false (Type II errors). As it is the most accurate method of evaluating statistical significance, the results of the Likelihood Ratio statistic[2] are presented for all logistic regression models.

[2] Likelihood ratio statistics are obtained in SPSS by running backward stepwise procedure, and using output from the first step with all variables included in the model.

As in the case of linear regression, the logistic regression coefficient can be interpreted as the change in the dependent variable, logit(Y), associated with a one unit change in the independent variable (Menard, 1995). Because all independent variables are simply dichotomies indicating firm or household type, and are essentially measured on the same 'scale', there is no need to convert the unstandardised coefficients into standardised measures. In fact, as Hosmer and Lemeshow (1989) illustrate, the case where independent variables are dichotomous is the simplest, whereby the parameter of interest is the odds ratio. The odds ratio is a measure of association which approximates how much more likely, or unlikely, it is for the outcome to present among those with $x = 1$ than among those with $x = 0$. In SPSS the odds ratio is presented as Exp (ß), which is simply the exponentiation of the coefficient. It is important to note that this procedure does not alter the way in which we interpret the sign of the coefficient. A positive coefficient increases the probability of the event occurring, whereas a negative value decreases the predicted probability (Hair *et al* 1998: 278).

When using a dichotomous independent variable we have a choice of whether or not to use a design variable. As Hosmer and Lemeshow (1989) explain, a dichotomous variable will require a single design variable with a single estimated coefficient, while treating the dichotomous variable as interval scaled will yield an equivalent, though not necessarily numerically equal, coefficient. SPSS specifies that categorical variables be treated as such and then allows different types of contrasts to be selected. There are number of different contrasts available, but the two most relevant for discussion in this case are deviation contrasts[3] and indicator contrasts. In the case of indicator coding, the variable is assigned values of 0 and 1, 0 for the lowest and 1 for the highest. One category is then selected as the reference category, which is left out of the model and exponentiation of the estimated coefficient estimates the odds ratio of 1 vs 0, or vise versa. Hosmer and Lemeshow (1989) explain that the same result is obtained if the variable is coded originally 0 and 1, and then treated as though it were interval scaled. These authors recommend that dichotomous variable be treated as interval scaled or specified as a design variable with indicator coding in order to ensure correct estimation of the odds ratio.

[3] Deviation coding the effect of each design variable is compared with the overall effect of the independent variable (analogous to comparing un-weighted means in linear regression). It measures the deviation of the logit for each group from the average logit of the entire sample. The statistical significance is then interpreted as whether the effect of being in a certain category is significant from the average effect of the categorical variable.

A concise and comprehensive method of interpreting the coefficients given by interaction terms is provided by Russell (1997). Like all other terms in the model, each interaction effect has an independent ß coefficient and associated odds ratio. It is important to acknowledge that these independent effects are additive, and must be integrated into the main effects of the model. This integration provides three comparator combinations against which to judge the effect of each interaction. A matrix can then be constructed to examine the effect of the interaction against each of the three comparator groups, based on producing a sum of all relevant ß coefficients and calculating the exponentiation to obtain each of the log odds ratios.

## Appendix N

## 'Economic footprints' illustrating spatial patterns of economic activity: Firms


| | |
|---|---|
| Figure 6.1A | Kingsbridge town: outputs (sales) |
| Figure 6.2A | Kingsbridge hinterland: outputs (sales) |
| Figure 6.3A | Kingsbridge town: inputs (supplies) |
| Figure 6.4A | Kingsbridge hinterland: inputs (supplies) |
| Figure 6.5A | Olney town: outputs (sales) |
| Figure 6.6A | Olney hinterland: outputs (sales) |
| Figure 6.7A | Olney town: inputs (supplies) |
| Figure 6.8A | Olney hinterland: inputs (supplies) |

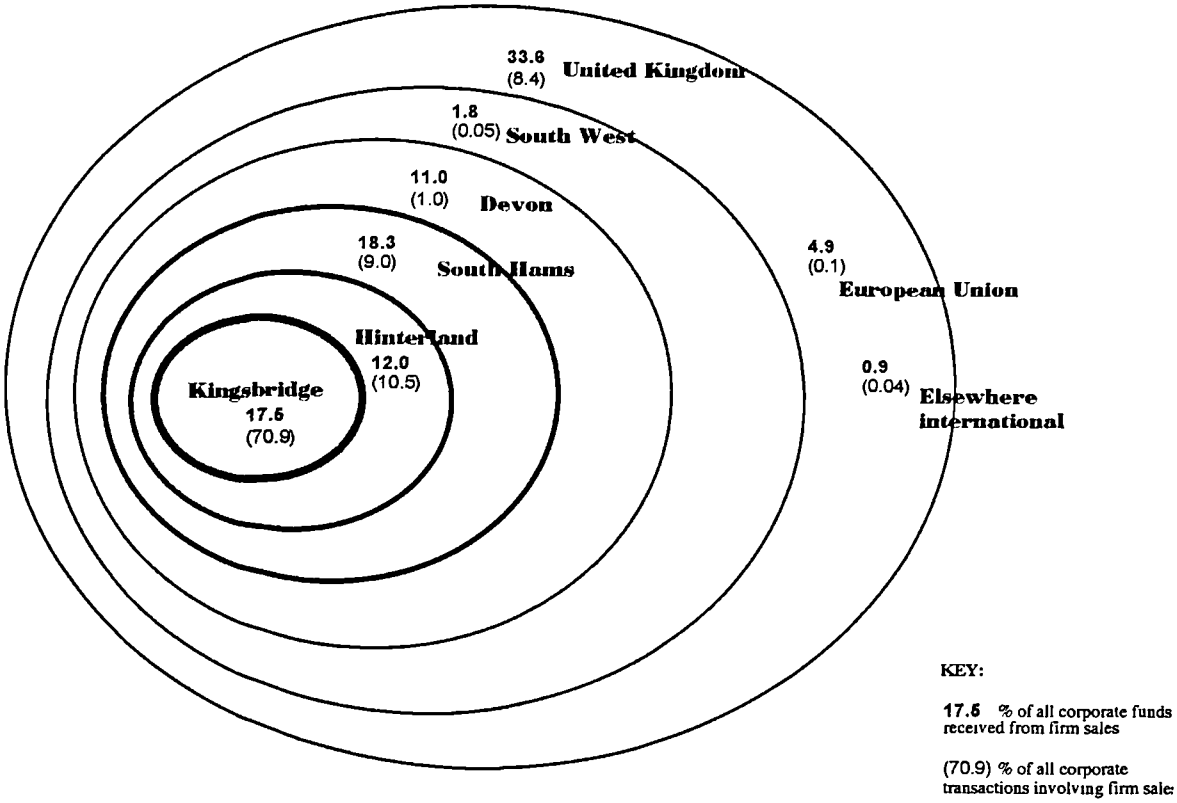


**Figure 6.1A: The 'economic footprint' of Kingsbridge town firms:** given by the proportion of output transactions by value and number

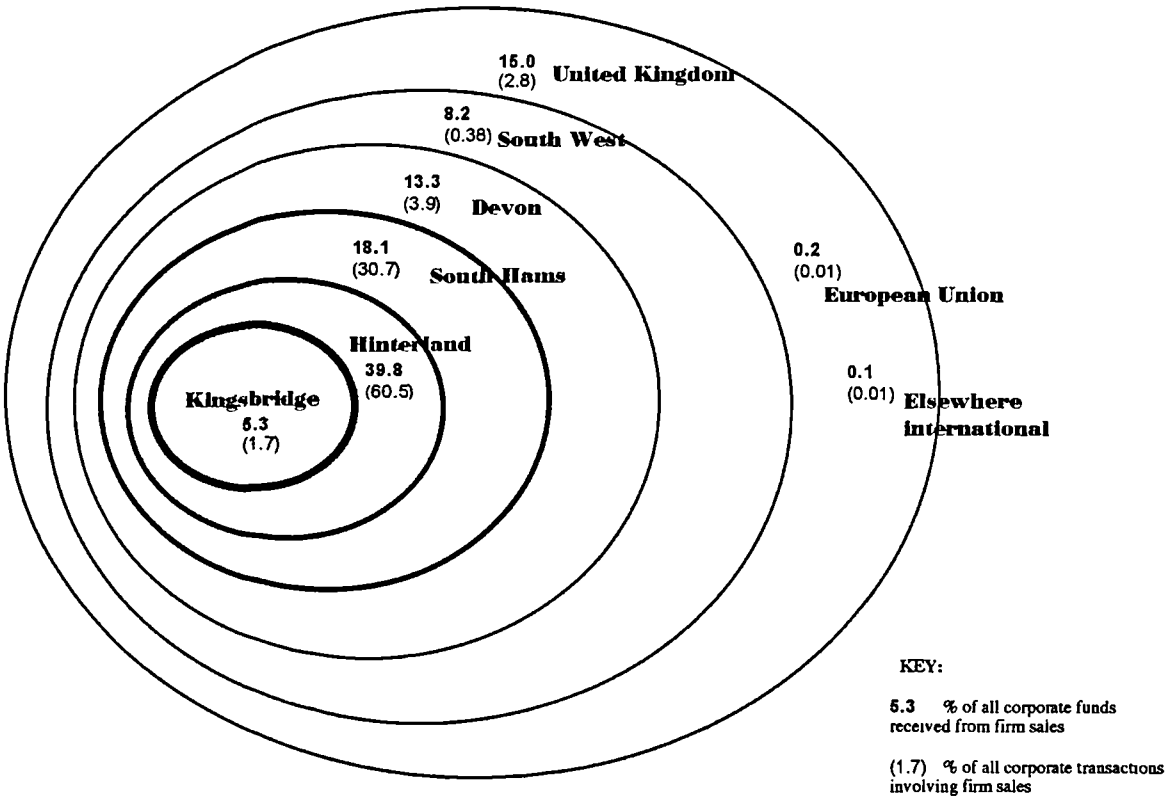


**Figure 6.2A: The 'economic footprint' of Kingsbridge hinterland firms:** given by the proportion of output transactions by value and number

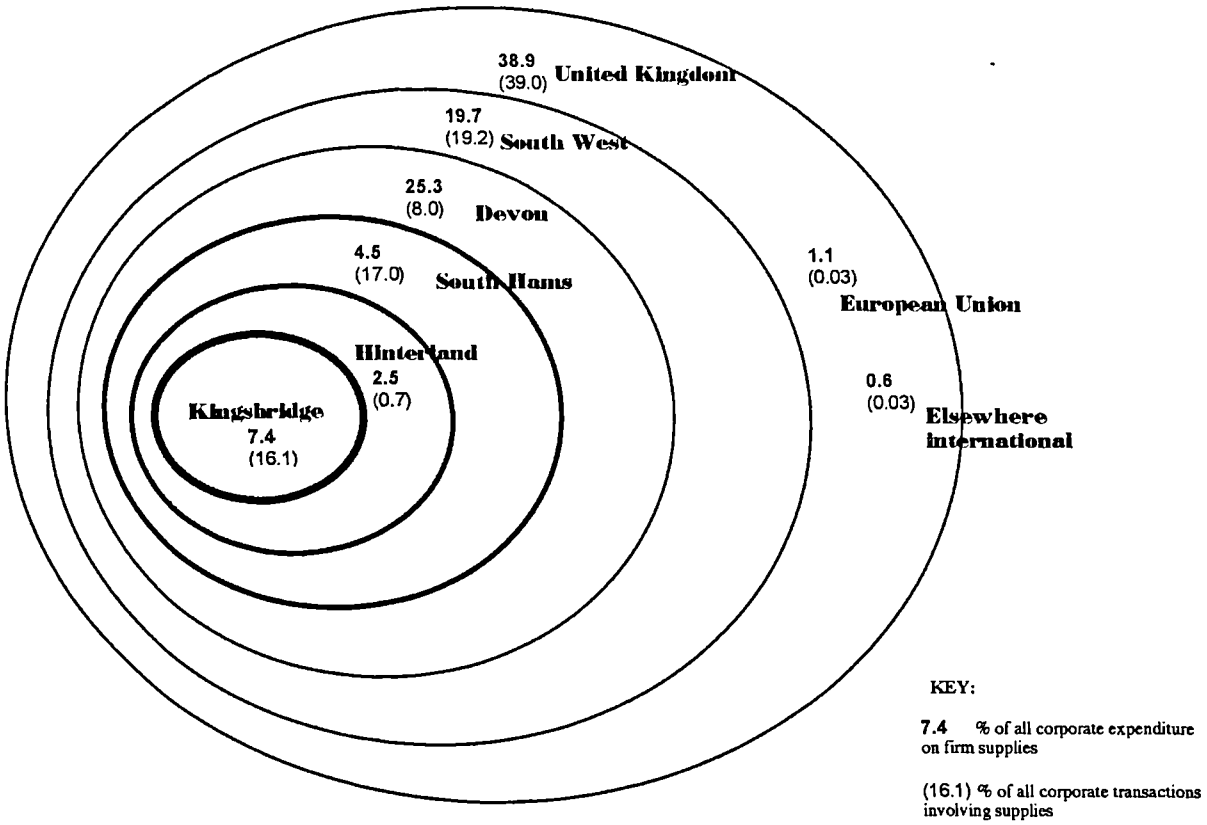


**Figure 6.3A: The 'economic footprint' of Kingsbridge town firms:** given by the proportion of input transactions by value and number

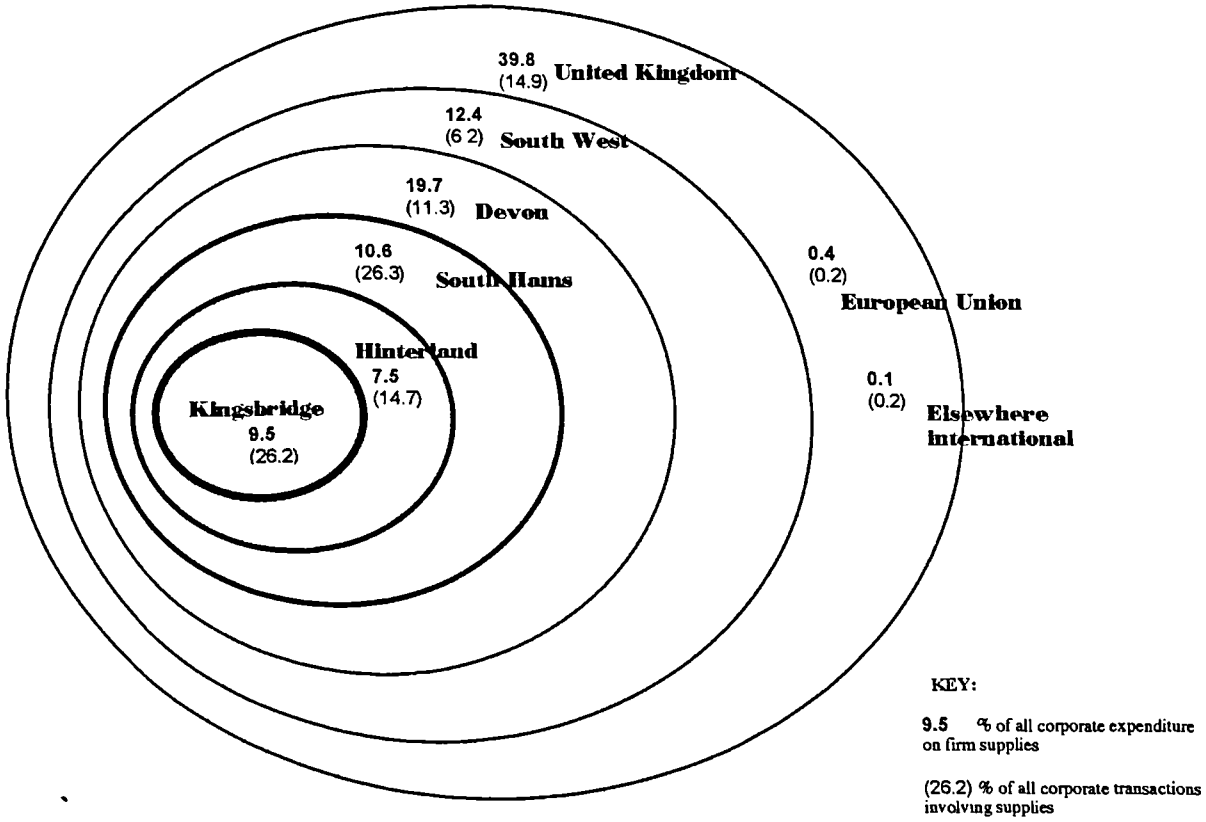


**Figure 6.4A: The 'economic footprint' of Kingsbridge hinterland firms:** given by the proportion of input transactions by value and number

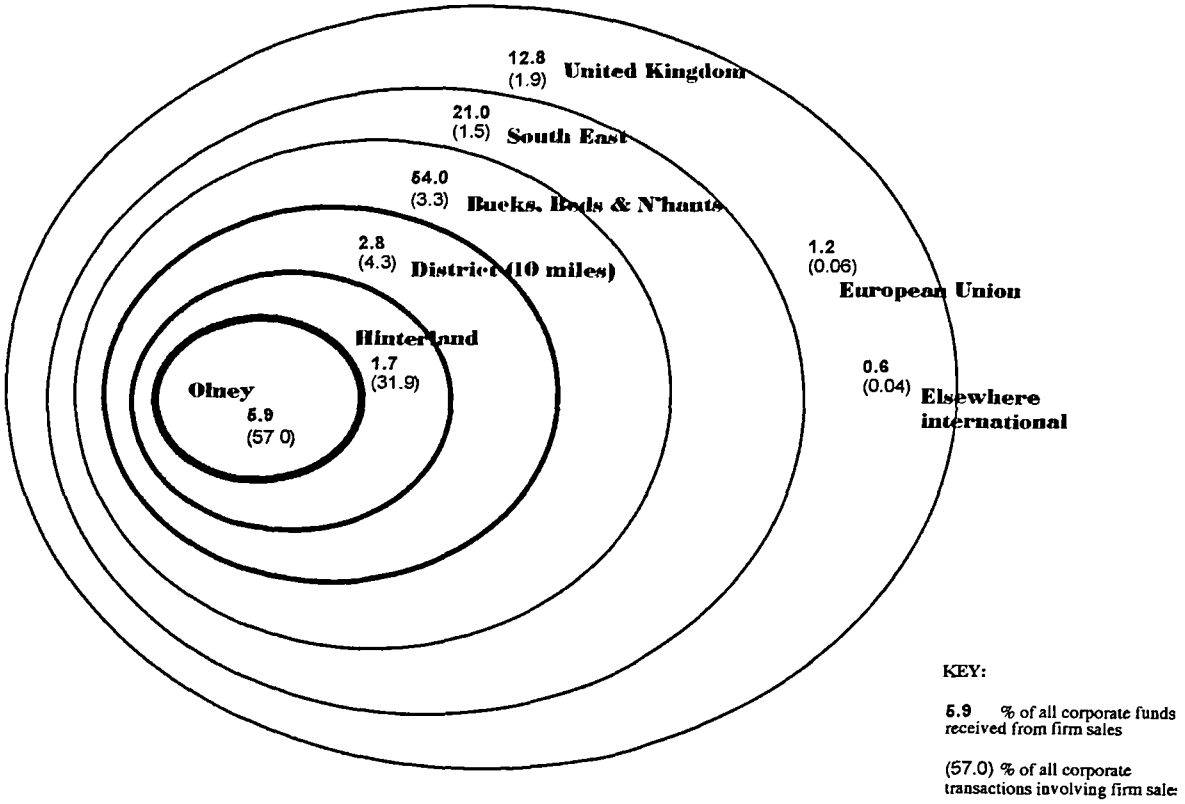


**Figure 6.5A: The 'economic footprint' of Olney town firms:** given by the proportion of output transactions by value and number

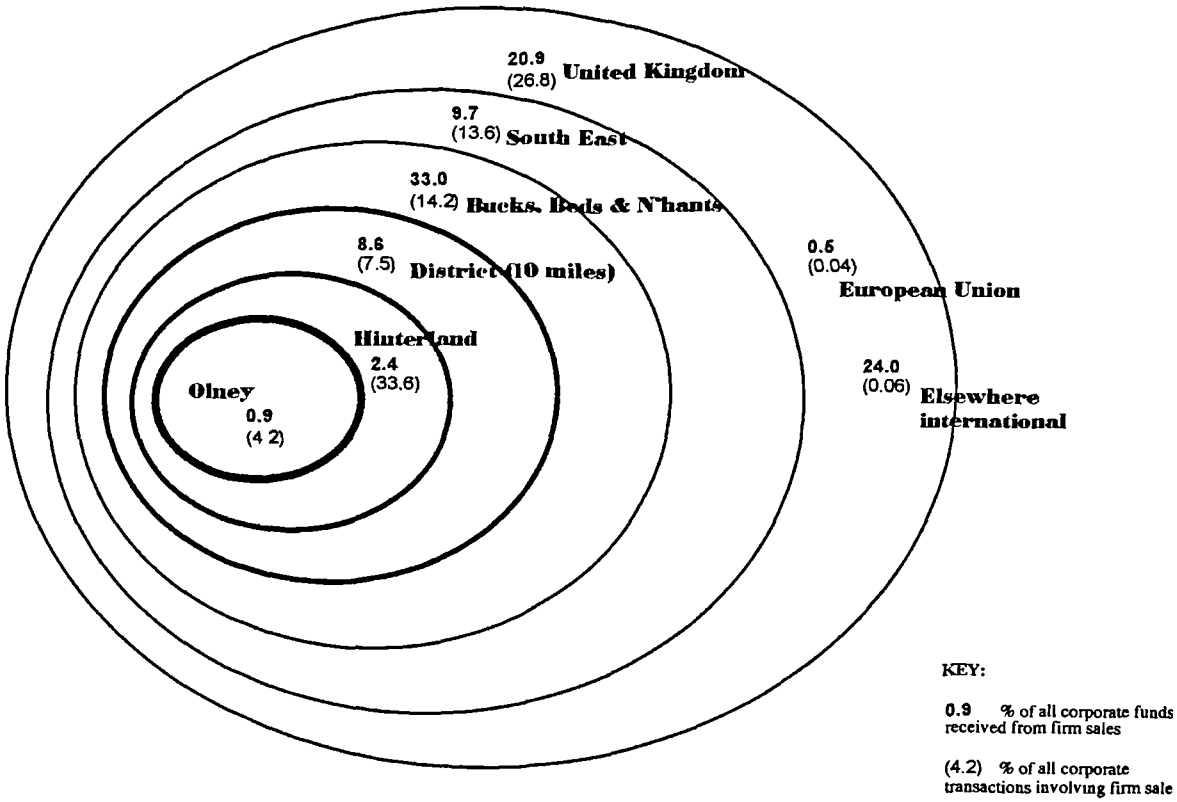


**Figure 6.6A: The 'economic footprint' of Olney hinterland firms:** given by the proportion of output transactions by value and number

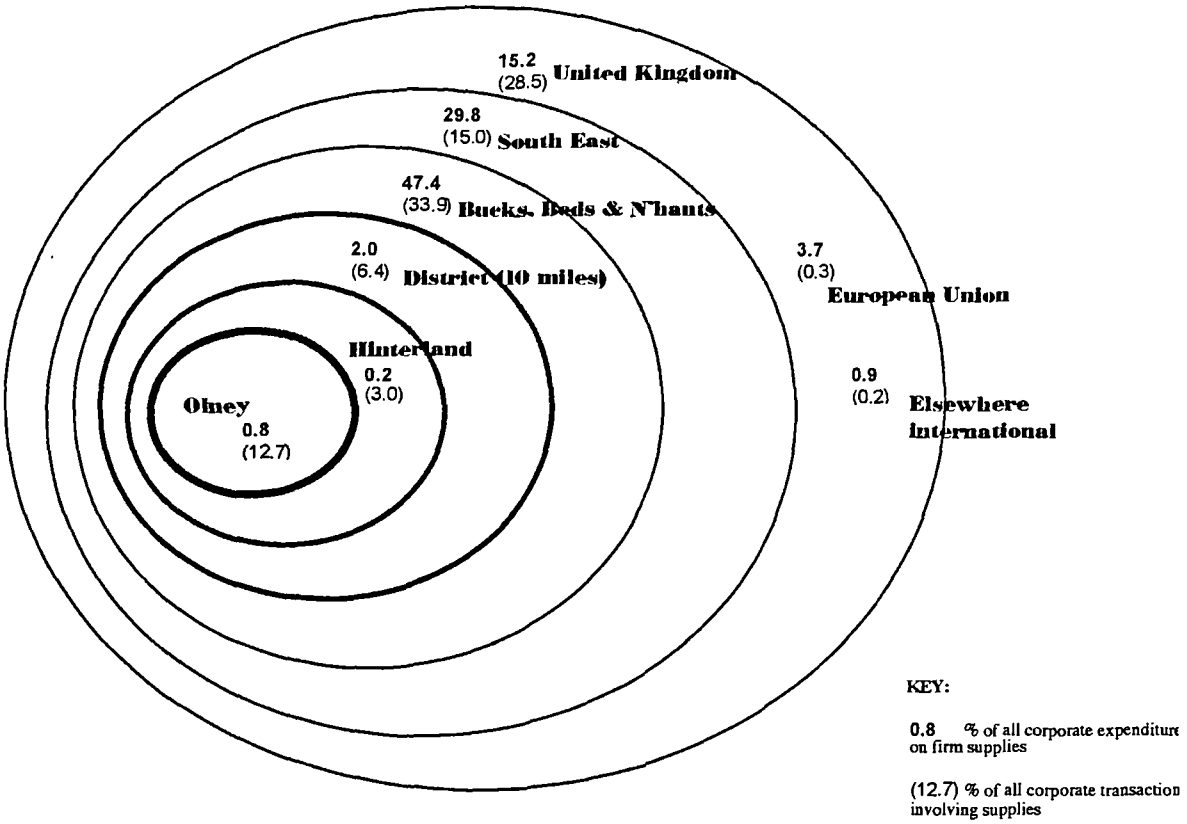


**Figure 6.7A: The 'economic footprint' of Olney town firms:** given by the proportion of input transactions by value and number

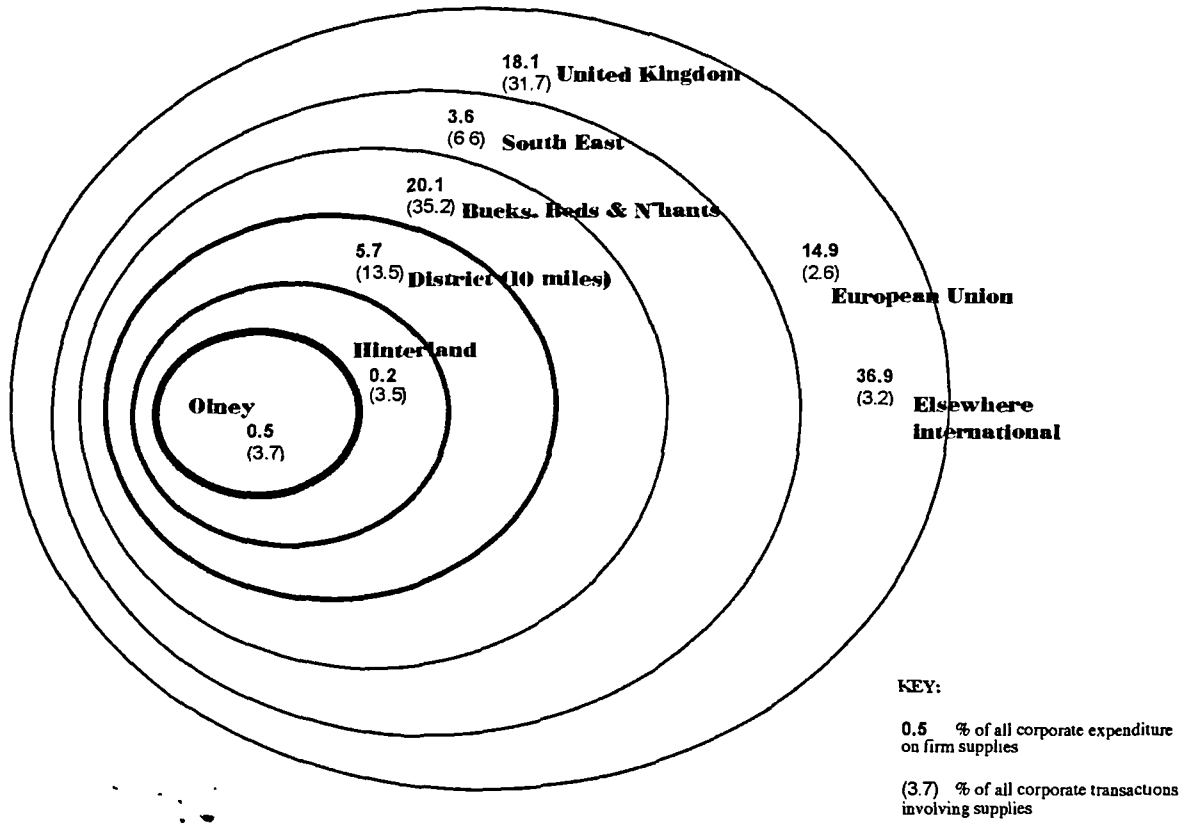


**Figure 6.8A: The 'economic footprint' of Olney hinterland firms:** given by the proportion of input transactions by value and number

## Appendix O

## 'Economic footprints' illustrating spatial patterns of economic activity: Households

| | |
|---|---|
| Figure 7.1A | Kingsbridge town: low order |
| Figure 7.2A | Kingsbridge hinterland: low order |
| Figure 7.3A | Kingsbridge town: high order |
| Figure 7.4A | Kingsbridge hinterland: high order |
| Figure 7.5A | Olney town: low order |
| Figure 7.6A | Olney hinterland: low order |
| Figure 7.7A | Olney town: high order |
| Figure 7.8A | Olney hinterland: high order |

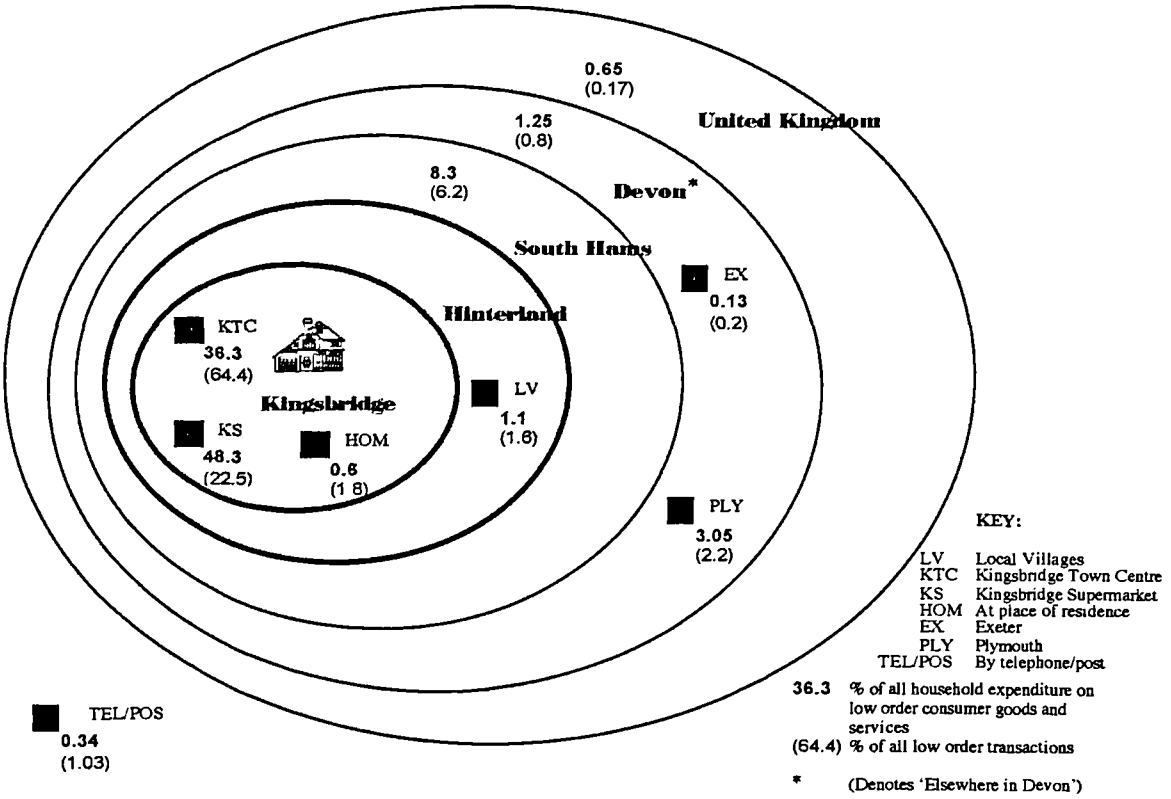


**Figure 7.1A: The 'economic footprint' of Kingsbridge town households:** given by the proportion of low order transactions by value and number

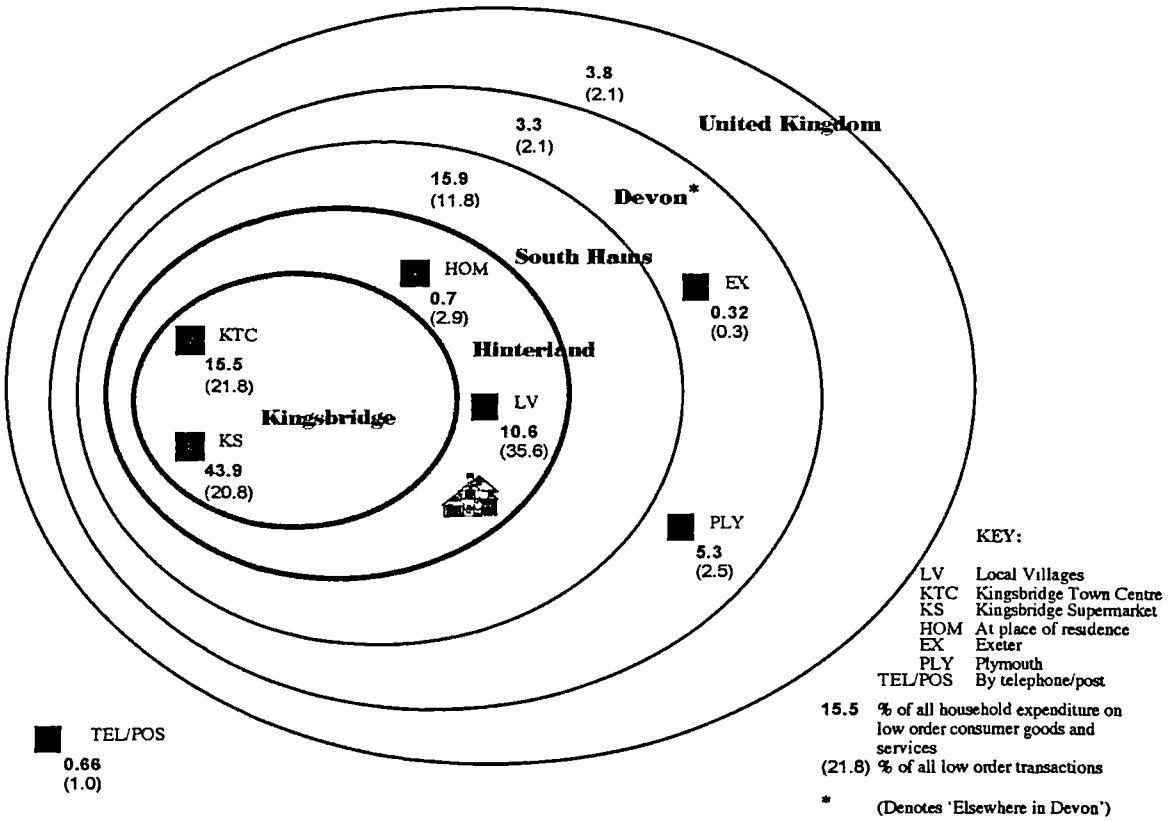


**Figure 7.2A: The 'economic footprint' of Kingsbridge hinterland households:** given by the proportion of low order transactions by value and number

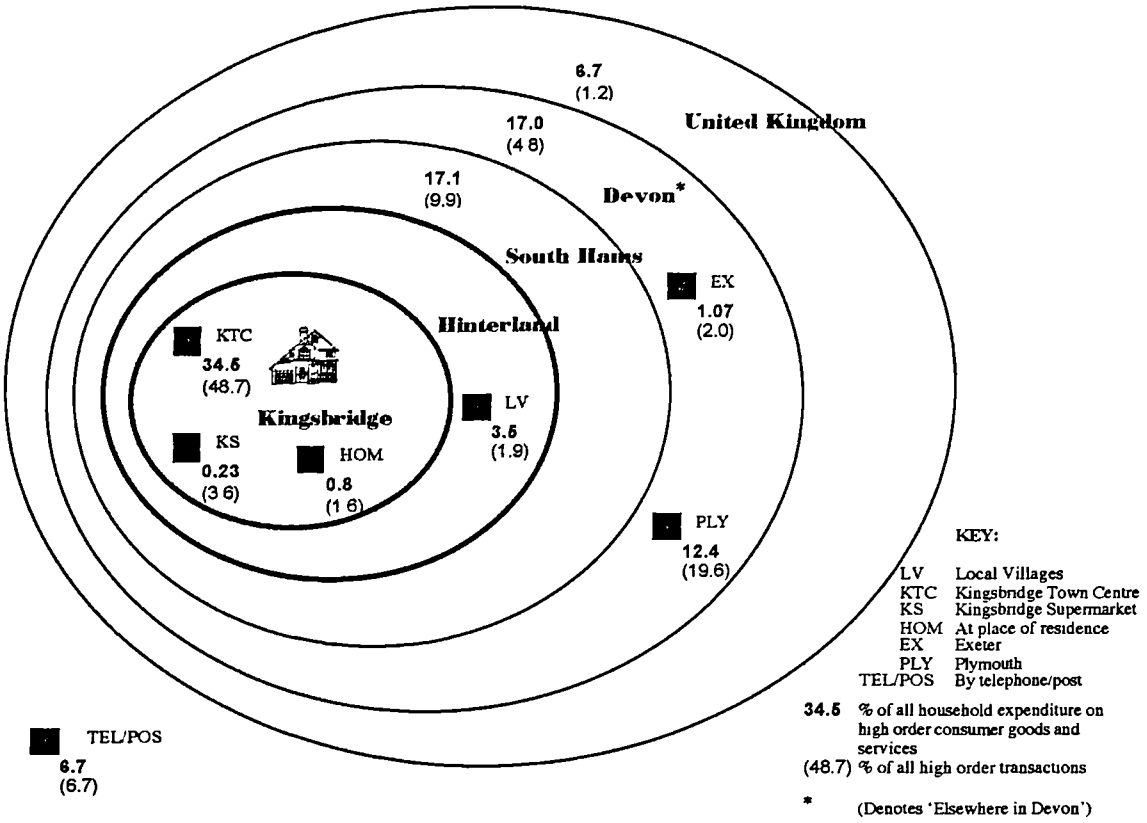


**Figure 7.3A: The 'economic footprint' of Kingsbridge town households:** given by the proportion of high order transactions by value and number

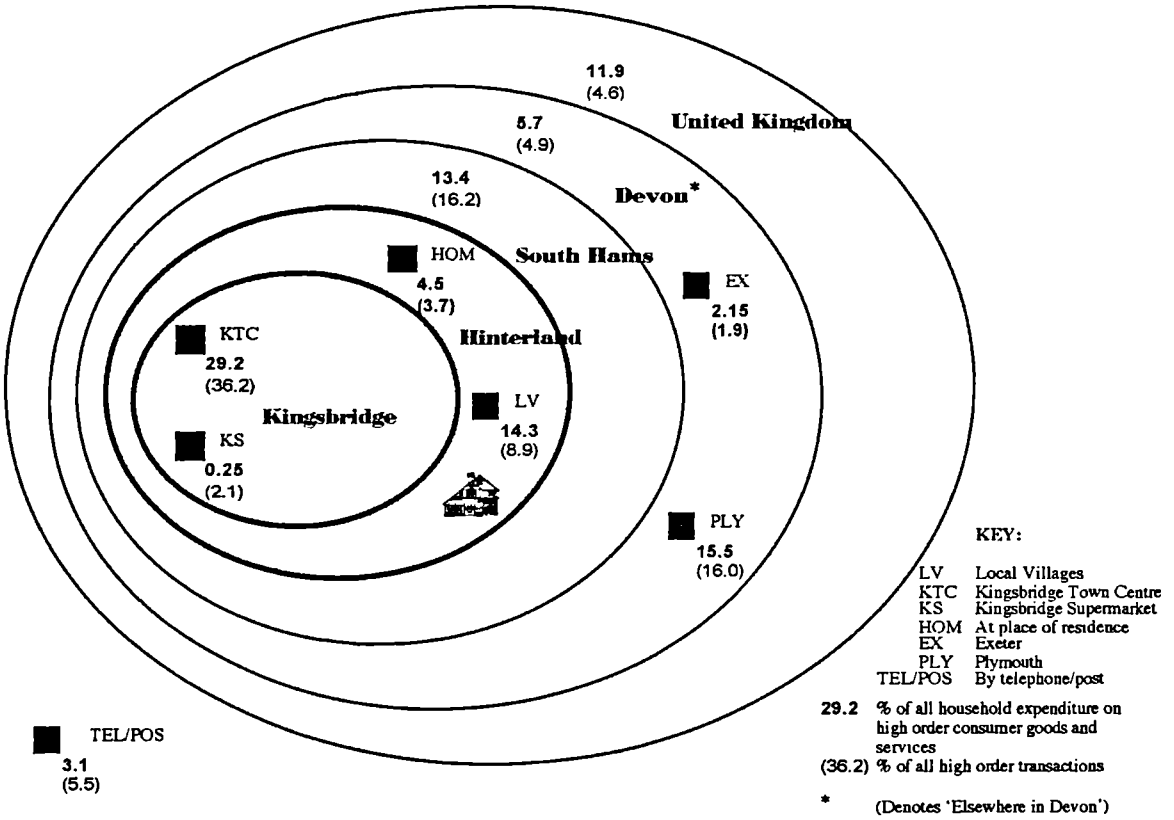


**Figure 7.4A: The 'economic footprint' of Kingsbridge hinterland households:** given by the proportion of high order transactions by value and number

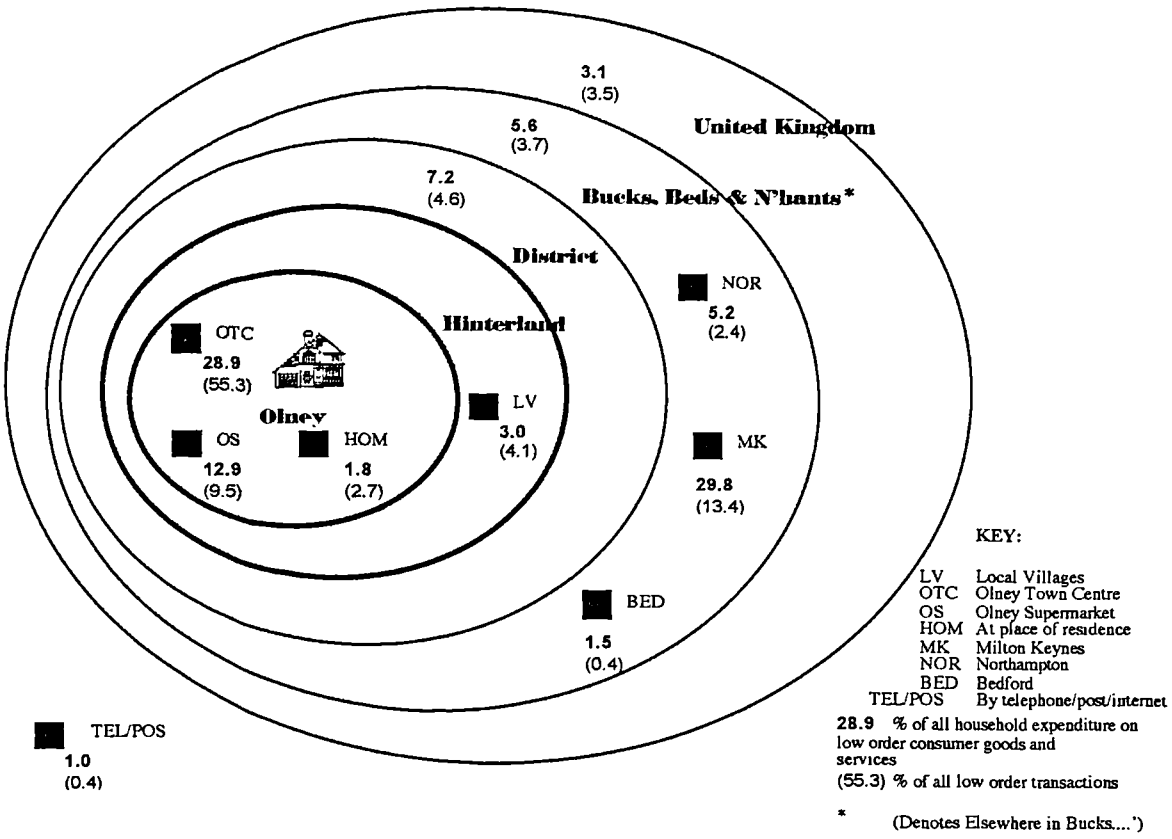


**Figure 7.5A: The 'economic footprint' of Olney town households:** given by the proportion of low order transactions by value and number

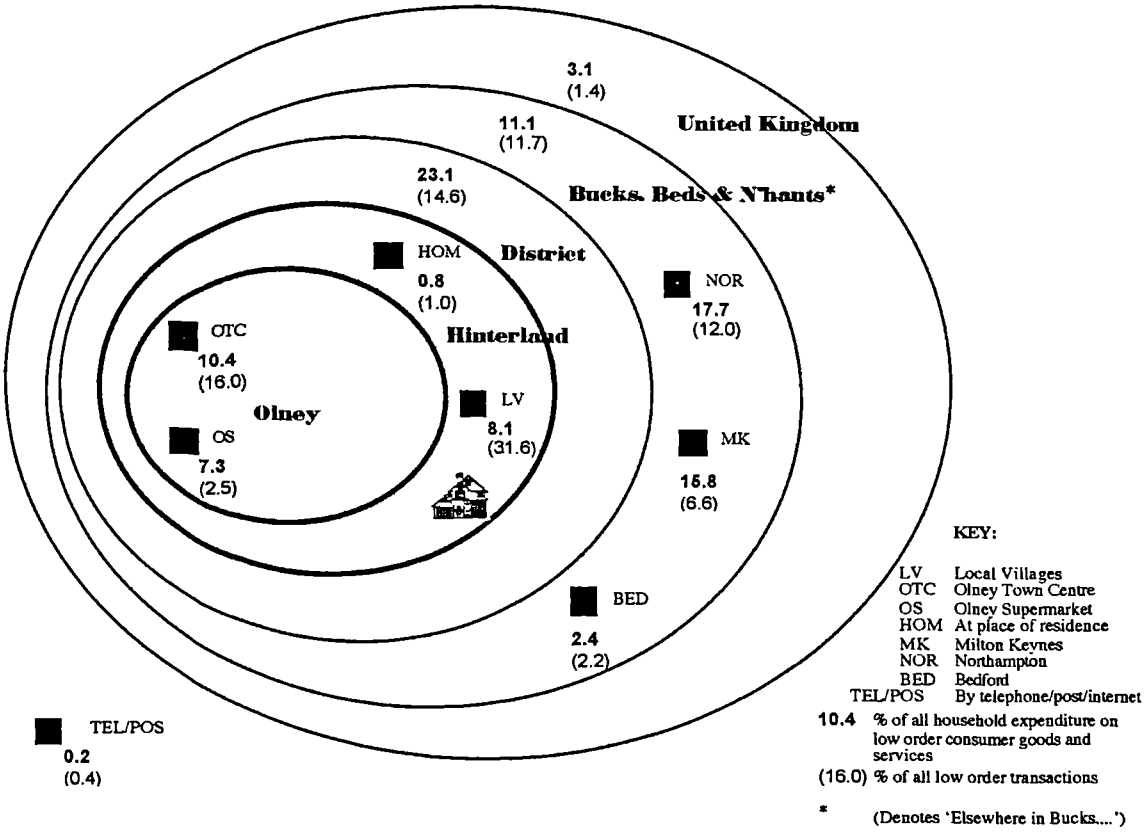


**Figure 7.6A: The 'economic footprint' of Olney hinterland households:** given by the proportion of low order transactions by value and number

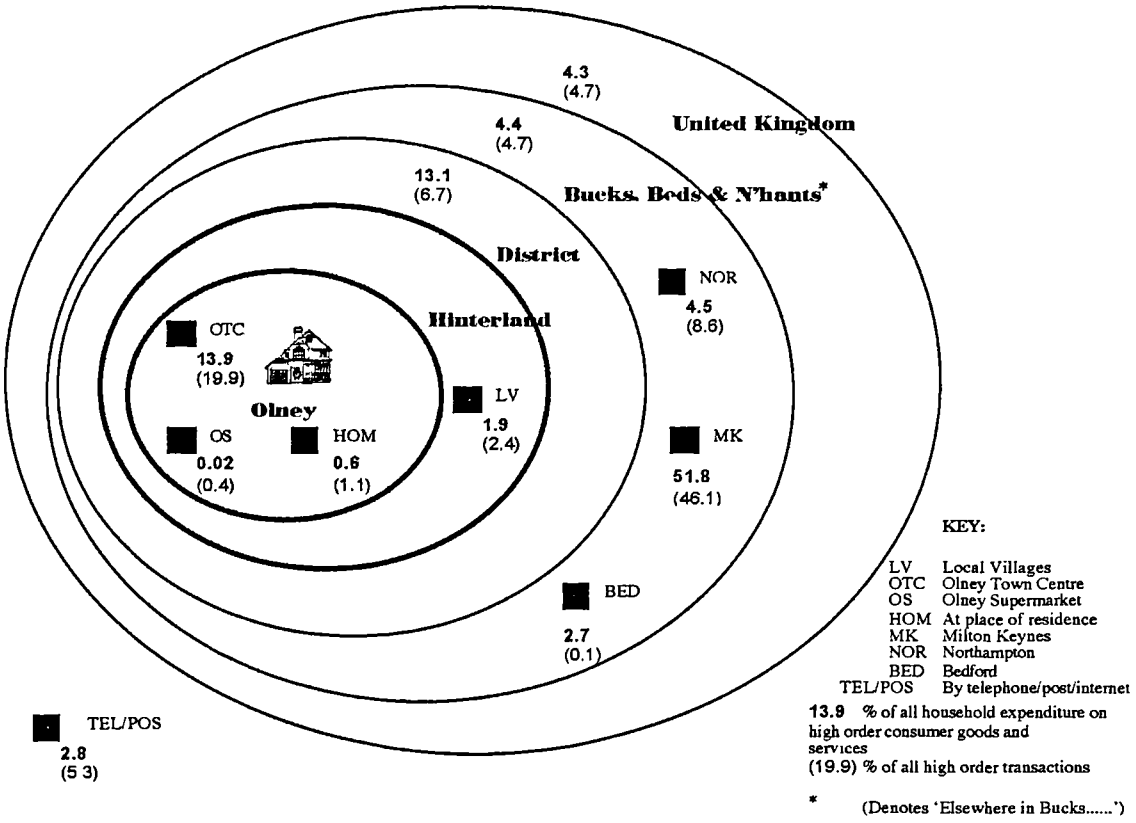


**Figure 7.7A: The 'economic footprint' of Olney town households:** given by the proportion of high order transactions by value and number

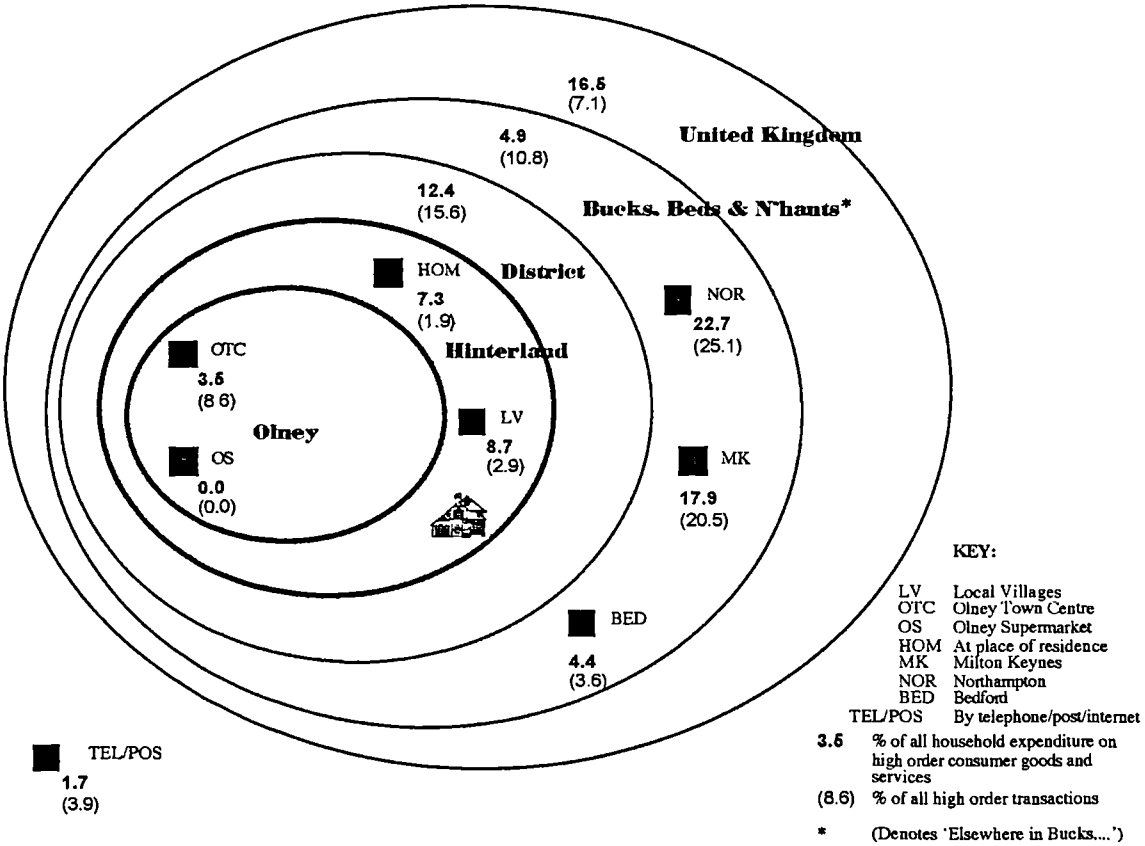


**Figure 7.8A: The 'economic footprint' of Olney hinterland households:** given by the proportion of high order transactions by value and number

## Appendix P

## Derivation of Independent variables for prediction models

*Firms**

$X_1$(FIRM1): 1 = Agricultural firms
0 = All other firms

$X_2$(FIRM2): 1 =Service sector firms
0 = All other firms

$X_3$(FIRM3): 1 = Consumer service firms
0 = All other firms

$X_4$(FIRM4): 1 = Business service firms
0 = All other firms

$X_5$(FIRM5): 1 = Manufacturing firms
0 = All other firms

$X_6$(LOC): 1 = Town firms
0 = Hinterland firms

$X_7$(NEWDEL): 1 = New technology firms
0 = All other firms

$X_8$(SIZE): 1 = Small firms
0 = Large firms

$X_9$(TYPE): 1 = Independent firms
0 = All other firms

$X_{10}$(AGE): 1 = New firms
0 = Mature firms

See Appendix 4A for a more detailed description of each of the categories

*Households**

$X_1$(FAM): 1 = Retired / young families
0 = Other stages

$X_2$(INC): 1 = Lower income groups
0 = Higher income groups

$X_3$(SOC): 1 = Low social groups
0 = Other households

$X_4$(CAR): 1 = Non-car owners
0 = Car owners

$X_5$(COMM): 1 = Commuters
0 = Other households

$X_6$(LOC): 1 = Town households
0 = Hinterland

$X_7$(LIVE): 1 = Indigenous h'holds
0 = Newcomers

*NOTES

Retired households refer to those where all occupants are aged 65 and over. Young families to those with dependent children, the youngest aged seven years or less.

Lower income groups refer to those with a gross annual household income of up to £15,500; higher income groups to those with a gross annual household income of more than £15,500.

Lower social groups refer to those households in groups IV (partly skilled occupations) and V (unskilled occupations). 'Other households' refer to those in social groups I, II and III (N) and III (M): professional, managerial and technical, skilled non-manual and skilled manual occupations. The classification is based on the occupation of the head of household, derived by assessing the most senior position held in the household. 'Other households' also include retired households, for whom it is not possible to derive a social group. The inclusion of such respondents in this group is due to the restrictions on sample size imposed by this variable which, enforces an artificially low $n$ on other predictors, particularly $X_4$, when it is excluded.

Commuters refer to those households where the person who does the majority of the household shopping works outside the study area. 'Other households' refer to those where this person works within the study. It also includes retired households for the reasons noted above.

Indigenous households refer to those where the respondent had lived in the Kingsbridge / Olney area all of their life. Newcomers to those where this person had not.

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