The Contribution of Logistics in Improving the Competitiveness of the Yorkshire and the Humber Economy in the European Marketplace

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ABSTRACT

This research investigates the relationship between the success of a regional economy – particularly that of the Yorkshire and the Humber region - and the adequacy or otherwise of its logistics infrastructure and services, in order to determine how regional competitiveness can be enhanced through the provision of effective logistics services.

The theory of business cluster formation and development has been employed as a linking point between logistics and regional development. The research undertaken for the literature review and in the later stages of the original investigations has led to the identification of a number of knowledge gaps in the assessment of the transport and logistics implications of cluster development for the regional economy.

Data collection encompassed two questionnaire surveys of users and providers of freight transport and logistics services in Yorkshire and the Humber, followed by a series of case studies. These original investigations contributed to the extension of an existing supply chain mapping technique by incorporating a regional or spatial dimension for the first time and the development of a Regional Index of Supply Chain Activity (RISCA).

The information gathered, analysed and evaluated in all stages of this research (the literature review, the surveys and case studies), when considered in its entirety, presents a conceptual framework (which can also be regarded as a decision-support tool) for identifying a best practice approach to achieving improved regional economic competitiveness through logistics. This enables regional governments to develop a much improved understanding of the extent to which supply chains add their maximum possible value to the economies of their regions and to put in place adequate business support measures to ensure that the regional freight and logistics providers are delivering services more closely aligned to the diverse and often specialised needs of users.

I dedicate this dissertation to the memory of my Mum who very bravely battled breast cancer for seven years but very sadly passed away before I can finish it…I so strongly wish she could see it…

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CHAPTER 1 INTRODUCTION

1.1 Introduction to the Research Topic

It is now widely recognised that effective logistics management offers businesses the opportunity to achieve an important competitive edge. Research has demonstrated that many businesses have prospered through the successful application of logistics principles to the management of their supply chains (Christopher, 2005). It is also the case that the trend in modern business is to outsource logistics requirements to specialists (Bamford, 2007). Success through logistics can hinge to a large extent on the existence of competent third party contractors who can provide the full range of logistics services.

In recent years in the UK there has been a greatly increased emphasis on regional self-determination. Each planning region is responsible for the development of its own regional economy. This in turn has placed greater emphasis on supply-side economics (i.e. policies that are designed to increase aggregate supply). In this context, it is vital that regional industry can operate cost effectively and provide excellence to its customers. It is evident that this can only be achieved if the region is endowed with (amongst other things) an adequate transport infrastructure and a sufficient supply of competitive logistics services.

The UK government's regional policy framework attempts to deal with different kinds of problems such as disparities between regions in Gross Domestic Product (GDP) per head, a relative lack of investment, poor skills and educational qualifications, economic under-performance and wastage of resources. The popular perception is that solving problems at regional level will benefit and hence strengthen the entire UK economy.

When reviewing the approach to regional policy, the UK government based its view on two principles (Byers, 2000). The first one pursues ways of promoting economic growth in all regions by improving performance in areas such as enterprise, skills, innovation,

higher education and scientific excellence. The second one defines the role of the UK government as supportive rather than authoritative in a sense that it should enable regional and local initiatives to work. Therefore, it is rather a shared responsibility between the government and local businesses, educational institutions and organisations in each region to develop their strengths and to improve their economic performance.

In the light of current economic policy towards the English regions, the potential role of logistics to create regional prosperity needs to be explored. The Yorkshire & Humber region is characterised by its diversity. It can be divided into four 'sub-regions' (North Yorkshire, West Yorkshire, South Yorkshire and the Humber), each of them of different social status and economic specialisation. For this reason, any well-thought economic strategy should be of benefit to the whole region rather than to separate sub-regions or major cities. For example, investment into the financial services sector will favour the economic development of a city like Leeds whereas investment into logistics could spread the economic prosperity over a sub-region or indeed the whole region.

However, little attention appears to have been paid to this aspect of logistics to date. For instance, regional transport strategies set priorities that aim primarily at passenger or car travel rather than freight transport. Logistics proposals and developments in the Yorkshire and the Humber region remain rather sporadic. This gap in policy making at the regional level affirms the need for greater depth of understanding and clarity of the role of logistics in regional economic development. Moreover, it confirms the need for greater empirical research. This research topic seeks to do this.

1.2 Research Aims and Objectives

The **aim** of this research is to explore the relationship between the success of the regional economy – particularly that of the Yorkshire and the Humber region – and the adequacy, or otherwise, of its logistics infrastructure and services in order to determine how regional competitiveness can be enhanced through the provision of effective logistics services.

The **main objective** of this study is to evaluate the role of logistics in regional economic development. To achieve this, a number of **research questions** have to be addressed:

- Why is logistics important to the Yorkshire and the Humber region?

- How is logistics related to its current and future economic development?

- What are the strengths and weaknesses of logistics service provision in the Yorkshire and the Humber region and how do they hinder or facilitate the movement of goods into and from the region?

- What is the potential for improving the already established logistics network in the region?

- Is it worth investing in logistics as a way of spreading economic prosperity over the whole Yorkshire and the Humber region?

- How could logistics contribute to developing workforce skills and competencies?

- How can logistics be turned into a profitable opportunity for the Yorkshire and the Humber region?

To answer these questions, the following **research processes** have been pursued:

(1) To review how regional development policies are formulated and to investigate the economic and trade profile of the Yorkshire and the Humber region

(2) To identify freight transport and logistics initiatives in the Yorkshire and the Humber region

(3) To evaluate the formation and development of business clusters as a policy tool to improve the competitiveness of regional economies

(4) To evaluate the state and role of cluster development for the economy of the Yorkshire and the Humber region

(5) To review existing supply chain management strategies and the family of supply chain mapping tools intended to make businesses more competitive

(6) To identify how any gaps in the knowledge of supply chain management strategies and supply chain mapping tools could be addressed at the regional level so that supply chains add their maximum value to regional economies

(7) To conduct comprehensive surveys of the requirements and provision of freight transport and logistics services in Yorkshire and the Humber

(8) To conduct a supply chain investigation of companies in Yorkshire and the Humber to investigate the extent to which supply chain operations are carried out in the region and their usage of regional operators and facilities

(9) To apply the outcomes of research processes 5-6 to selected case study companies

(10) To evaluate the outcomes of the research processes 1-9 for the purpose of developing a conceptual framework.

1.3 Research Methodology

A number of techniques and approaches to research methodology have been reviewed. When making decisions on which research methods to employ, it was recognised that the selected research methods should be sufficiently rigorous to achieve the desired contribution to knowledge but at the same time it was recognised that they need to be

realistic and achievable within the constraints of the research project. The following research methods have been employed:

- An extensive ***literature review***

The literature sources that have been identified are grouped to address the following research areas:

  - Literature sources that study the profile of the Yorkshire and the Humber region, explore the state of the regional economy and evaluate the key logistics proposals and developments in the Yorkshire and the Humber region.
  - Literature sources on business clusters that also address the Yorkshire Forward approach to enhancing regional competitiveness.
  - Literature sources that refer to the research work undertaken for the purposes of developing a conceptual framework and that focus primarily on the review of supply chain mapping techniques.

- Comprehensive ***questionnaire surveys*** to establish the strengths and weaknesses of freight transport and logistics service provision in Yorkshire and the Humber, evaluating their potential to promote the competitive advantages of the region.

Two questionnaires were designed to determine the present state of freight transport and logistics services in Yorkshire and the Humber. The aim of these questionnaires was to identify the needs of **users** of freight transport and logistics services in the region, and to determine how successfully the **providers** of such services are meeting those needs. The surveys laid particular emphasis on determining any shortfalls in service provision, so that strategies to address such shortfalls might be determined and appropriate recommendations put in place.

- A series of ***case studies***

The case studies evolved from the questionnaire surveys and aim to:

- Enhance the knowledge of the freight transport and logistics requirements of companies within the Yorkshire Forward priority clusters and across the Yorkshire and the Humber sub-regions by following up and building on the results of the survey of users and providers of freight transport and logistics services in Yorkshire and the Humber.

- To extend a supply chain mapping technique to incorporate a regional or spatial dimension for the first time. An extension of the Scott and Westbrook 'pipeline mapping' tool by adding a geographical dimension that identifies the location of supply chain activities has been demonstrated by a set of case study examples. Each of the case studies was developed to investigate the extent to which supply chain operations were carried out in the region and the consequent usage of regional operators and facilities.

- To develop a Regional Index of Supply Chain Activity (RISCA). This index is based on the proportion of total supply chain costs incurred in carrying out operations within the Yorkshire and the Humber region and suggests which logistics requirements of companies might offer the most potential to regional service providers.

This case study investigation strongly contributes to achieving the overall aims and objectives of the research project and is one of the elements of the methodological triangulation (together with the literature review and questionnaire surveys) employed in this research.

- Based on the information gathered, analysed and evaluated in the above stages of the research (the literature review, the surveys and case studies), a ***conceptual framework*** will be developed based on extension of the currently available mapping techniques

to include the extent to which supply chains make effective use of logistics services available in the region and so add maximum value to regional economies.

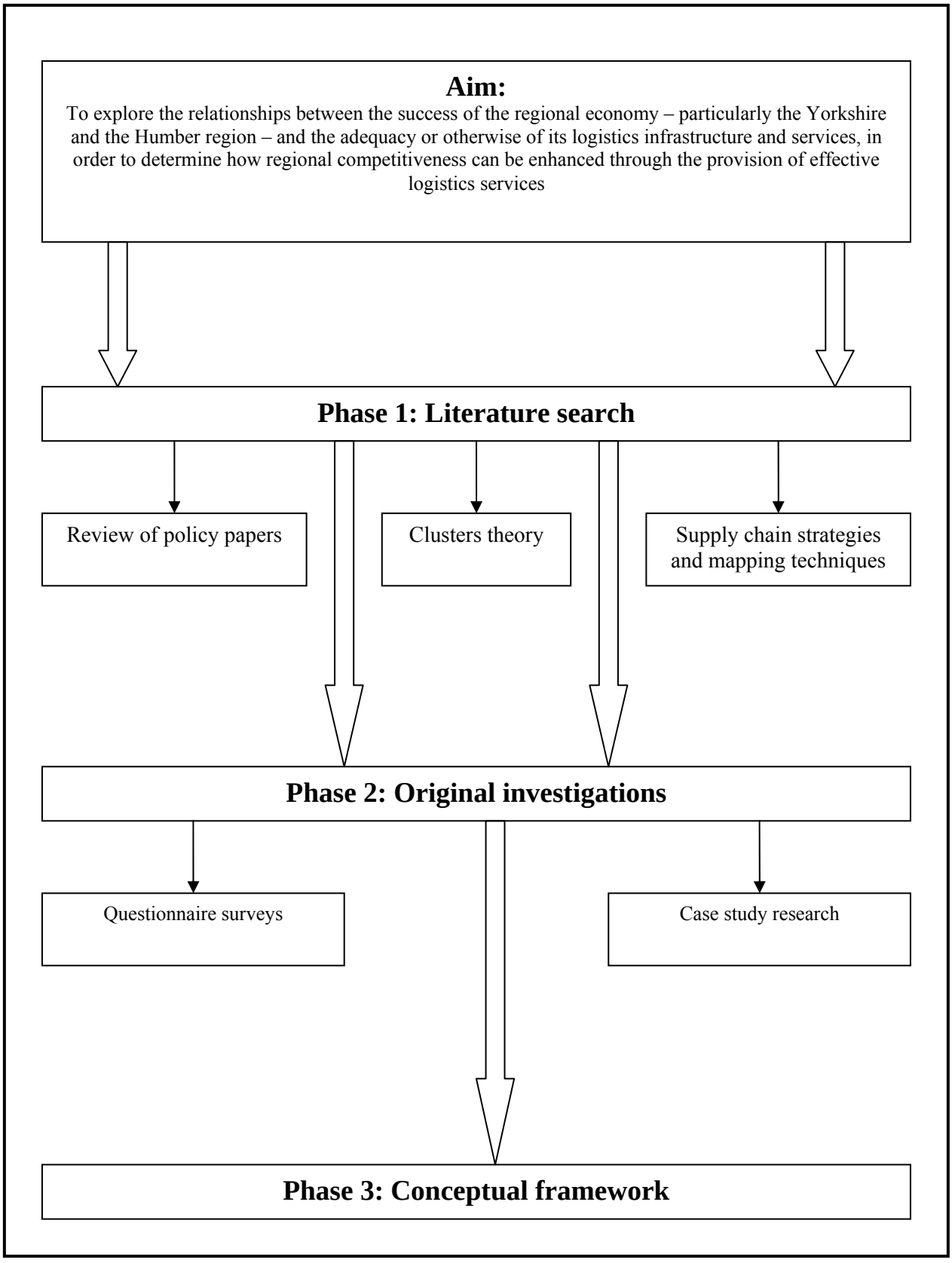


Figure 1.1: Sequence of the research methods employed in this research

1.4 Structure of the dissertation

This dissertation comprises of the following chapters:

Chapter 1: Introduces the research topic, defines the research aim and objectives, outlines the research processes which were pursued to answer the research questions and the methodological tools employed in this research. This chapter also elaborates on the relationships between the research processes, research methods and the structure of the dissertation.

Chapter 2: Develops the research context by investigating the profile of the Yorkshire and the Humber region, the state of its economy and the trade flows from and into the region. Various papers which formulate regional development policies in Yorkshire and the Humber (and more generally) have also been reviewed. This chapter also provides an overview of the major transport and logistics initiatives in Yorkshire and the Humber.

Chapter 3: Evaluates the formation and development of business clusters as a policy tool to improve the competitiveness of regional economies. This chapter also examines the state and role of cluster development for the economy of the Yorkshire and the Humber region and investigates to what extent cluster development in the region is reflected in and supported by its Regional Economic Strategy. Findings from other international and UK studies of cluster development in a regional context are also presented.

Chapter 4: Defines logistics and supply chain management and reviews the existing supply chain management strategies and the family of supply chain mapping techniques that make businesses more competitive. Special attention is paid to identifying any gaps in this knowledge at the regional level and ways of addressing them so that supply chains add their maximum value to regional economies. On this basis, an extension of the Scott and Westbrook supply chain mapping technique and the development of a Regional Index of Supply Chain Activity (RISCA) are proposed in this chapter.

Chapter 5: Deals with survey design and methodology, questionnaire objectives and practical aspects of data collection.

Chapter 6: Survey results are analysed. An analysis of the differing perceptions of users and providers is made and discussed in this chapter.

Chapter 7: Discusses the objectives and methodology of the supply chain mapping exercise, including the limitations and difficulties of the data collection process. The extended Scott and Westbrook supply chain mapping technique and the RISCA measure are applied to selected case study companies.

Chapter 8: The overall conclusions, limitations and recommendations for further research are presented in this chapter.

1.5 The relationship between the research processes, research methods and the structure of the thesis

The table below shows how the research processes, developed to answer the research questions, relate to the scientific methods employed in this research and the structure of the dissertation.

Table 1.1: Research Processes and the Structure of the Dissertation

Number	Research Process	Scientific Method	Chapter(s)
1	To review how regional development policies are formulated and to investigate the economic and trade profile of the Yorkshire and the Humber region	Literature review	2
2	To identify freight transport and logistics initiatives in the Yorkshire and the Humber region	Literature review	2
3	To evaluate the formation and development of business clusters as a policy tool to improve the competitiveness of regional economies	Literature review	3
4	To evaluate the state and role of cluster development for the economy of the Yorkshire and the Humber region	Literature review	3
5	To review the existing supply chain management strategies and the family of supply chain mapping techniques intended to make businesses more competitive	Literature review	4
6	To identify how any gaps in this knowledge could be addressed at the regional level so that supply chains add their maximum value to regional economies	Literature review	4
7	To conduct a comprehensive survey of the requirements for and the provision of freight transport and logistics services in Yorkshire and the Humber	Questionnaire survey	5, 6
8	To conduct a supply chain investigation of companies in Yorkshire and the Humber to investigate the extent to which supply chain operations are carried out in the region and the usage of regional operators and facilities	Case study research	7
9	To apply the outcomes of research processes 5-6 to selected case study companies	Case study research	7
10	To evaluate the outcomes of research processes 1-9	Development of a conceptual framework	2 - 8

1.6 Summary

Chapter one has provided a brief introduction to the research topic and has identified the main aim and objective to be addressed in the dissertation. The research processes undertaken in pursuit of answering the research questions have been outlined. The

methodology employed in this research has been discussed. Finally, the relationships between the research processes, research methods and the structure of the dissertation have been explained.

CHAPTER 2 RESEARCH CONTEXT

2.1 Introduction

Chapter one provided a brief introduction to the research topic, identified the main aim and objective to be addressed in this dissertation, outlined the research processes undertaken in pursuit of answering the research questions and discussed the methodology employed in this research.

This chapter will review sources of information that formulate regional development policies. It will also investigate the economic and trade profile and will discuss the key logistics proposals and developments in the Yorkshire and the Humber region.

2.2 The emerging of the "new regionalism" in Europe

Tomaney and Ward have thoroughly researched a process in European politics and economics that they refer to as the "new regionalism" in which they acknowledge the re-emergence of the region as a unit of analysis (Tomaney and Ward, 2000). Several reasons are given to explain this phenomenon. The main one is linked to the declining capacities of the nation-state as a result of the processes of globalization. In the political context, democratic deficit (a situation in which political structures, organisations, or decision-making processes lack democratic legitimacy) occurs and a gap in the system of political representation and decision making is created. This gap, according to the authors, can only be filled by regional democracy. Hence, regions are exposed to new challenges and face new problems.

The move to regional governance in Europe is driven by various factors, primarily of a political nature, which have led to "the existence of an elected regional tier of government as a feature of every large Member State of the European Union" (op. cit., 2000). This observation refers to countries such as Germany, Austria, Italy, Belgium, Spain and France. The need for economic restructuring has further facilitated the process

of decentralisation of administrative and political power (Keating, 1998). Hausner (1995) links the move to regional government to the need to create intermediate level structures in the economy to adapt to the conditions of domestic and international competition.

Unlike continental Europe, the evolution of regionalism in England is driven by economic rather than political factors. Tomaney and Ward (2000) focus on the economic inequalities between the English regions. The South East of England is regarded as a region, in which "social structure is biased toward higher income and professional groups". On the contrary, the North East is characterized by "a relative dependence on manufacturing (which is largely externally controlled) and under-developed business service and hi-tech sectors", "low levels of research and development and a poor record of new firm formation". Politics remains heavily focused on Westminster and is reluctant to grant power to the English regions and there still is a demand for regional autonomy (Tomaney and Ward, 2000).

Burch and Gomez support the above-mentioned idea by claiming that "English regionalism can be seen, in comparison to the situation in other large EU states, as being at an early stage of development" (Burch and Gomez, 2002). They point out various differences between the conception of regionalism in the UK and the other EU countries. In the case of the other EU countries, regional bodies are seen as players at regional and local level to establish the strategic framework for funding programmes and to assist in their implementation. The principle of subsidiarity and the idea of a Europe of regions are also important drivers for the development of regions throughout the EU. Overall, this process is driven more by political than by economic reasoning. In the case of England, more economic reasons apply, which are closely linked to the need for the regeneration of regional economies.

The authors go on to describe the movement to English regionalism as:

- Primarily driven by economic rather than political factors and largely concerned with the regeneration of the regional economies.

- Driven from within the region, in a sense that it was generated from within each region, and not imposed from outside.
- Much more strongly orientated towards Europe than London. The reasons behind this could be found in the economic reality, namely that regions are involved in trading not only between each other but rather with other EU countries and worldwide.
- "Based on the idea of partnership between public and private sectors and regional business interests"
- "Elite led and generated and, with the exception of the North East, has not engaged any substantial and coherent popular expression"
- A "pragmatic and practical movement" (op.cit., 2002).

Government policy in the early 21st century towards regional development builds on the importance of an active regional economic policy and the need to achieve sustainable, long-term economic growth and stability throughout the UK regions (Byers, 2000).

The new policy framework is set to address different kinds of problems such as:

- Disparities between regions;
- Low Gross Domestic Product per head;
- Lack of investment;
- Poor skills and educational qualifications;
- Economic under-performance and wastage of resources.

The perception is that solving problems at regional level will benefit the entire UK economy: "A strong economy of the United Kingdom is the sum of its parts. In order to enjoy increasing prosperity in our country we need strong economic growth in all our regions." (op.cit., 2000)

The new regional policy is based on two principles (op.cit., 2000). The first traces out the ways of achieving economic growth in all regions by looking into the regional dimensions of issues such as enterprise, skills, innovation, higher education and scientific excellence. The second one defines the role of Government as supportive rather than

authoritative in a sense that it should enable regional and local initiatives to work. Rather, it is a shared responsibility between the government and local businesses, educational institutions and organisations in each region to develop their strengths and improve their economic performance.

The movement to regionalism has evoked the formation of new regional organisations or channelled the work of existing organisations into more regionally orientated activities. The process began with the formation of nine Integrated Regional Offices in 1994 that later were called Government Offices in the Regions. The Labour Party's return to power in 1997 deepened the process and other regional organisations, such as the Regional Development Agencies, were subsequently formed.

Regional structures have been established in the Yorkshire and the Humber region as part of this process. According to data provided by the Regional Assembly for Yorkshire and the Humber, there are four key regional bodies in the Yorkshire and the Humber region. These are described as "partners in a high level framework called "Advancing Together" which promotes a common vision for the region and common high level objectives" (RAYH, 2000). The network of organisations includes the Regional Assembly for Yorkshire and Humberside (RAYH), the Regional Chamber for Yorkshire and Humberside (RCYH), the Government Office for Yorkshire and the Humber and Yorkshire Forward (the Regional Development Agency for Yorkshire and the Humber).

The Regional Assembly for Yorkshire and Humberside (RAYH) represents the Yorkshire and the Humber local authorities regionally, nationally and at European level (through a European office in Brussels) and is working towards influencing economic, social and environmental policy development in the interests of the Yorkshire and the Humber region.

The Regional Chamber for Yorkshire and Humberside (RCYH) is described by the RAYH as a "strategic partnership of key regional bodies enabling participation and consultation in regional decision-making in which the Regional Assembly is a leading

partner" (RAYH, 2000). It is tackling problems concerning the economy, infrastructure, training and education, sustainable development and quality of life.

The Government Office for Yorkshire and the Humber represents the central government in the region. It "manages programmes on behalf of parent Government Departments, supports and facilitates effective linkages between partners and programmes and informs the development of central government policies from a regional perspective" (RAYH, 2000).

Yorkshire Forward is funded by the Government and its members were initially appointed by the Secretary of State for the Environment, Transport and the Regions. The Agency includes eight business and community representatives and four local authority representatives from each of the sub-regions (RAYH, 2000). The Regional Development Agency has wide-ranging responsibilities, including economic development, social and physical regeneration, social inclusion, business efficiency, investment and competitiveness, employment, skills development and it also works towards furthering the sustainability of the region (RAYH, 2000).

Beyond the scope of the national level, English regions are also involved in brisk relationships with the European Union institutions. Burch and Gomez (2002) see a clear difference in the policy involvement of the English regions on European issues prior to 1997 and after 1997. They claim that prior to 1997 the activities in the regions followed the developments in EU structural funds mainly in line with Objectives 1, 2 and 5 funding. Bidding for the money from the Structural Funds was seen as an early attempt for regional bodies to influence decision making and as an involvement in European policy making. However, the power of the central government at that time remained very strong and limited the power of regions.

Burch and Gomez (2002) also claim that in the early process of interaction with the European institutions new partnership arrangements (between the public and the private sector) emerged in the English regions. This process also brought the "development of

regionally based representative and lobbying organisations and the emergence of the non-state elements", which are seen as "nascent political systems at regional level" (Burch and Gomez, 2002).

The process of bidding for money from the European Regional Development Fund stimulated sub-national lobbying in the EU. This process was deepened by the exchange of information between the EU and the English regions on the occasion of the formulation and implementation of the regional economic strategies. In order to address the need for inward investments and to enable visibility of their activities, some regions (including Yorkshire and the Humber) opened offices in Brussels.

The policy involvement of the English regions on European issues after 1997 was marked by the establishment of some important political structures. The first one was the creation of the Regional Development Agencies in 1999. These structures were established to address the needs of each region and to design strategies for regional economic development. The Regional Development Agencies' involvement in European policy is linked primarily to European structural funds management. Burch and Gomez refer to the experience of the North West Regional Development Agency as "involvement in the strategic aspects of the Structural Funds programmes, viewing it as a facilitator of economic development policy coordination between the central and regional tiers" (Burch and Gomez, 2002).

The Regional Assemblies continued to develop the European dimension and focused on several issues defined by Burch and Gomez as "the wider importance to the region of engagement with Europe, the activism of individual Assemblies, their relationships with other regional players, and the political composition of the region". European activities have centred on issues such as raising the European profile of the region, attracting inward investments, the reform of the Common Agricultural Policy or stimulating public awareness of the EU (Burch and Gomez, 2002).

As a further step, Government Offices for the Regions became more involved in the process of structural funds allocation and as a linkage between central government and regional bodies.

Burch and Gomez (2002) also claim that the process of EU enlargement shifted the focus of orientation to Europe from primarily 'EU structural funds' issues to long term opportunities relating to Europe. Thus, representation in Brussels has changed. At present, "Searching for new funding, lobbying on behalf of businesses and local authorities in the EU institutions and participating in debates about European strategy in the regions are all important functions of Brussels representatives" (op. cit., 2002).

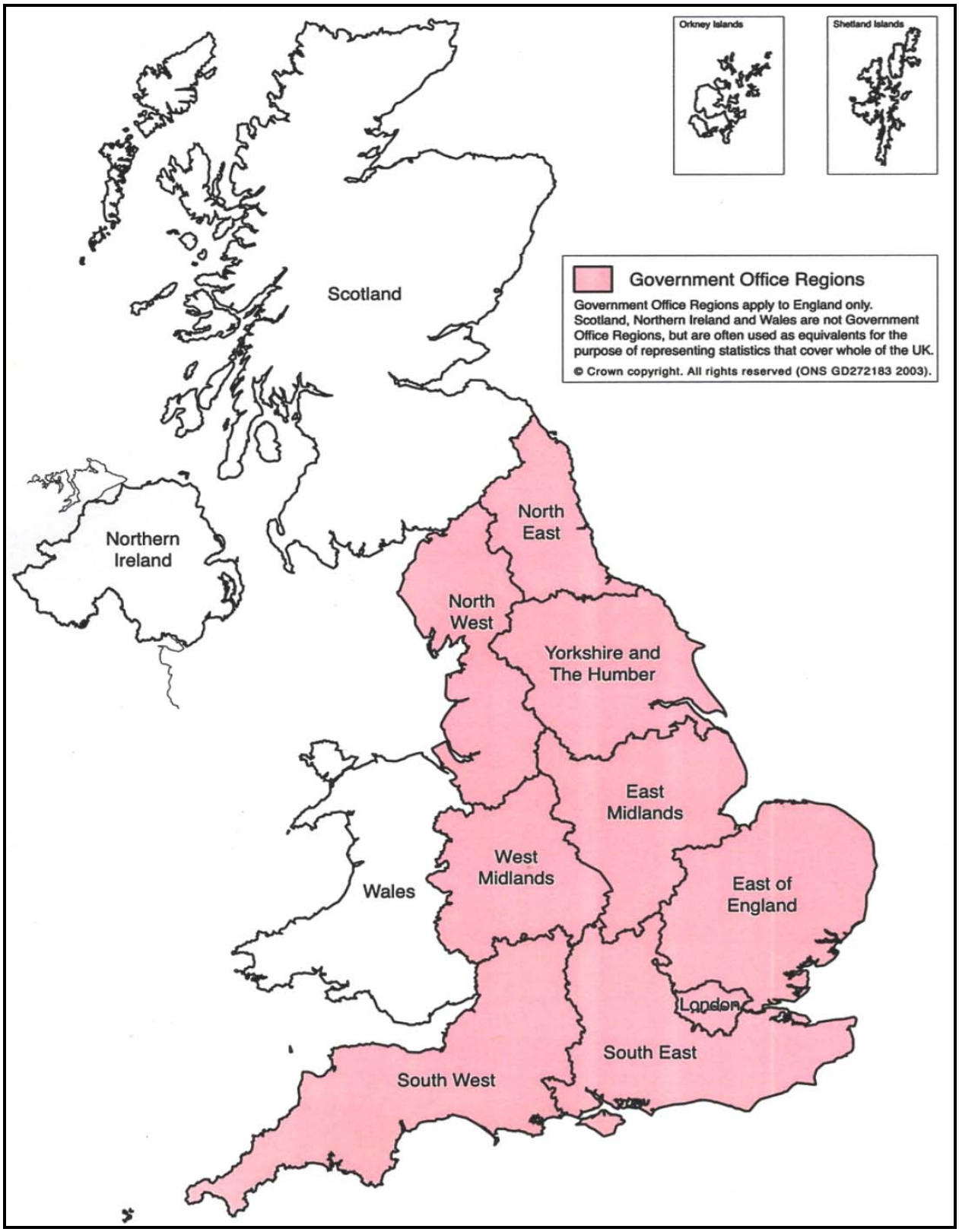


Figure 2.1: United Kingdom Government Office Regions

Source: www.statistics.gov.uk

2.3 The state of the Yorkshire and the Humber region

2.3.1 Profile of the Yorkshire and the Humber region

The Yorkshire and the Humber region is one of the nine English planning regions. It occupies a territory on the east side of the country. According to 2001 Census data, the population of the Yorkshire and the Humber region is 4,964,838, which is approximately 8% of the UK total and 10% of the English total. The age profile of the region is very similar to the UK average with 19% of the population aged 14 years old or younger, some 60% between 15 - 59 years of age, and 21% aged 60 - 90 and over years of age.

However, the economic characteristics of the region are to a great extent shaped by its diverse nature and the key economic indicators reflect regional diversity. This is clearly outlined in a report by Munn et al. (1998) which compared GDP per head figures on a sub-regional basis from 1981 to 1996. The report claims that "from a relatively even position right across the region of around 90% of the UK average, North Yorkshire, West Yorkshire and the Humber sub-region have all performed slightly better than the rest of Britain, improving their percentage of the national average". Further in the same report it is stated that "by contrast the South Yorkshire percentage has fallen very sharply from over 91% of the national average to about 75%". The shrinkage of the South Yorkshire economy is attributed primarily to the "run down in the coal industry" and "a decline in heavy engineering and restructuring of the steel industry" (op.cit., 1998). These economic disparities across the region are further deepened by the prosperity of the economy of major cities like Leeds, which has grown strongly in recent years. In contrast, large areas of relative deprivation remain.

As has already been mentioned, the Yorkshire and the Humber region is characterised by its diversity. It can be divided into four sub-regions (North Yorkshire, West Yorkshire, South Yorkshire and Humberside), each of them of different social status and economic specialization.

North Yorkshire is primarily a rural area focused on the historical city of York. The population of this sub-region is 569,660, some 11.47% of Yorkshire and the Humber total (National Statistics Census data, 2001). According to 2001 Census data, the population density in this sub-region is 71 persons per sq. km., which is well below the UK figure of 243 persons per sq. km. and the Yorkshire and the Humber density of 322 persons per sq. km.

West Yorkshire is an industrial and commercial area centred on the city of Leeds and includes the cities of Bradford and Wakefield and the towns of Dewsbury, Halifax and Huddersfield. The population of this Yorkshire and the Humber sub-region was 2,079,217, 42% of Yorkshire and the Humber total (National Statistics Census data, 2001). The population density in this sub-region is 1,025 persons per sq. km., which is the highest of the four Yorkshire and the Humber sub-regions being well above the Yorkshire and the Humber figure of 322 persons per sq. km.

South Yorkshire, an area for many years associated with the steel and coal industries, is centred on the city of Sheffield and includes the urban centres of Rotherham, Barnsley and Doncaster. The population of this sub-region is 1,266,337, some 26% of Yorkshire and the Humber total (National Statistics Census data, 2001). According to 2001 Census data, the population density in this sub-region is 816 persons per sq. km., which is well above the UK figure of 243 persons per sq. km. and above the Yorkshire and the Humber one of 322 persons per sq. km.

The Humber sub-region is a mainly agricultural area around the trade and fishing ports of the Humber estuary and includes the urban areas of Hull, Scunthorpe and Grimsby. The population of this Yorkshire and the Humber sub-region is 1,049,570, some 21% of Yorkshire and the Humber total (National Statistics Census data, 2001). This sub-region includes the East Riding of Yorkshire, North Lincolnshire and North East Lincolnshire counties as well as the Hull city unitary authority.

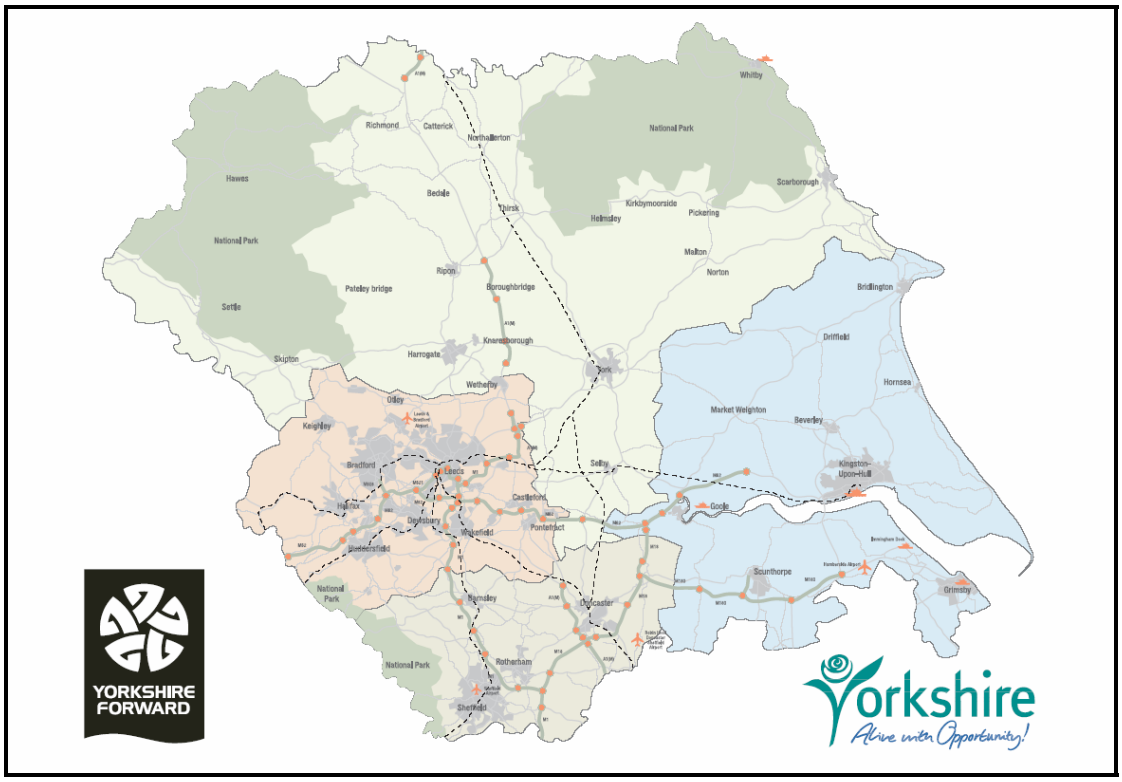


Figure 2.2: The Yorkshire and the Humber Region

Source: Yorkshire Forward

2.3.2 Key economic indicators

Statistics clearly point out a serious and persistent under-performance of the region's economy (see Table 2.1). Data in Table 2.1 based on the Department of Trade and Industry (DTI) Regional Competitiveness Indicators show that there is considerable scope for improving the competitive performance of the Yorkshire and the Humber economy.

Table 2.1: DTI Regional Competitiveness Indicators as of July 2006

Indicator	Year	Y&H	UK	Y&H rank out of the nine English regions
Overall Competitiveness				
Gross Value Added (GVA) per head (Workplace basis) UK = 100	2004	88.8	100.00	7
GVA per head (£) (Workplace basis)	2004	14,928	16,802	8
Manufacturing investment by foreign-owned companies (£ million) Average (1998-2003)	1998 - 2003	385 (7.7% of UK)	5,003	6
Manufacturing investment by UK-owned companies (£ million) Average (1998-2003)	1998 - 2003	1,127 (10.1% of UK)	11,179	3
Manufacturing output (GVA from foreign-owned companies) (£ million)	2003	4,021 (9.2% of UK)	43,833	3
Manufacturing output (GVA from UK-owned companies) (£ million)	2003	9,257 (9.3% of UK)	99,328	7
Labour Market				
Median Full-Time Hourly Earnings of all (M+F) Employees (£ per hour)	2005	9.92	10.79	8
Unemployment rate (%)	2005	5.00	4.88	7
Capital				
VAT registrations (per head of adult population)	2004	84.2	100	8
Business survival rates (% surviving three years or more after registering)	1999	66.1	66.5	6
Company R&D spend (% of GVA)	2003	0.50	1.3	8
Percentage of total employee jobs in high and medium high technology sectors	2000	5.00	5.60	8

Source: DTI Regional Competitiveness Indicators and own calculations

DTI Regional Competitiveness Indicators (DTI, 2006) show that the Yorkshire and the Humber region has an unsatisfactory performance in terms of levels of Gross Value Added (GVA) per head. The figures for 2004 are below the UK average and the region, according to this indicator, is ranked 7th out of the 9 English regions. The figures for the Yorkshire and the Humber region are comparable to those of the North East and North West (including Merseyside) regions. Furthermore, according to DTI regional competitiveness data, there is no significant change in the data over a sixteen-year period (1989-2004 inclusive).

Data on 'Manufacturing Investment by Foreign-Owned and UK-Owned Companies' (see Table 2.1) shows that the share of UK-owned companies and their contribution to manufacturing GVA is substantial compared to that of foreign-owned companies. The figures either suggest that the Yorkshire and the Humber region is not so attractive to foreign investors or else the region's economic development agencies have failed to attract such investors. Either way, the importance of foreign investment to the manufacturing base of the region is not great.

Low levels of GDP per head suggest the need for inward investments into this region. The importance of foreign direct investment is seen as an opportunity to replace jobs lost in declining industries such as coal-mining and steel industries (The Economist, 2001). Furthermore, the focus of the new projects should not be on "high-volume, low-value assembly work", but instead it should concentrate on "persuading firms to set up research, design and development laboratories" (op.cit., 2001). The economic development agencies should aim to "convince big companies that they can make use of expertise in universities and other research facilities through collaborative ventures" (op.cit., 2001).

The Regional Economic Strategy for Yorkshire and the Humber (2000) acknowledged the need for an economic change in this region. Furthermore, it built on the understanding that raw materials, land or cheap labour can no longer be regarded as the UK's

competitive advantages, but rather knowledge, skills and creativity will be the keys to success in the future.

Household Disposable Income per head data show the same picture as the GVA per head figure and the Yorkshire and the Humber region is ranked 8th out of the 9 English regions (DTI, 2006).

However, the weakest competitive position of the region is related to certain features of the region's economy such as Value Added Tax (VAT) registrations and company Research and Development (R&D) spend as a percentage of GVA. According to those indicators, based on 2003 and 2004 data, the region is ranked eight out of the nine English regions (DTI, 2006).

The above-mentioned key economic indicators suggest that the region is lagging behind most of the other English regions in terms of high GVA industries' performance, levels of incomes and productivity, business investment for R&D, skills and employment levels. These major weaknesses are clearly outlined in a SWOT analysis carried out by the Yorkshire & Humber Regional Development Agency and include (RDA, 2000a, p.18):

- Low levels of GDP per head
- Under-performance of industry
- Not enough businesses and entrepreneurs
- Under-employment and skills deficits
- Basic educational attainment levels
- South Yorkshire's economic structure
- Concentrated areas of urban and rural deprivation leading to social exclusion, poor health, poor housing and unemployment
- Supply-led focus of business support
- Lack of investment in technology and research and development
- Poor rail links between London and Sheffield, London and Hull, Leeds and Sheffield, and Leeds and Manchester.

A report prepared by the Government Office for Yorkshire and the Humber elaborates on these issues and provides an even more detailed list of regional economic weaknesses. The above mentioned report identifies under-performance in high GVA industries, low business investment for R&D and skill levels as major areas of concern (GOYH, 2000a). All these make significant sections of the Yorkshire & Humberside region eligible for Objective 2 EU funding, which aims at "balancing the need for high and stable levels of economic growth and employment with effective protection for the environment" (GOYH, 2000a).

At the same time, the Yorkshire and the Humber region is endowed by certain strengths and the following are acknowledged by the Yorkshire Forward and GOYH documents mentioned above (GOYH, 2000a, p. 323):

- Employment significance of major and multi-national companies
- Numerical dominance of SMEs
- Tendency to concentration amongst business and financial services
- High ICT penetration in medium and large companies
- Multi-cultural diversity
- National Parks and Heritage Coast as precious environmental assets
- Largest total of any UK region for destination of road borne goods
- Multi-modal freight platform at Wakefield
- Unique transportation feature of Humber ports.

The Regional Economic Strategy document adds to the list of strengths the following characteristics of the Yorkshire and the Humber economy (Yorkshire Forward, 2000a, p.18):

- Wide acceptance of the need to change
- Leeds as a strong business service centre
- World-class businesses
- Manufacturing tradition and industrial craftsmanship and heritage

- Educational infrastructure
- Additional European funding up to 2006.

However, the above-listed strengths in the context of the less than satisfactory regional economic indicators relate to potential rather than current economic success. Hence, regional economic development needs to be actively driven forward.

The following sectors have been identified by Cambridge Econometrics as having the greatest potential for job growth in the region (RAYH, 2001, p. 41):

- Financial and business services (18%)
- Other services (35%)
- **Distribution**, hotels and catering (11%)
- **Transport and communications** (9%)
- Agriculture (5%)

At first glance this might seem to suggest that logistics is indeed regarded as important for regional employment growth. In reality, though, much of the employment in distribution relates to purely retail activity, and moreover much of the prospective employment in transport and communications relates to passengers rather than goods. For example, several of the passenger train companies are based in York.

On the other hand, a decline in employment is predicted in the following sectors (RAYH, 2001, p.41):

- Electricity, gas and water (- 46%)
- Mining and quarrying (- 25%)
- Construction (-10%)
- Manufacturing (- 10%)

This implies a shift from 'traditional' sectors' orientation (manufacturing, construction, electricity, gas and water, mining and quarrying) towards services and R&D sectors.

Furthermore, the Regional Innovation Strategy Final Report (January 2001), quoted in the Draft Regional Planning Guidance for Yorkshire & the Humber, identified the freight industries as a sector that is vital to the regional economy and has potential for growth. Hence measures should be taken to restructure and diversify this sector.

Having set out the strengths and weaknesses of the Yorkshire and the Humber region, it is important to recognise that compared to (particularly) the South-East of England, the region could be described as somewhat peripheral (although not to the extent of for example, the South-West of England or Scotland), and such peripherality could impact on business development and inward investment, including investment into facilities for the freight and logistics sector.

Previous research on the effects of logistics on the development of peripheral regions has been reported in a number of studies (Fernie and McKinnon, 1991; McKinnon, 1992; McKinnon, 1996). An initial assessment by Fernie and McKinnon (1991) of the current and future demand for distribution facilities in Scotland, a region perceived as geographically marginal to the mainstream operations of most British multiple retailers, has concluded that the centralisation of stock into fewer, larger strategically located Regional Distribution Centres (RDCs) has had displacement effects throughout the supply chain. This study has suggested that it will be necessary to monitor the scale of depot closures and employment losses incurred by retailers, manufacturers and contractors and to set them against the job gains derived from the centralisation of stock into large RDCs. This concept of peripherality, not so much in terms of geography, but in the context of economic development (i.e. the perception that London is central to all major economic development plans) has implications for the Yorkshire and the Humber region, especially for the assessment of the transport and logistics initiatives in the region and their potential to bring regeneration and sustainable economic development.

The trade profile of the Yorkshire and the Humber region shows that it is very heavily dependent on European trade. According to data from the year 2000, 63.1% of the total export goes to the EU countries and 7.3% to other European countries (see Table 2.2).

Furthermore, research has shows that 88% of export companies in this region export to European (EU and non-EU) countries (Smart and Dent, June 2001, pp. 4-6).

Table 2.2 also shows that over a considerable period of time the percentage of exports from the Yorkshire and the Humber region to other European countries exceed the average for England. This supports the claim that European trade plays an important role in the economy of the Yorkshire and the Humber region. Although in recent years there has been an increase in the share of exports to other world regions of growing importance in the world economy, such as the Middle East and Asia, the figures are below the average for England. This trend is also related to the increasing internationalisation and globalisation of supply chains.

Table 2.2: Destination of Export Goods 2000-2005 (%)

	2000		**2001**		**2004**		**2005**	
	YH	**England**	**YH**	**England**	**YH**	**England**	**YH**	**England**
EU	63.1	56.3	63.0	56.7	60.0	55.0	58.0	53.5
Other Europe	7.3	6.7	8.7	6.9	5.7	5.8	6.7	6.9
Total Europe	**70.4**	**63.0**	**71.7**	**63.6**	**65.7**	**60.8**	**64.7**	**60.4**
Americas	13.6	19.3	13.3	19.1	15.8	19.2	16.5	18.4
Asia and Oceania	10.7	11.2	9.7	10.8	11.8	12.2	11.9	12.3
Middle East and Africa	5.2	6.5	3.5	4.6	6.7	7.9	6.9	9.0
Total World	**100**	**100**	**98.2***	**98.1****	**100**	**100**	**100**	**100**

Source: RCI (2006)
Note: *,** Numbers do not add to 100% as 1,8% for 'Other' are not included. This refers to this particular year only.

2.4 Transport and logistics developments in the Yorkshire and the Humber region

Munn et al. (1998) make the following conclusions with respect to the region's transport infrastructure in a report commissioned by Yorkshire Forward:

- The road network: "the region has a good network of communications and is well placed in the national road network. The major north-south routes are the M1 and the A1(M)/A1 which traverses the length of the region. The major east west route is the

M62 which, together with the A63/A1033 on the north bank of the Humber and the M180/A180 on the south bank, provides the main transpennine link and the principal access to the Humber ports".

- The rail network: "there are reasonable rail links to London for most of the region provided by the East Coast Main Line and the Midland Main Line railways. There are also a number of transpennine routes providing key east-west links. Businesses in the region have direct access to the Channel Tunnel via freight terminals in Wakefield and Doncaster. Suburban rail services and rapid light transit, particularly in the metropolitan areas of South and West Yorkshire, have an increasingly important role to play in addressing problems posed by traffic growth on the most heavily congested sections of the motorway network in the region and heavily congested urban areas".

- The availability of airports: the three regional airports deal "primarily only with holiday and short haul flights". The report acknowledges the importance of the Manchester International Airport for the region, but, at the same time, clearly point out that "Leeds/Bradford, Humberside and Sheffield airports all have growth potential". Although since the publication of this report the Sheffield city airport has been closed down, the new Doncaster Sheffield Robin Hood airport is gaining a stronger standing on a regional level.

- The Humber ports: "they process some 15% of total UK seaborne trade - mostly to Scandinavia and northern Europe". The report acknowledges the importance of the Humber ports both at regional and national level (Munn et al., 1998). Indeed, the River Humber is the busiest estuary in the UK for freight.

The key logistics proposals and developments in the Yorkshire and the Humber region, such as the Humber Trade Zone (HTZ) initiative and the Doncaster Sheffield Robin Hood airport development, address the need for improvement of the existing transport and logistics infrastructure and aim to enhance the competitiveness of the regional economy.

The Humber Trade Zone (HTZ) concept is an example of how logistics might influence regional economic development in a positive way. The Yorkshire and the Humber Regional Development Agency first introduced the concept as part of its Regional Economic Strategy. The initiative was launched to meet the need for developing specific geographical areas of integrated, sustainable economic growth with the intention of exploiting the potential of the Humber ports. The HTZ concept was further developed by the Freight Business Yorkshire and Humber (FBYH) organisation in recognition of the huge economic importance of the Humber sub-region upon the rest of the region and its potential to increase economic prosperity. The HTZ concept, according to the FBYH steering group, addresses issues such as inward investment, increasing the utilisation of Humber ports, encouraging the adoption of e-commerce and ICT within companies and the development of workforce skills and competencies. The latter has been particularly significant. The “Team Humber” activity led by Hull College has been acclaimed as a leader in the provision and development of skills training within the ports industry in the region. The development of management skills and competencies for the logistics sector, on the other hand, has been reinforced by the opening of the Logistics Institute at Hull University, supported by Yorkshire Forward and the European Regional Development Fund.

Another key logistics proposal in the region has been the development of the former RAF Finningley, a Royal Air Force station near Doncaster (South Yorkshire), into a world class international airport. The Doncaster Sheffield Robin Hood airport is envisaged as a major airfreight hub as well as a passenger airport. In 2000, the Yorkshire and the Humber Regional Development Agency endorsed the decision to undertake a public enquiry on a series of environmental issues and eventually supported the outcome of the enquiry. Yorkshire Forward pointed out that the airport proposal fits well into the Regional Economic Strategy as the Agency and its partners are striving for "a future sustainable package of air service provision befitting a world class region" (RDA, 2000b). Another strong reason for backing up the proposal was linked to "the economic advantages of creating up to 7,000 jobs in South Yorkshire through the injection of £30 million of private funds into a deprived area" (RDA, 2000b). Yorkshire Forward was also

arguing for the case of "an internationally competitive airport, providing better access for existing businesses and new investors in the region to an airport able to sustain long haul international flights and to utilise public and private national transport networks" (RDA, 2000b). The Regional Development Agency was standing behind the idea of "the expansion of regional passenger and freight services and reduction of economic leakage from the region" (RDA, 2000b). It also wished to utilise a valuable regional asset such as the RAF Finningley and to support the airlines and hauliers for the re-use of this asset.

The approval of this proposal was however not unconditional. At the time of backing the proposal, Yorkshire Forward identified some issues which need to be addressed and measures that have to be taken regarding "the impact of noise on local communities, traffic calming measures and the assurance that the public transport interchange, including a rail station, is operational before the airport opens" (RDA, 2000b).

The airport commenced commercial operation in 2005. However, to date air freight actually is minimal and remains an opportunity. Furthermore, Doncaster railway station, situated 7 miles away, remains the nearest station to the airport.

2.5 Conclusions

This chapter has established the research context by investigating the profile of the Yorkshire and the Humber region, the state of its economy and the trade flows from and into the region. Various papers which formulate regional development policies in Yorkshire and the Humber and in general have also been reviewed. The main findings of the research in this chapter are:

1) Regional development in the UK and other EU countries has been driven by political and economic forces. In the case of England, however, the economic reasons prevail. The need for the regeneration of regional economies has evoked the formation of new regional organisations or channelled the work of existing

organisations into more regionally orientated activities and has led to the re-emergence of the region as a unit of analysis.

2) The Yorkshire and the Humber region is characterised by its diversity as each of its four sub-regions has different social status and economic specialization. Serious and persistent under-performance of its economy has resulted in the region lagging behind the other English regions in terms of levels of GVA per head, incomes and productivity, business investment for R&D and skills and employment levels. The Yorkshire and the Humber region is endowed by certain strengths, which, however, in the context of the rather less than satisfactory regional economic indicators, relate to potential rather than current economic success. Hence, regional economic development needs to be actively driven forward. The freight sector has been identified as vital to the regional economy and as a potential growth generator. The trade profile of the region has shown that it is very heavily dependent on European trade. Therefore, if the Yorkshire and the Humber region should become more competitive in the European marketplace, measures should be taken to restructure and diversify its freight sector which facilitates the movement of goods from and into the region.

3) The key logistics proposals and developments in the Yorkshire and the Humber region, such as the Humber Trade Zone (HTZ) initiative and the Doncaster/Sheffield Airport development, address the need for improvement of the existing transport and logistics infrastructure and aim to enhance the competitiveness of the regional economy.

CHAPTER 3 IMPROVING THE COMPETITIVENESS OF REGIONAL ECONOMIES THROUGH CLUSTER DEVELOPMENT

3.1 Introduction

The previous chapter established the research context by investigating the profile of the Yorkshire and the Humber region, the state of its economy and the trade flows from and into the region. Various papers which set out regional development policies in Yorkshire and the Humber and in general have also been reviewed. It was found that, although the region is endowed by certain strengths, serious and persistent under-performance of its economy has resulted in it lagging behind other English regions. More specifically, it has been concluded that regional economic development needs to be actively driven forward and measures should be taken to restructure and diversify the region's freight sector.

This chapter evaluates the formation and development of business clusters as a policy tool to improve the competitiveness of regional economies. It examines the state and role of cluster development for the economy of the Yorkshire and the Humber region and investigates to what extent cluster development in the region is reflected in and supported by its Regional Economic Strategy.

3.2 Definitions and characteristics of a cluster

There is no one single definition of a cluster. Porter defines clusters as "Geographical concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also co-operate" (Porter, quoted in Miller et al., 2001, p.6). The UK Department of Trade and Industry (DTI) has adopted a very similar approach, defining clusters as "concentrations of competing, collaborating and interdependent companies and institutions which are connected by a system of market and non-market links" (Miller et al., 2001). Bergman and Feser use another definition of a cluster, describing it as "a group of business enterprises and non-business organizations for whom membership within the group is an

important element of each member firm's individual competitiveness" (Bergman and Feser, 1999). Binding the cluster together, as shown in Figure 3.1, are "buyer-supplier relationships, or common technologies, common buyers or distribution channels, or common labor pools" (Enright 1996, quoted in Bergman and Feser, 1999). At the regional level, Yorkshire Forward has developed its own definition of clusters, namely "groups of organizations in related industries which are linked together because they buy and sell from each other and/or because they use the same infrastructure, customers or skills base" (Yorkshire Forward, 2001a). Eddington (2006) refers to "the concentration or clustering of firms and workers, typically in urban areas or industrial locations" as 'agglomerations'.

All the above definitions describe clusters as **a system which comprises of elements and the links between these elements**. The 'systemic' approach to defining clusters based on the findings from the literature could even be recognised as a definition in itself.

Porter's definition clearly outlines cluster elements and shows that there are three types of major players within a cluster. These are:

- The business entities such as companies and their suppliers;

- Service providers such as other "firms in related industries"

- A number of supporting institutions such as universities, standards agencies, trade associations that function in the areas of education, training, R&D and regulation.

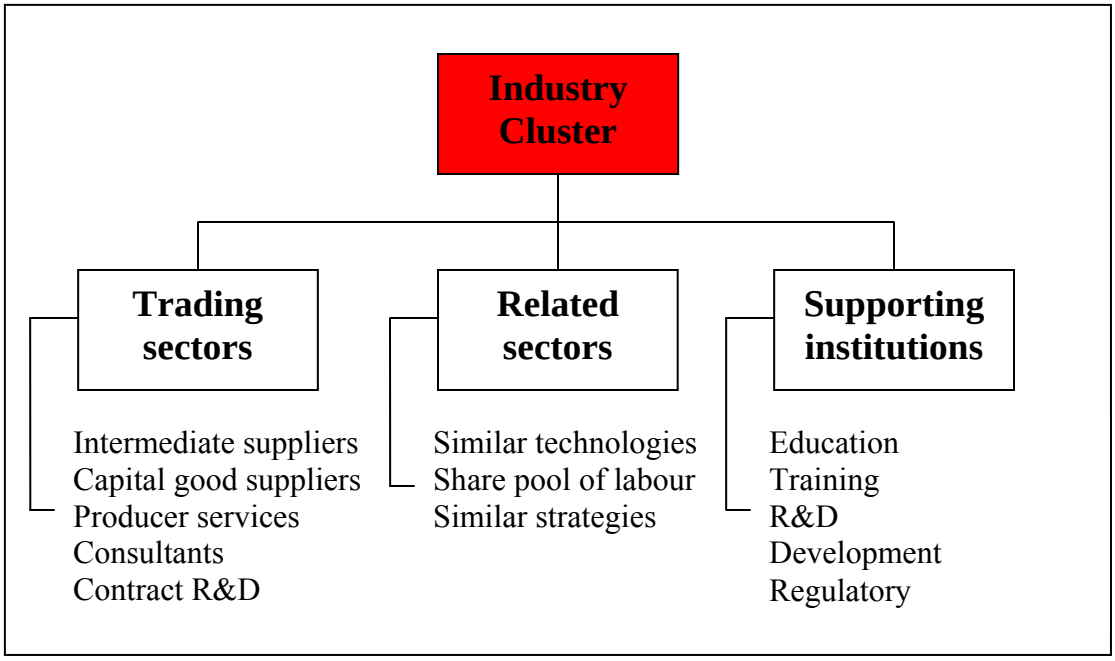


Figure 3.1 Illustration of an industrial cluster
Source: Bergman and Feser (1999)

The above definitions also show that the players within a cluster are interdependent regarding:

- location, as Porter defines clusters as "geographic concentrations";
- infrastructure, customers or skills base according to the Yorkshire Forward's definition;
- "a system of market and non-market links", according to the DTI definition of a cluster;
- "buyer-supplier relationships, or common technologies, common buyers or distribution channels, or common labor pools" as identified by Bergman and Feser (1999).

The interdependencies, as described above, bring the players within a cluster together and serve as links of various kinds between the elements of the system. There is little

mention, however, of interdependencies such as the advantages and constraints imposed by the use of common supply chains and transport infrastructure or any other physical inter-linkages between firms in clusters. Therefore, of particular relevance to this research is the need to explore and better understand the interdependencies between organisations within a cluster, particularly those important to the effective management of supply chains.

Porter points out various other characteristics that define and help in the understanding of clusters but which are not included specifically in the above definitions:

- It is difficult to define the boundaries of a cluster as clusters do not always fit into political boundaries and may cross state and national borders. For that reason, cluster boundaries are defined by "the linkages and complementarities across industries and institutions that are most important to competition" (Porter, 1998, p.79).

- The players within a cluster cannot be easily identified as clusters rarely conform to standard industrial classification systems. That is why clusters may be obscured or even go unrecognised.

- Competition and co-operation are essential characteristics of a cluster. The elements of a cluster compete between themselves for customers. At the same time, there is also vertical co-operation between companies in related industries and local institutions. Porter attributes the co-existence between competition and co-operation within a cluster to the fact that they occur on different dimensions and among different players. Bergman and Feser (1999) have developed this concept. Although they acknowledge the role of trust and co-operation among the participants within a cluster, they clearly demonstrate that it is equally important for those participants to gain an economic advantage from their presence in the cluster. Otherwise, the existence of the cluster is not justified from a theoretical and policy-making perspective.

- Clusters are perceived as a more flexible, efficient and effective structure, which mitigates the inflexibilities of vertical integration or management challenges of creating networks and partnerships. Hence, they could be identified as an alternative way of organising the value chain (Porter, 1998).

It becomes clear from the definitions and the above-listed characteristics that a cluster comprises of more than a single company or industry. Indeed, it includes more than one company from more than one industrial sector and is very much determined by the complex links between its elements. The latter are crucial for cluster strength and integrity.

Cluster theory analyses the factors that influence the life cycle of a cluster. To a great extent, these factors also help to further understand the circumstances which determine the strength and integrity of a cluster. Porter argued that clusters go through three stages of their development, namely birth, evolution and decline and their development is shaped by different circumstances at a particular stage (Porter, 1998).

The formation of a cluster, at its birth stage, is attributed to a number of reasons:

- historical circumstances
- unusual, sophisticated or stringent local demand
- prior existence of supplier industries, related industries or even entire related clusters
- one or two innovative companies that stimulate the growth of many others
- a chance event

During the second stage of the cluster life cycle, its evolution, the cluster begins to grow and the support of local institutions and local competition accelerates its growth. As it is growing, a cluster attracts other players from other locations with relevant skills and ideas. Eventually, this leads to the emergence of specialised suppliers and the accumulation of information. The importance of specialised training, research and

infrastructure is also acknowledged by this research, as these strengthen the cluster and contribute to its improved visibility.

Over time, clusters evolve and some of them prosper for decades. This prosperity is determined by the extent to which its assets (market information, employees' skills, scientific and technical expertise and supplier bases) are utilised and retain their relevance.

From a transport planning perspective, Eddington (2006) suggests that although transport alone cannot generate clusters, it can play an important role in facilitating their expansion by reducing travel time and costs, bringing firms, workers and consumers closer than otherwise would be the case.

Whatever the strength of the cluster, there are internal and external forces that lead to its decline (which is the final stage in the life cycle of a cluster), for example:

- technological discontinuities
- cluster's assets (as described above) may become irrelevant
- a shift in buyer's needs
- internal rigidities such as overconsolidation, mutual understandings, cartels and other restraints to competition
- regulatory inflexibility or the introduction of restrictive union rules
- poor quality of supporting institutions such as schools and universities (Porter, 1998).

It becomes clear from the above issues that competition is essential to the successful development and existence of a cluster. A lack of competition, any internal action or any government intervention that undermines competition, poses a serious threat to cluster development and seriously worsens its performance.

3.3 Clusters and the regional economy

3.3.1 Clusters and regional competitiveness

Porter's research is crucial to understanding the contribution of cluster development to the success of regional economies. An essential issue that underpins his work is that clusters are critical to competition.

He argued that there are three ways in which clusters affect competition:

- By increasing the productivity of companies based in the area;

- By driving the direction and pace of innovation, which underpins future productivity growth;

- By stimulating the formation of new businesses (Porter, 1998).

Bergman and Feser built on Porter's arguments and clearly outlined the role of clusters in regional development. They claimed that "industrial clusters are seen as permitting possibilities of linking together several strands of regional policy interest into a single framework: technology, regional productivity advantages, growing vs. declining sector balancing, etc" (Bergman and Feser, 1999).

The above statements show that there are three areas in which clusters play an important role in regional economies. These are:

- Productivity
- Innovations
- Formation of new businesses.

Defining competitiveness is not straightforward as in most cases it is difficult to find and apply an appropriate apparatus to measure competitiveness. Porter contributes to a definition of competitiveness, which could be applied to a national, regional or even

cluster context, by claiming that "A nation's standard of living (wealth) is determined by the productivity with which it uses its human, capital, and natural resources" and, hence, "The appropriate definition of competitiveness is productivity" (Porter, 2002).

Productivity, as a measurement of competitiveness, is linked to the success of regional or national economies in a sense that "Productivity, not exports or natural resources, determines the prosperity of any state or nation" (Porter, 1998). Indeed, the UK government builds its policy on competitiveness on the understanding that the UK's distinctive capabilities are not raw materials, land or cheap labour but rather knowledge, skills and creativity (Competitiveness White Paper, 1998, p.6).

Porter (1998) suggests that, as part of a cluster, companies benefit from improved productivity through:

- Better access to employees and suppliers
- An efficient way of obtaining important inputs
- Overcoming the negative impacts of vertical integration as clusters offer an alternative organisational structure
- Access to specialised information
- The positive effects of complementarities
- Access to institutions and public goods
- Better motivation and measurement

Clusters not only enhance productivity but are also an important driving force for innovation. Porter (1998) argued that clusters make opportunities for innovation more visible and they allow companies to be more flexible and act more quickly in the process of implementing the innovation. The close proximity and links between the players within a cluster offers them the chance to get whatever resources they need more easily and get closely involved in the innovation process. Innovation within a cluster is also reinforced by pressure from peer companies.

Clusters also contribute to the formation of new businesses. This process is facilitated by factors such as lower barriers and the perceived risks of entry, the availability of assets, skills, inputs and staff as well as better knowledge of the local market (Porter, 1998). For that reason, it is more likely that new companies grow up within an existing cluster rather than elsewhere. Porter claimed that this was particularly valid for new suppliers that proliferate within a cluster as the concentrated customer base lowers their risks and enables them to seize market opportunities. New businesses in a cluster are also built around gaps in products or services due to the specific environment of close links and shared information. These gaps are more easily detectable within a cluster.

The Department of Trade and Industry (DTI) also acknowledges the importance of cluster development for both businesses and the economy. It has drawn up a list of potential benefits as follows:

- "Companies can increase the expertise available to them if they locate amongst a cluster of other firms.

- They can also draw upon others with complementary skills to bid for large pieces of work which each of the individual firms would have been unable to complete.

- Advantage can be taken of economies of scale by further specialising production within each firm, by joint purchasing of common raw materials to attract bulk discounts or by joint marketing.

- Social and other informal links are important and can lead to the creation of new ideas and new businesses.

- Reputations spread quickly within the cluster, enabling finance providers to judge who the good entrepreneurs are and business people to find who provides good support services.

- The cluster enables an infrastructure of professional, legal, financial and other specialist services to develop." (DTI, 2002).

These issues, as listed above, may be combined into three main groups of benefits, experienced by companies in a cluster. These are:

1) Enhanced access to shared knowledge, expertise, skills and specialist services, on one hand, and resources or inputs, on the other;

2) Substantial economies of scale;

3) Generation of new ideas and potentially of new businesses.

These benefits result in a more effective and efficient use of resources within a cluster and as a consequence make businesses more competitive. This, in its turn, contributes to a more competitive regional and national economy.

Eddington (2006) also acknowledges the benefits brought by the close interactions between firms and individuals in clusters as they result in the sharing of knowledge and the development of new ideas. These interactions also offer individuals a greater choice of jobs and business access to a larger pool of applicants and can generate productivity benefits. Hence, considering that, in Porter's words "the appropriate definition of competitiveness is productivity", clusters have the potential to increase the competitiveness of the regional economy.

Indeed, according to Eddington (2006) "agglomeration economies, especially service clusters, are extremely valuable to the future growth and productivity of the UK economy. They can offer a unique environment and create 'stickiness', allowing sectors to remain competitive longer than they otherwise might, in a highly competitive global economy. They can also stimulate further innovation and growth benefits, for instance, by attracting globally mobile activity, which is explored later in this chapter.

Consideration of the role of transport (alongside housing policy) in supporting their growth is, therefore, strongly recommended."

3.3.2 Clusters and the Regional Economic Strategy

At the regional level, Yorkshire Forward (the Yorkshire and the Humber Regional Development Agency) defines clusters as "Groups of organizations in related industries which are linked together because they buy and sell from each other and/or because they use the same infrastructure, customers or skills base" (Yorkshire Forward, 2001a).

As stated earlier, Porter claimed that clusters bring benefit to the regional economy as they "increase productivity and efficiency", "stimulate and enable innovations" and "facilitate commercialization" (Porter, 2002). Thus, a well thought-out regional economic development strategy should strongly address and reflect these issues.

The Regional Economic Strategy for Yorkshire and the Humber set up six objectives:

- "To grow the region's businesses in key economic sectors and create a radical improvement in their competitiveness and contribution to the wealth of the region.

- To achieve higher business births and survival rates that creates a radical improvement in the number of new, competitive businesses that last.

- To attract and retain more investment by providing the right product for investors and more effective marketing of the region.

- To achieve a radical improvement in the development and application of education, learning and skills, particularly high quality vocational skills.

- To implement targeted, community-based regeneration programmes that improve the living standards of the region's most deprived and excluded communities.

- To get the best out of the region's physical attributes and conserve and enhance its environmental assets." (Yorkshire Forward, 2000c).

It has already been mentioned that there are three ways in which clusters make regional economies more competitive: increased productivity, innovation and formation of new businesses. It now becomes evident that five of these objectives (growing the region's businesses, higher business birth and survival rates, attracting and retaining more investment, improving education, learning and skills and getting the best out of the region's physical and environmental assets) directly address the above mentioned areas of improvement that cluster development brings.

The 'Draft Regional Planning Guidance for Yorkshire & the Humber' identifies the issues that need to be considered by the regional development agencies when they formulate their policy on cluster development. This report indicated that "local planning authorities will need to take account of the factors that influence cluster development including interdependency of firms based on common supply chains or labour pools, the competitive and co-operative relationships that ensue, and the positive externalities that result." (RAYH, 2001). **However, the objectives that Yorkshire Forward has set in its regional economic strategy do not really address those issues and thus leave a knowledge gap that needs to be further investigated and explored. This research project seeks to address this gap.**

Cluster development is also closely linked to the issue of national and regional competitiveness. Porter argued that in the global marketplace, poor countries lack well-developed clusters and, for this reason, they compete with cheap labour and natural resources. "To move beyond this stage, the development of well-functioning clusters is essential" (Porter, 1998, p.86).

It has already been mentioned that the UK government has built its policy on competitiveness on the understanding that raw materials, land or cheap labour can no

longer be regarded as the UK's competitive advantages, but rather knowledge, skills and creativity will be the keys to success in the future. This has also been acknowledged in the Regional Economic Strategy for Yorkshire and the Humber (Yorkshire Forward, 2000a). Hence, measures should be taken to encourage and support cluster development in the region. The central or regional governments cannot create clusters, but they are responsible for providing the business, innovative and institutional environment vital for cluster success (DTI, 2002).

Porter further elaborates on these issues and identifies the determinants of regional competitiveness, which the central and regional governments should focus on:

- a strong physical and information infrastructure
- a strong basic educational system in order to develop local talent and attract outside talent
- provision of specialised training, which is more important than abundant labour
- recognition of universities and specialised research centres as the driving force behind innovation
- commercialisation as an important part of the innovation process (Porter, 2002).

The determinants of regional competitiveness, as described above, are closely linked to cluster assets that have already been identified in section 3.1. These are market information, employees' skills, scientific and technical expertise and supplier bases. Cluster assets broadly address the following areas of policy-making: education and skills, technology, supporting institutions and infrastructure. It was also demonstrated that the prosperity of a cluster is determined by the extent to which its assets will be utilised and maintained relevant. For this reason, the government and regional development agencies should also invest into these assets. The opposite causes inefficiencies and results in poor quality of life (Porter, 1998).

3.3.3 Clusters in a regional context: examples of applications

Studies on cluster development have been undertaken by the US Council on Competitiveness, the Institute for Strategy and Competitiveness at the Harvard Business School and the UK Department of Trade and Industry (DTI). Each of these has a different scope and geographical coverage and employs different methodological tools. Most of the research work that has been undertaken is US-based.

The Cluster Mapping Project is a project of the Institute for Strategy and Competitiveness at the Harvard Business School. Its aim is to provide statistical information about clusters and create a profile of regional economies across the United States at different geographical levels: state, economic area, metropolitan area and county. The data that has been collected is divided into three categories: overall regional economic performance, composition of the regional economy and cluster competitiveness. The project team analyse data with regard to employment levels, wages, patents and job creation.

The project identifies two types of industries, 'local' and 'traded', which contribute to a better understanding of regional competitiveness. 'Local' industries are defined as "those present in most if not all geographic areas, are evenly distributed, and hence primarily sell locally". On the other hand, 'traded' industries are "those that are concentrated in a subset of geographic areas and sell to other regions and nations". In Porter's view, the productivity of both 'local' and 'traded' industries is fundamentally important to regional competitiveness (Porter, 2002).

The US Council on Competitiveness conducted the Clusters of Innovation project between 1998 and 2001. This focused on how clusters form, why they are critical to a region's economic future and how regional stakeholders can help its clusters thrive. It studied five pilot regions using Porter's cluster mapping data and other methodological tools. The following areas were investigated:

- economic performance
- composition and evolution of the regional economy
- business and innovation environment

- competitiveness of selected regional clusters
- the cluster development implications for the regional agenda (Council on Competitiveness, 2002).

The Global Competitiveness Programme itself monitored a number of indicators regarding the market environment, political and regulatory environment, infrastructure environment, innovation, technology, research and development. The latter, on the one hand, helps to understand and evaluate the competitive position of a nation, but, on the other hand, is closely linked to the success or failure factors that determine cluster development.

A DTI study entitled 'Business Clusters in the UK - A First Assessment' is the only one of its kind in a UK context and has been undertaken in order to help the regional development agencies with their work on cluster development. Its purpose is to identify clusters across the UK and their locations at regional level, map them and to inform and advise on:

- existing DTI policies and business support activities

- the design of effective cluster promotion policies at both regional and central government level

- the state, location and strength of specific clusters in order to raise awareness within and outside government as well as business, regional and local planners (Miller et al., 2001).

The DTI report used a highly systematic approach to studying clusters by introducing a classification system, which addressed four criteria for assessment of cluster characteristics:

- Stage of development of a cluster. According to this criterion, clusters are classified as 'embryonic', 'established' and 'mature'. This approach also addresses the Porter view on the cluster 'life cycle', which has been described earlier in this chapter, and links the cluster growth to the different stages of its development.

- Cluster depth. According to this variable, clusters are classified as 'deep', 'shallow' and 'unknown'. As cluster depth is determined by the number of industrial linkages, it has important implications on the strength of a cluster: the larger the number of industrial linkages, the stronger the cluster.

- Employment dynamics. The research differentiates between 'growing', 'declining' or 'stable' clusters. The cluster is classified as 'stable' when the employment figures change within a 10% band.

- Significance. This criterion identifies the significance of a cluster in geographical terms and according to it clusters could be of 'regional', 'national' or 'international' importance.

All the studies, as described above, make a rather broad overview on cluster development. Cluster analyses are undertaken mainly from a macroeconomic perspective and involve aggregate variables such as employment levels and wages. Although the transport and logistics sector is recognised as an important part of a cluster (that of related and supporting industries) offering specialist services to the other industries in a cluster, it has **not** been researched in depth. In addition, no scientific toolkit offering a methodological approach to studying this particular activity in a cluster has been developed. Neither have the sector's implications for cluster development or the competitiveness of the national or regional economy been assessed.

3.3.4 Cluster development in the Yorkshire and the Humber region

Yorkshire Forward has established the Yorkshire Forward Cluster Network (YFCN) as the successor of the Regional Innovation Strategy (RIS). The promotion of business clusters, as suggested by Yorkshire Forward, is being used as a tool to encourage "new business formation, innovation, inward investment, and regional economic performance" (Yorkshire Forward, 2001a). Clusters in Yorkshire and the Humber that are of regional and national significance have been identified by previous DTI research, as shown in Table 3.1.

Table 3.1. Clusters in Yorkshire and the Humber

Cluster	Stage	Depth	Employment	Significance
Agriculture/Food (processing)	established	deep	growing	national
Chemicals (speciality)	established	deep	growing	national
Construction & construction products	mature	deep	stable	national
Financial services (housing, corporate, consumer)	established	shallow	growing	national
Furniture manufacture	mature	unknown	declining	regional
Leisure software	embryonic	shallow	growing	international
Medical/surgical equipment	established	deep	growing	national
Metals (steel processing and products)	mature	shallow	stable	national
Web design/internet services	embryonic	shallow	growing	regional
Woollens	mature	shallow	stable	national

Source: Miller et al. (2001)

Table 3.1 shows that agriculture and food processing, chemicals, financial services and medical equipment are recognised as established clusters of national importance and that employment in these clusters is growing. Furniture manufacture and web design/internet services are clusters of regional significance. The only cluster of international significance is that of leisure software, but this is only at the embryonic stage of development.

The DTI 'Business Clusters in the UK - A First Assessment' survey produced the following major findings with regard to cluster development in the Yorkshire and the Humber region:

1) Yorkshire and the Humber was identified as one of the UK's least specialised regions. The degree of regional specialisation is measured by the standard specialisation index. This index "could vary from zero, when a regional economy has the same industrial structure as the UK, to one, when it is completely specialised (i.e. it has all of its employment in one industry and has all of the UK's employment in that industry) (Miller et al., 2001, p. 64). The figure for the Yorkshire and the Humber region is 0.27 (the highest values being 0.54 for Northern Ireland and 0.50 for London), which lines the region up with the South Eastern, Eastern and South Western regions.

2) The ten clusters in the Yorkshire and the Humber region account for 21 % of its employment. This suggests that the regional economy is not very highly clustered.

3) Although only a fifth of the region's employment is in its industrial clusters, the region has a number of distinctive clusters of considerable size.

Yorkshire Forward acknowledges the following clusters as crucial to the regional economy:

- Food (including agriculture) and Drink
- Chemicals
- Advanced Engineering and Metals
- Digital Industries[1]
- Bioscience

The first three of these clusters are major users of logistics services. For this reason, they will be investigated in turn in order to assess the transport and logistics implications of cluster development for the regional economy.

[1] Yorkshire Forward's broad description includes web design and creative, film, TV, games, music, video, electronics, animation, e-learning, enterprise software, and IT solutions and services. The physical manufacture and distribution of electronic equipment are not included.

The Food (including agriculture) and Drink Cluster

Some research into the Food and Drink cluster has been undertaken by the YHRDA. This work does not provide any specific data or information on the transport and logistics businesses in this cluster and, as in the other studies that have been mentioned in section 3.2.3, cluster analyses are undertaken mainly from a macroeconomic perspective and focus on aggregate variables such as employment levels. However, this research provides an insight into the food and drink industry at regional level and attempts to evaluate some cluster development issues.

The findings provide some important facts about the food and drink regional industry, such as:

- Food manufacturing is acknowledged as the second largest sector within the Yorkshire and the Humber region employing 200,000 across agriculture, manufacturing, wholesaling and retailing;

- It accounts for 3.6% of the region's GDP;

- It directly involves 1000 businesses and is supported by a further 2000 businesses;

- It is the largest source of employment in rural areas;

- Although it is recognised as a mature industry, there are sectors within it that are expected to grow much faster than the industry average (Yorkshire Forward, 2003a).

The same report also makes an interesting observation with regard to the UK trade balance in food. It claims that in the current situation of a negative trade balance (exports of £9bn being outweighed by imports of £17bn), a growth rate of some sectors by import substitution could be expected. However, it could also be argued that the brisk import activity would use more transport and logistics services to move food products into and within the UK. If this is the case, it is essential that the Yorkshire and the Humber

operators can offer excellent services at competitive prices so that they can win business against service providers based in other regions. They must also make a good use of the region's transport infrastructure to the benefit of the regional economy.

Data in Table 3.2 provides an overview of employment in the food and drink industry at sub-regional level and in the food manufacturing, retailing, wholesaling and agriculture sub-industries. The key features are:

1) 22% of the workforce in the Yorkshire and the Humber region are employed in the food and drink industry and are North Yorkshire based, providing the largest industry output in value terms. This finding could in part be attributed to the presence of a major multinational producer based in York and breweries in Tadcaster. The tourist industry in this sub-region is also a market opportunity mainly for the hospitality industry, a major customer of the food and drink industry.
2) A very substantial percentage of the workforce in the food and drink industry is actually employed by the retailing and wholesaling sub-industries.

3) Each of the four sub-regions is specialised into different areas of the food and drink industry, as listed in the 'Key Factors' section of Table 3.2.

Table 3.2. Food and Drink Cluster Sub-Regional Analysis

Region	Output	Total Region		Food Manufacturing		Retailing		Wholesaling		Agriculture		Key factors
	£m	emp	%	emp	%	emp	%	emp	%	emp	%	
South Yorkshire	384	36569	19	10366	28	20220	55	4478	12	1535	4	40% jobs in Baking 3% Ethnic Good road network Sheffield Hallam Innovation Centre Objective 1 Funding Major Food companies
West Yorkshire	750	65371	34	18728	29	34570	53	8588	13	3486	5	10% Baking Brewing/Soft Drinks Good road network Leeds University ASDA HQ
North Yorkshire	1002	42537	22	15672	37	13381	31	3057	7	10427	25	Regional specialities Agriculture Chocolate (York) CSL York Tourist industry
Humberside	894	47568	25	20864	44	15709	33	4854	10	6160	13	10% in Fish Processing Pig Farming Vegetables National Seafood Institute Access to ports
Totals	**3030**	**192045**	**100**	**65630**	**34**	**83880**	**44**	**20977**	**11**	**21608**	**11**	

Source: Yorkshire Forward (2003a)

The Yorkshire Forward 'Food and Drink Research Summary' study researched the regional organisational facilities, relevant to the Food and Drink cluster, and identified their availability. Table 3.3 provides an evaluation of those findings, assessing and grouping them as strengths and weaknesses regarding the development of the Food and Drink cluster in the Yorkshire and the Humber region.

Table 3.3. Strengths and Weaknesses of the Yorkshire and the Humber Knowledge Base

Strengths	Weaknesses
• Presence of nine universities and other organisations (laboratories and technology centres) that provide a strong science base and analytical facilities. • Availability of initiatives and organisations involved in technology transfer to industry. • Availability of general business support (advice) networks within the region, such as Yorkshire Forward and Business Link organisations. • Best practice examples of mentoring within large 'blue chip' companies in the region. • Established food networks such as Yorkshire Pantry, Humber Seafood Forum and Ethnic Food Forum. • Comprehensive provision of food related courses.	• Lack of focus and speed of offered services. Few of the business support organisations have a specific focus or operational emphasis on the food and drink sector. • Lack of commercial awareness within the R&D facilities. • Poor marketing by universities. • Low level of awareness in industry with regard to what provision of R&D services is available. • Limited dialogue between industry and academia. • Universities more often interact with companies outside the region. • Business Link organisations not specialist enough in food. • Mentoring, as a way to improve business performance, implemented only in large, 'blue chip' companies. • Food related courses identified as 'under subscribed' • Shortage of graduates entering the food and drink industry. • Skills shortages - 60 % of companies in the region do not have staff with a qualification above NVQ level 3. Skills shortages involve staff from shop floor operatives through to middle and senior management, including technology specialists. • Difficulties in attracting and retaining good staff (especially young people) due to the poor image of the sector.

Source: Derived from information from Yorkshire Forward (2003a)

The study concluded that "The Food Industry of Yorkshire and the Humber does not operate as a single cluster, but there is evidence of cluster activity". However, it identified food and drink industry clustering at sub-regional and sub-industry level (see Table 3.4).

Table 3.4. Food and Drink Industry Clustering at Sub-regional and Sub-industry Level

	South Yorkshire	West Yorkshire	North Yorkshire	Humberside
Farming Fishing	Potatoes	Vegetables	Dairy, Meat, Poultry, Potatoes	Fishing, Glasshouses, Vegetables, Pigs
Food Manufacturing	Bakeries	Bakeries, Meat, Brewing, Soft Drinks	Pigs, Cheese, Potatoes, Tea, Confectionary, Speciality Foods	Fish, Oils, Ice Cream
Wholesaling	Depots, Markets	Depots, Markets	Livestock	Fish, Vegetables
Retailing	Retail, Food Service	Retail, Food Service	Food Service	

Source: Yorkshire Forward (2003a)

This study recognised seafood processing as "the only one true cluster" and another five niche sectors within the region as "appropriate for clustering interventions that would increase collaboration and co-operation between functionally related firms". The latter are: bakery, organic produce, ethnic food, pig meat and speciality foods.

Yorkshire Forward recognised the need for improvement within the food and drink industry. It selected several improvement areas that potentially will be developed through separate projects. These include a wide range of issues that broadly address the areas of innovation, skills, the environment and the food and drink industry image. Regional food supply chains are considered an area that need to be further developed and issues like mutual collaboration, local sourcing and distribution will be further investigated.

The Advanced Engineering and Metals Cluster

Advanced Engineering and Metals is another cluster where the member industries are major users of freight transport and logistics services. It has been already mentioned that

it is very difficult to identify the industries within a cluster, as clusters rarely conform to standard industrial classification systems. Yorkshire Forward suggests that "The advanced engineering and metals cluster encompasses entire industries from steel and other metals and alloy processing, through to manufacturing high tech products for sectors including aerospace, automotive and household appliances" (Yorkshire Forward, 2002).

Yorkshire Forward has established that the development of the Advanced Engineering and Metals cluster is strongly enhanced by:

- A well-established and advanced knowledge base in the region, supported by strong university links to industry and innovative research at the University of Sheffield and Bradford University.

- A deep-rooted tradition in metal production and metal processing. Even at present, Yorkshire Forward acknowledges metals related industry and metal production as "the region's largest sector by gross value added, accounting for over 16% of Yorkshire and the Humber's gross value added".

- The location of many world-class companies such as Sheffield Forgemasters, Cummins Turbo Technologies, the Weir Group, Optare, Sulzer in the Yorkshire and the Humber region.

The regional development agency has already embarked on a decision to enhance the development of the Advance Engineering and Metals cluster with a specific collaborative project between the University of Sheffield and the Boeing company to create an Aerospace Manufacturing Research Centre on Yorkshire Forward's Advanced Manufacturing Park. Other organisations with a high potential to undertake R&D advanced engineering cluster activities in the region are the Castings Development Centre and the Sheffield Hallam University's Materials Research Institute, well known for its research into the automotive industry.

The Chemicals Cluster

The Chemicals cluster is another cluster of major interest to Yorkshire Forward and, indeed, the industries within this cluster are substantial users of specialist freight transport and logistics services. Their supply chains stretch well beyond the boundaries of the Yorkshire and the Humber region.

Again, taking into consideration general cluster characteristics, it is very difficult to identify the industries within the Chemicals cluster. According to Yorkshire Forward, it entails companies involved in the manufacturing and processing of organic and inorganic chemicals. Geographically, this cluster is based mainly in the Humber and West Yorkshire sub-regions.

Similar factors to those which enhance the development of the Advanced Engineering and Metals cluster determine the growth and strength of the Chemicals cluster. These are identified by Yorkshire Forward as:

- The chemical industry in the region is identified as one of the strongest growing manufacturing sectors, which provides 10% of the UK's chemicals output. It is acknowledged as the region's third largest area of manufacturing after the food and drink and metal industries.

- The presence of industry leaders such as BP, Novartis and Syngenta in the Yorkshire and the Humber region.

- Good availability of research services and infrastructure.

- The physical assets of the region (the Humber ports in particular), which offer the chemical industry a good transport infrastructure and easy access to European markets.

The Humber Trade Zone initiative, which was discussed in Chapter 2, is an ongoing Yorkshire Forward project that aims to optimise the current and potential assets of the area around the Humber estuary. A large number of chemical companies in the region are based here. This project is particularly relevant to freight transport and logistics service provision as it is looking, among other things, into the ways to improve the transport infrastructure of that area, to promote the use of Humber ports, to improve the availability and level of on-site services and to develop workforce skills relevant to the logistics industry.

3.4 Conclusions

This chapter has reviewed literature sources on cluster development, including those with particular reference to the Yorkshire and the Humber region. It has produced the following findings.

1. The review of the studies on cluster development in a regional context, most of them US-based, has shown that cluster analyses are undertaken mainly from a macroeconomic perspective and primarily involve aggregate variables such as employment levels and wages. Transport and logistics businesses are recognised as an important part of a cluster (that of related and supporting industries), offering specialist services to the other industries in a cluster, but their importance has not been researched in depth. In addition, there is no scientific toolkit to offer a methodological approach to studying this particular activity in a cluster and its implications for cluster development or the competitiveness of the national or regional economy.

2. There is very little evidence of collaboration between organisations at national and regional level, which possibly explains the different approaches of DTI and Yorkshire Forward regarding cluster definition, methodology of studying clusters and indeed the different priority of clusters identified by both organisations. The DTI study on clusters has clearly outlined these differences. The same study has also been undertaken with the

purpose of helping the regional development agencies with their work on cluster development and on a wide range of policy issues. However, it seems that not all the recommendations have been taken on board by Yorkshire Forward and reflected in its regional economic strategy. The same refers to the factors for cluster development, identified by the Regional Assembly for Yorkshire and the Humber 'Draft Regional Planning Guidance' document.

3. It has become clear that research into cluster development in the Yorkshire and the Humber region is at a rather early stage. The work that has been done so far clearly lacks depth of understanding. Most of the objectives set in the Regional Economic Strategy for Yorkshire and the Humber clearly address the areas for improvement, identified by the cluster theory. In that sense they are consistent with the theoretical frameworks. However, in practice, many issues still need to be investigated in much more depth. Of particular reference to this research, the transport and logistics implications of cluster development need to be further explored. For this purpose, the interdependencies between organisations within a cluster need to be understood, and the advantages and constraints imposed by the use of common supply chains and transport infrastructure need to be further investigated.

CHAPTER 4 IMPROVING INDUSTRIAL COMPETITIVENESS THROUGH EFFECTIVE LOGISTICS AND SUPPLY CHAIN MANAGEMENT STRATEGIES: DEVELOPING ANALYTICAL FRAMEWORKS

4.1 Introduction

The previous chapter reviewed cluster theory and provided an evaluation of the formation and development of business clusters as a policy tool to improve the competitiveness of regional economies. It also examined the state and role of cluster development for the economy of the Yorkshire and the Humber region and investigated the current view on cluster development in the region. Findings from other international and UK studies of cluster development in a regional context were also reviewed.

This chapter will investigate how companies can achieve competitive advantage through the implementation of effective logistics and supply chain management strategies. This will lead on to a review of existing supply chain management strategies and the family of supply chain mapping techniques intended to make businesses more competitive. Special attention will be given to identifying any gaps in this knowledge at the regional level and ways of addressing them so that supply chains can add their maximum value to regional economies. A further development of the Scott and Westbrook model will also be made in this chapter. Such a development involves an extension of the pipeline mapping tool by adding a dimension that identifies the location where supply chain activities take place.

4.2 Definitions of Logistics and Supply Chain Management

Different authors provide numerous definitions of logistics. Coyle et al. (1996) offer an extensive overview of various definitions of logistics. Each of these definitions focuses on different aspects of logistics and contributes to a better understanding of what logistics is about. According to these definitions, logistics is described as:

- A process of managing the flows of materials and information through an organisation.
- A managerial process, which entails activities, both on the inbound and outbound side, such as transportation, inventory management, warehousing, materials handling, packaging.
- Logistics also has a spatial and temporal dimension, as the operations involved are place and time sensitive and movement and storage of physical goods are an integral part of logistics.
- Satisfaction of customer requirements and hence, maximisation of profitability, is a major objective of logistics (Coyle et al, 1996).

Christopher provides a definition of logistics that reflects all the above-mentioned characteristics. He defines logistics as "the process of strategically managing the procurement, movement and storage of materials, parts and finished inventory (and the related information flows) through the organization and its marketing channels in such a way that current and future profitability are maximized through the cost-effective fulfilment of orders" (Christopher, 1998).

Harrison and van Hoek offer an insight into the concepts of logistics and supply chain management. They define supply chain management as “The alignment of upstream and downstream capabilities of supply chain partners to deliver superior value to the end customer at less cost to the supply chain as a whole” (Harrison and van Hoek, 2002). According to this definition, supply chain management focuses on customer satisfaction, cost minimisation and profit maximisation. These are also the key objectives of logistics. However, there are certain differences between logistics and supply chain management, which can be mainly attributed to the scope of operations.

According to the above definitions, logistics could be described as a **process** of managing the flows of materials and information through an organisation. Harrison and van Hoek claim that the supply chain entails a number of processes that are not limited to any one organisation and extend across organisational boundaries. They also describe the supply

chain as 'tiered' in a sense that the organisations that a company deals with are organised into groups both on the supply and demand side (see Figure 4.1). As part of supply chain management, "Logistics refers to management of materials and information. Inbound logistics deals with links between our organisation and tier 1 suppliers, while outbound logistics refers to the links between our organisation and tier 1 customers." (op. cit., 2002, pp. 8-9). Thus, the scope of supply chain management is much greater than that of logistics as it is about the **management** of the entire network of organisations and the links between them.

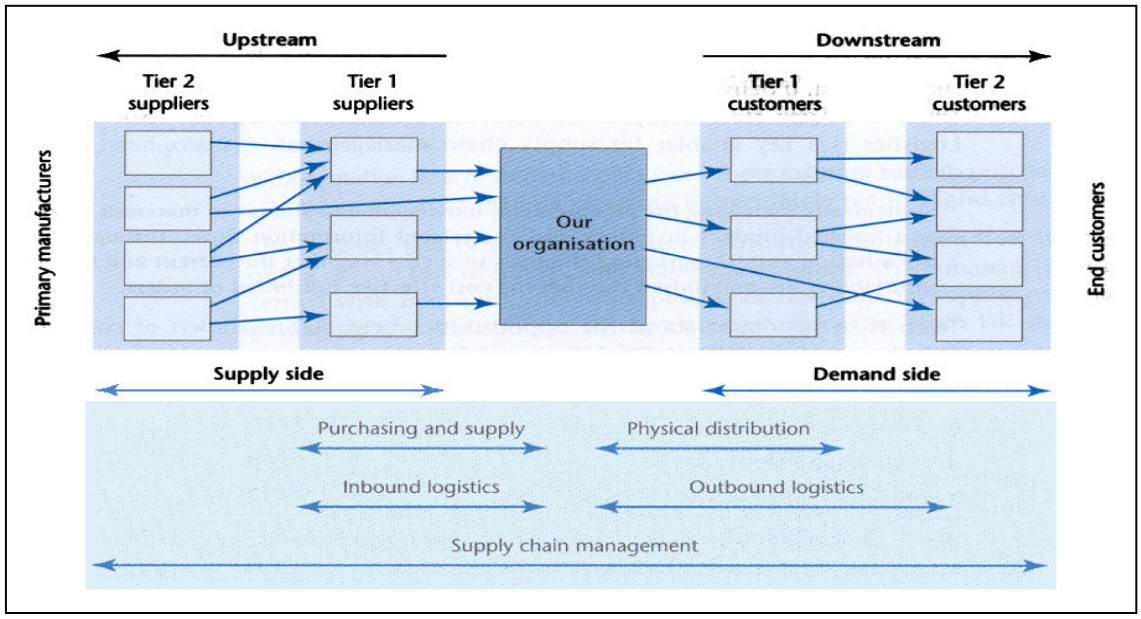


Figure 4.1. Relationships in the Supply Chain
Source: Harrison and van Hoek (2002)

Christopher elaborates the distinction between logistics and supply chain management. He claims "Logistics is essentially a planning orientation and framework that seeks to create a single plan for the flow of product and information through a business. Supply chain management builds upon this framework and seeks to achieve linkage and co-ordination between processes of other entities in the pipeline, i.e. suppliers and customers, and the organisation itself." (Christopher, 1998, p.17).

Scott and Westbrook refer to the traditional attitudes to purchasing and the practice of frequently switching between suppliers to outline the new thinking behind supply chain

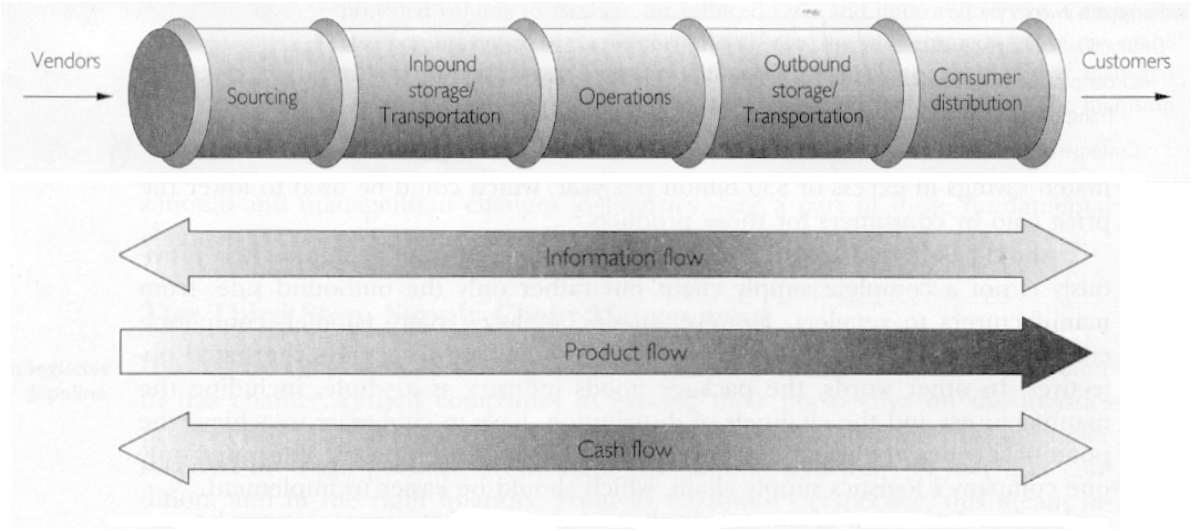
management. The traditional approach to logistics management is associated simply with "purchasing", i.e. "switching between suppliers on the basis of cost or quality or delivery – usually cost" (Scott and Westbrook, 1991, p.27). To go beyond this stage, it is important to adopt the supply chain approach, which makes assessments not from an individual company point of view but rather from a strategic total supply chain perspective. They also suggest that the shift towards supply chain management thinking implies a different approach to managing supplier relationships (see Table 4.1).

Table 4.1. Supplier Relationships Revisited: After the Supply Chain Concept

Traditional purchasing attitudes	Supply chain approach
Good suppliers are: • at arm's length • changed frequently • giving the lowest quote for a given specification	***Good suppliers are:*** • trustworthy • committed to the longer term • innovative • committed to quality

Source: Scott and Westbrook (1991)

Coyle et al. (1996) identified three basic flows of product, information and cash within the supply chain (see Figure 4.2). This shows that information and cash flow in both directions, whereas products flow in only one direction (towards the customer) with the exception of those cases when product and parts returns take place.



Source: Coyle et al. (1996)

Figure 4.2. The Supply Chain and Main Flows Within It

4.3 Achieving competitive advantage through logistics and supply chain management

Cost minimisation and profit maximisation are regarded in economic theory as crucially important factors for the successful running of a business. Indeed, many concepts have been developed to help businesses cut costs and maximise profits. Traditionally, savings might be achieved through economies of scale. The economies of scale allow for gaining a productivity advantage through a reduction of long run average costs.

However, Christopher argued that "An increasingly powerful route to achieving a cost advantage comes not necessarily through volume and the economies of scale but instead through logistics management" (Christopher, 1998). As logistics costs represent a significant share of total costs in many industries, re-engineering of logistics processes could offer a major cost reduction.

Besides cost reduction, logistics offers a significant service enhancement to the end customer and thus leads to a value advantage as well. Competition nowadays is based not only on the physical product itself but also on the intangible value-added services that

complement the tangible features of the product and create value from the end customer's point of view. That is why, as Christopher (1998) claims, companies should seek for a strategy of differentiation through service excellence. This is also the reason why superior customer service has great importance attached to it.

Harrison and van Hoek point out several areas in which an organisation should concentrate its efforts to gain competitive advantage through logistics. These are:

- Quality, which they describe as "the most visible aspect of the supply chain". Quality problems in supply chain processes are visible to the end customer and affect customer loyalty in a very negative way. Such quality problems include unavailability of the product, defects and late deliveries.

- Speed that is measured by the elapsed time from order to delivery, i.e. the lead-time.

- Dependability, which is a measure of how successful a company has been in meeting a delivery promise made to the customer. Deliveries on time and in full are indeed important aspects of customer service.

- Flexibility measures the ability of supply chains to respond to the introduction of new products, new market circumstances or changes in customer demand.

- Cost is indeed regarded as very important for all supply chain processes and is directly linked to the profitability of a business. Cost reductions have important implications for companies as they could gain a competitive advantage in the marketplace through lower prices and/or higher profit margins (Harrison and van Hoek, 2002).

Companies can also gain competitive advantage through effective supply chain management since it is much greater in scope than logistics as it extends across

organisational boundaries and entails the entire network of organisations and the links between them.

There are various ways in which companies could benefit from the supply chain approach. First, they could outsource non-core business activities and this could be achieved only if the organisation is seen to be part of the supply chain. Outsourcing allows companies to focus on their core business. That is why, the trend in modern business is to outsource logistics requirements to specialists (Bamford, 2007). Success through logistics then hinges to a large extent on the existence of competent contractors who between them can provide the full range of logistics services.

It has already been mentioned that the shift towards supply chain management implies a different approach to managing supplier relationships. From a strategic total supply chain perspective, good suppliers are trustworthy, committed to the longer term, innovative and committed to quality (Scott and Westbrook, 1991). This, in turn, implies a move to supply chain integration and co-ordination and replaces the traditional approach to vertical integration.

Christopher acknowledged the benefits that supply chain management bring to businesses and indeed to the end customer as well. Cost reduction, value adding and efficiency through supply chain integration and co-ordination clearly offer a business the opportunity to achieve an important competitive edge. Hence, "the real competition is not company against company but rather supply chain against supply chain" (Christopher, 1998, p. 16).

4.4 'Lean' and 'agile' as approaches to supply chain management

4.4.1 The 'Lean' Concept

The rationale behind the lean approach is elimination, or at least reduction, of waste (Hines and Rich, 1997; Christopher and Towill, 2001). Leanness can be defined as

"developing a value stream to eliminate all waste including time, and to enable a level schedule" (Naylor et al., 1999).

Hines and Rich and Hines et al. contribute to the understanding of the term 'value stream' (Hines and Rich, 1997; Hines et al., 2000). The latter define the value stream as "those set of tasks and activities required to design and make a family of products or services that are undertaken with a group of linked functions or companies from the point of customer specification right back to the raw material source". The difference between 'value stream' and 'supply chain' or 'value chain' is also clearly outlined. "The difference between the traditional supply or value chain on the one hand and the value stream on the other is that the former includes the complete activities of all the companies involved, whereas the latter refers only to the specific parts of the firms that actually add value to the specific product or service under consideration. As such the value stream is a far more focused and contingent view of the value-adding process." (Hines and Rich, 1997).

The above definition of leanness, enhanced by the understanding of what the 'value stream' is, shows that there are two key issues that underpin the 'lean thinking' approach. First of all, it is largely concerned with the reduction or elimination of waste within the supply chain. Secondly, it focuses on the identification and pursuing of the value-adding processes and activities within supply chains.

Hines et al. outline the key elements of the 'lean thinking' (see Table 4.2).

Table 4.2. The Ten Key Elements of the Lean Value Stream

1.	Specify what does and does not create *value* from the customer's perspective rather than from the perspective of individual firms, functions and departments
2.	Identify all the steps necessary to design, order and produce across the whole *value stream* to highlight non-value-adding waste
3.	Make those actions that create value *flow* without interruption, detours, backflows, waiting or scrap
4.	Only make what is *pulled* by the customer just-in-time
5.	Create a dynamic *transparency* of strategies, costs and information in the value stream
6.	Address competitive advantage at the value stream *network* level, moving past simple buyer/supplier partnership rhetoric
7.	Use a new toolkit called *value stream mapping* for analysis, diagnosis and implementation of change
8.	Focus on key *processes*, not just separate business departments
9.	Address *whole industries* over the long term rather than on short-term improvement of individual firms
10.	Strive for *perfection* by continually removing successive layers of waste as they are uncovered

Source: Hines et al. (2000)

It has already become clear that the focus on waste removal is crucial to lean manufacturing thinking and, as they put it, it is primarily "productivity-oriented" (Hines et al., 2000). The focus on productivity rather than anything is attributed to the claim that "improved productivity leads to leaner operations which help to expose further waste and quality problems in the system". "Thus the systematic attack on waste is also a systematic assault on the underlying causes of poor quality and fundamental management problems." (Bicheno (1994) quoted in Hines et al., 2000, p. 14).

For example, seven wastes have been identified within the 'Toyota Production System':

- Overproduction
- Waiting
- Transportation
- Inappropriate Processing
- Unnecessary Inventory
- Unnecessary Motion
- Defect

All of the above-listed wastes have a negative impact on productivity, communications, lead-and-storage-times, work-in-progress stocks and inventory levels. These result in poor company performance and customer service and thus not only severely impair the competitiveness of a business, but they also have a negative effect on overall supply chain performance.

As has been already mentioned, value-and non-value adding are important parts of lean thinking. From this perspective, three types of operations can be distinguished:

- Non-Value-Adding operations, which are regarded as pure waste and should be eliminated completely.

- Necessary but Non-Value-Adding are those operations, which are wasteful, but may be necessary under the current operating procedures.

- Value-Adding operations are concerned with the conversion or processing of raw materials or semi-finished products, in which manual labour or machined operations are involved. (Monden (1993) quoted in Hines et al., 2000, p. 14).

Hines et al. (2000) point out that these concepts, as described above, and especially the categorising of the wastes, are largely concerned with a manufacturing environment. However there is a claim that "Although the 'Seven Wastes' were originally developed in a manufacturing context, research has shown that waste removal is equally relevant as a basis for improvement across the whole range of supply-chain activities such as warehousing, transport, procurement or sales." (Taylor, 1999a, p. 15).

Indeed, attempts have been made to apply these concepts into a wider range of UK-based industry sectors and a warehouse environment (Hines (1994) and Jones (1995) quoted in Hines et al., 2000). The seven wastes have even been reworded to fit into an after-market distribution setting and have been renamed as follows:

- faster than necessary pace;
- waiting;
- conveyance;
- processing;
- excess stock;
- unnecessary motion;
- correction of mistakes. (Jones (1995) quoted in Hines et al., 2000).

4.4.2 The 'Agile' Concept

Naylor et al. (1999), quoted in Christopher and Towill (2001) define agility as "using market knowledge and a virtual corporation to exploit profitable opportunities in a volatile marketplace".

Schary and Skjøtt-Larsen expand the above definition and link agility to the transition from mass production to customised manufacturing. Under these new circumstances, the focus is not so much on cost minimisation and economies of scale through mass production but rather flexibility, customisation and response to individual customer requirements. Agility is a new model of "close integration to match individual customer requirements and serve strategy beyond the boundaries of production. Agile manufacturing is therefore recognition of a need to integrate production operations into the supply chain." (Schary and Skjøtt-Larsen, 2001).

Another important characteristic of agility, which is closely linked to flexibility and customisation, is that it is a concept developed to deal primarily with turbulence and uncertainty in the marketplace. While the lean concept has been developed to deal with waste elimination and value adding maximisation, agility is mostly concerned with issues that stem from uncertainty associated with upstream demand in the supply chain (Christopher and Towill, 2001).

Companies have adopted supply chain strategies such as 'the principle of postponement' to deal with uncertainty in demand. Harrison and van Hoek define postponement as "the delay of value-adding activities in the supply chain until customer orders are received. Orders are then executed with the intention of customising product/service requirements when they are on the way to the customer.". Research by van Hoek (2000) shows that postponement is most commonly applied to supply chain activities such as packaging, labelling and adding country/language-specific kits.

Another supply chain strategy, mainly used to deal with uncertainty resulting from seasonality, is that of 'semi-postponement'. In this case, postponement is executed to retailer order, not end customer order (Harrison and van Hoek, 2002).

4.4.3 Differences Between the 'Lean' and 'Agile' Concepts

Christopher and Towill (2001) make a comparison between the lean and agile concepts. A closer look at their findings shows important characteristic features of both concepts. The lean and agile concepts are similar in a way in so far as they both require high levels of product quality and minimisation of lead-times. Both concepts are also interdependent in a way that agility builds on performance improvements driven by the 'lean thinking' concept. However, there are certain differences between them. These are shown in Table 4.3.

Table 4.3. Differences Between the 'Lean' and 'Agile' Concepts

Lean concept	Agile concept
Works well in cases where demand is relatively stable and predictable and where variety is low.	Works well in cases where demand is volatile and the customer requirement for variety is high.
The lean concept is most powerful when the winning criterion is cost.	The agile concept is most powerful when service and customer value enhancement are prime requirements for market winning.
Quality, lead-time and service level are market qualifiers for lean supply. Cost is the market winner.	Quality, cost and lead-time are market qualifiers for agile supply. Service level is the market winner.
The total cycle time compression paradigm is a sufficient condition for achieving lean production.	The total cycle time compression paradigm is only one necessary condition for enabling agile supply.
Lean procedures are intended to meet base demand and economies of scale are achievable through their application.	Agile procedures are intended to meet surge demand and involve more flexible, and probably higher cost, processes.

Source: After Christopher and Towill (2001)

Mason-Jones et al. (2000) quoted in Christopher and Towill (2001) further elaborate on the differences between the lean and agile concepts and distinguish between the two concepts on the bases of their attributes assessment (see Table 4.4).

Table 4.4. Differences between the lean and agile concepts

Distinguishing attributes	Lean supply	Agile supply
Typical products	Commodities	Fashion goods
Marketplace demand	Predictable	Volatile
Product variety	Low	High
Product life cycle	Long	Short
Customer drives	Cost	Availability
Profit margin	Low	High
Dominant costs	Physical costs	Marketability costs
Stockout penalties	Long-term contractual	Immediate and volatile
Purchasing policy	Buy materials	Assign capacity
Information enrichment	Highly desirable	Obligatory
Forecasting mechanism	Algorithmic	Consultative

Source: Mason-Jones et al. (2000)

Christopher and Towill suggest some ways in which the lean and agile concepts could co-exist, claiming that "the real focus on supply chain re-engineering should be on seeking ways in which the appropriate combination of lean and agile strategies can be achieved" (Christopher and Towill, 2001).

4.5 Supply chain mapping

Christopher (1998) claims that the activity of mapping processes in the supply chain is largely concerned with the identification and understanding of the opportunities for improvements in productivity through re-engineering these processes. The concepts of 'value adding' time versus 'non-value-adding' time are crucial as far as the reengineering opportunities are concerned.

Another, yet similar approach to supply chain mapping has been developed and this largely reflects the 'lean thinking' principles. Accordingly, the logic behind supply chain mapping is to "help researchers or practitioners to identify waste within individual value

streams and then to find an appropriate route to remove or at least to reduce this waste" (Hines et al., 2000).

Harrison and van Hoek (2002) suggest that the main purpose of supply chain mapping is to generate visibility of the processes within the supply chain and once this has been achieved, benchmarking against accepted performance indicators can show important areas for improvement.

The importance of benchmarking logistics processes has been clearly outlined by Christopher (1998). Benchmarking of logistics processes, as in other manufacturing processes, is largely concerned with process improvement and process control rather than the output itself. This, related to the supply chain, means that in order to achieve high levels of customer satisfaction it is important to understand, monitor and control all the processes from the input of raw materials to the distribution of the end product. This could be achieved through mapping, or flowcharting, supply chain processes.

Christopher argues that any improvements in productivity are closely related to the 'value-adding' versus 'non-value-adding' time concept. Value-adding time is defined as the "time spent doing something which creates a benefit for which the customer is prepared to pay" versus the "time spent on an activity whose elimination would lead to no reduction of benefit to the customer", which is non-value-adding time (Christopher, 1998, p. 110). Thus, manufacturing or the physical movement of a product could be classified as value-adding time.

Supply chain mapping allows for literally 'seeing' the opportunities for reducing non-value-adding time. In doing so, supply chain mapping highlights areas for potential improvements in the supply chain. The latter, enhanced by better communication and the sharing of information, contributes to an improved visibility in the supply chain. There is a claim that "Once this visibility has been achieved it is possible to benchmark similar processes (Harrison and van Hoek, 2002, p. 121).

A supply chain map is described as “essentially a time-based representation of the processes and activities that are involved as the materials or products move through the chain. Simultaneously the map highlights the time that is consumed when those materials or products are simply standing still, i.e. as inventory.” (Christopher, 2005, p. 162). Harrison and van Hoek (2002) further contribute to the understanding of supply chain mapping. They point out that when mapping takes place, the focus is on the actual processes that are taking place and not on those that are supposed to happen. The same refers to time as actual times that are observed are recorded. “The key is to track one order, one product, or one person through the process with respect to time.” and, hence, “A map is a snapshot taken during a given time period.” (Harrison and van Hoek, 2002).

Based on the 'pipeline map' introduced by Scott and Westbrook (1991), Christopher (1998) distinguishes between two types of time in supply chain mapping, namely ‘horizontal’ time and ‘vertical’ time. The former represents time spent in processes. The latter is regarded as time when the material or product is not being moved or processed but is rather standing still as inventory. Hence, ‘vertical’ time adds no value but only generates cost.

There are different factors that result in non-value-adding time in a supply chain. Christopher (1998) refers to these as “rules that are imposed or that have been inherited” and are:

- Economic batch quantities;
- Economic order quantities;
- Minimum order sizes;
- Fixed inventory review periods;
- Production planning cycles;
- Forecasting review periods.

However, the above-listed factors are largely relevant at a microeconomic, corporate level. In a much broader context, to assess the impact of inefficiencies in logistics service

provision on key performance indicators (such as lead-times and inventory levels) at regional level, these could well be:

- the nature of the decision making process (the way the decisions are made and at which level) that affects movement of goods from and into the planning region;

- the extent to which companies outsource non-core activities and the nature of their logistics requirements;

- the way users and providers obtain information about each other;

- the importance that users and providers attach to different service attributes and the way they evaluate each others' performance;

- barriers that prevent the logistics industry at regional level supplying efficient services, such as skills shortage, road congestion, operational constraints, regulatory restrictions and health and safety legislation.

Harrison and van Hoek (2002) suggest that the mapping process involves the following stages:

- Creation of a task force
- Selecting the process to map
- Data collection
- Distinguishing between value-adding and non-value-adding time
- Construction of the time-based process map
- Solution generation

The actual mapping is done using a supply chain mapping toolkit, which will be discussed below.

4.6 Supply Chain Mapping Toolkit

As has already been mentioned, the rationale behind supply chain mapping is the removal, or at least reduction, of different wastes, identified within the 'Toyota Production System'. Supply chain mapping also helps to generate visibility of the processes within the supply chain and once this has been achieved, benchmarking against accepted performance indicators could reveal important areas for improvement.

Scott and Westbrook suggest that three major steps should be undertaken to improve supply chain performance:

- Pipeline mapping

- Positioning the organisation in terms of supplier relations

- Selecting actions to enhance supply chain effectiveness.

They introduce a supply chain mapping tool, which they call a 'pipeline map', as a way to represent often complex supply chains. Their 'pipeline map' is a 2-dimensional model, which graphically represents lead times between each stage of the supply chain and inventory levels at each point in the supply chain (an illustration of the model is presented in Figure 4.3).

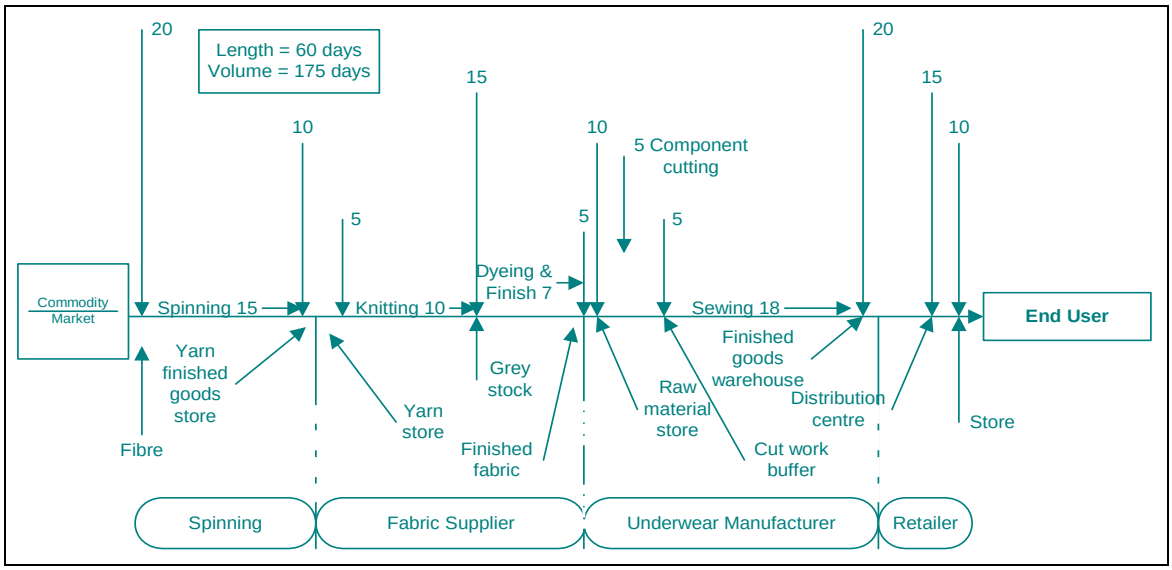


Figure 4.3. Scott and Westbrook 'Pipeline Map'
Source: Scott and Westbrook (1991)

A particular advantage of this model is that different levels of detail can be applied according to requirements. Scott and Westbrook claim that the pipeline map analysis may "telescope into any of the processes and break it down further into its sub-processes and the intermediate stockholding points between them" (Scott and Westbrook, 1991). Thus, this mapping technique could be used to identify and concentrate on that supply chain or parts of it where performance improvements are most needed. This is very important, as in practice the structure of most supply chains is very complex on both the supply and demand sides.

Hines and Rich (1997) introduce another seven mapping tools:

1. Process activity mapping
2. Supply chain response matrix
3. Production variety funnel
4. Quality filter mapping
5. Demand amplification mapping
6. Decision point analysis
7. Physical structure

Each of the above-listed mapping tools originates from a different area; two of them are regarded as new (see Table 4.5).

Table 4.5. Origin of the supply chain mapping tools

Mapping tool	**Origin of mapping tool**
(1) Process activity mapping	Industrial engineering
(2) Supply chain response matrix	Time compression/logistics
(3) Production variety funnel	Operations management
(4) Quality filter mapping	New tool
(5) Demand amplification mapping	Systems dynamics
(6) Decision point analysis	Efficient consumer response/logistics
(7) Physical structure	New tool

Source: Hines and Rich (1997)

Research undertaken by them, followed by the Lean Processing Programme (LEAP) that took place between 1997 and 2000, studied the application of each of the mapping tools.

Table 4.6 shows the usefulness of the various mapping tools in tackling each of the wastes as identified within the 'Toyota Production System'.

Table 4.6. The Seven Value Stream Mapping Tools

Mapping Tool Wastes/Structure	Process Activity Mapping	Supply Chain Response Matrix	Production Variety Funnel	Quality Filter Mapping	Demand Amplification Mapping	Decision Point Analysis	Physical Structure (a) volume (b) value
Overproduction	L	M		L	M	M	
Waiting	H	H	L		M	M	
Transport	H						L
Inappropriate Processing	H		M	L		L	
Unnecessary Inventory	M	H	M		H	M	L
Unnecessary Motion	H	L		H			
Defects	L						
Overall Structure	L	L	M	L	H	M	H
Notes: H = High correlation and usefulness M = Medium correlation and usefulness L = Low correlation and usefulness							

Source: Hines and Rich (1997)

4.7 An illustration of the concept of the extended Scott and Westbrook mapping technique

The review of the literature in the previous section led to the conclusion that neither the Scott and Westbrook 'pipeline map' nor the family of mapping tools introduced by Hines et al (2000) incorporates a regional or spatial dimension and none of them investigates the impact of such a regional or spatial dimension on supply chain performance. To address this knowledge gap, a further development of the Scott and Westbrook model is proposed. Such a development involves an extension of the pipeline mapping tool by adding a dimension that identifies the location of supply chain activities (see Figure 4.4).

The extension of the Scott and Westbrook supply chain mapping tool aims to achieve a clear representation on a scaled diagram of:

- lead times and time spent in processes; these are plotted on the horizontal, X axis;
- the levels of inventory in the supply chain, which are plotted on the Y-axis;

- locations of inventory in the supply chain and the location of supply chain activities throughout the whole supply chain; these are plotted on the extended vertical axis which runs downwards below the horizontal (X) axis;

The location of supply chain activities, which becomes visible by means of this enhancement of the Scott and Westbrook mapping tool, is important in order to:

- identify the extent to which supply chain activities take place in a region under consideration;
- consider whether supply chain activities that take place outside the planning region can possibly be undertaken within the region without any detriment to cost or service level whilst producing benefit for the regional economy.

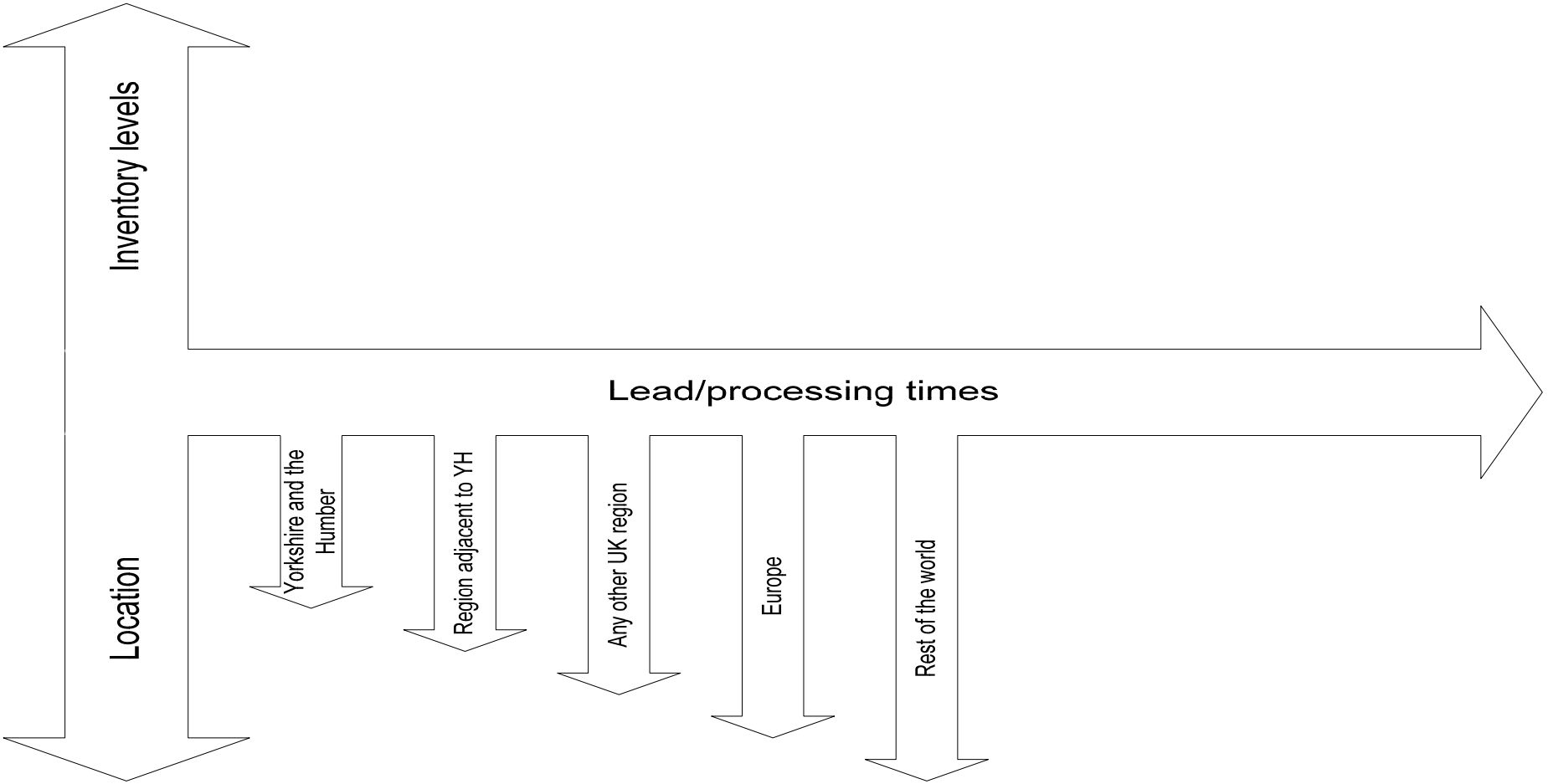


Figure 4.4: Illustration of the concept of the extended Scott and Westbrook mapping tool

The possibility of developing this concept using the 'Supply Chain Response Matrix' mapping tool was also considered. Similar to the Scott and Westbrook 'pipeline map', the horizontal axis represents the lead time (in days) for the product, while the vertical axis shows the average amount of standing inventory (in days) at specific points in the supply chain (see Figure 4.5). In comparison with the Scott and Westbrook 'pipeline map', the supply chain response matrix was however found harder to adapt to the approach adopted in this research project due to the following reasons:

- It employs cumulative rather than absolute numbers for the lead times and inventory levels, which does not allow a more detailed representation of the location of supply chain activities and the levels of, and locations of, inventory at different stages of the supply chain;
- The extension of the supply chain response matrix will be less immediately visual than that of the Scott and Westbrook 'pipeline map' and this will reduce the potential benefits offered by the mapping tool;
- It will be much technically challenging to apply the concept to the supply chain response matrix.

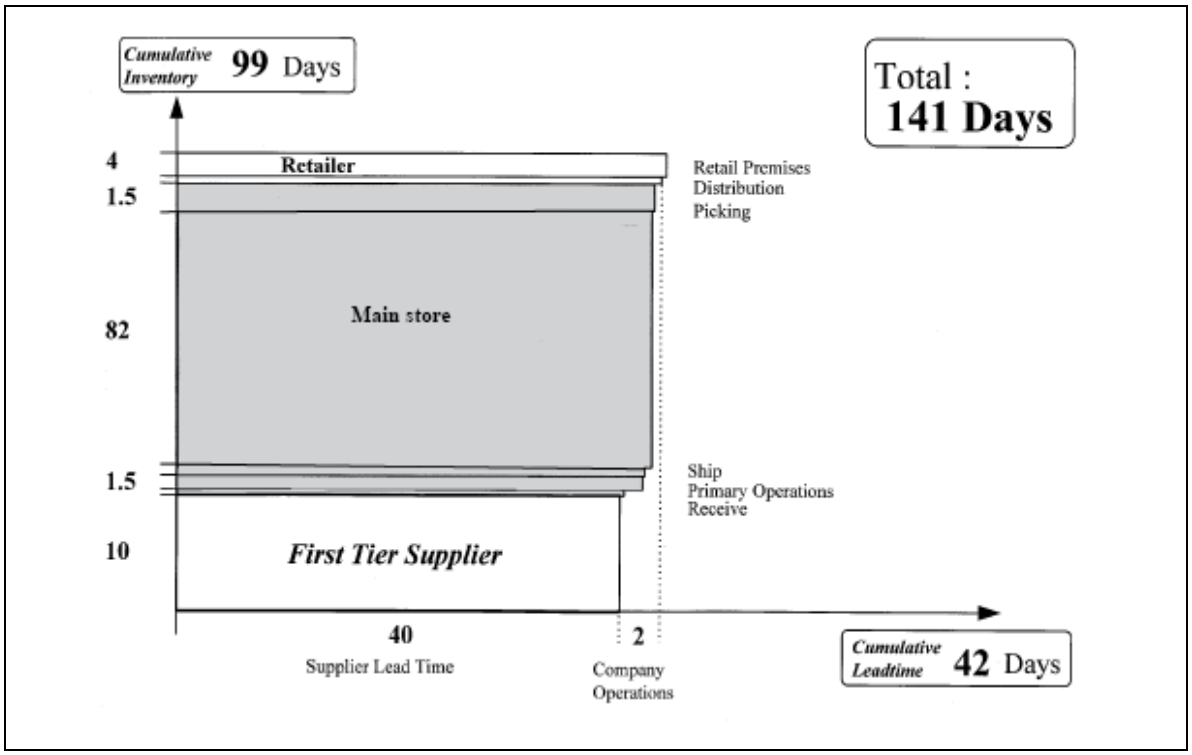


Figure 4.5: 'Supply Chain Response Matrix' mapping tool
Source: Hines and Rich (1997)

4.8 Conclusions

This chapter has investigated how companies can achieve competitive advantage through the implementation of effective logistics and supply chain management strategies. Outsourcing logistics requirements to specialists has been recognised as an important trend in modern business. Success through logistics then hinges to a large extent on the existence of competent contractors who between them can provide the full range of logistics services.

In order to maintain low costs and high levels of customer satisfaction it is important that companies understand, monitor and control all the processes from the input of raw materials to the distribution of the end product. This could be facilitated through mapping, or flowcharting, supply chain processes.

Lead times and inventory levels, which the Scott and Westbrook mapping technique focuses on, are crucial performance indicators for supply chain management. Furthermore, an investigation into the impact of any shortfalls in logistics service provision on such key performance indicators at the regional level **can only be achieved if the location of supply chain activities is visible**. However, neither the Scott and Westbrook 'pipeline map' nor the family of mapping tools introduced by Hines et al (2000) incorporates a regional or spatial dimension and none of them investigates the impact of such a regional or spatial dimension on supply chain performance. To address this knowledge gap, a further development of the Scott and Westbrook model is made in this research project. Such a development involves an extension of the pipeline mapping tool by adding a dimension that identifies the location where supply chain activities take place. Thus, it becomes possible to identify the extent to which supply chain activities take place in a particular region, and how much value could potentially be added within the region at each stage of the supply chain.

This approach based on supply chain mapping and performance measurement against accepted benchmarks has therefore been adopted in this research to identify any shortfalls in logistics service provision at the regional level and could lead to significant improvements in the supply chain, thus increasing the competitiveness of companies and hence the competitiveness of the regional economy. The extended Scott and Westbrook mapping technique is applied to case studies of supply chains involving companies from the Yorkshire and the Humber region later in Chapter 7. Before that the design and methodology of two questionnaire surveys of users and providers of freight transport and logistics services in Yorkshire and the Humber is discussed in the next chapter.

CHAPTER 5 ORIGINAL INVESTIGATION OF USERS AND PROVIDERS OF FREIGHT TRANSPORT AND LOGISTICS SERVICES: SURVEY METHODOLOGY

5.1 Introduction

The previous chapter discussed how companies can achieve competitive advantage through effective logistics and supply chain management strategies. The 'lean' and 'agile' concepts as approaches to supply chain management were compared. This led to a discussion of supply chain mapping as a method which helps the researcher to understand, monitor and control all the processes from the input of raw materials to the distribution of the end product and generates visibility of the processes within the supply chain. The review of the supply chain mapping toolkit showed that none of the mapping tools, including the Scott and Westbrook 'pipeline map', incorporated a regional or spatial dimension and none of them investigated the impact of such a regional or spatial dimension on supply chain performance.

This chapter discusses the design and methodology of two questionnaire surveys. These surveys are of users and providers of freight transport and logistics services in Yorkshire and the Humber. It also explains how these surveys contribute to meeting the overall aims and objectives of this research project. The process of questionnaire distribution, the method of sampling and the distribution of responses to both questionnaires are also discussed.

The survey results are presented and discussed in the next chapter.

5.2 Discussion of methodological issues

Sekaran (2000) defines business research as "an organised, systematic, databased, critical, objective, scientific inquiry or investigation into a specific problem, undertaken with the purpose of finding answers or solutions to it".

The building blocks of scientific inquiry according to the same author include the processes of initially observing phenomena, identifying the problem, constructing a theory as to what might be happening, developing hypotheses, determining aspects of the research design, collecting data, analysing the data and interpreting the results (Sekaran, 2000).

Observation is the initial activity undertaken by the researcher and leads to identification of the problem area. Once the problems are defined, the need to design the research methodology arises. Research methods refer to the ways in which research studies are designed and the procedures by which data are analysed in order to best achieve the research objectives of the project. The choice of research methods very much depends on the general research philosophy which underpins the research activity and therefore reflects the principles of positivism, interpretivism or realism.

Positivism is defined as "research philosophy that involves working with an observable social reality. The emphasis is on highly structured methodology to facilitate replication, and the end product can be law-like generalisations similar to those produced by the physical and natural scientists" (Saunders et al, 2003).

Interpretivism is a research philosophy that "requires the researcher to seek to understand the subjective reality and meanings of participants" (Saunders et al, 2003). This is often associated with the term constructionism or social constructionism. Constructionism explores the subjective meanings motivating people's actions in order to be able to understand these.

Positivism and social constructionism are described in theory as two contrasting traditions. Easterby-Smith et al (2008) elaborate on the characteristic features of the two research philosophies (see Table 5.1). The two philosophies mainly differ in the way they interpret and explain the differences in people's experiences and behaviour. In the social constructionist approach, compared to the positivist approach, "the 'reality' is determined

by people rather than by objective and external factors. Hence the task of the social scientist should not be to gather facts and measure how often certain patterns occur, but to appreciate the different constructions and meanings the people place upon their experience. The focus should be on what people, individually and collectively, are thinking and feeling, and attention should be paid to the ways they communicate with each other, whether verbally or non-verbally" Easterby-Smith et al (2008).

Table 5.1: Contrasting Implications of Positivism and Social Constructionism

	Positivism	**Social constructionism**
The observer	must be independent	is part of what is being observed
Human interests	should be irrelevant	are the main drivers of science
Explanations	must demonstrate causality	aim to increase general understanding of the situation
Research progresses through	hypotheses and deductions	gathering rich data from which ideas are induced
Concepts	need to be defined so that they can be measured	should incorporate stakeholder perspectives
Units of analysis	should be reduced to simplest terms	may include the complexity of 'whole' situations
Generalisation through	statistical probability	theoretical abstraction
Sampling requires	large numbers selected randomly	small numbers of cases chosen for specific reasons

Source: Easterby-Smith, M. et al (2008)

The strengths and weaknesses of each approach are summarised in Table 5.2.

Table 5.2: Strengths and weaknesses of research philosophies

	Strengths	Weaknesses
Positivist	Can provide wide coverage. Potentially fast and economical. Easier to provide justification of policies.	Inflexible and artificial. Not good for process, meanings or theory generation. Implications for action not obvious.
Relativist	Accepts value of multiple data sources. Enables generalisations beyond present sample. Greater efficiency including outsourcing potential	Requires large samples. Cannot accommodate institutional and cultural differences. Problems reconciling discrepant information.
Social Constructionist	Good for processes, and meanings. Flexible and good for theory generation. Data collection less artificial.	Can be very time consuming. Analysis and interpretations are difficult. May not have credibility with policy makers.

Source: Easterby-Smith, M. et al (2008)

Choice of research approach

The choice of research approach is important as it influences the overall design of the research project. The researcher may choose the deductive approach which involves the development of a theory and hypothesis (or hypotheses) and the design of a research strategy to test the hypothesis. It may however be more appropriate to adopt the inductive

approach in which data is collected and theory is developed as a result of the analysis of the data (Saunders, M et al, 2003).

In the context of this particular research, it was important to gather information and collect data in a relatively novel and under-researched area. Therefore, it was difficult to frame a hypothesis because of the relatively little information in the public domain and the rather insufficient understanding of the topic at the inception stage of the research project. For this reason, it was concluded that induction was the more appropriate research approach, especially to an 'exploratory' study such as this. 'Exploratory' is a study which aims to find out "what is happening, particularly in little-understood situations; to seek new insights; to ask questions; to assess phenomena in a new light and to generate ideas and hypotheses for future research"(Robson, 2002, p.59). An exploratory study is associated with more flexible research design, which typically includes the collection of non-numerical data (but can also include the collection of quantitative data), evolves during data collection and is often referred to as a qualitative strategy (Robson, 2002).

The approaches and strategies as discussed above do not exist in isolation. It is quite usual, and often beneficial, to combine quantitative and qualitative methods and to use primary and secondary data (Saunders, M et al, 2003; Easterby-Smith, M., 2008; Robson, 2002). The relative merits of different data collection methods are shown in Table 5.3.

Table 5.3: Strengths and Weaknesses of Different Data Collection Methods

Research strategy	Form of question	Need control over behavioural events?	Focuses on contemporary issues?	Advantages	Disadvantages
Experiment	How, why	Yes	Yes	Generalisable to a statistical population	Limited focus; *a priori* theoretical commitment
Survey	Who, what, where, how many and much	No	Yes	Generalisable to a statistical population	Limited scope; may ask the wrong question
Archival analysis	Who, what, where, how many and much	No	Yes/no	Interpret past events in light of new information; find mistakes in previous interpretations	Not generalisable to a statistical population; may be subjective
History	How, why	No	No		Often lack access to subjects of research
Case study	Who, what, how, why, where, how many and much	No	Yes	Ability to ask why and to narrate; uses range of methodologies; Suitable for examining processes (such as activities along a supply chain)	Not generalisable to a statistical population; subjective; may use small sample sizes; validity of results from interviews with actors may be difficult to establish

Source: Yin (2003) and Woodburn (2000)

The use of multiple methods (quantitative and qualitative) to enhance the rigour of the research is known as 'methodological triangulation' (Robson, 2002). Triangulation allows for checking the results of a qualitative method with those of a quantitative method (or vice versa). For example, interviews may be a valuable way of triangulating data collected by other means such as a questionnaire.

Hence, based on the above arguments and analysis, the chosen methodologies in this thesis are the literature review, the questionnaire surveys and the case studies. The approach to and the outcomes of the literature review have been discussed in Chapters 2-4. The methodology and data collection requirements for the case study exercise are presented in Chapter 7. The design and methodology of the questionnaire surveys are discussed in detail in the section below.

5.3 Survey Design and Methodology

5.3.1 Questionnaire Objectives

Two questionnaire surveys were designed to determine the present state of freight transport and logistics services in the Yorkshire and the Humber region. The aim of these surveys was to identify the needs of users of freight transport and logistics services in the region, and to determine how successfully the providers of such services in the region are meeting those needs at the present time. The surveys laid particular emphasis on determining any shortfalls in service provision in the region, so that strategies to address such shortfalls could be determined and appropriate recommendations put in place.

Within the context of the overall aims of the research project, the specific objectives of the two surveys are:

To gather information on the logistics requirements of **users** of freight transport and logistics services in Yorkshire and the Humber, including:

- Whether they outsource these requirements or use their own resources;

- The extent to which value-added activities such as warehousing, labelling and packaging are required and the ways in which they are organised;
- The locations of their logistics providers.

To evaluate the adequacy of services offered by freight transport and logistics service **providers**, including:

- To understand the work carried out by service providers and determine whether it is focused on the Yorkshire and the Humber region;
- To gather information on the support that service providers offer at local, national and international level for movements in to and out of the Yorkshire and the Humber region.

For both **user and provider companies**, to understand the nature of the decision-making processes that affect:

- Corporate logistics requirements;
- Movements of goods out of and in to the Yorkshire and the Humber region (e.g. decisions on routes and modes of transport);
- Where such decisions are taken and at what level.

To identify any gaps in service provision, including:

- The ways users and providers obtain information about each other;
- Contract review mechanisms;
- The importance that users and providers attach to different service attributes and the ways they evaluate each other's performance;
- The market perception of both users and providers.

To obtain information about the current and future barriers to effective freight transport and logistics service provision in the Yorkshire and the Humber region.

The ultimate goal of the surveys was to determine whether users of freight transport and logistics services (particularly manufacturing companies in Yorkshire and the Humber) could obtain excellent services at competitive prices, to allow them to improve their industrial competitiveness to the benefit of the regional economy.

Some emphasis was put on the role of transport and logistics services in facilitating trade between the Yorkshire and the Humber region and the rest of the world, and so allow the region's industry to become more competitive in the global market place.

5.3.2 Survey Objectives and Overall Research Aims and Objectives

As stated in Chapter 1, the **aim** of this research project is to explore the relationships between the success of the regional economy – particularly the Yorkshire and the Humber region – and the adequacy or otherwise of its logistics infrastructure and services, in order to determine how regional competitiveness can be enhanced through the provision of effective logistics services.

The main **objective** is to evaluate the role of logistics in regional economic development. To achieve this, a number of research questions have to be addressed:

- Why is logistics important to the Yorkshire and the Humber region?
- How is logistics related to its current and future economic development?
- What are the strengths and weaknesses of logistics service provision in the Yorkshire and the Humber region and how do they hinder or facilitate the movement of goods from and into the region?
- What is the potential for improving the already established logistics network in the region?
- Is it worth investing in logistics as a way of spreading economic prosperity over the whole Yorkshire and the Humber region?

- How could logistics contribute to developing workforce skills and competencies?

- How can logistics be turned into a profitable opportunity for the Yorkshire and the Humber region?

At this fairly advanced stage of the project, the research questions were validated by the findings from the literature review and in discussions with Yorkshire Forward and its freight industry working group, 'Freight Business Yorkshire & Humber'.

As a next step, and in pursuit of a rigorous approach to achieving the aim and objective of this study, questionnaires were designed to answer these research questions. A copy of each questionnaire (for the postal and the telephone follow-up surveys) is included in the Appendices.

Below is an elaboration of how each of the research questions was addressed by the content of the questionnaires.

- **Why is logistics important to the Yorkshire and the Humber region? How is logistics related to its current and future economic development?**

The literature review showed a range of issues in support of this research question:

- The trend towards regional devolution in the UK and the re-emergence of the planning region as a unit of analysis;

- A shift from traditional sector orientation (manufacturing, construction, electricity, gas and water, mining and quarrying) towards services and R&D sectors;

- Freight industries were identified as sectors that are vital to the regional economy and have potential for growth.

The trade profile of the region has shown that it is very heavily dependent on European trade. Its favourable geographical location (being close to the rest of Europe) and the unique transportation features of the Humber ports further enhance trading opportunities. It is clear that the region is endowed by certain strengths. It is essential, however, to assess **the adequacy of the existing transport infrastructures** and their utilisation for the movement of goods out of and in to the Yorkshire and the Humber region. Both the user and provider questionnaires were designed to address this very important issue.

The current and future economic development of the Yorkshire and the Humber region is closely linked to cluster development. Yorkshire Forward has acknowledged the formation and promotion of business clusters as an effective approach to improving the competitiveness of the regional economy. Moreover, it has identified five priority clusters as crucial to the regional economy:

- Food (including agriculture) and Drink
- Chemicals
- Advanced Engineering and Metals
- Digital Industries
- Bioscience

The first three of these are major users of logistics services. For this reason, when designing the questionnaires, emphasis was put on surveying manufacturing companies in these three clusters to assess the transport and logistics implications of cluster development for the regional economy.

- **What are the strengths and weaknesses of logistics service provision in the Yorkshire and the Humber region and how do they hinder or facilitate the movement of goods from and into the region? Which are the areas for improvement?**

To address these research questions, the surveys were designed:

- To gather information on the logistics requirements of user companies;
- To evaluate the adequacy of service provision;
- To identify any gaps (shortfalls) in service provision;
- To identify the current and future barriers to effective service provision.

- **Is it worth investing in logistics as a way of spreading economic prosperity over the whole Yorkshire and the Humber region?**

The Yorkshire and the Humber region is characterised by its diversity. Each of its sub-regions has different social status and economic specialisation.

The economic disparities across the region are further deepened by the prosperity of the economy of major cities like Leeds, which has grown strongly in recent years. In contrast, large areas of relative deprivation remain.

For this reason, any well-thought out economic strategy must be of benefit to the whole region rather than to separate sub-regions or major cities. For example, investment into the financial services sector will favour the economic development of a city like Leeds whereas **investment into logistics could spread the economic prosperity over a sub-region or indeed the whole region.**

To assess this potential role of logistics, the surveys are designed to:

- Obtain information on the transport and logistics sector in Yorkshire and the Humber. Both user and provider questionnaires established the size of companies, total number of employees, employees in Yorkshire and the Humber, Head Office location and location of current markets to assess how powerful these companies are as economic agents within the Yorkshire and the Humber region;

- Analyse data at sub-regional level to identify whether results reflect the degree of economic development of the sub-regions;

- Obtain information on the nature of the decision-making processes within companies in Yorkshire and the Humber regarding their logistics requirements, routes and modes of transport and choice of logistics providers. Questions were asked about the level at which decisions are taken and the location of decision-making. Such questions were important to assess the implications of decision-making for the economic power of these companies within the region and for the regional economy overall. In cases where most of the decisions are taken outside the region, this will not necessarily benefit the regional economy to any significant extent.

- **How could logistics contribute to developing workforce skills and competencies?**

The review of the literature sources has shown that logistics is regarded as important for regional employment growth. The future development of this sector and its contribution to the regional economy, however, depends on the ability of the workforce to offer the required skills and competencies. Therefore, skills issues are a major cause for concern to both users and providers of freight transport and logistics services as the lack of appropriate skills threatens their future competitiveness. This is particularly relevant to businesses in the key industrial clusters (Food and Drink, Chemicals and Advanced Engineering) as they tend to be heavy users of freight transport and logistics services.

Questions directly addressing any skills shortages that affect both users and providers of freight transport and logistics services in Yorkshire and the Humber were included in the surveys. The focus was on:

- Driver shortages and other skills shortages;
- The cost of training;
- The impact of Health and Safety legislation;
- The potential impact of the Working Time Directive.

Indirectly, responses to questions about the sources of information employed by users when searching for logistics operators and by providers when searching for new customer contacts will show the overall level of techno-readiness within companies.

- **How can logistics be turned into a profitable opportunity for the Yorkshire and the Humber region?**

In both surveys, there was particular emphasis on determining any shortfalls in service provision in the region, so that strategies to address such shortfalls can be determined and recommendations made to put in place.

Table 5.4 presents a summary of how the research questions are addressed by survey objectives and relevant sections of the questionnaires.

Table 5.4. Research Questions, Survey Objectives and Questionnaire Contents: A Summary Table (1 of 4)

Research Question	Survey Objective	Relevant Sections of Questionnaire	
		Users	Providers
Why is logistics important to the Yorkshire and the Humber region? How is logistics related to its current and future economic development?	• To assess the adequacy of the existing transport infrastructures and their utilisation for movements of goods from and into the Yorkshire and the Humber region; • To assess the transport and logistics implications of cluster development for the regional economy.	Sections 3 and 4 and particularly questions on the usage of ports and control over port of entry or exit. Double weight was attached to companies in the Food and Drink, Advanced Engineering and Chemical clusters when sampling.	Section 2 (questions on markets, services on offer, usage of the Humber ports) and Section 3 (questions on the relevance of services to customers based in Yorkshire and the Humber).

Table 5.4. Research Questions, Survey Objectives and Questionnaire Contents: A Summary Table (2 of 4)

<table>
<tr><th rowspan="2">Research Question</th><th rowspan="2">Survey Objective</th><th colspan="2">Relevant Section of Questionnaire</th></tr>
<tr><th>Users</th><th>Providers</th></tr>
<tr><td rowspan="2">What are the strengths and weaknesses of logistics service provision in the Yorkshire and the Humber region and how do they hinder or facilitate the movement of goods from and into the region? Which are the areas for improvement?</td><td rowspan="2">• To gather information on the logistics requirements of user companies;
• To evaluate the adequacy of service provision;
• To identify any gaps (shortfalls) in service provision;
• To identify the current and future barriers to effective service provision.</td><td>Questions in Sections 2 and 4 regarding:
whether companies outsource their logistics requirements or employ own resources;
requirements for value-added activities and the way these are organised; the location of their logistics providers.</td><td>Questions in Sections 2 & 3 to evaluate the adequacy of service provision:
whether the work of service providers is focused on the Yorkshire and the Humber region; the support that they offer at local, national and international level for moving freight in and out of the region.</td></tr>
<tr><td colspan="2">To identify any gaps in service provision, questions were asked with regard to:
• The way users and providers obtain information about each other;
• How often contract reviews are conducted;
• The importance that users and providers attach to different service attributes and the way they evaluate each other’s performance on a scale from 1 to 7;
• The perception of both sides about the market (to understand whether supply meets demand).</td></tr>
</table>

Table 5.4. Research Questions, Survey Objectives and Questionnaire Contents: A Summary Table (3 of 4)

Research Question	Survey Objective	Relevant Section of Questionnaire	
		Users	Providers
Is it worth investing in logistics as a way of spreading economic prosperity over the whole Yorkshire and the Humber region?	• To obtain information on the transport and logistics sector in Yorkshire and the Humber; • To analyse data at sub-regional level to identify whether results reflect the degree of economic development of the sub-regions; • To obtain information on the nature of the decision-making processes within companies in Yorkshire and the Humber	Questions in Section 1 about the size of companies surveyed, their total number of employees, number of employees in Yorkshire and the Humber, Head Office location, the nature of their businesses, location of their current markets. Questions on the nature of **decision-making** processes within companies in Yorkshire and the Humber regarding **companies' logistics requirements, routes and modes of transport and choice of logistics providers**. Questions about the **level** at which decisions are taken and the **location** of decision-making.	

Table 5.4. Research Questions, Survey Objectives and Questionnaire Contents: A Summary Table (4 of 4)

Research Question	Survey Objective	Relevant Section of Questionnaire	
		Users	Providers
How could logistics contribute to developing workforce skills and competencies?	• To identify the skills shortages that are a major cause for concern to both users and providers of freight transport and logistics services.	Questions directly addressing any skills shortages that affect both users and providers, such as driver shortages and other skills shortages. Other issues were also considered: • The cost of training; • The impact of Health and Safety legislation; • The impact of the Working Time Directive. Questions about the sources of information employed by users when searching for logistics operators and by providers when searching for new customer contacts to reveal the overall level of techno-readiness within companies.	
How can logistics be turned into a profitable opportunity for the Yorkshire and the Humber region?	• To determine any shortfalls in service provision, so that strategies to address such shortfalls can be determined and put in place.	Questions in all sections (as already listed above).	

5.3.3 Survey Methodology

Two questionnaire surveys have been carried out. These are:

- A survey of the **users** of freight transport and logistics services in Yorkshire and the Humber
- A survey of the freight transport and logistics service **providers** in Yorkshire and the Humber

In both cases, the questionnaires were designed to gather information on:

- The nature of the companies concerned;
- Their target markets and requirements;
- Their involvement in the movement of goods within the region, between the region and the rest of the UK, rest of Europe and the rest of the world;
- The current extent of outsourcing of transport and logistics services;
- The obstacles to the successful operation of freight transport and logistics services in the region, at present and in the future.

In both surveys, there was a focus on the region's priority industrial clusters as identified by Yorkshire Forward – notably the chemicals, advanced engineering, agricultural and food and drink industries – though the surveys are not exclusively dedicated to these sectors. The geographical coverage of both surveys is the Yorkshire and the Humber planning region as a whole.

Previous empirical studies in the area of transport and logistics and other literature sources have been investigated as part of the questionnaire development process. The

work undertaken by Bell (2001) and especially the survey that he carried out have proved particularly useful. Other logistics surveys such as those carried out by the European Chemical Industry Council and the Holland International Distribution Council were also evaluated.

In planning this original work, a series of meetings were held with representatives of Freight Business Yorkshire and the Humber (which has been the collaborating organisation on this research project) and Yorkshire Forward (the Regional Development Agency). It was agreed that such collaboration would benefit both the University and the above-mentioned organisations, as it would increase the relevance of the University's research and would be a good opportunity for a considerable future input and involvement in the work undertaken by the Regional Development Agency. The survey itself was commissioned by Freight Business Yorkshire and the Humber and fully sponsored by Yorkshire Forward.

The design of two questionnaires and the creation of a sampling frame of companies in the Yorkshire and the Humber region were undertaken by the researcher. Initial questionnaire drafts were circulated to all members of the collaborating organisation (Freight Business Yorkshire and the Humber) for comments and suggestions.

Yorkshire Forward decided to outsource the management and administration work for the surveys to Faber Maunsell (a consulting company with particular expertise in the transport sector) as it required the basic findings in a very short period of time. Bearing in mind the scope of the surveys and personal resource constraints, this was supported by the project supervisors who also took an active part in the process of selecting a consulting company. The draft questionnaires were then discussed with market research experts from Faber Maunsell who made suggestions not so much on the content, but rather on the style, layout and presentation of the questionnaires in order to maximise response rates. Faber Maunsell was also required by Freight Business Yorkshire and the Humber and Yorkshire Forward to undertake the following tasks:

- Advise on questionnaire design prior to commitment to the final version;

- Liaise with regard to using the company databases made available by the researcher at the University of Huddersfield;
- Survey management, to include printing of questionnaires, mailing, handling of returned forms, survey administration;

- Initial data analysis at an aggregate level only;

- Presentation of basic results and report production to meet the immediate needs of Yorkshire Forward;

- Handover of data files to the researcher for more in-depth research.

Completed questionnaires and files containing all data obtained from the surveys were then made available and a more detailed and academically rigorous analysis at cluster and sub-regional level was undertaken by the researcher. No further work was undertaken by Faber Maunsell.

5.4 Questionnaire circulation

Prior to mailing out the questionnaires in January 2003, a pilot study was carried out by Faber Maunsell survey staff. The pilot study was through face-to-face interviews to ascertain that the final questionnaires were unambiguous and correctly focused.

In the light of the need to obtain sufficient responses to provide adequate information on a range of industrial users and types of logistics operators across the various sub-regions of the planning region, relatively high sample sizes were required. At the same time, it was really important to have as good coverage as possible both in terms of geographical location and industry type. In order to achieve a good representation of industries, the UK

Standard Industrial Classification of Economic Activities - SIC (92) was used in the process of sampling.

One problem that had to be addressed was how to link clusters to the Standard Industrial Classification system. Yorkshire Forward's broad guidelines were followed to match the SIC codes with the appropriate cluster. Table 5.5 below shows the distribution of SIC codes by clusters.

Table 5.5. SIC (92) Codes Distribution by Clusters

Cluster	SIC (92) Code
Food (Including Agriculture) and Drink	01.1 - 01.50
	05.0 - 05.02
	15.1 - 16.00
	51.11
	51.17
	51.21
	51.23
	51.25
	51.31 - 51.39
	52.11
	52.21 - 52.27
Advanced Engineering and Metals	11.10 - 11.20
	23.10 - 23.20
	27.10 - 35.50
	45.11 - 45.25
	51.52
Chemicals	21.11 - 21.25
	24.11 - 24.30/3
	24.51 - 25.24
	51.46
	51.55
Bioscience	24.41 - 24.42/2

Companies from the database were selected according to the following method. First of all, double weight was attached to three of the user clusters (Food and Drink, Advanced Engineering and Chemicals). This was a way of ensuring an adequate response from these key clusters which are heavy users of freight transport and logistics services. Once

this had been done, companies were then chosen randomly from each industry type, in the appropriate proportions to ensure a total selection of at least 4000. In the event, 4032 questionnaires were despatched to users (see Table 5.6).

The survey of providers consisted of 762 companies (see Table 5.7). In this survey, companies were chosen at random from the sampling frame.

Table 5.6. Sample for User Survey by Cluster and Subregion

	Humber	West Yorkshire	South Yorkshire	North Yorkshire	Total	N
None of the Clusters	2%	11%	5%	2%	21%	841
Food and Drink Cluster	4%	5%	2%	4%	14%	573
Advanced Engineering and Metals Cluster	7%	26%	17%	7%	57%	2291
Chemical Cluster	1%	4%	1%	1%	8%	321
Bioscience Cluster	0%	0%	0%	0%	0%	8
Total	13%	46%	26%	15%	100%	4032
N	525	1871	1051	585	4032	

Table 5.7. Sample for Provider Survey by Subregion

	Sample
West Yorkshire	42%
South Yorkshire	20%
North Yorkshire	17%
Humber	20%
N	762

The FAME database, to which the University of Huddersfield subscribes, was used to draw up the list of companies. FAME was identified as an excellent company database that contains up to 1.8 million UK and Irish public and private companies and is very regularly updated. It was also used to ensure that the sampling frame was robust.

Some 23,151 companies, users of freight transport and logistics services in the Yorkshire and the Humber region, were identified. 1,590 freight transport and logistics service

providers in the region were also identified. Detailed instructions on how to sample (including the requirement to double-weight key cluster industries as discussed above) and a detailed list of the SIC (92) codes that belong to each of the priority clusters identified by Yorkshire Forward were provided to the consulting company.

The questionnaires were mailed out in early January 2003. Bearing in mind the nature of the logistics industry, this was considered to be a good time of year to survey such companies. Hundred and thirty (130) completed and valid user questionnaires (3% response rate) and 94 provider questionnaires (12% response rate) were received.

A considerable amount of telephone surveying was undertaken which generated further responses. Sixty-three (63) additional valid user responses and 98 additional valid provider responses were obtained through this follow-up survey and this boosted the user and provider questionnaire response rate to 5% and 25% respectively.

Response rates to the user survey are presented in Table 5.8. At first glance this is a low response rate (5%). However, as Table 5.8 shows, there is a good representation of responses by cluster and subregion, i.e. matrix of responses is broadly similar to matrix of questionnaires despatched. The number of companies, in absolute terms, is also reasonable, given the very large scale of the survey.

Some possible reasons for the low response rate to the user questionnaire include:

- It was not possible to address the questionnaire personally to the most appropriate manager within a particular company. Although FAME provides the names of a company's directors or secretaries, it does not have the names of the logistics or supply chain managers/directors. Thus, it was a matter of goodwill of the person who received the questionnaire to pass it on to the most relevant person within the company.

- Most of the companies in the sample were 'micro' or 'small' to 'medium-sized' enterprises. These companies are often subcontractors to larger companies and the scope of their supply chain activities (if any at all) is very limited. Hence, these companies might have found the questionnaire seemingly irrelevant to their operations or they might not collect the data that were requested.

- The general attitude to questionnaires and surveys in industry is not always positive as companies are often bombarded with such requests. Although companies in this case were offered an incentive (a charity donation per completed questionnaire), it might not have been attractive enough for some people to spare the time to complete the questionnaire.

- Although every effort was taken to keep the questionnaires as short as possible (by both reducing the contents and using some design techniques), it proved impossible to keep the length under four pages. Given the survey aims and objectives, this was considered to be an optimum length. Due to their very limited time and heavy workload, however, some respondents might have been put off by the length of the questionnaire.

Table 5.8. Response to User Survey by Cluster and Sub-region

	Humber	West Yorkshire	South Yorkshire	North Yorkshire	Total	n=
None of the clusters	2%	7%	4%	2%	15%	27
Food and drink cluster	6%	1%	2%	6%	16%	28
Advanced engineering and metals	7%	26%	18%	7%	58%	105
Chemical cluster	2%	5%	3%	1%	11%	20
Total	17%	39%	27%	16%	100%	180
n=	31	71	49	29	180	

Table 5.9 shows that 14 respondents to the user questionnaire did not provide cluster and sub-region details.

Table 5.9. Case Summary Users (Cross Tabulation by Cluster and Sub-region)

Cases					
Valid		Missing		Total	
n	Percent	n	Percent	n	Percent
180	93	14	7	194	100

The breakdown of responses to the provider questionnaire by sub-region is shown in Table 5.10.

Table 5.10. Responses to the Provider Questionnaire by Sub-region (Postal and Telephone)

		Sent	Returned
n=		762	190
Of which	West Yorkshire	43%	52%
	South Yorkshire	20%	14%
	North Yorkshire	17%	7%
	Humber	20%	27%
Total		100%	100%

5.5. Summary

This chapter was largely concerned with the design and methodology of the survey of the users and providers of freight transport and logistics services in Yorkshire and the Humber. The survey objectives were discussed in the wider context of the project's aims and objectives. It was demonstrated how each of the research questions was addressed by the contents of the questionnaires. This led on to a discussion of some methodological issues such as the design of the two questionnaires and the creation of a sampling frame of companies in the Yorkshire and the Humber region. The practical aspects of data collection were also considered.

The difficulties in collecting data and the possible reasons for the low response rate, in particular to the user questionnaire, were also discussed in detail. The relatively low response rate to the questionnaires initially caused concern. Given the very large scale of the survey, however, it was concluded that this should not be seen as a problem due to the

good representation of responses by cluster and sub-region and the reasonable number of companies, in absolute terms.

The survey results will be analysed in the next chapter.

CHAPTER 6 ORIGINAL INVESTIGATION OF USERS AND PROVIDERS OF FREIGHT TRANSPORT AND LOGISTICS SERVICES: SURVEY RESULTS

6.1 Introduction

The previous chapter discussed the design and methodology of the surveys of the users and providers of freight transport and logistics services in Yorkshire and the Humber. It also explained how these surveys contributed to meeting the overall aims and objectives of the research project. The process of questionnaire distribution, the method of sampling and the distribution of responses were also discussed.

Survey results are presented and discussed in this chapter.

6.2 Survey Results

6.2.1 Head Office Location and Nationality of the Parent Company

The majority of user and provider companies (89% and 94% respectively) have their head offices located within Yorkshire and the Humber. A breakdown of user responses by cluster is shown in Table 6.1.

Table 6.1 User Companies: Head Office Location By Cluster

Head Office Location	None of the clusters	Cluster		
		Food & Drink	Advanced Engineering	Chemicals
Within Yorkshire & the Humber	81%	86%	91%	100%
Elsewhere in Britain	7%	14%	4%	-
Outside Britain	12%	-	5%	-
Total	100%	100%	100%	100%

Despite the trend towards increasing industrial concentration within the UK and significant acquisition by foreign companies in recent years, the majority of survey

respondents were from companies based in the Yorkshire and the Humber region that are not part of a larger group or organisation. 82% of user companies in the Food and Drink cluster, 67% of user companies in the Advanced Engineering cluster and 62% of those in the Chemical cluster that responded to the postal questionnaire have indicated that they are not part of a larger group or organisation. Only 11% of provider companies are part of a larger group or organisation. The nationality of the parent company in the provider's case is predominantly British (67%), followed by Dutch (22%) and Danish (11%). The nationality of the parent company in user's case is far more diverse. 75% of the user respondent companies in the Food and Drink cluster which stated they were part of a larger group or organisation have a British parent company and 25% have a French parent company. The nationality of the parent company in the Advanced Engineering cluster is the most diverse, 47% being British, followed by American (17.6%) and Swedish, Austrian, Dutch, Danish, German and Finnish (5.9% each) nationality. The nationality of the users' parent company in the chemical cluster is predominantly British (50%) followed by French and American (25% each). Data suggest that company ownership in the Yorkshire and the Humber region is predominantly British and the total number of foreign-controlled companies is small.

6.2.2 Number of Employees in Total and in Yorkshire and the Humber

A majority of the user companies employ 50 or less people (69% of respondents to both the postal and telephone surveys). 15% of companies have between 51-250 employees and 16% over 250 employees. A breakdown of user responses by cluster is shown in Table 6.2.

Table 6.2 User Companies: Total Number of Employees by Cluster

	Range	None of the clusters		Cluster					
				Food & Drink		Advanced Engineering		Chemicals	
		N	Approx.%	N	Approx.%	N	Approx.%	N	Approx.%
Number of employees	1-10	11	41	8	31	31	31	4	20
	11-20	1	4	6	22	13	13	1	5
	21-30	2	8	2	7	9	9	2	10
	31-40	2	8	4	14	11	11	2	10
	41-50	2	8	2	8	6	6	3	15
	51-60	0	0	0	0	3	3	1	5
	61-100	0	0	1	4	6	6	3	15
	101-200	2	8	0	0	8	8	1	5
	201-1000	3	12	3	12	14	14	1	5
	1001-2500	3	12	1	4	2	2	0	0
	2501-8000	1	4	1	4	2	2	2	10
Total		27		28		105		20	

The majority of user respondents (79% in the Food & Drink cluster, 73% in Advanced Engineering and 60% in Chemicals) have indicated that their companies employ less than 50 people, which means that most of these companies are micro (fewer than 10 employees) or small businesses (up to 50 employees) (see Table 6.3). Data in Table 6.3 show that the number of medium-sized companies is highest in the Chemicals cluster which could be explained by the nature of the industry.

Table 6.3 Number of Employees in Yorkshire and the Humber by Cluster

	Range	Cluster					
		Food & Drink		Advanced Engineering		Chemicals	
		N	%	N	%	N	%
Employees in Yorkshire and the Humber	1-10	8	29	33	32	4	20
	11-50	14	50	42	41	8	40
	51-250	1	4	17	17	6	30
	250+	5	18	11	11	2	10
Total		28	100	103	100	20	100

83% of the provider companies employ 50 or less people, 14% have 51-250 employees and only 3% have more than 250 employees in total. 86% of respondents to both the postal and telephone surveys have 50 or less employees in Yorkshire and the Humber, 12% have 51-250 employees and only 2% employ more than 250 people. These data are not surprising as most of the companies surveyed were small hauliers.

6.2.3 Companies' Position in the Supply Chain

Companies undertaking business throughout the supply chain from raw materials to retail distribution were represented in these surveys. Manufacturing is the largest single sector for the users (62% of respondents giving response), followed by raw materials processing (25%). 19% are involved in wholesaling and 12% in retailing. Within the Food & Drink cluster, the majority of respondents (36%) were involved in raw materials processing, 23% in manufacturing of finished goods, 18% in raw materials extraction, 14% in wholesaling and 9% in retailing. The majority of companies (60%) in the Advanced Engineering cluster are manufacturers. 19% are involved in raw materials processing, 19% in 'other' activities and just 2% in wholesaling. 50% of companies in the Chemicals cluster are raw materials processors, 42% are involved in manufacturing and 8% in wholesaling. Data suggest that the core business of the majority of respondents is manufacturing or processing. Hence, it could be expected that they may well outsource any non-core activities (such as their logistics requirements) to third party service providers.

The majority of provider companies (69%) indicated that the users of their services were involved with manufacturing of finished goods, 51% with raw materials processing, 39% were wholesalers, 28% were retailers and 16% were involved with raw materials extraction.

Data analysis offers an insight into the nature of the business of the provider companies. The majority of them (94%) offer road transport services, 35% are storage and warehousing operators, 12% are freight forwarders/integrators, 10% offer sea transport services, 9% are involved with packaging or other value-added activities, 6% do air transport and 2% rail transport.

6.2.4 Requirements for Specialist Vehicles, Handling or Processing Equipment

Data analysis shows that 64% of user companies in the Food & Drink cluster require specialist vehicles, such as bulk blower lorries for deliveries into bins (7% of respondents within the Food & Drink cluster), chilled distribution vehicles (7% of respondents within the Food & Drink cluster), paper cutting equipment (5%), fork trucks, crane, general heavy lifting equipment (5%), etc. Only 27% of respondents within the Advanced Engineering cluster have indicated that they require any specialist equipment, the most popular being fork trucks, crane, general heavy lifting equipment (15% of respondents within the Advanced Engineering cluster). Although only 46% of user companies within the Chemical cluster require specialist equipment, they use the most diverse range of equipment. The most widely used are tankers for chemicals (15% of respondents within the Chemical cluster). The same proportion of companies require printing machinery.

However, only 42% of provider companies can offer specialist vehicles, handling or processing equipment. 32% of respondents can provide fork trucks, crane or general heavy equipment. The same proportion of companies have responded that they can cater for various special loads. 23% have got a large vehicle fleet of varying sizes and only 5% can offer tankers for chemicals. 58% of respondents have indicated that they do not provide specialist equipment at all.

6.2.5 Modes of Transport

Road transport is by far the dominant mode used by both user and provider survey respondents, with sea coming second, reflecting the importance of the region's ports. Very little use of rail freight was reported in the survey (see Table 6.4).

Table 6.4 User Companies: Use of Modes of Transport for Inbound and Outbound Movements

Mode	Consignment Movements Inbound	Consignment Movements Outbound
By Road	87%	93%
By Rail	1%	0%
By Sea	8%	4%
By Air	4%	3%
Total	100%	100%

Disaggregation of data at cluster level shows that 73% of user respondents in the Food & Drink cluster, 53% in the Advanced Engineering cluster and 54% in the Chemicals cluster use road as the only mode of transport for inbound movements. 86% of user respondents in the Food & Drink cluster, 85% in the Advanced Engineering cluster and 69% in the Chemicals cluster do not move inbound goods by sea. 95% of user respondents in the Food & Drink cluster, 76% in the Advanced Engineering cluster and 77% in the Chemicals cluster do not move inbound goods by air. Hardly any user company has reported the usage of rail for inbound movements.

The usage of different transport modes for outbound movement of goods is very similar to the inbound one as described above. 86% of user respondents in the Food & Drink cluster, 42% in the Advanced Engineering cluster and 46% in the Chemicals cluster use road as the only mode of transport for outbound movements. 100% of user respondents in the Food & Drink cluster, 75% in the Advanced Engineering cluster and 62% in the Chemicals cluster do not move outbound goods by sea. 100% of user respondents in the Food & Drink cluster, 75% in the Advanced Engineering cluster and 62% in the Chemicals cluster do not move outbound goods by air. No respondent has reported the usage of rail for outbound movements.

The proportion of movements by road reported by the provider companies was 96% followed by rail (1.8%), sea (1.8%) and air (0.4%). Road therefore is by far the dominant mode used as in the case of user companies.

6.2.6 Location of Inbound and Outbound Movements

Table 6.5 User Companies: Location of Inbound Movements

Location	% of inbound movements (ranges)	None of the clusters		Cluster					
				Food & Drink		Advanced Engineering		Chemicals	
		n	%	n	%	n	%	n	%
Inbound Yorkshire and the Humber	1-25	11	55	8	42	17	41	7	64
	26-50	4	20	4	21	4	10	2	18
	51-75	3	15	2	11	7	17		
	76-100	2	10	5	26	13	32	2	18
Total		**20**	**100**	**19**	**100**	**41**	**100**	**11**	**100**
Inbound Rest of Britain	none	8	30	6	29	17	32	2	15
	1-25	3	11	4	19	12	23	2	15
	26-50	7	26	4	19	7	13	4	31
	51-75	5	19	4	19	3	6	4	31
	76-100	4	15	3	14	14	26	1	8
Total		**27**	**100**	**21**	**100**	**53**	**100**	**13**	**100**
European Union Inbound	none	16	59	10	48	41	77	4	31
	1-25	7	26	8	38	9	17	4	31
	26-50	1	4	2	10			4	31
	51-75	1	4						
	76-100	2	7	1	5	3	6	1	8
Total		**27**	**100**	**21**	**100**	**53**	**100**	**13**	**100**
Rest of Europe Inbound	none	24	89	18	86	53	100	12	92
	1-25	3	11	2	10			1	8
	51-75			1	5				
Total		**27**	**100**	**21**	**100**	**53**	**100**	**13**	**100**
Rest of the World Inbound	none	17	63	14	67	44	83	9	69
	1-25	6	22	6	29	8	15	3	23
	26-50	2	7						
	51-75							1	8
	76-100	2	7	1	5	1	2		
Total		**27**	**100**	**21**	**100**	**53**	**100**	**13**	**100**

A large proportion of the freight and logistics requirements of user companies are purely within the Yorkshire and the Humber region. As Table 6.5 shows, 37% of respondents in the Food & Drink cluster indicated that more than half of their inbound materials come from Yorkshire and the Humber, with the corresponding figure in Advanced Engineering being as high as 49%. In the Chemicals cluster however only 18% of the respondents indicated that more than half of their inbound materials come from Yorkshire and the Humber.

Table 6.6 shows the location of outbound movements. Data led to similar observations as in the case of inbound movements. 34% of respondents in the Food & Drink cluster indicated that more than half of their outbound products go to Yorkshire and the Humber, with the corresponding figure in Advanced Engineering being 17%. The most striking again is the case of the Chemicals cluster, in which only 8% of respondents indicated that more than half of their outbound products go to Yorkshire and the Humber.

Table 6.6 User Companies: Location of Outbound Movements

Location	% of outbound movements (ranges)	None of the clusters		Cluster					
				Food & Drink		Advanced Engineering		Chemicals	
		n	%	n	%	n	%	n	%
Outbound Yorkshire and the Humber	none	7	26	3	14	14	26	2	15
	1-25	12	44	8	38	23	43	7	54
	26-50	3	11	3	14	7	13	3	23
	51-75	3	11	1	5	4	8	1	8
	76-100	2	7	6	29	5	9		
Total		27	100	21	100	53	100	13	100
Outbound Rest of Britain	none	6	22	5	24	15	28		
	1-25	4	15	4	19	8	15		
	26-50	5	19	2	10	8	15	5	38
	51-75	2	7	1	5	8	15	4	31
	76-100	10	37	9	43	14	26	4	31
Total		27	100	21	100	53	100	13	100
Outbound European Union	none	18	67	19	90	35	66	6	46
	1-25	5	19	2	10	13	25	7	54
	26-50	3	11			4	8		
	76-100	1	4			1	2		
Total		27	100	21	100	53	100	13	100
Outbound Rest of Europe	none	23	85	20	95	44	83	8	62
	1-25	4	15	1	5	8	15	4	31
	26-50					1	2	1	8
Total		27	100	21	100	53	100	13	100
Outbound Rest of the World	none	19	70	19	90	38	72	7	54
	1-25	5	19	2	10	13	25	6	46
	26-50	3	11			2	4		
Total		27	100	21	100	53	100	13	100

6.2.7 Logistics Requirements for Inbound and Outbound Movements

Table 6.7 shows that own transport accounts for a small proportion of the logistics requirements for inbound movements. None of the respondents in the chemical cluster reported usage of own transport for inbound movements. In the Food & Drink cluster the outsourced requirements are almost equally split between the usage of logistics providers or customer/supplier who controls transport. Customers or suppliers have a very high degree of control over transport in the case of companies in the Advanced Engineering and Chemical cluster in particular. Companies in the Chemical cluster also seem to outsource a high proportion of their logistics requirements to a logistics provider. 38% of respondents in the Chemical cluster indicated that they outsource three quarters or more of their logistics requirements for inbound transport to a logistics provider.

Table 6.7 User Companies: Logistics Requirements for Inbound Movements

Inbound materials moved by:	% of requirements	none of the clusters		Cluster					
				food and drink		advanced engineering and metals		chemicals	
		n	%	n	%	n	%	n	%
own transport	none	17	63	13	62	26	49	13	100
	1-25	8	30	3	14	19	36		
	26-50			1	5	6	11		
	76-100	2	7	4	19	2	4		
Total		27	100	21	100	53	100	13	100
logistics provider	none	9	33	12	57	36	68	7	54
	1-25	6	22	1	5	8	15	1	8
	26-50	1	4	2	10	3	6		
	51-75	2	7			1	2		
	76-100	9	33	6	29	5	9	5	38
Total		27	100	21	100	53	100	13	100
customer or supplier controls transport	none	11	41	11	52	14	26	3	23
	1-25	3	11	1	5	3	6	1	8
	26-50	1	4	3	14	2	4		
	51-75	2	7			2	4		
	76-100	10	37	6	29	32	60	9	69
Total		27	100	21	100	53	100	13	100

The proportion of outbound transport under the control of respondents is higher than for inbound materials (see Table 6.8). 38% of user respondents in the Food & Drink cluster, 43% in the Advanced Engineering cluster and 54% in the Chemicals cluster indicated that they do not use own transport for movement of their outbound products. These

figures are lower than the ones reported for inbound movements. Data also show that a higher proportion of outbound movements is outsourced to logistics providers compared to inbound movements. However, a much smaller proportion of outbound transport is controlled by a customer.

Table 6.8 User Companies: Logistics requirements for Outbound Products

Outbound products moved by:	% of requirements	none of the clusters		Cluster					
				Food and Drink		Advanced Engineering and Metals		Chemicals	
		n	%	n	%	n	%	n	%
own transport	none	14	52	8	38	23	43	7	54
	1-25	4	15	2	10	19	36	3	23
	26-50	3	11			4	8		
	51-75			1	5	3	6		
	76-100	6	22	10	48	4	8	3	23
Total		27	100	21	100	53	100	13	100
logistics provider	none	7	26	11	52	22	42	2	15
	1-25	3	11	3	14	3	6	3	23
	26-50	1	4	1	5	4	8		
	51-75	3	11			6	11		
	76-100	13	48	6	29	18	34	8	62
Total		27	100	21	100	53	100	13	100
customer controls transport	none	20	74	15	71	31	58	10	77
	1-25	5	19	4	19	14	26	2	15
	26-50	1	4	1	5	1	2		
	51-75					1	2		
	76-100	1	4	1	5	6	11	1	8
Total		27	100	21	100	53	100	13	100

Data has shown that in line with recent trends towards outsourcing, more than half the total transport requirement of users is contracted out to hauliers or service providers. Outsourcing of warehousing, storage or value added logistics activities is however much less common. Two thirds of user respondents in the Food & Drink and Advanced Engineering clusters (76% and 77% respectively) and about half of respondents in the Chemical cluster (46%) are not outsourcing their warehousing operations to third party logistics providers. Non-core value added activities such as assembly, packing, labelling and load consolidation are either not required by companies or carried out in-house.

6.2.8 Decision-Making

Logistics decisions in user companies are very largely the responsibility of middle management (51% of respondents) and senior management (67% of respondents). Only 9% of respondents indicated that junior members of staff make logistics decisions. These results may suggest that decision-making concerning a company's logistics requirements is regarded as very important and thus is not delegated to junior members of staff. Another explanation could be related to the size of companies. Most of the user companies surveyed are micro or small in size. Such companies do not necessarily have a designated logistics or supply chain management function within the company. Hence, usually more senior members of staff are responsible for making logistics decisions in addition to their primary function.

Table 6.9 shows where decisions regarding routes and modes of transport affecting movements of goods to and from respondents' locations in Yorkshire and the Humber are taken. Data illustrate that the majority of companies take such decisions in house. This observation implies a very high degree of control over logistics requirements.

Table 6.9 User Companies: Location of Decision Making

Location of decision making	None of the clusters		Cluster					
			food and drink		advanced engineering		chemicals	
	n=27	%	n=22	%	n=55	%	n=13	%
In House - within Yorkshire & Humber	20	74	17	77	48	87	13	100
In House - elsewhere in Britain	3	11	2	9	8	15	2	15
In House - elsewhere in the World	2	7			3	5	2	15
Freight Forwarder/Agent in Yorkshire & Humber	2	7	1	5	4	7		
Freight Forwarder/Agent outside Yorkshire & Humber	2	7	1	5				
Service provider makes decisions	2	7	1	5	5	9		
your customers make decisions	1	4	2	9	11	20	1	8
other	25	93	21	95	45	82	11	85
Total	27	100	22	100	55	100	13	100

Note: Proportions are number of respondents giving response - columns do not sum to 100.

Data analysis of user responses have shown that a large proportion of their freight and logistics requirements is purely within the Yorkshire and the Humber region. This is reflected in the fact that nearly half of providers' current markets are in Yorkshire and the Humber (46.4%). 41.3% of provider companies responded that their current markets are based somewhere else in Britain, rest of the European Union (5.6%), rest of Europe (3.3%) or rest of the world (2.2%). Bearing in mind that such a great proportion of user companies' logistics requirements are based within Yorkshire and the Humber, there is scope for providers to extend their market share in this region.

Provider companies were asked to identify, for domestic transport journeys, where decisions affecting their route and mode for customers in Yorkshire and the Humber are taken. 85% of respondents said such decisions are taken within their companies in Yorkshire and the Humber. Only 4% of provider companies indicated that their customers in Yorkshire and the Humber take these decisions. 3% reported that customers outside Yorkshire and the Humber (but in Britain) take these decisions.

6.2.9 Imports and Exports

Movements to and from the rest of the UK were also investigated, as was international traffic. 61% of respondents in the Food & Drink cluster, 43% in the Advanced Engineering cluster and 85% in the Chemical cluster indicated that their companies are involved in import activities. The proportion of exporters is smaller. Only 25% of user companies in the Food & Drink cluster, 45% in the Advanced Engineering and 70% in the Chemicals cluster reported involvement in any export activities.

On the provider side, only 24% of respondents undertook international transport. 76% of provider companies surveyed indicated that they did not undertake any international transport at all. 56% of those who gave a positive response, undertake international transport both into and out of Britain whereas 34% undertake international transport out of Britain only and 10% into Britain only.

The volumes of imports/exports per annum reported by user companies and the volume of movements into and out of Britain reported by provider companies are shown in Table 6.10 and Table 6.11 respectively.

Table 6.10 User Companies: Volume of Imports/Exports per Annum

Volumes operated Internationally (Units)	Imports	Exports
Tonnes	57541	11544
Lorry loads	1221	87
Value (£)	1246476	1279048

Table 6.11 Provider Companies: Volume of Movements Into and Out of Britain

Volumes operated Internationally (Units)	Into Britain	Out of Britain
Tonnes	5717803	1428971
Lorry loads	1885	1588
Value (£)	90600	24333

The majority of user respondents (71%) said decision-making on routes and modes of transport for exports takes place within their companies in Yorkshire and the Humber. A logistics provider within Yorkshire and the Humber is responsible for taking such decisions in 13% of the cases. Only 4% said that a customer decides on routes and modes of transport for exports (see Table 6.12).

Table 6.12 User Companies: Location of Decision-making on Routes and Mode of Transport for Imports and Exports

Location	Imports	Exports
In house within Yorkshire & Humber	53%	71%
In house outside Yorkshire & Humber	7%	4%
Logistics Provider within Yorkshire & Humber	9%	13%
Logistics Provider in rest of Britain	7%	4%
Logistics provider outside of Britain	10%	4%
Customer decides	6%	4%
Other	7%	0%

Decision-making on routes and modes of transport for imports takes place within companies in Yorkshire and the Humber in 53% of respondents. A logistics provider within Yorkshire and the Humber is responsible for taking such decisions in 9% of the cases. 6% said that a customer decides on routes and modes of transport for imports (see Table 6.12).

93% of provider respondents reported that decision-making regarding route and mode of transport for movements into Britain is done in-house within Yorkshire and the Humber. In 7% of the cases such decisions are taken in-house but outside Yorkshire and the Humber. For movements outside Britain, responses are very similar - decisions are taken in-house within Yorkshire and the Humber in 92% of the cases and in-house outside Yorkshire and the Humber in just 8% of the cases.

30% of user respondents reported that they have control over port of entry for imports. Half of the user companies have control over port of exit for exports. The degree of control over the port of entry/exit in the case of provider companies is higher. 70% of provider companies said they have control over port of entry and 73% have control over port of exit.

The majority of user respondents (over 50%) in the Advanced Engineering and Chemical clusters rated the port of exit for their exports as 'neither important nor unimportant'. The rest of companies think that the port of exit is not an important issue for them or that it is not any concern whatsoever for them. Over 40% of respondents in the Food & Drink cluster think that the port of exit for their exports is important. One third of respondents in this cluster however said that the port of exit for their exports does not concern them whatsoever. Very similar are the ratings of the port of entry for companies' imports. Half or over half of respondents in the three clusters indicated that the port of entry for their imports is 'neither important nor unimportant'.

Providers share a rather different view on the importance of the port of entry or exit for imports and exports. 46% of respondents identified the port of entry for imports as 'very

important', 22% as 'important', 12% as 'neither important nor unimportant', 7% as 'unimportant' and 12% are not concerned with this issue whatsoever. Very similar are the responses regarding the port of exit for exports. 49% of respondents identified the port of exit for exports as 'very important', 18% as 'important', 13% as 'neither important nor unimportant', 7% as 'unimportant' and 13% are not concerned with this issue whatsoever.

6.2.10 Usage of the Humber Ports

Users reported that their use of Yorkshire and the Humber ports (65% of companies for imports and 62% for exports) is slightly ahead of South Coast ports (61% of companies for imports and 58% for exports) (see Table 6.13).

Table 6.13 User Companies: Use of Ports for Imports and Exports

Ports Used	Imports	Exports
Yorkshire & Humber Ports	65%	62%
North East Ports	31%	26%
North West Ports	33%	32%
Ports on South Coast	61%	58%
Other	10%	16%
n=	84	76

Note: Proportions are number of respondents giving response - columns do not sum to 100.

Providers on the other hand reported much greater use of South Coast ports (76% for movements into Britain and 79% for movements out of Britain), presumably reflecting the large numbers of road hauliers in the sample (see Table 6.14). The usage of Humber ports is far less than in the case of user companies (35% for movements into Britain and 38% for movements out of Britain).

Table 6.14 Providers: Use of Ports for Movements into and out of Britain

Ports Used	Movements Into Britain	Movements Out of Britain
Yorkshire & Humber Ports	35%	38%
North East Ports	15%	15%
North West Ports	3%	23%
Ports on South Coast	76%	79%
Other	9%	10%
n=	34	39

Note: Percentages are those of respondents giving response - columns do not sum to 100.

As Table 6.15 shows, the main reasons for not using the Humber ports for imports as indicated by user respondents are lack of awareness for this issue (33% of cases), unsuitable sailing frequencies (17% of cases) and unsuitable destinations (13% of cases). The responses for not using the Humber ports for exports are quite similar to those for imports. 33% of respondents had not considered this issue, 37% did not user the Humber ports for exports because of unsuitable destinations and 15% found sailing frequency unsuitable. In both cases (imports and exports), a large proportion of companies (23% and 11% respectively) have listed reasons other than the suggested ones. Amongst these 'other' reasons are: the fact that not all shipping lines dock in the Humber ports; companies had no requirement to use the Humber ports; the decision concerning the use of the Humber ports was out of companies' control as it was taken rather by a customer, a carrier or a supplier.

Table 6.15 User Companies: Reasons for Not Using the Humber Ports

Reasons for Not Using the Humber ports	Imports	Exports
Have not considered the issue	33%	33%
Inadequate services	0%	0%
Too expensive	3%	4%
Sailing frequency not suitable	17%	15%
Unsuitable destinations	13%	37%
Unsuitable facilities	3%	4%
Other	23%	11%
n=	30	27

Very similar to user's responses are the reasons given by provider companies for not using the Humber ports for movements of goods into and out of Britain. The main reason

as given by 32% of the cases (for both movements in and out of Britain) was that this option had not been considered. Other major reasons affecting provider's choice for the Humber ports were unsuitable sailing frequencies (21% of the cases) and unsuitable destinations (21% of the cases). Amongst the 'other' reasons for not using the Humber ports are: more extensive use of the Channel Tunnel; companies use France as a gateway to mainland Europe and thus the Humber ports do not suit their requirements; the usage of the Humber ports is described as 'uneconomical'.

6.2.11 The importance of location in the choice of logistics providers (for user respondents) and customers (for service providers)

The majority of companies (55% in the Food & Drink cluster, 38% in the Advanced Engineering cluster and 58% in the Chemical cluster) reported that, given the choice, they would prefer to use logistics providers based within Yorkshire and the Humber only if service criteria matched or exceeded that available elsewhere. 25% of the respondents in the Food & Drink cluster, 32% in the Advanced Engineering cluster and 17% in the Chemical cluster said that they would always use logistics providers based within Yorkshire and the Humber, regardless the service level. 20% of user companies in the Food & Drink cluster, 30% in the Advanced Engineering cluster and 25% in the Chemical cluster reported that they have no preference at all as far as the location of their logistics providers is concerned.

Half of provider companies (53%) seem to have no preference with regard to the location of their customers. 46% of them reported that they prefer to work for customers based within Yorkshire and the Humber. Only 1% said that, given the choice, they would rather not work for customers based within Yorkshire and the Humber.

The majority of user companies in all clusters (68% of respondents in the Food & Drink cluster, 79% in the Advanced Engineering cluster and 94% in the Chemical cluster) use third party logistics providers based in Yorkshire and the Humber. A large proportion of

companies also use third party logistics providers based anywhere else in Britain or the rest of Europe (see Table 6.16).

Table 6.16 User Companies: Location of Third Party Logistics Providers

Location	None of the clusters		Cluster					
			Food and Drink		Advanced Engineering		Chemicals	
	n	%	n	%	n	%	n	%
Yorkshire and the Humber	14	58	17	68	66	79	16	94
Rest of Britain	13	54	15	60	41	49	8	47
Europe	3	13	7	28	13	15	5	29
Rest of the World					2	2		
Do not Know			1	4	4	5		
Cannot say - Regularly Change Supplier	1	4			4	5		
Total	24	129	25	160	84	155	17	171

Note: Percentages are that of respondents giving response - columns do not sum to 100.

Providers were asked about the specific advantages that their companies could offer for being based in Yorkshire and the Humber. Their answers to this question could explain why so many user companies choose to work with third party logistics providers based in Yorkshire and the Humber. 69% of providers believe that these advantages are based on cost related to close proximity of operating base. 64% see past records and personal contacts as an advantage. Flexibility of service is regarded as such an advantage in 62% of the cases. 8% think that these advantages are most related to availability of information and communication.

6.3 The Different Perceptions of Users and Providers

6.3.1 The overall view of the market

A primary objective of this study was to determine the adequacy of freight and logistics service provision in the Yorkshire and the Humber region and to gauge the perception of the region's users as to the standard of regional service provision in terms of price and a number of service quality indicators.

As shown in Table 6.17, most respondents considered that supply is broadly in line with demand.

Table 6.17 Supply and Demand for Logistics Services

Market of logistics services	Users	Providers
Significant undersupply	4%	2%
Slight undersupply	14%	6%
Supply meets demand	70%	61%
Slight oversupply	10%	26%
Significant oversupply	2%	6%
n=	171	179

The distribution of responses from users was slightly skewed towards undersupply, whilst that of providers was skewed towards oversupply. 87% of users and 85% of providers believed that there were no significant gaps in what the logistics sector offers to customers based in the Yorkshire and the Humber region.

6.3.2 Imperfect market search and contract review mechanisms

Table 6.18 shows the sources of information employed by users in their search for suitable service providers.

Table 6.18 Sources of Information Employed by User Companies

	None of the clusters		Cluster					
			Food and Drink		Advanced Engineering		Chemicals	
Sources of Information	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Past experience	17	71	15	65	68	83	16	89
Customer's experience	0	0	7	32	33	44	7	39
Experiences and recommendation of others	4	17	9	41	22	36	6	40
Own company databases	1	4	2	10	11	19	3	20
Direct approach from logistics providers	2	8	5	24	13	23	6	35

Note: Percentages are those of respondents giving response - columns do not sum to 100.

Table 6.19 shows the sources of information used by provider companies when searching for new customer contacts. The 'other' sources of information that companies used mostly included trade directories, the Internet, trade fairs, telemarketing, personal contact, mail shots, local papers and magazines. A few companies indicated that they dealt with existing customers only.

Table 6.19 Sources of Information Used by Providers

Sources of information	Providers
Past experience	70%
Customer recommendation	81%
Own company databases	18%
Internet auction	7%
Invitation to tender	48%
Other	5%
n=	185

Data on the sources of information employed by both users and providers demonstrate a high degree of dependence on past experience and on recommendations of others when searching for third party logistics operators or potential customers. This suggests there is little objective searching on either side of the market. The use of invitations to tender is a more positive sign that reflects the increasing use of longer term contracts for logistics services.

A further indication of the imperfect state of the market place is that a significant proportion of both users and providers never undertake formalised service reviews (see Table 6.20).

Table 6.20 Contract Review Periods

Review period	Users	Providers
Monthly	10%	12%
Quarterly	5%	10%
Annually	41%	31%
Never	25%	18%
Other	19%	29%
n=	162	180

The majority of users in all clusters do not periodically consider making substantial changes to their logistics arrangements (see Table 6.21). This could explain the fact why so many user companies do not need to conduct service provider reviews.

Table 6.21 Users Companies: Changes in Logistics Arrangements

		Cluster							
		None of the clusters		Food and Drink		Advanced Engineering		Chemicals	
Changes to Logistics Arrangements		n	%	n	%	n	%	n	%
Mode of Transport	**Yes**	2	9	6	24	7	8	3	16
	No	20	91	19	76	80	92	16	84
Total		22	100	25	100	87	100	19	100
Proportion of Own Transport/3PL	**Yes**	7	32	5	25	17	19	7	37
	No	15	68	15	75	71	81	12	63
Total		22	100	20	100	88	100	19	100
Control and Location of Warehousing	**Yes**	4	16	3	15	9	11	3	16
	No	21	84	17	85	75	89	16	84
Total		25	100	20	100	84	100	19	100

6.3.3 Gap Analysis of differing perceptions of users and providers

Users and providers of freight transport and logistics services in Yorkshire and the Humber region were asked to rate the relative importance of a range of attributes including cost and various service quality attributes and then to score the services available against each of these. More specifically, both users and providers were asked to rate the importance of, and score the perceived performance in respect of, each of the following seven attributes:

- Cost
- Past track record
- Quality of service
- Flexibility of service
- Availability of information

- Location
- Reliability.

Fig. 6.1 shows the mean importance levels of the seven attributes for both users and providers, where 1 is 'not important' and 7 is 'very important'. Attributes such as reliability, quality of service and cost recorded the highest importance ratings.

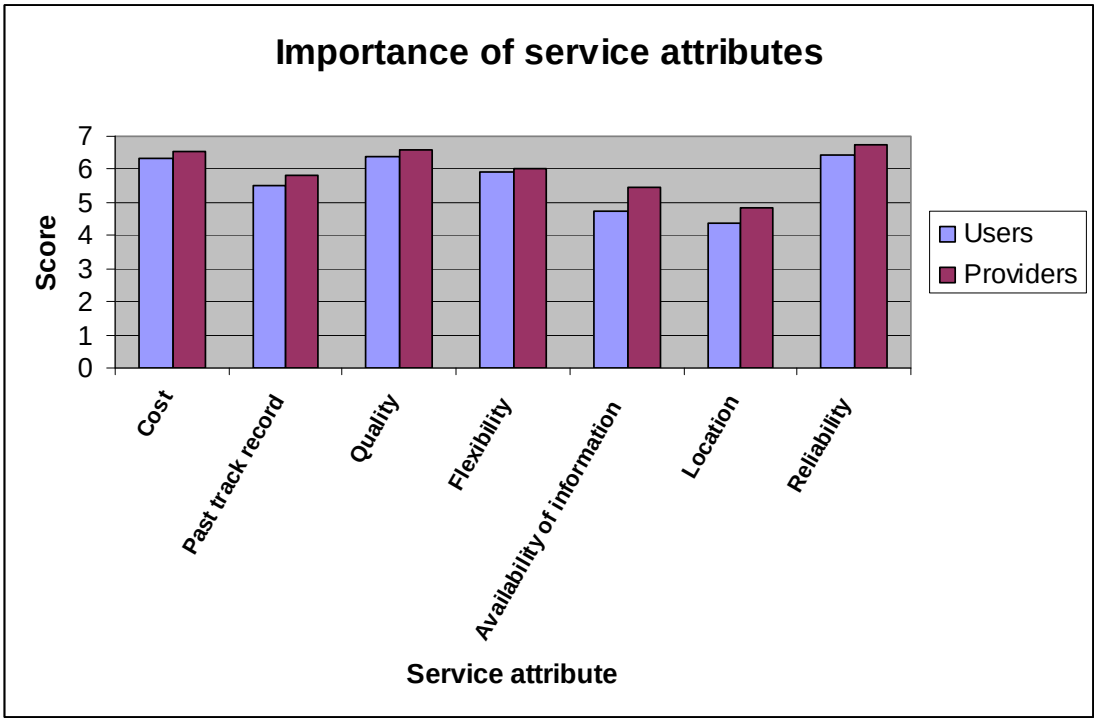


Figure 6.1 Importance of service attributes to users and providers (mean scores)

Fig. 6.2 shows the levels of performance achieved, as perceived by both users and providers.

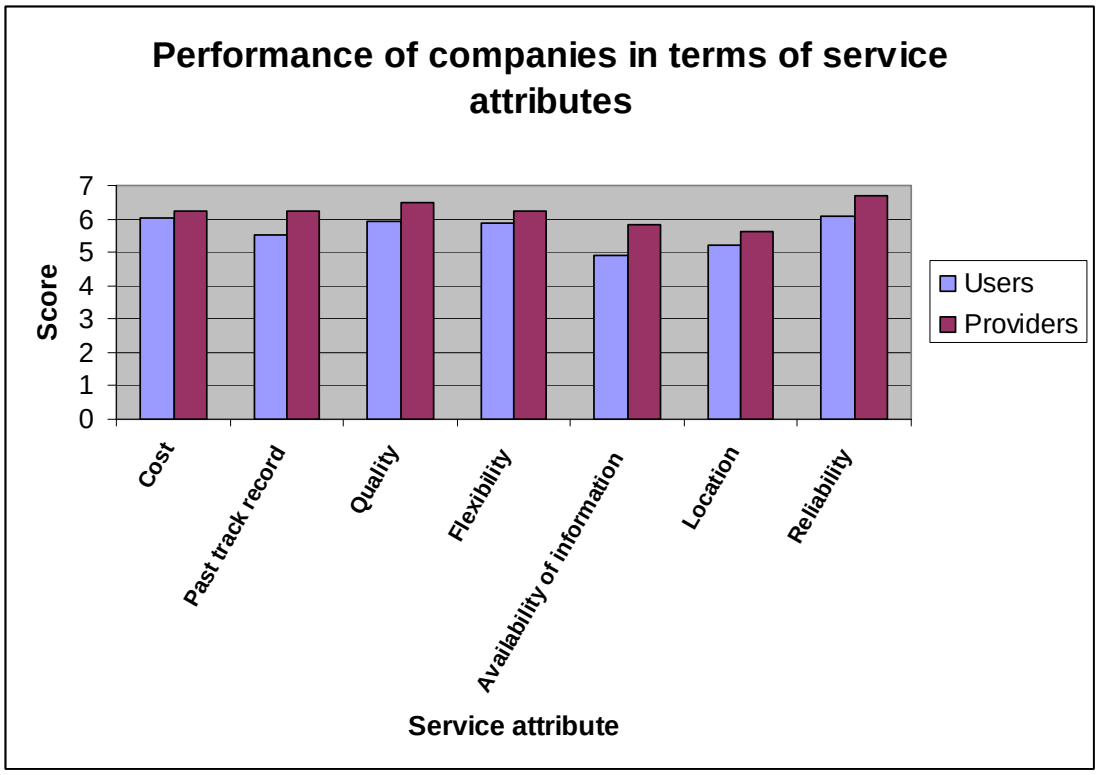


Figure 6.2 Performance mean scores for each service attribute

Results show that providers believe their services to be generally well adapted to the needs of their customers. Indeed the general level of satisfaction of their customers has been found to be relatively high, with all attributes achieving a performance score of at least 5 (with the exception of availability of information) out of a maximum of 7.

Further analysis has been undertaken on the importance and performance scores from both the user and provider groups to identify the areas of greatest need for improvement. The relative weighted performance scores by category (see Tables 6.22 and 6.23) were estimated by calculating for both users and providers:

1/ the relative importance scores which take into consideration the relative weight of the average importance scores across the 7 categories

2/ the shortfall on performance from the maximum possible score (i.e. from 7)

3/ for each category, the shortfall on performance from the maximum possible score was then weighted by the relative importance of category

4/ a score which expresses the users' perception relative to providers' perception was obtained by comparing, in relative terms, the shortfalls on performance weighted by the relative importance of category for both groups

5/ the highest possible value indicates the top priority for providers to address (please refer to last column of Table 6.24)

Table 6.22 Gap Analysis - Providers data

Categories	Average importance scores	Relative importance scores	Average performance scores	Shortfall from best score (i.e. 7)	Shortfall weighted by relative importance of category
Cost	6.54	0.155863	6.23	0.77	0.120014299
Past track record	5.79	0.137989	6.25	0.75	0.10349142
Quality of service	6.57	0.156578	6.5	0.5	0.078288847
Flexibility of service	6.02	0.143470	6.22	0.78	0.111906578
Availability of information	5.45	0.129886	5.85	1.15	0.149368446
Location	4.85	0.115586	5.6	1.4	0.161820782
Reliability	6.74	0.160629	6.67	0.33	0.053007626

Table 6.23 Gap Analysis - Users data

Categories	Average importance scores	Relative importance scores	Average performance scores	Shortfall from best score (i.e. 7)	Shortfall weighted by relative importance of category
Cost	6.34	0.159819	6.01	0.99	0.158220318
Past track record	5.53	0.139400	5.54	1.46	0.203524074
Quality of service	6.36	0.160323	5.94	1.06	0.169942022
Flexibility of service	5.91	0.148979	5.86	1.14	0.169836148
Availability of information	4.71	0.118730	4.92	2.08	0.246957399
Location	4.4	0.110915	5.21	1.79	0.198537938
Reliability	6.42	0.161835	6.1	0.9	0.145651626

Table 6.24 Relative weighted performance by category

Categories	Shortfall providers	Shortfall users	Gap (relative)	Priority for improvement 1=TOP
Cost	0.120014299	0.158220318	1.318345551	**6**
Past track record	0.10349142	0.203524074	1.966579189	**3**
Quality of service	0.078288847	0.169942022	2.170705397	**2**
Flexibility of service	0.111906578	0.169836148	1.517660103	**5**
Availability of information	0.149368446	0.246957399	1.653343828	**4**
Location	0.161820782	0.198537938	1.226900129	**7**
Reliability	0.053007626	0.145651626	2.747748504	**1**

The following conclusions can be drawn from this analysis:

1/ Data in tables 6.22 and 6.23 show that all values indicating shortfall of performance from best score are more favourable from the providers' point of view than perceived by the users. For several of the service attributes, providers feel they are meeting expectations, which is not the perception of the users.

2/ Providers believe they are falling short mainly in areas of lower importance to customers. Users generally agree. The gaps perceived by users, however, tend to be much wider than the gaps seen by providers.

3/ Even the relative least important issues are not absolutely unimportant. Hence, a poor score in a relatively unimportant aspect is still a cause for concern.

The priority areas for service improvement which providers need to address have been identified in Table 6.25. An interpretation of the results has also been provided.

Table 6.25: Ranking of priority areas for service improvement

Service attribute	Priority ranking	Interpretation
Reliability	1	Biggest gap in a high importance category (providers perceive very small shortfall, users relatively not so happy). Hence, top priority area for providers to address.
Quality of service	2	Providers perceive a small shortfall in their performance for this category, but users are not so happy
Past track record	3	Relatively big user shortfall
Availability of information	4	Relatively low importance category but biggest user gap observed
Flexibility of service	5	Small user gap but category relatively highly weighted
Cost	6	High importance category but users generally fairly happy
Location	7	Lowest importance weight (both users and providers groups)

6.4 Barriers to Effective Service Provision in the Yorkshire and the Humber Region

Driver shortages, skills shortages, cost of training and congestion (within the Yorkshire and the Humber region and elsewhere) were regarded by user companies in all clusters as important barriers to effective provision of freight transport and logistics services in Yorkshire and the Humber (see Table 6.26). Respondents also indicated 'other' barriers such as:

- Lack of adequate road infrastructure in parts of Yorkshire;
- The attitude and flexibility of their service providers;
- Quality of their staff;
- Fuel prices and road tax on vehicles.

Table 6.26 Barriers to Supplying Efficient Services at Present (User Companies)

Barrier	None of the Clusters		Cluster					
			Food and Drink		Advanced Engineering		Chemicals	
	n	%	n	%	n	%	n	%
Skills - general driver shortage	8	32	7	33	14	23	3	20
Skills - other skills shortage	3	12	3	14	8	13	2	13
Cost of Training	5	20	3	14	8	13	3	20
Road congestion-within region	11	44	7	33	33	55	10	67
Road congestion-elsewhere	11	44	6	29	30	50	8	53
Lack of investment in new equipment	3	12	4	19	12	20	1	7
Rail operational constraints	1	4	1	5	7	12		
Regulatory restrictions at delivery point	5	20	1	5	2	3	1	7
Other	13	52	9	43	21	35	7	47

Table 6.27 compares the barriers to effective service provision in the Yorkshire and the Humber region, as indicated by both users and providers. The results highlight a number of reasons why operators are particularly focused on the need to contain their costs, partly in order to fight off strong competition from abroad. 45% of providers reported that they lose business to non-British road transport operators. Amongst the reasons they believe this is happening are: lower taxation base (76% of respondents), lower labour costs (62%), lower fuel prices (90%), ability to offer cheap back loads from Britain to the rest of Europe (32%), more efficient operations (2%).

The lower number of users identifying with many of these problems in Table 6.27 also reflects the relatively high level of contracting out in transport, as this shifts the immediate problem from the owner of the goods onto the transport operator.

Providers have also indicated a number of 'other' reasons for ineffective service provision in Yorkshire and the Humber at present. These are:

- The cost of fuel;
- High running costs;

- Too many regulations within the industry;
- New employment legislation, particularly regarding the 48 hour week;
- Poor road networks;
- Amount of traffic on roads;
- Competition from other European hauliers (lower fuel prices and road tax costs as well as lower labour costs).

Table 6.27 Barriers to Supplying Efficient Services at Present: A Comparison Between Users and Providers

Barrier		Users	Providers
Skills -general driver shortage		27%	69%
- other skills shortage		14%	20%
Cost of training		15%	29%
Road congestion	within region	53%	77%
	elsewhere	48%	51%
Lack of ability to invest in new equipment		16%	13%
Rail operational constraints		7%	1%
Regulatory restrictions at delivery point		7%	7%
Other		41%	13%
n		132	143

Users and providers were also asked for their views on any barriers to effective service provision in Yorkshire and the Humber in the future. Concern about the implications of the Working Time Directive was becoming particularly noticeable at the time of the survey (see Table 6.28). Operators were very concerned about the potential cost implications and about the difficulties in planning ahead due to the lack of information on the precise form the Directive will take. Road congestion charging was also highly topical due to the publicity surrounding the then introduction of the scheme in Central London.

Table 6.28 Potential Barriers to Effective Service Provision in Yorkshire and the Humber

Potential barrier	Users	Providers
Working Time Directive	48%	94%
Road congestion charging	83%	80%
Regulatory restrictions at delivery point	31%	44%
Health and safety legislation	30%	4%
Other	5%	5%
n	93	85

Note: Percentages are those of respondents giving response - columns do not sum to 100.

6.5 Conclusions

This chapter has presented the results from a survey of users and providers of freight transport and logistics services in the Yorkshire and the Humber region. The main aim of the survey was to determine whether users of freight transport and logistics services (particularly manufacturing companies in Yorkshire and the Humber) could obtain excellent services at competitive prices, to allow them to improve their industrial competitiveness to the benefit of the regional economy. Therefore particular attention has been given to the different perceptions of users and providers as to the effectiveness of services available in the region, in terms of their cost and a range of service attributes. The analysis of the survey results was conducted using SPSS. Statistical testing however to assess the statistical significance of the results for example by using Chi-square tests was inappropriate because this is a pioneering, 'exploratory' study in logistics rather than 'explanatory' based on hypothesis testing. The survey undertaken was of an exploratory and descriptive character and qualitative rather than quantitative data were being collected. No attempt has been made to draw conclusions or inferences that would have required such testing at this stage (such as for example significant differences between clusters), with any such conclusions drawn instead from the subsequent case study analysis.

The key findings have been stated in the earlier sections of this chapter. In more general terms,

- The consensus of opinion was that a full range of services was available in the region and that such services were generally performing well.

- A gap analysis of the perceptions of users and providers has however highlighted that providers have a more positive view of the quality of their services than the corresponding view held by the users.

- There are clearly some service quality issues that need to be addressed in the region (whilst not wishing to overstate these gaps given the generally high level of satisfaction with the services on offer).

- A strong preference for quality service attributes over cost was observed in this survey.

- The priority areas for service improvement which providers need to address have been identified as reliability and quality of service. These preferences, however, will not be easily met due to a number of current and future barriers to effective provision of freight transport and logistics services in Yorkshire and the Humber. These barriers have been identified by both the user and provider groups as driver and skills shortages, the increasing cost of training and congestion (within the Yorkshire and the Humber region and elsewhere).

- Operators were particularly focused on the need to contain their costs, partly in order to fight off strong competition from other European hauliers.

- The study has also produced a number of findings which suggest that market information is rather less than perfectly available and that as a result choices are being made on the basis of a restricted choice set.

This survey has also contributed to the evaluation of the cluster approach for researching the contribution of logistics to the competitiveness of regional economies. In this survey

there was a focus on businesses in the key industrial clusters (Food and Drink, Chemicals and Advanced Engineering) as they tend to be heavy users of freight transport and logistics services. Survey results provided an insight into the logistics requirements of user companies in these clusters, the extent to which these requirements were outsourced and the nature of the decision-making process of the companies concerned and suggested that shortfalls in logistics service provision at the regional level could result from:

- the nature of the decision-making process of the companies concerned (the manner in which decisions are made and at what level) that affect movement of goods from and into the planning region;

- the nature of their logistics requirements, the extent to which companies outsource non-core activities and the way in which service providers are selected;

- the way users and providers obtain information about each other;

- the importance that users and providers attach to different service attributes and the way they evaluate each others' performance;

- barriers such as skills shortages, road congestion, operational constraints, regulatory restrictions and health and safety legislation that prevent the logistics industry in the region from supplying effective services.

Companies do business on different terms, which in the context of international trade operations are known as Incoterms. Incoterms are “a set of uniform rules for the interpretation of international commercial terms defining the costs, risks, and obligations of buyers and sellers in international transactions” (Hinkelman, 2000). Among the best known Incoterms are EXW (Ex works), FOB (Free on Board), CIF (Cost, Insurance and Freight), DDU (Delivered Duty Unpaid), and CPT (Carriage Paid To).

In this study, the Incoterms have been taken into consideration, albeit not explicitly, when designing the survey questionnaires from the perspective that they influence the division of responsibility for transport within a supply chain. Companies purchasing from overseas suppliers on an ex-works basis (EXW), for example, must assume more responsibility for logistics decisions, whereas those purchasing on a delivered price basis (e.g. DDU) may well absolve themselves of logistics decision making and hence may have little influence over (or indeed perhaps even little knowledge of) routes or ports used. This would suggest that if the region's industry is to maximize its control over logistics, it should purchase ex-works and sell at delivered price. However companies in the region may not have such power, being dictated to by for example, overseas parent companies or dominant customers and suppliers.

The supply chain investigation of companies discussed in the next chapter will aim to strengthen the findings from the surveys and to provide a further insight into the freight transport and logistics requirements of companies within the Yorkshire Forward priority clusters and across the Yorkshire and the Humber sub-regions.

CHAPTER 7 SPATIAL MAPPING OF SUPPLY CHAINS OF CASE STUDY COMPANIES

7.1 Introduction

The previous chapter analysed and discussed the results from a survey of the users and providers of freight transport and logistics services in Yorkshire and the Humber. The aims and objectives of these surveys were presented in detail in Chapter 5.

The surveys, amongst other findings, have provided an insight into the logistics requirements of user companies for inbound and outbound transport and value-adding services, the extent to which these requirements were outsourced and the nature of the decision-making process of the companies concerned. A gap analysis has also been undertaken to study the differences in the perceptions of both the user and provider groups of a number of service attributes such as cost, quality, flexibility, reliability and location. The current and future barriers which prevent service providers from supplying the user companies in the Yorkshire and the Humber region with effective and efficient services were also investigated.

This chapter discusses the findings of a supply chain mapping investigation of selected companies in the Yorkshire and the Humber region. The extended Scott and Westbrook mapping technique as shown in Chapter 4 is applied to five case studies of supply chains involving companies from the Yorkshire and the Humber region. This chapter is also concerned with the development of a Regional Index of Supply Chain Activity (RISCA).

The overall conclusions of this research project and recommendations for further research are discussed in the next chapter.

7.2 Objectives of the case study research

The objectives of the supply chain mapping exercise are threefold.

Firstly, it aims to enhance the knowledge of the freight transport and logistics requirements of companies within the Yorkshire Forward priority clusters and across the Yorkshire and the Humber sub-regions by following up and building on the results of the surveys of users and providers of freight transport and logistics services in Yorkshire and the Humber as analysed in Chapter 6.

The second objective is to apply the extended Scott and Westbrook mapping technique to supply chains involving companies from the Yorkshire and the Humber region. An extension of the Scott and Westbrook 'pipeline mapping' tool by adding a dimension that identifies the location of supply chain activities has been carried out through a set of case study examples. Each of the case studies investigated the extent to which supply chain operations were carried out in the region and the usage of regional operators and facilities.

The final objective is to develop for the first time a Regional Index of Supply Chain Activity (RISCA). This index is based on the proportion of total supply chain costs incurred in carrying out operations within the Yorkshire and the Humber region and suggests which logistics requirements of companies might offer the most potential for regional service providers.

This case study investigation makes an important original contribution to achieving the overall aims and objectives of the research project and is one of the elements of the methodological triangulation (together with the literature review and questionnaire surveys) that have been employed.

7.3 Discussion of the data collection process

7.3.1 Choice of companies

When selecting companies, emphasis was put on the (1) Food (including agriculture) and Drink (2) Chemicals and (3) Advanced Engineering and Metals clusters as the companies in these clusters are major users of freight transport and logistics services and account for a significant proportion of the movement of goods from and into this region. The idea was to investigate enough case study companies to cover all three clusters across the four sub-regions (North Yorkshire, South Yorkshire, West Yorkshire and the Humber).

The difficulties in the data collection process and the low representation of some industry types in certain sub-regions (e.g. significant advanced engineering companies in North Yorkshire) reduced the number of case studies that were possible or indeed required. It was concluded that the cluster dimension is far more important to pursue as the supply chains of the companies within a cluster stretch beyond the boundaries of the sub-region and indeed the planning region. Hence, the sub-regional dimension had also been covered even though the research was skewed towards the cluster approach.

7.3.2 The process of contacting companies

The questionnaire survey of users of freight transport and logistics services in Yorkshire and the Humber enquired into the potential interest of companies to participate in a follow up case study investigation into their supply chains. The positive responses were followed up.

Other sources of contact information were the FAME database (also used for creating the database of companies for the questionnaire surveys), colleagues within the Department of Logistics and Hospitality Management at the University of Huddersfield as well as other company databases available on the Internet. Professional organisations within the region such as The Grimsby Institute of Food and Fisheries, the Yorkshire and the Humber branches of the Institute of Logistics and Transport, the Manufacturing Excellence Club for West Yorkshire and the regional Chambers of Commerce and Industry were also approached to facilitate the contact with potential case study companies.

In excess of 100 companies were contacted on an ongoing basis. Initial contact in most cases was by e-mail or phone. Once the most appropriate person within the company was identified (usually the logistics or supply chain manager or director), the company was visited to give an introductory presentation on the proposed supply chain mapping investigation. A detailed description of the data requirements and an action plan were sent in advance of the company visits to improve the efficiency of the data collection process. If the company was found suitable and data were available, the introductory company visit was followed up by a meeting with the company contact as well as an extensive tour of the manufacturing, storage and transportation facilities and equipment. Data were then collected on site or e-mailed/posted by the company contact. Subsequent visits or e-mail correspondence for points of clarification were also employed in the process. Data collection took place between April 2004 and July 2005.

7.3.3 Data requirements and methodology for the mapping exercise and the development of the RISCA measure

The mapping process in this study broadly followed the stages suggested by Harrison and van Hoek (2002):

- Creation of a task force
- Selecting the process to map
- Data collection
- Distinguishing between value-adding and non-value-adding time
- Construction of the time-based process map
- Solution generation

Specifically, the collection of data for the extension of the Scott and Westbrook 'pipeline map' involved the following activities:

Step 1: Obtaining initial information about the case study company and its logistics requirements;

To introduce the company in question, information was gathered to create a short overview of its markets, geographical coverage, sectors of operation, product range and characteristics, turnover and employees in total and in Yorkshire and the Humber.

At a deeper level, to understand the company's logistics operations, the following areas were researched:

- The company's requirements for inbound and outbound transport, warehousing operations and value-adding non-core services;
- The company's extended supply chain – movements of goods from and into the Yorkshire and the Humber region, import and export activities;
- Logistics providers;
- The company's perception about the extent to which its logistics requirements are met by service providers in the region in order to identify gaps in service provision and highlight the current and future barriers to effective freight transport and logistics service provision in the Yorkshire and the Humber region.

Step 2: Identifying one product (either slow-moving or fast-moving) and following its movement along the supply chain;

The choice of a product was facilitated by the company contact. In most cases this was a relatively senior member of staff, namely the Logistics or Supply Chain Manager or Director.

Step 3: Obtaining information about the location of the supply chain activities (stock-holding or other supply chain activities such as manufacturing, processing, assembling or transportation) for the selected product (from materials sourcing to outbound transport). Once the locations were determined, they were categorised as follows:

- within a Yorkshire and the Humber sub-region (West Yorkshire, North Yorkshire, South Yorkshire or East Yorkshire/the Humber/North East Lincolnshire);
- within a region adjacent to Yorkshire and the Humber (i.e. North East, North West (including Merseyside) or East Midlands);
- within any other UK region;
- within the rest of Europe;
- rest of the world.

Step 4: Obtaining information about which of these supply chain activities were outsourced and which of them were carried out in-house or using own resources.

Step 5: For each of the supply chain activities, information about the location of the companies' logistics providers was collected. The same location options as in Step 3 were considered.

Step 6: Collecting data on lead times between each stage of the supply chain and inventory levels at each point in the supply chain for the selected product. In cases where no exact figures could be obtained, approximate values were used.

Step 7: Data collection on the breakdown of costs for the RISCA measure.

The Regional Index of Supply Chain Activity (RISCA) has been devised as a measure of the proportion of a company's total supply chain costs that are incurred in the region concerned. As a result, it highlights business opportunities for service providers to extend their market share in this region.

The example below illustrates how the RISCA measure is calculated.

Table 7.1: Example of the Regional Index of Supply Chain Activity (RISCA)

Supply Chain Activity	% of Total Supply Chain Costs (A)	% of (A) in Yorkshire and the Humber (B)	Score (AxB/100)
	A	B	
Materials sourcing	10	10	1
Inbound transportation	5	0	0
Inbound storage	5	100	5
Processing/Manufacturing/ Assembly	40	100	40
Outbound storage	20	50	10
Outbound transportation[2]	10	50	5
Distribution to customers[3]	10	60	6
Total	**100**		**67**

The supply chain maps are then created in a two-staged process. First, a scaled map was produced in Excel, representing:

- lead times and time spent in processes or other supply chain activities such as manufacturing, labelling, packaging, assembling or transportation;
- the levels of, and locations of, inventory in the supply chain;
- the location of supply chain activities throughout the supply chain.

This map was then enhanced using VISIO software which is a tool for drawing complex diagrams and charts.

7.3.4 Limitations and difficulties in the data collection process

The following difficulties were encountered in the data collection process:

- **Finding the most relevant contact within the given company**

[2] Refers to the transportation of the product from the factory to the Distribution Centre
[3] Refers to the transportation of the finished product from the Distribution Centre to the retailer/customer

Usually more senior members of staff (such as logistics or supply chain managers/directors) were responsible for making logistics decisions. They were also the ones who had an extensive overview of the company's supply chain operations. Due to their seniority, however, their time was very limited and although they had found this research very interesting and relevant, they were often unable to spend time on it or their input was hugely delayed.

- **Confidentiality**

Lead times and inventory levels, which this supply chain mapping exercise focuses on, and supply chain costs for the development of the RISCA measure, are crucial performance indicators for supply chain management. Therefore, such data were treated as confidential and most companies which had been approached were rather reluctant to participate. Furthermore, to be able to compare and contrast the findings from the mapping exercises between the three key industrial clusters of the Yorkshire and the Humber region, and to attempt to explain any significant differences, data were collected from companies, especially within a cluster, which were competitors. This made collecting data even harder and to an extent limited the level of detail of the data which the companies were willing to provide. In most cases, there was a single point of contact within the company and it was not permitted to approach any other people or departments within the organisation.

- **Limitations related to the size of companies**

The initial idea of this case study research was to collect data from companies of different sizes. This idea, however, was soon abandoned in favour of contacting rather large companies. An explanation for this limitation related to the size of companies is similar to one of the reasons for the low response rate to the user questionnaire in Chapter 5. It was concluded that the 'micro' and 'small' to 'medium-sized' companies were often only subcontractors to large companies and the scope of their supply chain activities (if any at all) was very limited. Hence, the proposed case study work was irrelevant to their

operations or these companies did not collect the data that were requested. Furthermore, the members of staff in the small-sized companies which were contacted were responsible for making logistics decisions in addition to their primary function and could not make themselves available to this research. Another reason often quoted by members of staff in small-sized companies was the lack of experience of and procedures for working with research students.

- **Limitations related to the marketing of this work to potential case study companies**

It was found difficult to persuade companies to take part in this work unless there was a well-established link between the company and the University. Indeed, as explained earlier in this section, the main sources of initial contact information were obtained from colleagues within the Department of Logistics and Hospitality Management at the University of Huddersfield. As no payment was involved, it was a matter of goodwill of the company contact to collaborate in this case study work.

- **Limitations related to the location of companies**

Not all three clusters were equally well represented across the four sub-regions of the Yorkshire and the Humber region. Although the cluster approach to selecting case study companies was given highest priority, an effort was made to ensure that representation of companies across the sub-regions was as good as possible. Some of the sub-regions, however, were underrepresented in terms of the industries typical of a cluster. Examples include the North Yorkshire and the Humber sub-regions, where it was very difficult to identify suitable companies representing the Advanced Engineering cluster.

7.4 Application of the Scott and Westbrook Mapping Technique and the RISCA Measure to Selected Case Study Companies

Five companies in three of the Yorkshire Forward priority clusters took part in the supply chain mapping exercise (see Table 7.2).

Table 7.2: Case Study Companies and Their Cluster Affiliation

Case study number	Name of company	Cluster affiliation
1	CRAY VALEY	Chemicals
2	ROCKWARE GLASS LTD	Chemicals
3	NESTLÉ	Food and Drink
4	FOX'S BISCUITS	Food and Drink
5	TMD FRICTION	Advanced Engineering

Discussion of individual cases follows below.

7.4.1 CASE STUDY 1: CRAY VALLEY

1. Company overview

- **Markets**

Cray Valley is part of TOTAL's chemicals. It develops high-technology resins and additives for the coatings industry (such as paints, inks, varnishes, adhesives) and polyester resins and gel coats for the composites industry.

Cray Valley (the Stallingborough site in the Humber) services the following market sectors: marine, construction, transport, mastics, storage tanks and sanitary.

- **Geographical coverage**

Cray Valley operates in Europe, Americas, Africa and Asia.

- **Sectors of operation/service**

Cray Valley (the Stallingborough site) is engaged in the manufacture of unsaturated polyester resins and coating resins and has recently made an investment in the gel coat business.

- **Products (product range and characteristics)**

Cray Valley's (the Stallingborough site) range of products includes:

- Emulsion resins for decorative paints
- High dried extract resins for industrial paints
- Polyester resins for industrial paints
- Polyester resins with low styrene emission for stratification
- Photocure systems, 100% reagents & solvent free
- Resins for powder paints

- **Company information: turnover, number of employees**

The group formed by Cray Valley, Cook Composites & Polymers (which is the resins business, part of TOTAL's chemicals branch, known in the United States under this name) and Sartomer is the second largest resins manufacturer in the world with sales of 1.6 billion euros and nearly 3,600 employees worldwide (Cray Valley, 2003).

The Stallingborough site employs 120 people, all of them based in Yorkshire and the Humber.

2. An overview of the logistics requirements of Cray Valley (the Stallingborough site)

Requirements for inbound and outbound transport, warehousing operations and value-adding non-core services

Road is by far the most widely used mode of inbound and outbound transport. The bulk of inbound materials (70%) and outbound products (90%) are moved by road. 30% of inbound transport and only a fraction of the outbound transport (10%) is seaborne.

The volume of inbound materials amounts to 40,000 tonnes per annum. 20% of the inbound materials come from Yorkshire and the Humber, 40% originate from the rest of Britain, 30% from the rest of the European Union and 10% from the rest of world.

All inbound transport is outsourced to a logistics provider which is typical of the chemical industry and has been supported by the survey results in Chapter 6.

The volume of the outbound products moved per annum is comparable to that of the inbound materials and amounts to 37,000 tonnes. However, the majority of finished products (65%) are despatched to other GB areas outside Yorkshire and the Humber and the rest of the EU (15%) and only 15% stay in Yorkshire and the Humber. 5% of the finished products are despatched to customers in the rest of the world.

As with inbound transport, requirements for outbound transport are entirely outsourced to logistics providers.

The majority (80%) of the requirements for warehousing operations are outsourced to third party logistics operators. The requirements for value-adding non-core services (such as assembly, packing, labelling, load consolidation, etc) are also primarily outsourced to address cost, flexibility and skills constraints.

Junior and middle management staff are involved in taking decisions that affect the planning of logistics requirements. During the interview it became clear that such decisions are taken not only in-house within Yorkshire and the Humber but also in-house elsewhere in the world. Indeed, 80 % of raw materials are purchased by the central purchasing department in Paris. In this way purchasing economies of scale are achieved

when buying in bulk. The Stallingborough factory is responsible for purchasing only 20% of its raw materials which it is buying independently from its French owner in low volumes.

The extended supply chain: movements of goods from and into Yorkshire and the Humber, imports and exports

Cray Valley is involved in both import and export operations. The volume of imports amounts to 15,000 tonnes per annum and exceeds that of exports which is 8,000 tonnes per annum.

Decisions on routes and modes of transport for imports are taken primarily by the supplier. 75% of imported goods (inbound raw materials) are delivered by the supplier and 25% by a logistics provider through the Humber ports. This explains the lack of control over the port of entry for imports. Decisions on routes and modes of transport for exports are taken primarily by logistics providers (requirements for outbound transport being entirely outsourced to logistics providers) and thus the company has no control over the port of exit too.

In descending order, the ports on the South Coast, Yorkshire and the Humber ports and North West ports are used for imports. In the same order, Yorkshire and the Humber ports (for shipments to Scandinavia), North West ports (for shipments to Ireland) and the ports on the South Coast (for shipments to France) are used for exports.

Logistics providers

Cray Valley uses a wide range of third party logistics providers based in Yorkshire and the Humber and elsewhere in Britain. In an interview, the logistics manager expressed his concern over the current lack of their own warehousing facility to chemical storage standards on-site. This, combined with the very high transport costs to move goods to and from the warehouse, explained why at present the company prefers to always use

logistics providers based in Yorkshire and the Humber. If the company had its own warehousing facility on-site, it would have no preference for the location of its logistics service providers. To build a properly equipped warehouse on-site, the company needed to invest at least £1.5m which is not a feasible option at present.

The sources of information employed by Cray Valley when searching for third party logistics providers include (1) past experience (2) experiences and recommendation of others (3) own company databases.

The company conducts service provider reviews quarterly. It does not consider making substantial changes to its logistics arrangements regarding mode of transport and proportion of own/third party transport but will consider changing control and location of warehousing if possible. Cray Valley would prefer to have its own warehouse onsite and controlled in-house.

Gaps in service provision and current and future barriers to effective freight transport and logistics service provision

Upon reflection, Cray Valley's logistics manager felt that the supply of logistics services in Yorkshire and the Humber meets demand. Yorkshire-and-Humber-based logistics providers failed to offer an adequate service in terms of availability of warehousing to chemical storage standards. Warehousing which complies with stringent chemical storage standards is clearly an area of utmost concern to the company mainly due to the very high costs of inbound and outbound transport.

Other service attributes important to Cray Valley when choosing a logistics service provider include cost, quality of service and reliability, each of these being of equal importance. The perception is that logistics service providers in Yorkshire and the Humber perform excellently against these criteria.

Amongst the shortcomings, which currently prevent logistics providers in Yorkshire and the Humber from supplying an effective service, the general driver shortage and road congestion surprisingly not in Yorkshire and the Humber but elsewhere in Britain were mentioned.

The implementation of the Working Time Directive and road congestion charging were identified as future problems.

The product and its choice

The product, whose supply chain is illustrated by the Scott and Westbrook 'pipeline map' in Figure 7.1, is SHOWER TRAY CASTING RESIN. This is a fast-moving product and accounts for 30% of Cray Valley's monthly sales.

Similar to the other case studies, the choice for this product was advised by Cray Valley's logistics manager who also provided the data for the supply chain mapping exercise and the RISCA measure.

4. The extended supply chain for the production of SHOWER TRAY CASTING RESIN

This section is concerned with Cray Valley's logistics requirements and location of service providers for the selected product and includes information on the product's movements throughout the supply chain; namely

- Supplier and inbound transport information;
- Production information;
- Delivery information for finished goods.

Supplier and inbound transport information

The main raw material for the production of the shower tray casting resin (styrene monomer) is sourced from within Yorkshire and the Humber by a local transport company and is moved by road. Another raw material, glucose, is also sourced from within Yorkshire and the Humber and transport is outsourced to a sub-contracted haulier based in this region. Maleic Anhydride is sourced from France as a driver accompanied delivery and enters the UK through Dover. Phthalic Anhydride (PA) is also sourced from France but in this case the port of entry is Hull and a Yorkshire-and-Humber-based transport company carries it to the Stallingborough site. Another additive (BYK) used in the production of the resin is sourced from Holland and despatched by a Dutch transport operator.

The supplier and inbound transport information for the selected product shows a very high degree of outsourcing of inbound transport. In fact, inbound transport for all raw materials is either the supplier's responsibility or is outsourced to a third party transport operator based in Yorkshire and the Humber or abroad. These observations support the survey results in Chapter 6 and reflect parent company's policy on strategic purchases explained earlier in this section.

Production

All activities for the production of the shower tray casting resin (base resin manufacture, blending and other operations such as adding accelerators, pigment, silica fine and titanium oxide) are carried out in-house at the Stallingborough site.

Pre production bulk storage of styrene monomer and storage of the finished product take place at the Stallingborough site but are outsourced to a third party logistics company. This is due to Cray Valley's lack of own warehousing facility to chemical storage standards on-site at present and is perceived by the company as a major disadvantage.

No work-in-progress (WIP) for the product was reported apart from the one batch in manufacture. As the maximum cycle time for the manufacture of this product (processes

such as base resin manufacture and mixing and blending) is 30 hours, any open jobs are referred to as “the raw material” and not WIP.

Delivery information for finished goods leaving Cray Valley

The bulk of the finished product (60%) is containerised and despatched to a client, a locally based shower tray manufacturer. Outbound transport is outsourced to a transport company based in Yorkshire and the Humber. The order lead time in this case is 24 hours. Another 40% of the finished product is loaded onto a road tanker in 6 hours. The finished product then leaves the manufacturing site immediately for delivery to the customer next day whatever the location around the UK. Outbound transport in this case is outsourced to a transport operator based in a region adjacent to Yorkshire and the Humber.

For containerised products (60%) the average stock turn is 20 days. For bulk, the company carries no finished product stock as this product is very much made to order.

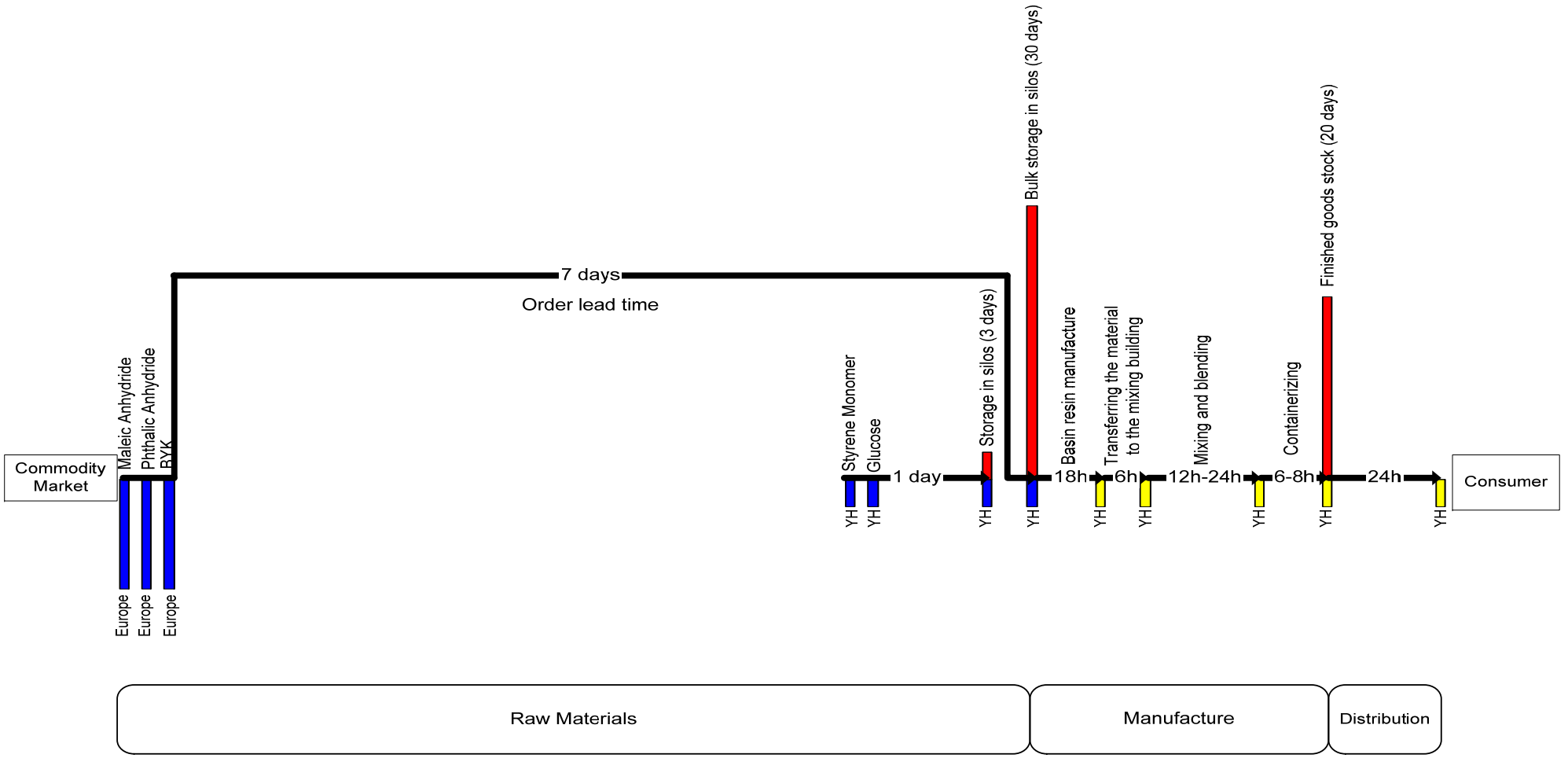


Figure 7.1: Supply Chain Map for Cray Valley

The RISCA Measure

The RISCA data presented in Table 7.3 were obtained as part of the supply chain mapping investigation and reflect the costs incurred in carrying out the supply chain activities for the selected product (the shower tray casting resin).

Table 7.3: Cray Valley: Regional Index of Supply Chain Activity (RISCA)

Supply Chain Activity	% of Total Supply Chain Costs (A)	% of (A) in Yorkshire and Humber (B)	Score (AxB/100)
	A	B	
Materials sourcing	45	50	22.5
Inbound transportation	8	20	1.6
Inbound storage	2	100	2
Processing/Manufacturing/ Assembly	30	100	30
Outbound storage	3	100	3
Outbound transportation	2	100	2
Distribution to customers	10	60	6
Total	**100**		**67.1**

The RISCA score shows that a relatively high share of the company's total supply chain costs are incurred in carrying out operations within the Yorkshire and the Humber region and imply that a high proportion of the logistics requirements are based within the region. Materials sourcing and especially inbound transport (despite its low percentage share of total supply chain costs) however remain potential areas which could offer business opportunities for regional service providers.

7.4.2 CASE STUDY 2: ROCKWARE GLASS LTD

1. Company overview

- **Markets**

The company is part of the Ardagh Group which claims to be the glass container industry market leader in Europe with manufacturing locations in the UK, Germany,

Poland and Italy. Rockware Glass Ltd purports to be the UK's market leader in the design and manufacture of glass containers for the food and beverage industries.

- **Geographical coverage**

Rockware Glass Ltd has four plants in the UK, two of which are in Yorkshire (in Doncaster and Knottingley). The other two are in Irvine (Ayrshire) and Worksop (Nottinghamshire). The company's Head Office is based in Knottingley.

- **Products (product range and characteristics)**

The Knottingley site has a manufacturing facility which specialises in the production of containers for the beer, wine and cider markets. It also features a glass recycling plant.

- **Company information: turnover, number of employees**

Rockware Glass Ltd employs 1000 people, 679 of whom are based in Yorkshire and the Humber.

2. An overview of the logistics requirements of Rockware

Requirements for inbound and outbound transport, warehousing operations and value-adding non-core services

All inbound materials and outbound products are moved by road.

Half of the inbound materials come from Yorkshire and the Humber, the other half originate from the rest of Britain.

Typical of the chemical industry, as illustrated by the survey results in Chapter 6, all inbound transport is controlled by the company's suppliers.

Similar to the inbound materials, the outbound products are moved within Great Britain. The majority of the finished products (75%) stay in Yorkshire and the Humber and only a quarter are despatched to other areas outside Yorkshire and the Humber.

The requirements for outbound transport are either outsourced to logistics providers or are customer-controlled.

The requirements for warehousing operations and value-adding non-core services (such as assembly, packing, labelling, load consolidation, etc) are mostly outsourced to third party logistics operators which enable the company to concentrate on its core business activities and use subcontractors' expertise for the auxiliary ones.

Middle and senior management staff is involved in taking decisions that affect planning of logistics requirements. During the interview it became clear that such decisions are taken in-house within Yorkshire and the Humber.

The extended supply chain: movements of goods from and into Yorkshire and the Humber, imports and exports

The company is involved in both import and export operations. Data on the volume of imports and exports, in physical units, were not available. An indication, however, was provided through the value of imports (£300K) and exports (£400K). These figures should be interpreted in the context of a high volume low value production of a glass container manufacturer.

Decisions on routes and modes of transport for imports are taken primarily by a logistics provider within Yorkshire and the Humber. This explains the lack of control over the port of entry for imports. The imported goods are delivered through the Humber ports or the Scottish port of Grangemouth. Decisions on routes and modes of transport for exports are taken primarily by a logistics provider based outside the Yorkshire and the Humber region and therefore the company has no control over the port of exit too. Yorkshire and the Humber ports as well as ports on the South Coast are used for exports.

Logistics providers

The overview of the company's logistics requirements and related decision-making processes has shown that its successful manufacturing operations depend on the availability of effective and efficient services of third party logistics providers based in Yorkshire and the Humber and elsewhere in Great Britain. When interviewed, the company contact (a Logistics Contract Manager) made it clear that the use of service providers based within Yorkshire and the Humber should not be taken for granted and his company would use their services only if service criteria matched or exceeded that available elsewhere.

The sources of information employed by Rockware when searching for third party logistics providers include past experience and customer's experience.

The company conducts service provider reviews annually and periodically considers making substantial changes to its logistics arrangements.

Gaps in service provision and current and future barriers to effective freight transport and logistics service provision

Rockware's logistics contract manager expressed his concern over the state of significant undersupply of logistics services in Yorkshire and the Humber region. The lack of Yorkshire-and-Humber-based hauliers who can handle large volume, long transit deliveries on a just-in-time basis was identified as a major gap in service provision.

Other service attributes important to Rockware when choosing a logistics service provider include cost, quality of service, reliability and availability of information, each of these being of equal importance. The perception is that logistics service providers in Yorkshire and the Humber perform relatively well (but are not excellent) against these criteria.

Amongst the shortcomings, which currently prevent logistics providers in Yorkshire and the Humber from supplying an effective service, were mentioned the general driver shortage and road congestion in the region. There was also a perception that operators failed to invest in new equipment, which most probably is a reflection of the gaps in service provision discussed earlier in this section.

The implementation of the Working Time Directive, road congestion charging and health and safety legislation were identified as future problems affecting the performance of logistics service providers in Yorkshire and the Humber.

The product and its choice

The product, whose supply chain is illustrated by the Scott and Westbrook 'pipeline map' in Figure 7.2, is the 330ml Budweiser glass bottle. This is a fast-moving product and accounts for 9% of Rockware's monthly sales.

Similar to the other case studies, the choice for this product was facilitated by Rockware's logistics contract manager who also provided the data for the supply chain mapping exercise and the RISCA measure.

4. The extended supply chain for the production of the 330ml Budweiser glass bottle

This section is concerned with Rockware's logistics requirements and location of service providers for the selected product and includes information on the product's movements throughout the supply chain:

- Supplier and inbound transport information;
- Production information;
- Delivery information for finished goods.

Supplier and inbound transport information

The main raw materials for the production of the 330ml Budweiser glass bottle (cullet and sand) are sourced from within Yorkshire and the Humber by a local transport company and are moved by road. The other raw materials, limestone and soda ash, are sourced from regions adjacent to Yorkshire and the Humber. Transport of raw materials is the supplier's responsibility.

Some of the packaging (layer pads which are put between each layer of bottles and plastic band for fastening) is sourced from Yorkshire and the Humber. The wooden pallets and top frames (wooden boards used on top of the last tier of glass) come from a region adjacent to Yorkshire and the Humber.

Production

All activities for the production of the 330ml Budweiser glass bottle (creation of a batch of raw materials to be inputted into the furnace and turned into molten glass, transfer of the molten glass to a moulding machine, production of glass containers from mould, internal quality checks and annealing process) are carried out in-house at the Knottingley factory. This is a continuous process and a batch of raw materials is inputted into the furnace every 3-4 minutes.

Pre production bulk storage of raw materials and packaging and storage of the finished product (held 24 hours for quality checks) take place at the factory premises.

Delivery information for finished goods

The finished product is palletised and taken to the warehouse where it is held for 24 hours for quality checks. Half of deliveries go direct from Knottingley to the customer filling line at Mortlake. Outbound transport in this case is customer's responsibility. The other 50% of the finished product is despatched to a buffer warehouse at Brackmills and then delivered to the customer site by a transport company based in Northamptonshire.

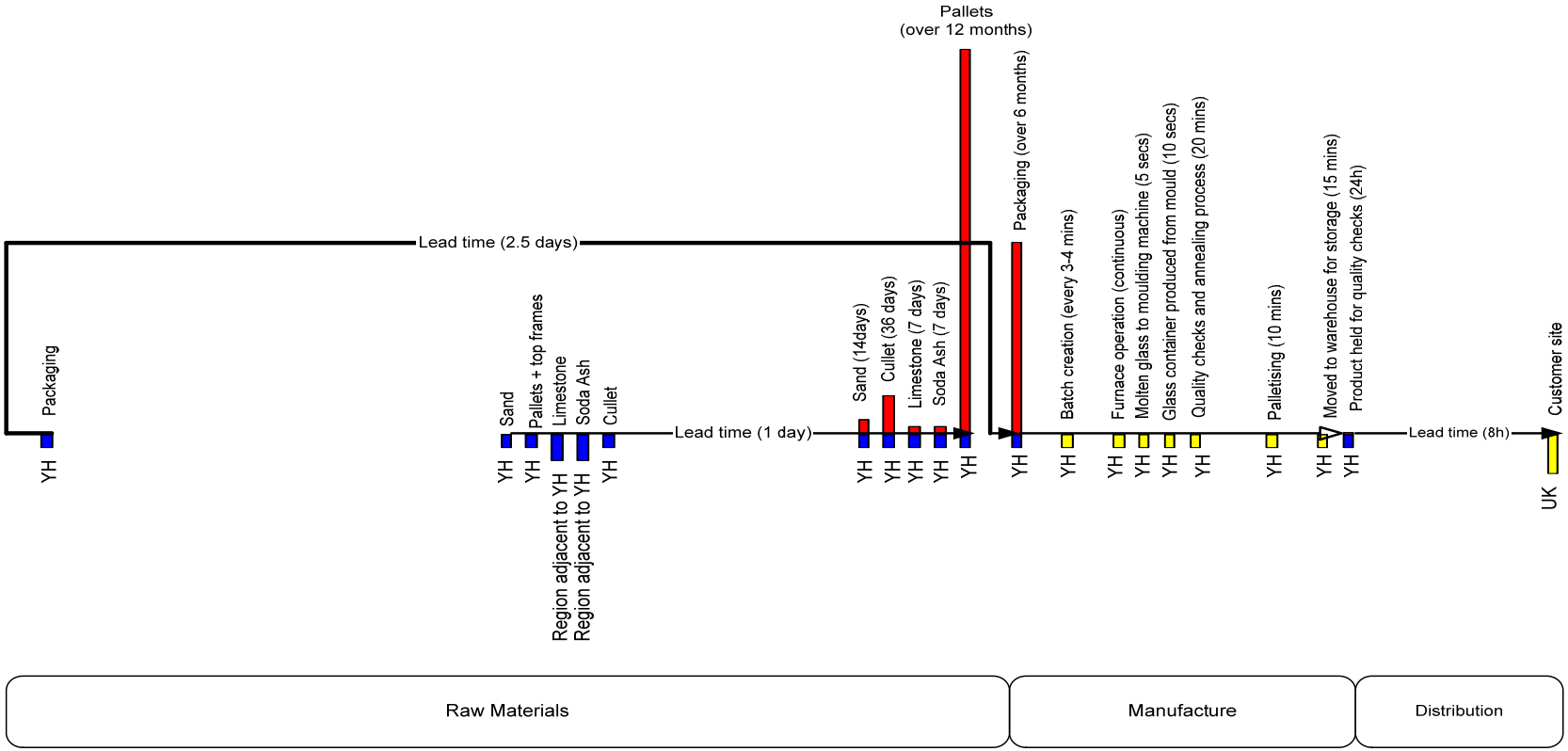


Figure 7.2: Supply Chain Map for Rockware

The RISCA measure

The RISCA score in Table 7.4, which is the highest of all case study companies, is very close to the one observed in the Cray Valley case. Data show that a high share of the company's total supply chain costs are incurred in carrying out operations within the Yorkshire and the Humber region and imply that a high proportion of the logistics requirements are based within the region. Materials sourcing, inbound transport and distribution however remain as potential areas which could offer business opportunities for regional service providers.

Table 7.4: Rockware Ltd: Regional Index of Supply Chain Activity (RISCA)

Supply Chain Activity	% of Total Supply Chain Costs (A)	% of (A) in Yorkshire and the Humber (B)	Score (AxB/100)
	A	B	
Material sourcing	50	50	25
Inbound transport	0	50	0
Factory storage (pre production)	0	100	0
330 ml Budweiser bottle manufacture	30	100	30
Storage (post production)	10	80	8
Outbound transport	0	0	0
Distribution	10	50	5
Total	**100**		**68**

7.4.3 CASE STUDY 3: NESTLÉ

1. Company overview

- **Markets**

Nestlé was founded in 1866 and since then has grown into a multinational company. The company's headquarters are in Vevey, Switzerland.

Europe is the biggest market for Nestlé's products with 32.5% of sales in 2003 registered in Europe, followed by the Americas (31.4%) and Asia, Oceania and Africa (16.4%) (Nestlé, 2003).

- **Geographical coverage**

Nestlé is a multinational company with factories or operations in almost every country in the world.

Nestlé UK is represented by 11 factories, the York site being the largest of company's 500 factories around the world. The York site also acts as the Head Office for Nestle UK confectionary business and the Consumer Services department is also based there.

Three of the Nestlé UK factories are based in Yorkshire and the Humber. The York site in North Yorkshire and the Castleford factory in West Yorkshire are specialised in manufacturing confectionary products. The factory in Halifax in West Yorkshire provides a comprehensive range of hot and cold drinks, confectionery and snacks for vending through a wide variety of machines.

- **Sectors of operation/service**

Nestlé UK is engaged in the manufacture of a wide range of food and drink products, as shown in the section below, and associated activities (such as beverage and snack vending).

- **Products (product range and characteristics)**

Breakfast cereals, chilled dairy products, chilled meats, coffee and other drinks, chocolate and sugar confectionary and chocolate biscuits, milks and creams and pasta.

- **Company information: turnover, number of employees**

At the end of 2003 Nestlé's sales globally amounted to CHF 88bn (≈ £40bn), with a net profit of CHF 6.2bn (≈ £2.74bn). The company employs around 253,000 people worldwide.

Nestlé Holdings (UK) plc employs around 9,196 employees and in 2003 its turnover reached about £1.8bn. Approximately 4,000 are employed in Yorkshire and the Humber.

2. An overview of the logistics requirements of Nestlé UK Ltd (the York site)

Requirements for inbound and outbound transport, warehousing operations and value-add non-core services

Inbound materials and outbound products are moved solely by road.

The volume of inbound materials amounts to 15,000 lorry loads per annum. Half of the inbound materials come from Yorkshire and the Humber, 35% originate from the rest of Britain, 10% from the rest of the European Union and 5% from the rest of Europe.

In 95% of the materials, the supplier controls transport of inbound materials to the York premises. This shows a very high level of outsourcing of inbound transport operations.

The volume of the outbound products moved per annum is comparable to that of the inbound materials and amounts to 22,000 lorry loads. However, the majority of finished products (80%) are despatched to other GB areas outside Yorkshire and the Humber and only 10% stay in Yorkshire and the Humber. 10% go to the rest of the EU.

Similar to inbound transport, requirements for outbound transport are outsourced to logistics providers in 80% of the cases and own transport is used in only 20% of the cases.

The majority (70%) of the requirements for warehousing operations are outsourced to third party logistics operators, reasons for that being (1) the very high level of automation of warehousing operations (2) seasonality of demand for finished products (3) raw materials and finished products of perishable nature and hence (4) requirements for specialist equipment. Indeed, the company requirement for specialist vehicles, handling or processing equipment includes the use of chocolate tankers and food grade dry freight box trailers. The requirements for value-add non-core services (such as assembly, packing, labelling, load consolidation, etc) are also primarily outsourced to address cost, flexibility and skills constraints.

All levels of management are involved in taking decisions that affect the planning of logistics requirements. During the interview it became clear that such decisions are primarily taken in-house within Yorkshire and the Humber (the York site is the Head Office for Nestlé's confectionary business in the UK and the Consumer Services department is also based in York) but also in-house elsewhere in Britain. Given the high percentage of outsourcing of transport and logistics requirements, service providers are also regarded as important in the decision-making process.

The extended supply chain: movements of goods from and into Yorkshire and the Humber, imports and exports

Nestle UK Ltd is involved in both import and export operations. The volume of exports amounts to 2,800 lorry loads per annum and exceeds that of imports which is 1,200 lorry loads per annum.

Decisions on routes and modes of transport for exports are taken primarily by the customer whereas in the case of imports such decisions are taken in-house in Yorkshire and the Humber. This explains the lack of control over the port of exit for exports. The port of entry for imports is regarded as important and the company has control over it. Yorkshire and the Humber ports, North East ports and the ports on the South Coast are used for imports.

Logistics providers

Nestlé is using a wide range of third party logistics providers based in Yorkshire and the Humber, rest of Britain and Europe. The company will only use logistics providers based in Yorkshire and the Humber only if service criteria matched or exceeded these available elsewhere.

The sources of information employed by Nestle when searching for third party logistics providers include (1) past experience (2) experiences and recommendation of others (3) internet auction and (4) direct approach from logistics providers.

The company conducts service provider reviews quarterly. It also periodically considers making substantial changes to its logistics arrangements regarding mode of transport, proportion of own/third party transport and control and location of warehousing.

Gaps in service provision and current and future barriers to effective freight transport and logistics service provision

Upon reflection, Nestlé's planning and scheduling manager and the supply chain manager felt that there is a slight undersupply of logistics services in Yorkshire and the Humber. Yorkshire-and-Humber-based logistics providers failed to offer an adequate service in terms of levels of IT proficiency and quality of transport provision. Other service attributes important to Nestlé when choosing a logistics service provider include cost, quality of service, flexibility of service and reliability, which are most and equally important. However, the perception is that logistics service providers in Yorkshire and the Humber perform badly against these criteria. These shortcomings were attributed to general driver shortage and road congestion which currently prevent logistics providers in Yorkshire and the Humber from supplying an effective service.

Skills shortages, the implementation of the Working Time Directive and road congestion charging were identified as future problems.

3. The product and its choice

The product, whose supply chain is illustrated by the Scott and Westbrook 'pipeline map', is the YORKIE chocolate bar (see Figure 7.3).

The choice for this product was facilitated by Nestlé's Planning and Scheduling Manager and the Supply Chain Planning Manager who also provided the data for the supply chain mapping exercise and the RISCA measure. As in practice the structure of most supply chains is very complex on both the supply and demand sides, the selected product was chosen for the relative simplicity of the raw materials and technological processes employed in its manufacture.

Other reasons for choosing this product include: (1) it is a fast-moving typical all-year-round Nestlé's product which will allow comparison with the Fox's Biscuits seasonal product (see below); (2) people who chose the product felt that they were in a position to provide the data for the selected product.

4. The extended supply chain for YORKIE

This section is concerned with Nestlé's logistics requirements and location of service providers for the selected product (YORKIE) and includes information on the product's movements throughout the supply chain:

- Supplier and inbound transport information;
- Production information;
- Delivery information for finished goods.

Supplier and inbound transport information

Some of the main ingredients for the production of the YORKIE bar are sourced locally (sugar from York, North Yorkshire), from a region adjacent to Yorkshire and the Humber (outer packaging from Hartlepool, North East) or from any other UK region (crumb from Girvan, Scotland and film from Livingston, Scotland). Two of the ingredients (coco and lecithin) are sourced directly from the commodity markets and

hence the requirement for very high stock levels (12 months for coco and 6 years for lecithin) and specialised warehousing capacity (a cold store for the lecithin in Hull).

Inbound transport to the UK port of entry for selected raw materials is outsourced to a third party Dutch operator (for coco) or is supplier's responsibility (for lecithin). In both cases, inbound transport to the UK port of entry is seaborne and is through Hull.

Nestlé primarily uses own transport for moving the majority of raw materials to its premises within the UK. Goods are moved by road. Only the inbound transport of film and outer packaging is outsourced to a third party transport company based in Scotland.

Production

All activities for the production of the YORKIE chocolate bar (chocolate processing, moulding, wrapping and packaging) are carried out in-house at the York site. About 400,000 YORKIE chocolate bars (20 tonnes of chocolate) are produced in an 8-hour shift.

Delivery information for finished goods leaving Nestle

60% of the product goes from the factory to the own warehouse on the York site. This is moved by an internal shuttle vehicle. Stock leaves the factory and is in the warehouse within 15 minutes. The remaining 40% is despatched to the Bardon distribution centre in Leicestershire, and is transported by the Nestlé own fleet.

Loads from York to customer are delivered 25% by own fleet and 75% by third party logistics providers based in Yorkshire and the Humber (50%), the North East (25%) and Lancashire and Scotland (25%).

Outbound transport from Bardon to the customer is entirely outsourced to a third party logistics provider.

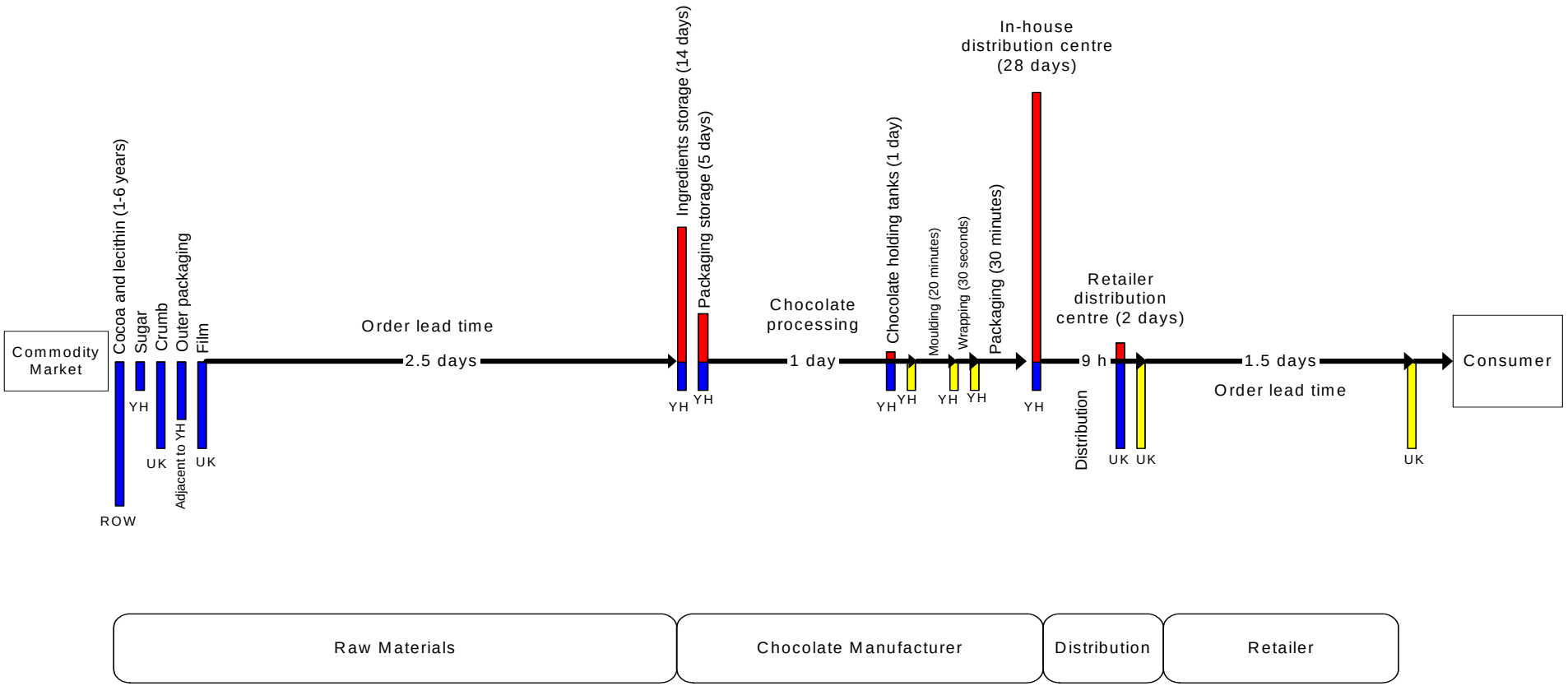


Figure 7.3: Supply Chain Map for Nestlé

The RISCA measure

The RISCA figures in Table 7.5 show that a relatively low share (compared to the scores of companies in the other two clusters) of the company's total supply chain costs are incurred in carrying out operations within the Yorkshire and the Humber region. Although supply chain activities such as inbound storage and manufacturing are carried out exclusively in Yorkshire and the Humber and the company employs local facilities and operators (especially for outbound transport), materials sourcing and inbound transport stand out as areas which could offer significant business opportunities for regional service providers.

Table 7.5: Nestlé: Regional Index of Supply Chain Activity (RISCA)

Supply Chain Activity	% of Total Supply Chain Costs (A)	% of (A) in Yorkshire and Humber (B)	Score (AxB/100)
	A	B	
Raw materials sourcing	65	25	16.25
Inbound transport	2	25	0.5
Factory storage (pre-production)	2	100	2
YORKIE chocolate bar manufacture	25	100	25
Storage (post-production)	2	60	1.2
Outbound transport	2	100	2
Distribution	2	60	1.2
Total	**100**		**48.15**

7.4.4 CASE STUDY 4: FOX'S BISCUITS

1. Company overview

- **Markets**

Fox's Biscuits parent company is Northern Foods plc, of which it has been part since 1977. Northern Foods plc is a leading UK food manufacturer. The consortium's products cover a wide range of the food market, including biscuits, cakes and Christmas puddings, chilled ready meals and frozen food products.

Fox's Biscuits is part of Northern Foods' Ambient Division and positions itself on the market as a premium biscuit manufacturer.

- **Geographical coverage**

Northern Foods' manufacturing sites are grouped under various divisions (ambient, chilled, frozen and chilled dedicated) located in various places throughout the UK.

Fox's Biscuits has three factories, at Batley in West Yorkshire, Kirkham near Blackpool and at Uttoxeter in Staffordshire. The company also has two distribution centres, in Wakefield and Uttoxeter.

With the recent merger with the Uttoxeter factory, the company is expanding its market share in the UK, especially in the South of England, and has become a national player rather than just 'Fox's Biscuits of Batley', as known in the past. The rest of Europe, USA and the Far East are destinations for Fox's exports.

- **Sectors of operation/service**

Fox's Biscuits is engaged in the manufacture of a wide range of biscuits.

- **Products (product range and characteristics)**

Fox's Biscuits product range include a wide range of biscuits under different brands such as Rocky, Classic and Echo as well as a range of products under character licensing such as The Simpsons.

- **Company information: turnover, number of employees**

In 2004 Northern Foods reported a turnover in excess of £1.5bn and employed around 23,000 people in the UK.

Fox's Biscuits has around 1,500 employees, approximately 1,000 of which are in Yorkshire and the Humber.

2. An overview of the logistics requirements of Fox's Biscuits

Requirements for inbound and outbound transport, warehousing operations and value-add non-core services

All outbound products are moved solely by road. 98% of all inbound materials are also moved by road and 2% of inbound transport is seaborne.

The volume of inbound materials amounts to 50,000 tonnes per annum. 34% of inbound materials come from Yorkshire and the Humber, 62% originate from the rest of Britain, 1% from the rest of the European Union and 3% from the rest of Europe. The high share of purchases from within Britain reflects the fact that, whilst raw materials such as cocoa and coconut originate from 'rest of the world', the company purchases these products from UK refineries.

Inbound transport is entirely controlled and managed by suppliers.

The volume of the outbound products moved per annum is comparable to that of the inbound materials and amounts to 41,000 tonnes per annum. The majority of finished products (80%) are despatched to other GB areas outside Yorkshire and the Humber, the EU (2%) or rest of the world (2%) and 16% to Yorkshire and the Humber.

Requirements for outbound transport are outsourced to logistics providers in 75% of the cases. A small proportion of own transport is also used (5%) and 20% of outbound transport is controlled and managed by customers.

Warehousing operations are organised and carried out using the company's own resources. Value-add non-core services (such as assembly, packing, labelling, load consolidation, etc) are also mostly carried out in-house.

Middle to senior management staff as well as retail customers are involved in taking decisions that affect the planning of logistics requirements. During the interview with the Planning and Logistics Controller it became clear that such decisions are primarily taken in-house within Yorkshire and the Humber or customers make such decisions.

The extended supply chain: movements of goods from and into Yorkshire and the Humber, imports and exports

Fox's Biscuits is involved in both import and export operations. The volume of exports amounts to £2.5 million per annum and exceeds that of imports which is £1.5 million per annum.

Decisions on routes and modes of transport for exports are taken primarily by logistics providers based in Britain but outside Yorkshire and the Humber. Destinations for outbound products as well as the very high share of contract hauliers in outbound transport explain this. For imports, such decisions are taken by suppliers and, similar to exports, the explanation lies with the organisation and management of inbound transport. Hence, the lack of control over the port of exit for exports and the port of entry for imports. For the above reason, the company is indifferent as far as the port of exit or entry is concerned. The North West ports are used for exports and the ports on the South Coast are used for imports. This reflects the focus on the deep sea routes, mainly on South Coast ports such as Felixstowe and Southampton, determined by suppliers and logistics providers.

Logistics providers

Fox's Biscuits is using a wide range of third party logistics providers based in Yorkshire and the Humber and the rest of Britain. The company will only use logistics providers based in Yorkshire and the Humber only if service criteria match or exceed those available elsewhere.

The sources of information used by Fox's Biscuits when hiring third party logistics providers include (1) past experience (2) experiences and recommendation of others

but also (3) other sources such as promotional materials, trade directories and the Internet for information in the retail logistics field.

The company conducts quarterly service provider reviews but will undertake these more often if issues arise. In an interview with the planning and logistics controller it became clear that the company does not periodically consider making substantial changes to its logistics arrangements regarding mode of transport and the proportion of own/third party transport but will change the location of warehousing because of size restrictions. Indeed, after merging with a factory in Uttoxeter, the company has set up a new distribution centre in Staffordshire in addition to the existing one in West Yorkshire. This step, which unfortunately does not add value to the Yorkshire and the Humber economy, will increase the company's market share in the south of England and will turn Fox's Biscuits into a national player.

Gaps in service provision and current and future barriers to effective freight transport and logistics service provision

Fox's Biscuits planning and logistics controller felt that in general logistics service provision in Yorkshire and the Humber was adequate and supply meets demand. Logistics providers based in Yorkshire and the Humber, however, failed to perform well against a set of attributes such as reliability, flexibility and quality of service, all of which were of utmost importance to Fox's Biscuits. Other service attributes important to Fox's Biscuits when choosing a logistics provider include cost and past track record (both of equal importantance). The perception is that logistics service providers in Yorkshire and the Humber perform badly against cost. Indeed, the company did not see any real price advantage from Yorkshire logistics providers despite their proximity to Fox's distribution operations and the relatively good road links.

The above shortcomings were also attributed to skills shortages which currently prevent logistics providers in Yorkshire and the Humber from supplying an effective service.

Regulatory restrictions, the implementation of the Working Time Directive and road congestion charging were identified as future problems.

3. The product and its choice

The product, whose supply chain is illustrated by the Scott and Westbrook 'pipeline map' (see Figure 7.4), is the **SEASONAL ASSORTMENT BISCUIT TIN**.

The choice for this product was facilitated by Fox's Biscuits' Planning and Logistics Controller who also provided the data for the supply chain mapping exercise and the RISCA measure.

Reasons for choosing this product include: (1) it is a relatively slow-moving seasonal product which will allow comparison with the fast-moving typical all-year-round Nestlé's YORKIE chocolate bar; (2) people who chose the product felt that it was representative enough of company's operations and they also were in a position to provide the data for the selected product.

4. The extended supply chain for SEASONAL ASSORTMENT BISCUIT TIN

This section is concerned with Fox's Biscuits' logistics requirements and location of service providers for the selected product and includes information on the product's movements throughout the supply chain:

- Supplier and inbound transport information;
- Production information;
- Delivery information for finished goods.

Supplier and inbound transport information

Some of the main ingredients for the production of the SEASONAL ASSORTMENT BISCUIT TIN are sourced locally (small quantities of sugar from York, North Yorkshire and fat from Hull, the Humber) or from other UK regions (flour and some

of the tins from Mansfield, Nottinghamshire; main supply of sugar from Newark, Nottinghamshire; chocolate from Newark, Nottinghamshire and Banbury, Oxfordshire). Tins are also sourced from Denmark and moved into the UK through the port of Hull. The company will switch sourcing of tins to China to gain cost advantage but this will inevitably damage the share of traffic through the Humber ports.

Suppliers of raw materials control 100% of inbound transport. Goods are moved by road. Only the inbound transport of tins from Denmark is seaborne and through the port of Hull.

Production

All activities for the production of the SEASONAL ASSORTMENT BISCUIT TIN (biscuit production, wrapping, packing, labelling, etc) are carried out in-house at the Batley site. In the near future, however, 20% of biscuit manufacturing will move to Uttoxeter, Staffordshire, which will further damage the share of supply chain activities which take place in Yorkshire and the Humber.

Pre and post production storage of ingredients and packaging take place in Batley and Wakefield, but with the relocation of 20% of seasonal production to Uttoxeter, it can be expected that some of the factory storage will also move to Staffordshire.

Delivery information for finished goods leaving Fox's Biscuits

The finished product is despatched to the distribution centre in Wakefield and then to other regions in the rest of Britain. Outbound transport is entirely outsourced to logistics service providers. Locations of hauliers include Bristol (Avon), Leighton Buzzard (Bedfordshire), Wolverhampton (West Midlands), Warrington (Cheshire), Goole (the Humber), Glasgow (Scotland), Leeds (West Yorkshire), Barnsley (South Yorkshire), and Preston (Lancashire).

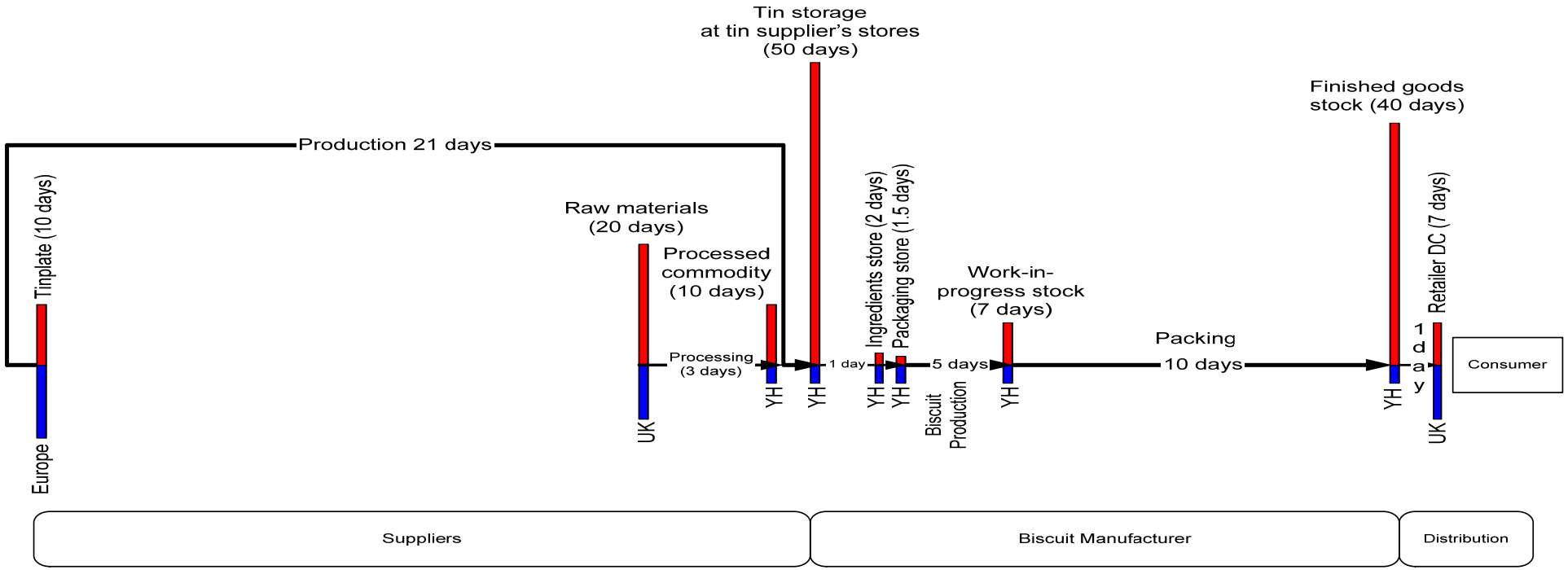


Figure 7.4: Supply Chain Map for Fox's Biscuits

The RISCA Measure

The RISCA figures in Table 7.6 show that a relatively low share (compared to the scores of companies in the other two clusters but higher than Nestlé's score) of the company's total supply chain costs are incurred in carrying out operations within the Yorkshire and the Humber region. Although supply chain activities such as inbound and outbound storage and manufacturing are carried out exclusively in Yorkshire and the Humber and the company employs local facilities and operators (especially for outbound transport), inbound transport and materials sourcing (with the highest share of total supply chain costs) stand out as areas which could offer significant business opportunities for regional service providers.

Table 7.6: Fox's Biscuits: Regional Index of Supply Chain Activity (RISCA)

Supply Chain Activity	% of Total Supply Chain Costs	% of (A) in Yorkshire and the Humber	Score (AxB/100)
	A	B	
Raw materials sourcing	52	18	9.4
Inbound transport	5	22	1.1
Factory storage (pre-production)	2	100	2
Biscuit manufacture	35	100	35
Outbound transport	1	100	1
Storage (post-production)	3	100	3
Distribution	2	20	0.4
Total	**100**		**51.9**

7.4.5 CASE STUDY 5: TMD FRICTION

1. Company overview

- **Markets**

TMD Friction UK is part of the TMD Friction Group, a globally operating company producing disc brake pads and drum brake linings for passenger cars, trucks, buses and trailers, motor cycles, industrial applications and racing.

TMD Friction Group's products are supplied as original equipment to all major vehicle manufacturers as well as to the replacement markets worldwide.

- **Geographical coverage**

TMD Friction Group's headquarters are based in Germany. The company has manufacturing facilities in Europe (Germany, UK, France, Spain, Sweden and Italy), Americas (USA, Brazil and Mexico), and Asia (China). Its UK factory is in Cleckheaton, West Yorkshire.

- **Sectors of operation/service**

TMD Friction Group is a manufacturer of friction materials in the original equipment market of the automotive and brake industry.

TMD Friction UK is primarily a brake pad manufacturer.

- **Products (product range and characteristics)**

TMD Friction UK's range of products includes disc brake pads, shoes, discs, drums, cylinders, hoses and fluid, commercial vehicles brake linings and commercial vehicles brake pads.

- **Company information: turnover, number of employees**

TMD Friction Group generated a turnover of €641m in 2004 and employed nearly 4,500 people worldwide (TMD Friction Group, 2004).

TMD Friction UK employs 200 people, all of them based in Yorkshire and the Humber.

2. An overview of the logistics requirements of TMD Friction UK

Requirements for inbound and outbound transport, warehousing operations and value-adding non-core services

Similar to the other case study companies and as shown by the survey results in Chapter 6, road is by far the most widely used mode for inbound and outbound transport. The bulk of inbound materials (90%) and all outbound products are moved by road. Only 10% of inbound transport is seaborne.

The volume of inbound materials amounts to 6.5 million tonnes per annum. It is important to note that none of the inbound materials come from Yorkshire and the Humber. 20% originate from the rest of Britain, 70% from the rest of the European Union and 10% from the rest of the world.

70% of inbound transport is outsourced to a logistics provider and 30% is controlled by a supplier or customer. These arrangements are typical of engineering companies in the Advanced Engineering cluster and have also been illustrated by the survey results in Chapter 6.

The volume of the outbound products moved per annum is comparable to that of the inbound materials and amounts to 7 million tonnes per annum. None of the outbound products are despatched to clients within Yorkshire and the Humber. The majority of finished products (80%) are moved to other EU countries (Germany in particular) and 20% of the finished products are despatched to other UK areas outside Yorkshire and the Humber.

As for inbound transport, requirements for outbound transport are outsourced to a logistics provider (70%) or are responsibility of a customer or supplier (30%).
Warehousing operations are organised and carried out using own resources. Some of the value-added non-core operations (such as assembly, packing, labelling, load consolidation, etc) are also carried out in house but outsourced to address mainly cost constraints.

Staff at all levels is involved in taking decisions that affect the planning of logistics requirements. During the interview it became clear that such decisions are taken

entirely in-house within Yorkshire and the Humber which, combined with the availability of an own warehousing facility onsite, suggests a high level of control over decisions concerning logistics requirements. Service provider reviews are carried out on an annual basis (compared to quarterly reviews in the cases of Nestlé, Cray Valley and Fox's Biscuits) and the company hardly makes or is planning to make any changes to its logistics requirements.

The extended supply chain: movements of goods from and into Yorkshire and the Humber, imports and exports

TMD Friction UK is involved in both import and export operations. The volume of exports amounts to 7 million tonnes per annum and slightly exceeds that of imports which is 6.5 million tonnes per annum.

Decisions on routes and modes of transport for imports are taken in house within and outside Yorkshire and the Humber as well as by suppliers. Decisions on routes and modes of transport for exports are taken in house or by customers. In both cases of imports and exports, TMD Friction UK has no control over the port of entry or exit. For this reason, the company is indifferent as far as the port of exit or entry is concerned.

The ports on the South Coast and Yorkshire and the Humber ports (Immingham and Hull) are used for imports and exports.

Logistics providers

Currently, TMD Friction UK uses third party logistics providers based mainly in Yorkshire and the Humber. However, the company will continue to use logistics providers based within Yorkshire and the Humber only if service criteria match or exceed these available elsewhere.

The sources of information employed by TMD Friction UK when searching for third party logistics providers include (1) past experience and (2) direct approach from logistics providers.

Gaps in service provision and current and future barriers to effective freight transport and logistics service provision

Upon reflection, the supply chain manager of TMD Friction UK felt that the supply of logistics services in Yorkshire and the Humber slightly exceeds demand. Overall, he did not think of any substantial gaps in the service provision of Yorkshire-and-Humber-based logistics providers.

However, the company closely monitors and remains very critical of its service providers. Indeed, it conducts service provider reviews annually and uses service attributes such as cost (most important) and quality of service, flexibility of service and reliability (second in importance) for performance benchmarking. Other service attributes important to TMD Friction UK when choosing logistics service providers include past track record, availability of information and location, each of these being of equal importance. The perception is that logistics service providers in Yorkshire and the Humber perform excellently against all these, best in terms of cost and location and to a lesser extent in terms of quality, availability of information and reliability. Flexibility of service and past track record are service attributes which are causing concern to the company as service providers fail to score well against them.

Amongst the shortcomings, which, in the company's view, currently prevent logistics providers in Yorkshire and the Humber from supplying an effective service, the supply chain manager mentioned (1) the general driver shortage (2) road congestion in Yorkshire and the Humber and elsewhere in Britain and (3) rail operational constraints.

The implementation of the Working Time Directive, road congestion charging, regulatory restrictions at delivery point and changes in health and safety legislation were identified as future problems that will hinder the effective provision of logistics services in Yorkshire and the Humber.

4. The product and its choice

The product, whose supply chain is illustrated by the Scott and Westbrook 'pipeline map' (see Figure 7.5), is DISC BRAKE PAD. This is a fast-moving product and accounts for 6% of TMD Friction UK's monthly sales to TMD Friction Germany.

Similar to the other case studies, the choice of this product was facilitated by the company's supply chain manager and the warehouse manager who have provided the data for the supply chain mapping exercise and the RISCA measure.

5. The extended supply chain for the production of DISC BRAKE PAD

This section is concerned with TMD Friction UK's logistics requirements and the location of service providers for the selected product and includes information on the product's movements throughout the supply chain:

- Supplier and inbound transport information;
- Production information;
- Delivery information for finished goods.

Supplier and inbound transport information

The raw materials for the production of the disc brake pad are sourced mainly from EU countries (Denmark, Germany and Italy) as well as from the UK's Midlands (Leicester and Coventry) and in most cases despatched to TMD Friction UK's premises by Yorkshire-and-Humber-based transport companies.

The imported raw materials enter the UK through the Humber ports of Immingham and Hull or Calais, depending on the country of origin. Transport to the UK port of entry is managed mainly by Yorkshire and the Humber based freight transport service providers which also include depots of global logistics service providers such as Hellmann Worldwide Logistics Ltd. (the Bradford depot) in Yorkshire and the Humber. The supplier and inbound transport information for the selected product shows a very high degree of outsourcing of inbound transport. In fact, inbound transport for all raw materials is outsourced to a third party transport operator based in

Yorkshire and the Humber or abroad. These observations confirm survey results in Chapter 6.

Production

All activities for the production of the disc brake pad (plate preparation, processing and stowing, grinding, painting, clip fixing, boxing, etc) are carried out in-house in Cleckheaton, West Yorkshire.

Pre production storage and storage of the finished product take place at the TMD Friction UK site in Cleckheaton. All warehousing activities are carried out in house using own resources.

Delivery information for finished goods leaving TMD Friction UK

The finished product is despatched to Leverkusen in Germany. Indeed, 80% of all TMD Friction UK produce is sent to TMD Friction Germany. Outbound transport is outsourced to a transport company based in Yorkshire and the Humber and is organised through Hull.

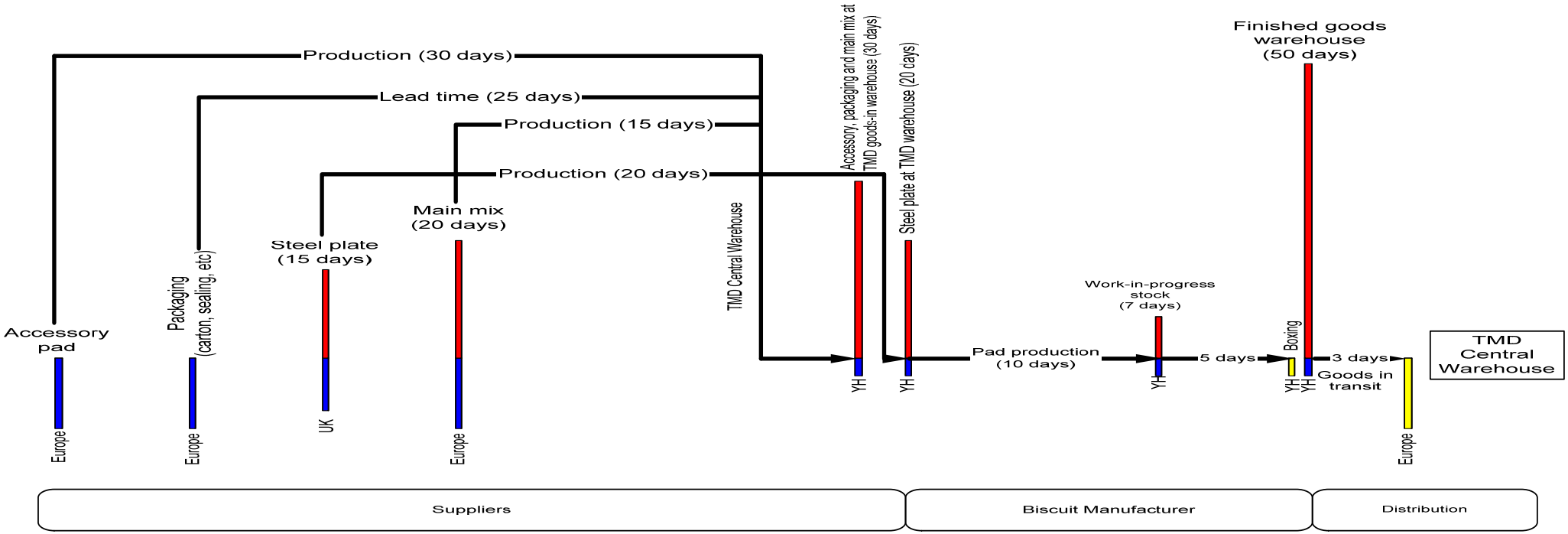


Figure 7.5: Supply Chain Map for TMD Friction

The RISCA Measure

The RISCA score in Table 7.7 is higher than the scores of the two companies in the Food and Drink cluster but lower than the scores of the two companies in the Chemicals cluster. It indicates that a relatively modest proportion of company's total supply chain costs are incurred in carrying out operations within the Yorkshire and the Humber region. Although manufacturing, which represents the highest share of total supply chain costs, is carried out exclusively in Yorkshire and the Humber and although the company employs local facilities and operators (especially for outbound transport), inbound transport and materials sourcing (with the second highest share of total supply chain costs) stand out as areas which could offer significant business opportunities for regional service providers.

Table 7.7: TMD Friction: Regional Index of Supply Chain Activity (RISCA)

Supply Chain Activity	% of Total Supply Chain Costs	% of (A) in Yorkshire and Humber	Score (AxB/100)
	A	B	
Material sourcing	45	1	0.5
Inbound transport	1	5	0.05
Factory storage (pre-production)	0	100	0
Brake pad manufacture	52	96	50
Storage (post-production)	0	100	0
Outbound transport	2	100	2
Total	**100**		**52.55**

The data in Table 7.7 shows that this is a product where costs are driven very largely by material costs and by costs of manufacturing. Distribution costs are a small percentage of total supply chain costs. So even though the transport and logistics is partly done by companies from the Yorkshire and the Humber region, RISCA comes out low due to non-local sourcing.

Similar examples in engineering also exist. As part of this study, an interview was also held at Sulzer Pumps (pumps manufacturer) in Leeds. The work in this company was rather project oriented and its supply chain was built around the design and manufacture

of a bespoke product. For this reason, the development of a full case study did not progress.

7.5 Discussion and summary of case study results

The results from this supply chain mapping investigation have reinforced the findings from the surveys of the users and providers of freight transport and logistics services in Yorkshire and the Humber presented in Chapter 6 and have provided a further insight into the freight transport and logistics requirements of companies within the Yorkshire Forward priority clusters and across the Yorkshire and the Humber sub-regions.

Overall, the extended Scott and Westbrook supply chain mapping technique allows enhanced visibility of the processes within the supply chain, particularly with respect to location. The extension of the Scott and Westbrook mapping technique, as shown by the case study examples, has achieved a clear representation on a scaled diagram of:

- lead times and time spent in processes;
- the levels of, and locations of, inventory in the supply chain;
- the location of supply chain activities throughout the whole supply chain.

The supply chain maps (Figures 7.1 – 7.6) and the RISCA data (Tables 7.3 – 7.7) for all companies have shown that supply chain activities such as inbound storage, manufacturing and outbound storage are carried out in Yorkshire and the Humber and in most cases companies employ local facilities and operators for at least some of these activities. The use of suppliers and transport operators based in the region is associated with a reduction of lead-times and the implementation of Just-In-Time strategies.

The supply chain mapping exercise reported in this chapter has also highlighted some distinctive characteristics of user companies at cluster level as discussed below.

(1) User companies in the Chemicals cluster:

- A very high degree of outsourcing requirements to logistics providers was observed. Therefore, decisions on routes and modes of transport in these cases were taken by logistics providers or by suppliers (for inbound movements) or customers (for outbound movements). The requirement to outsource logistics activities has also resulted in decisions regarding imports and exports or the use and control over the port of entry or exit resting outside the user companies. The overview of the companies' logistics requirements and related decision-making processes has shown that their successful manufacturing operations to a great extent depend on the availability of effective and efficient services of third party logistics providers based in Yorkshire and the Humber and elsewhere in the UK.
- In principle, the use of service providers based within Yorkshire and the Humber should not be taken for granted and companies would use their services only if service criteria matched or exceeded that available elsewhere. The lack of own warehousing facility, however, illustrated by the Cray Valley case dictates the use of service providers from within Yorkshire and the Humber.
- The lack of Yorkshire and the Humber-based hauliers who can handle large volume, long transit deliveries on a just-in-time basis was identified by Rockware as a major gap in service provision in the region.

(2) User companies in the Food cluster:

- The requirement for specialised warehousing facilities was reported by both case study companies. The requirement to outsource warehousing operations to third party logistics operators was also related to companies' products characteristics such as seasonality and perishability.
- More extensive use of own transport (Nestlé) was reported compared to companies in other clusters.
- The use of suppliers and transport operators based in the Yorkshire and the Humber region is associated with a reduction of lead-times and the implementation of Just-In-Time strategies (Nestlé).

(3) User companies in the Advanced Engineering cluster:

- The company investigated in this case study research was not a typical manufacturing company in a sense that its main activity, although still adding value to the regional economy, was product assembly than product manufacturing. This particular position of the company in the supply chain (as a sub-contractor of its parent company in Germany) has influenced its material sourcing and outbound logistics requirements. This also explains why the majority of inbound materials (70%) originate from the rest of the European Union and an even bigger proportion of the finished products (80%) are moved to other EU countries (Germany in particular);
- The availability of an own warehousing facility and the use of regional transport operators (especially for outbound transport) to an extent counterbalances the relatively high degree of control over decisions regarding transport and logistics requirements taken by customers or suppliers. Similar to the companies in the other clusters, however, regional service providers will only be considered if the cost and quality of their services matched or exceeded that available elsewhere.

In their entirety, the conclusions drawn from the case study investigation have implications concerning the following levels:

(1) At the company level

- Users of freight transport and logistics services are represented by companies whose main specialisation is manufacturing. Therefore it is not surprising that in all cases manufacturing activities, which are central to their supply chain operations, take place in Yorkshire and the Humber. These companies outsource non-core processes to specialists and the degree to which they outsource their requirements varies amongst clusters. The highest one has been observed in the chemicals cluster whereas more extensive use of own resources (e.g. own transport) has been employed by the food cluster companies.
- The requirement for specialised warehousing facilities has been perceived as a constraint, especially by companies in the chemicals cluster, when taking decisions

regarding the location of service providers. Other factors, observed in companies in the food cluster, such as products' perishability and seasonality, have also influenced their decisions to outsource the majority of their requirements for warehousing facilities to third party logistics operators within the Yorkshire and the Humber region. This may also be a reflection of the nature of the logistics property market in the region, which predominately caters for the retail and fast-moving consumer goods sectors. The more specialised needs of the region's key industrial clusters are not necessarily being met, suggesting poor physical interlinkages between cluster members (see Chapter 3). As a result, the land-use implications of logistics are often neglected, as claimed by Hesse (2003).

- The use of suppliers and transport operators based in the region is associated with a reduction of lead-times and the implementation of Just-In-Time strategies. On the other hand, requirements for specialist equipment or facilities – and inadequate supply at the regional level – could be an obstacle to implementing these more efficient and effective supply chain strategies.

The **conclusions regarding decision-making at the company level** are twofold:

(i) The overview of the companies' logistics requirements and related decision-making processes has shown that their successful manufacturing operations depend on the availability of effective and efficient services of third party logistics providers based in Yorkshire and the Humber and elsewhere in the UK;

(ii) The use of service providers based within Yorkshire and the Humber, however, should not be taken for granted and companies would use their services only if service criteria matched or exceeded that available elsewhere.

(2) At the regional level

The decisions that affect corporate logistics requirements are taken by companies and regional policy makers have no direct involvement into this decision-making process.

Companies, however, are not always aware of the opportunities, especially when the process of obtaining market information is less than perfect as has been illustrated by survey results in Chapter 6. This creates an opportunity for decision-makers at the regional level to get more actively involved through a range of measures to increase the use of regional facilities and operators. Regional policy makers, however, need to be equipped with a decision-support tool to be able to identify the extent to which supply chain activities take place in a region under consideration, and the benefits to the regional economy that can potentially be achieved at each stage of the supply chain.

Considerable attention has been paid in recent literature to the concept of non-value-adding time in supply chains (Hines et al (2000), Christopher (2005)). This concept, whilst crucially important, is largely relevant at a microeconomic, company level. In a much wider economic context, it is also important for regional governments to identify the extent to which supply chains add their maximum possible value to the economies of their regions concerned. The original investigations undertaken in this research suggest that important influences on this may include:

- the nature of the decision making process of the companies concerned (the manner in which decisions are taken, at what level and where) that affect the movement of goods from and into the planning region;
- the nature of their logistics requirements, the extent to which companies outsource non-core activities and the way in which service providers are selected;
- the way users and providers obtain information about each other;
- the importance that users and providers attach to different service attributes and the way they evaluate each others' performance;
- barriers such as skills shortages, road congestion, operational constraints, regulatory restrictions and health and safety legislation that may prevent the logistics industry in the region from supplying effective services.

Whilst the extended mapping tool of Scott and Westbrook is largely relevant to user companies, the Regional Index of Supply Chain Activity (RISCA) developed in this

research project for the first time, aims at identifying business opportunities for regional service providers. The RISCA scores for all case study companies are shown in Table 7.8.

Table 7.8: Regional Index of Supply Chain Activity (RISCA) scores: a summary table

Case study company	RISCA score	Areas of potential business opportunities for service providers in Yorkshire and the Humber
CRAY VALLEY	67.10	Materials sourcing and inbound transport
ROCKWARE LTD	68.00	Materials sourcing, inbound transport and distribution
NESTLÉ	48.15	Materials sourcing, inbound transport and outbound transport
FOX'S BISCUITS	51.90	Materials sourcing, inbound transport and outbound transport
TMD FRICTION	52.55	Materials sourcing and inbound transport

The RISCA scores, with the exception of Nestlè, are higher than 50 and show that a substantial proportion of companies' logistics requirements are based in the Yorkshire and the Humber region. The RISCA figures reported earlier in this chapter have shown that very large proportions of supply chain activities such as storage and manufacturing are carried out exclusively in Yorkshire and the Humber and companies employ local facilities and operators for these activities. The RISCA measure has also highlighted supply chain activities such as materials sourcing and inbound transport which could potentially be undertaken by regional service providers and therefore could potentially offer business opportunities for them. Regional business support services brokered for example by the Regional Development Agency need to be put in place to promote awareness of these opportunities among the regional service providers.

The application of the extended Scott and Westbrook mapping technique and the RISCA measure to selected case study companies evidenced the concept developed earlier in this research but also provided an evaluation of the data collection process and the methodology of this particular supply chain mapping investigation.

The difficulties in the data collection process and the adopted methodology for the development of the case studies has some implications not so much for the quality of data but rather for the level of detail. To encourage companies to collaborate, especially in cases where no exact figures could be provided, approximate values were used for the analysis. This, however, did not compromise in any way the quality of the case study research as its aim was to illustrate a concept (the extension of the Scott and Westbrook mapping technique) within the wider research context of this research project. Therefore obtaining exact figures was not necessarily critical to achieving the aims and objectives of the research. There are opportunities for better visual illustration of the results from the case study research (the supply chain maps) which can be achieved by using software (probably bespoke) which enables an enhanced representation of spatial graphs.

7.6 Summary

This chapter has presented findings from a supply chain mapping investigation of companies in the Yorkshire and the Humber region. The extended Scott and Westbrook mapping technique and the RISCA measure (developed in this research project for the first time) have been applied to selected case study companies representing the Chemicals, Food and Drink and Advanced Engineering clusters. An evaluation of the data collection process and the methodology of the supply chain mapping investigation of companies in the Yorkshire and the Humber region was also conducted in this chapter.

The next and final chapter discusses the overall conclusions from this research, its contribution to theory, policy and practice, its limitations and the opportunities for further research in the future.

CHAPTER 8 CONCLUSIONS AND RECOMMENDATIONS

8.1 Introduction

The previous chapter was concerned with the application of the extended Scott and Westbrook mapping technique and the estimation of the RISCA measure for selected case study companies. It also provided an evaluation of the data collection process and the methodology of the supply chain mapping investigation of companies in the Yorkshire and the Humber region. Case study results presented in that chapter have strengthened the findings from the survey of the users and providers of freight transport and logistics services in Yorkshire and the Humber and have provided a further insight into the service requirements of companies within the Yorkshire Forward priority clusters and across the Yorkshire and the Humber sub-regions.

This final chapter discusses the overall conclusions from this research. A review of the research questions and processes which have been pursued in realisation of the aims and objectives has been undertaken. This has led on to an evaluation of the relationship between the research questions and processes, the methods by which these have been achieved and the outcomes from this research. The final sections of this chapter have identified the contribution of the research to theory, policy and practice. Last but not least, a critical evaluation of the limitations of this research has led to the identification of opportunities for further research in the future.

8.2 Review of the aims and objectives of the research project

The aim of this research was to explore the relationship between the success of a regional economy – particularly that of the Yorkshire and the Humber region – and the adequacy or otherwise of its logistics infrastructure and services, in order to determine how regional competitiveness can be enhanced through the provision of effective logistics services.

The main objective was to evaluate the role of logistics in regional economic development. To achieve this, the answers to the following research questions identified in Chapter 1 have been actively sought:

- Why is logistics important to the Yorkshire and the Humber region?
- How is logistics related to its current and future economic development?
- What are the strengths and weaknesses of logistics service provision in the Yorkshire and the Humber region and how do they hinder or facilitate the movement of goods into and from the region?
- What is the potential for improving the already established logistics network in the region?
- Is it worth investing in logistics as a way of spreading economic prosperity over the whole Yorkshire and the Humber region?
- How could logistics contribute to developing workforce skills and competencies?
- How can logistics be turned into a profitable opportunity for the Yorkshire and the Humber region?

8.3 Realisation of the research aim and objectives

To achieve the aim and objective of this research and to provide answers to the above-listed research questions, the following research processes have been pursued:

(1) To review sources of information that underline the development of regional development policies and to investigate the economic and trade profile of the Yorkshire and the Humber region

(2) To identify logistics initiatives in Yorkshire and the Humber

(3) To evaluate the formation and development of business clusters as a policy tool to improve the competitiveness of regional economies

(4) To evaluate the state and role of cluster development for the economy of the Yorkshire and the Humber region

(5) To review existing supply chain management strategies and the family of supply chain mapping tools intended to make businesses more competitive

(6) To identify how any gaps in the knowledge of supply chain management strategies and supply chain mapping tools could be addressed at the regional level so that supply chains add their maximum value to regional economies

(7) To conduct comprehensive surveys of the requirements and provision of logistics services in Yorkshire and the Humber and to evaluate and analyse the survey results

(8) To conduct a supply chain investigation of companies in Yorkshire and the Humber to investigate the extent to which supply chain operations are carried out in the region and the usage of regional operators and facilities

(9) To apply the outcomes of the research processes 5-6 to selected case study companies

(10) To evaluate the outcomes of research processes 1-8 for the purpose of developing a conceptual framework

The table below shows the relationship between the research questions and processes, the methods by which these have been achieved and the outcomes from this research.

Table 8.1: Relationships between the research questions and processes, the methods by which these have been achieved and the outcomes from this research (1 of 6)

Research Question(s)	Research Process(es)	Method of investigation	Outcomes
Why is logistics important to the Yorkshire and the Humber region? How is logistics related to the region's current and future economic development?	To review sources of information that formulate regional development policies and to investigate the economic and trade profile of the Yorkshire and the Humber region	Literature review	The research context was established by investigating the profile of the Yorkshire and the Humber region, the state of its economy and the trade flows from and into the region. Various papers which formulate regional development policies in Yorkshire and the Humber and in general have also been reviewed. It was found that, although the region is endowed by certain strengths, serious and persistent under-performance of its economy has resulted in it lagging behind several other English regions. It has been concluded that regional economic development needs to be actively driven forward and measures should be taken to restructure and diversify the region's freight sector.
	To identify freight transport and logistics initiatives in Yorkshire and the Humber	Literature review	The Humber Trade Zone (HTZ) initiative and the Doncaster Sheffield Airport have been identified as key logistics proposals and developments in the Yorkshire and the Humber region which address the need for improvement of the existing transport and logistics infrastructure and aim to enhance the competitiveness of the regional economy. The development of skills and competencies for the logistics sector, on the other hand, has been reinforced by the opening of the Logistics Institute at Hull University, supported by Yorkshire Forward and the European Regional Development Fund.

Table 8.1: Relationships between the research questions and processes, the methods by which these have been achieved and the outcomes from this research (2 of 6)

Research Question(s)	Research Process(es)	Method of investigation	Outcomes
Why is logistics important to the Yorkshire and the Humber region? How is logistics related to the region's current and future economic development?	To evaluate the formation and development of business clusters as a policy tool to improve the competitiveness of regional economies	Literature review	The Cluster theory has been identified as a linking point between logistics and regional development. Transport and logistics businesses are recognised as an important part of a cluster (that of related and supporting industries), offering specialist services to the other industries in a cluster, but have not been researched in depth. In addition to that, there is no scientific toolkit to offer a methodological approach to studying this particular section of a cluster and its implications for cluster development or the competitiveness of the national or regional economy.
	To evaluate the state and role of cluster development for the economy of the Yorkshire and the Humber region	Literature review	The work on cluster development in the Yorkshire and the Humber region was found to be at an early stage and lacking depth of understanding. There is very little evidence of collaboration between organisations at national and regional levels, which possibly explains the different approaches of DTI and Yorkshire Forward regarding cluster definition, methodology of studying clusters and indeed the different priority clusters identified by both organisations. Of particular reference to opportunities for future research, the transport and logistics implications of cluster development need to be further explored. For that purpose, the interdependencies between organisations within a cluster need to be understood, and the advantages and constraints imposed by the use of common supply chains and transport infrastructure need to be further investigated.

Table 8.1: Relationships between the research questions and processes, the methods by which these have been achieved and the outcomes from this research (3 of 6)

Research Question(s)	Research Process(es)	Method of investigation	Outcomes
What are the strengths and weaknesses of logistics service provision in the Yorkshire and the Humber region and how do they hinder or facilitate the movement of goods from and into the region? Which are the areas for improvement?	To review the existing supply chain management strategies and the family of supply chain mapping techniques intended to make companies more competitive	Literature review	This part of the research investigated how companies can achieve competitive advantage through the implementation of effective logistics and supply chain management strategies. Outsourcing logistics requirements to specialists has been recognised as an important trend in modern business. Success through logistics then hinges to a large extent on the existence of competent contractors who between them can provide the full range of logistics services. In order to maintain low costs and high levels of customer satisfaction it is important that companies understand, monitor and control all the processes from the input of raw materials to the distribution of the end product. This could be facilitated through mapping, or flowcharting, supply chain processes. This approach based on supply chain mapping and performance measurement against accepted benchmarks has been adopted in this research to identify any shortfalls in logistics service provision and could lead to significant improvements in the supply chain, thus increasing the competitiveness of companies and hence the competitiveness of the regional economy.

Table 8.1: Relationships between the research questions and processes, the methods by which these have been achieved and the outcomes from this research (4 of 6)

Research Question(s)	Research Process(es)	Method of investigation	Outcomes
What are the strengths and weaknesses of logistics service provision in the Yorkshire and the Humber region and how do they hinder or facilitate the movement of goods from and into the region? Which are the areas for improvement?	To identify how any knowledge gaps could be addressed at the regional level so that supply chains add their maximum value to regional economies	Literature review	Lead times and inventory levels, which the Scott and Westbrook model focuses on, are crucial performance indicators for supply chain management. An investigation into the impact of any shortfalls in logistics service provision on such key performance indicators at a regional level can only be achieved if the location of supply chain activities is visible. However, neither the Scott and Westbrook 'pipeline map' nor the family of mapping tools introduced by Hines et al (2000) incorporates a regional or spatial dimension and none of them investigates the impact of such a regional or spatial dimension on supply chain performance. To address this knowledge gap, a further development of the Scott and Westbrook model has been proposed. Such a development involves an extension of the 'pipeline map' tool by adding a dimension that identifies the location where supply chain activities take place. Thus, it becomes possible to identify the extent to which supply chain activities take place in a region under consideration, and how much value could be added within the region at each stage of the supply chain.

Table 8.1: Relationships between the research questions and processes, the methods by which these have been achieved and the outcomes from this research (5 of 6)

Research Question(s)	Research Process(es)	Method of investigation	Outcomes
What are the strengths and weaknesses of logistics service provision in the Yorkshire and the Humber region and how do they hinder or facilitate the movement of goods from and into the region? Which are the areas for improvement?	To conduct a comprehensive survey of the requirements for and the provision of freight transport and logistics services in Yorkshire and the Humber; to evaluate and analyse the survey results	Questionnaire survey	The surveys provided an insight into the logistics requirements of user companies for inbound and outbound transport and value-adding services, the extent to which these requirements were outsourced and the nature of the decision-making process of the companies concerned. A gap analysis had also been undertaken to study the differences in the perceptions of both the user and provider groups of a number of service attributes such as cost, quality, flexibility, reliability and location. The current and future barriers which prevent service providers from supplying the user companies in the Yorkshire and the Humber region with effective and efficient services were also investigated.
	To conduct a supply chain investigation of companies in Yorkshire and the Humber to investigate the extent to which supply chain operations are carried out in the region and the usage of regional operators and facilities	Case study research	The application of the extended Scott and Westbrook mapping technique and the RISCA measure to selected case study companies illustrated the concept developed earlier in this research but also provided an evaluation of the data collection process and the methodology of this supply chain mapping investigation. Case study results have also strengthened the findings from the survey of the users and providers of freight transport and logistics services in Yorkshire and the Humber and have provided a further insight into the freight transport and logistics requirements of companies within the Yorkshire Forward priority clusters and across the Yorkshire and the Humber sub-regions.

Table 8.1: Relationships between the research questions and processes, the methods by which these have been achieved and the outcomes from this research (6 of 6)

Research Question(s)	Research Process(es)	Method of investigation	Outcomes
Is it worth investing in logistics as a way of spreading economic prosperity over the whole Yorkshire and the Humber region? How can logistics be turned into a profitable opportunity for the Yorkshire and the Humber region?	To evaluate the outcomes of research processes 1-8	Development of a conceptual framework	The information gathered, analysed and evaluated in the above stages of the research (the literature review, the surveys and case studies), when considered in its entirety, presents a conceptual framework to identify a best practice approach to achieving improved regional competitiveness through logistics. The influences on regional governments reported in this research are intended to help them identify the extent to which supply chains add their maximum possible value to the economies of their regions. The originality associated with this research, much of which is conducted for the first time, and the opportunities for further research have all contributed to establishing a framework (which can also be regarded as a decision-support tool) for researching and evaluating the complex relationship between logistics and regional development.

8.4 Contribution of the research to policy, theory and practice

It has been concluded that the economic development of the Yorkshire and the Humber region needs to be actively driven forward and measures need to ensure that the regional freight and logistics providers are delivering services more closely aligned to the diverse and often specialised needs of users. The lack of a knowledge base of previous work, however, may seriously prevent decision-makers in the Yorkshire and the Humber region from putting in place adequate business support measures and this can be detrimental to the success of the regional economy. This research does not claim to fill all the gaps but it can be used as a pilot study and an impetus for further work to understand better the relationship between logistics and the competitiveness of the regional economy.

Cluster development has been identified as an area of great importance to regional economies but has not been researched in depth. In this research project, cluster theory has been brought in as a linking point between logistics and regional development. The research undertaken for the literature review and in the later stages of the original investigations, has led to the identification of the following knowledge gaps:

- Transport and logistics businesses are recognised as an important part of a cluster (that of related and supporting industries), offering specialist services to the other industries. There is a lack, however, of a scientific toolkit offering a methodological approach to studying this particular section of a cluster and its implications for cluster development or the competitiveness of the national or regional economy.

- The work on cluster development in the Yorkshire and the Humber region was found at an early stage to be lacking depth of understanding. There is very little evidence of collaboration between organisations at national and regional levels, which possibly explains the different approaches of DTI and Yorkshire Forward regarding cluster definition, methodology of studying clusters and indeed the different priority clusters identified by both organisations.

- Of particular reference to opportunities for future research, the transport and logistics implications of cluster development need to be further explored. For that purpose, the interdependencies between organisations within a cluster need to be understood, and the advantages and constraints imposed by the use of common supply chains and transport infrastructure need to be further investigated.

This research has investigated how companies can achieve competitive advantage through the implementation of effective logistics and supply chain management strategies. Lead times and inventory levels, which the Scott and Westbrook model focuses on, are widely recognised in the literature as crucial performance indicators for supply chain management. The approach based on supply chain mapping and performance measurement against accepted benchmarks has been adopted to identify any shortfalls in logistics service provision at the regional level and to suggest improvements in the supply chain, thus increasing the competitiveness of companies and hence the competitiveness of the regional economy. Furthermore, an investigation into the impact of any shortfalls in logistics service provision on key performance indicators at the regional level can only be achieved if the location of supply chain activities is visible. However, neither the Scott and Westbrook 'pipeline map' nor the family of mapping tools introduced by Hines et al (2000) incorporates a regional or spatial dimension and none of them investigates the impact of such a regional or spatial dimension on supply chain performance. Therefore, to address this knowledge gap, this research has proposed and applied a further development of the Scott and Westbrook model for the first time. Such a development involved an extension of the 'pipeline map' tool by adding a dimension that identifies the location where supply chain activities take place. Thus, mainly from a policy decision-making perspective, it becomes possible to identify the extent to which supply chain activities take place in a region under consideration, and how much value can potentially be added within the region at each stage of the supply chain.

Considerable attention has been paid in recent literature to the concept of non-value-adding time in supply chains (Hines et al (2000), Christopher (2005)). This concept,

whilst crucially important, is largely relevant at a microeconomic, company level. In a much wider macroeconomic context, it is also important for regional governments to identify the extent to which supply chains add their maximum possible value to the economies of their regions. The research suggests that important influences on this may include:

- the nature of the decision-making process of the companies concerned (the manner in which decisions are made and at what level) that affect the movement of goods from and into the planning region;

- the nature of their logistics requirements, the extent to which companies outsource non-core activities and the way in which service providers are selected;

- the way users and providers obtain information about each other;

- the importance that users and providers attach to different service attributes and the way they evaluate each others' performance;

- barriers such as skills shortages, road congestion, operational constraints, regulatory restrictions and health and safety legislation that prevent the logistics industry in the region from supplying more effective services.

The information gathered, analysed and evaluated in all stages of this research (the literature review, the surveys and case studies), when considered in its entirety, presents a conceptual framework to identify a best practice approach to achieving improved regional competitiveness through logistics. The influences on regional governments reported in this research are intended to help them identify the extent to which supply chains add their maximum possible value to the economies of their regions concerned. The novelty and originality associated with this research and the opportunities for further research have all contributed to establishing a framework (which can also be regarded as

a decision-support tool) for researching and evaluating the complex relationship between logistics and regional development.

8.5 Limitations of the research

The limitations of this research have mainly resulted from difficulties in collecting data during the survey and case study exercises.

The low response rate to the user questionnaire was initially a cause for concern. Given the very large scale of the survey, however, this was consequently not seen as a major problem due to the good representation of responses by cluster and sub-region and the reasonable number of companies, both in absolute terms and as broadly proportionately representative of the total.

The possible reasons for the low response rate to the user questionnaire were discussed in detail in Chapter 5. Some of these reasons (such as the general attitude of industry to questionnaires and the resource constraints of respondents) are rather typical for large scale surveys. Some of them, however, are more specific and in this respect the experience from this research has contributed to the evaluation of:

- *The usefulness of the FAME database (to which most Universities subscribe) for obtaining contact details of potential respondents in large-scale surveys*

  Although FAME provides the names of a company's directors or secretaries, it does not contain the names of the logistics or supply chain managers/directors. Therefore it is not possible to address the questionnaire personally to the most appropriate manager within a particular company and it will be a matter of goodwill of the person who receives the questionnaire to pass it on to the most relevant person within the company. Nevertheless, the FAME database is a good starting point for compiling sampling frames, especially for very large scale surveys. The integrated search and

sorting facilities, as well as the inbuilt UK Standard Industrial Classification of Economic Activities (SIC) make it a robust tool for filtering and collecting data.

- *The target audience for collecting supply chain data*

  Most of the companies in the sample were 'micro' or 'small' to 'medium-sized'. These companies are often subcontractors to larger companies and the scope of their supply chain activities (if any at all) is very limited. Hence, collecting supply chain data from such companies by a questionnaire may not be very appropriate as they may find the questions irrelevant to the somehow limited scope of their operations or they might not collect the data that are requested.

The limitations of the case study research were found to be mostly linked to its methodology. The initial idea, as discussed in Chapter 7, was to investigate enough case study companies which would ensure an extensive coverage of the three key clusters (Food (including agriculture) and Drink, Chemicals and Advanced Engineering and Metals) across the four sub-regions (North Yorkshire, South Yorkshire, West Yorkshire and the Humber).

The difficulties in the data collection process as explained in Chapter 7 and the low representation of some industry types in certain sub-regions (e.g. significant advanced engineering companies in North Yorkshire) reduced the number of case studies that were possible or indeed required. It was concluded that the cluster dimension is far more important to pursue as the supply chains of the companies within a cluster stretch beyond the boundaries of the sub-region and indeed the planning region. Hence, the sub-regional dimension had also been covered even though the research was skewed towards the cluster approach.

Another limitation of the case study research related to the size of companies. The supply chain mapping exercise focused on large companies, the explanation being very similar to the problems encountered during data collection for the survey. Collecting supply

chain data, especially at this level of detail, from 'micro' or 'small' to 'medium-sized' companies was impeded by the somehow limited scope of their operations or the lack of understanding and records of the data that were requested. The inability of small-sized companies to devote time to this research also contributed to their exclusion from the supply chain mapping investigation.

The adopted cluster approach and the difficulties in the data collection process meant there was a lack of resource for considering companies representing none of the clusters. Therefore, any future attempt to compare and contrast the findings from the mapping exercise between the three key industrial clusters of the Yorkshire and the Humber region and any other industry sectors, and to explain any significant differences, will require extending the case study research to non-cluster companies.

The difficulties in the data collection process and the adopted methodology for the development of the case studies had some implications not so much for the quality of data but rather for the level of detail. To encourage companies to collaborate, especially in cases where no exact figures could be provided, approximate values were used for the analysis. This, however, did not compromise in any way the quality of the case study research as its aim was to illustrate a concept (the extension of the Scott and Westbrook mapping technique) within the wider research context of this dissertation and its aims and objectives. Therefore obtaining precise figures was not critical to achieving the aims and objectives of this research.

A limitation relating to the level of detail of the collected data has resulted in the RISCA scores being dominated by production and inbound material costs, dwarfing the logistical component. Excluding the cost of bought in materials, for example, would ‘magnify’ the logistic cost element – which is after all the main focus of the research. This, however, can only be achieved if data of considerably higher level of detail are available. This highlights the issue that, in reality, different companies define and measure logistics in very different ways. Ensuring consistency is difficult, and the fundamental requirement is

to state precisely what has been included (and not included) in each individual case study, as has been done in this case.

There are opportunities for better visual illustration of the results from the case study research (the supply chain maps), which can be achieved by using software (probably bespoke) which enables an enhanced representation of spatial graphs. This was seen as an expensive and time-consuming approach and therefore was not pursued.

The limitations of this study not only result from difficulties in the data collection exercises but are also related to the shortcomings in the analytical approach and the use of possible alternative methods. For example, such methods might include the use of input-output analysis as a means of modelling spatial interconnections between logistics and other activities within clusters. Input-output analysis is one of a set of related methods which show how the parts of a system are affected by a change in one part of that system. Input-output analysis specifically shows how industries are linked together through the outputs of one sector becoming the inputs supplied to other sectors. This method however is based on the analysis of secondary data, which is not readily available in the UK at the level of detail required, and even if it were available would become out-of-date very quickly. For these reasons such methodology was not employed in this study.

8.6 Opportunities for further research

The opportunities for further research should address the limitations as discussed in the previous section.

Other suggestions for further research include:

- Conducting a more detailed and updated study of the users and providers of logistics services in Yorkshire and the Humber

Each section of the questionnaires could be developed into a separate questionnaire to achieve even more depth and to study very specific issues regarding companies' logistics requirements or performance at a regional level.

Furthermore, in the process of designing the questionnaires, an environmental section was developed but was later abandoned to maintain the focus of the survey and to keep the length of the questionnaires down. Therefore, this could be achieved in a separate study of the environmental performance of companies, users and providers of logistics services in Yorkshire and the Humber. Such a detailed study would need to be carried out through face to face interviews.

- Achieving a better understanding of cluster development at the regional level

In this research, the clusters theory was a linking point between logistics and regional development. It also contributed to the better understanding of other research areas such as competitiveness which, as already explained, is difficult to measure at the regional level. It can be claimed that cluster development is a PhD topic in itself. Therefore, there are areas of this research which can be developed from a cluster perspective but this has been impossible to achieve within the framework of this particular project. These areas include:

    - Studying the interdependencies between the organisations within a cluster and the advantages and constraints imposed by them
    - Bearing in mind that in Porter's view the definition of competitiveness is productivity (i.e. competitiveness equals productivity), this current research could be developed into a separate study to investigate (and possibly measure) the impact of the location of supply chain activities on productivity, and, hence, on competitiveness of companies within a cluster.

- Extending the scope of the supply chain mapping exercise

- There is scope to further develop the concept of the extended supply chain maps developed in this research into a tool to investigate the opportunities for the redesign of supply chains at the regional level. The supply chain mapping exercise in this project has been undertaken to apply the concept of the extended Scott and Westbrook mapping technique to selected case study companies. The next step could be to suggest how to redesign or re-engineer the companies' supply chains and illustrate this with appropriate software. In future applications of the extended framework, actual distances rather than geographical categories (such as regional, national, European, rest of the world) could be used to calibrate the vertical axis. However, this would be more relevant if the modelling was being used in an environmental context rather than a regional development context. The nearest or cheapest supplier will not necessarily be in the same planning region as the user, depending on where the regional boundaries lie.
- To undertake performance measurement against accepted benchmarks to identify any shortfalls in logistics service provision that could lead to significant improvements in the supply chain, thus increasing the competitiveness of companies and hence the competitiveness of the regional economy.
- The research has identified a number of factors which could be regarded as important influences on regional governments to identify the extent to which supply chains add their maximum possible value to the economies of their regions. These factors need to be measured and quantified. This is however the objective of a further study which might be undertaken in the future.

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APPENDIX 1: POSTAL QUESTIONNAIRE SENT TO USER COMPANIES

SURVEY OF USERS OF FREIGHT TRANSPORT AND LOGISTICS SERVICES IN YORKSHIRE AND HUMBER

Please Help Your Views Are Important

This survey is designed to **help you** so please spare about 10 minutes to complete this questionnaire and post back to us using the freepost envelope provided. The research is being carried out according to the Market Research Society's Code of Conduct so all answers will be treated in the strictest of confidence.

Please circle the relevant number to indicate your answer unless otherwise indicated. Where you are unsure about any answers, please give your best estimate.

SECTION 1 **Some Information About You and Your Company**	
(If you prefer, please attach a business card)	
1 Your Name:	
2 Job title:	
3 Company name:	
4 Address:	
5 Telephone:	
6 Fax:	
7 E-mail:	
8 Web Address:	

9 Where is your company's Head Office located?	
Within Yorkshire and Humber	1
Elsewhere in Britain	2
Outside Britain	3

10 Is your company part of an organisation / group of companies?		
	No	1
	Yes	2
If no, go to Q 12	**11 If Yes, what is the name and nationality of the parent company?**	
	Name	
	Nationality	

12 Approximately how many employees does your company have in total?	
13 Approximately how many of those employees are in Yorkshire and Humber?	

14 What is the nature of your business, i.e. what does your business do?

15 Is your business involved with: *(Circle all that apply)*			
Raw Materials extraction	1	Wholesaling	4
Raw Materials Processing	2	Retailing	5
Manufacturing of finished goods	3	other	6
If other, please specify			

16 Do you require specialist vehicles, handling or processing equipment?		
No	1	*Go to Section 2*
Yes	2	*Go to Q16 a*
16a What are these?		

SECTION 2 **YOUR MARKETS AND REQUIREMENTS**

17 Considering the logistics requirements of your company; what is the approximate total volume moved per year?
(Please specify what this volume is measured in, e.g. Tonnes/Lorry Loads/ Value (£)

	Volume	*(Please circle number below)*	
Inbound Materials		Tonnes	1
		Lorry loads	2
		Value (£)	3
Outbound Products		Tonnes	1
		Lorry Loads	2
		Value (£)	3

18 What is your typical usage of different transport modes for these movements?		
	Inbound Materials	Outbound Products
Road	%	%
Rail	%	%
Sea	%	%
Air	%	%

19 Approximately what proportion of your company's outbound products and inbound materials come from or go to the following regions?		
Region	Inbound Materials	Outbound Products
Yorkshire and Humber	%	%
Rest of Britain	%	%
European Union	%	%
Rest of Europe	%	%
Rest of the World	%	%

20 Approximately how much of this is carried by:	Inbound Materials	Outbound Products
your own transport	%	%
Logistics provider	%	%
Your customer or supplier controls transport	%	%

21 How are your warehousing operations organised? Approximately what proportion are;	
Organised and carried out using your own resources	%
Outsourced to third party logistics operators	%

22 If you require non core services such as assembly, packing, labelling, load consolidation, how are these generally operated?		
Don't require these services	1	*Go to Q 24*
Mostly carried out in house	2	
Both in house and outsourced	3	
Mostly outsourced	4	*Go to Q 23*

23 Why are they outsourced?
Please specify

Thinking about the decisions that affect movement of goods to or from your locations in Yorkshire and Humber…….

24 Which members of your staff make logistics decisions? (*Circle all that apply)*	
Junior Staff	1
Middle Management	2
Senior Management	3
Other – *Please Specify*	4

25 Are the decisions made….? *Circle all that apply*	
In House - within Yorkshire & Humber	1
In House - elsewhere in Britain	2
In House - elsewhere in the World	3
Freight Forwarder/Agent in Yorkshire & Humber	4
Freight Forwarder/Agent outside Yorkshire & Humber	5
Service provider makes decisions	7
Your customers make decisions	8
other *If other or a mixture – please specify/clarify*	9

SECTION 3 IMPORTS AND EXPORTS

26a Do you Import?	No Yes	1 2
26b Do you Export?	No Yes	1 2

If you neither import nor export, please go straight to Section 4

26c Please state volumes of imports/exports per annum, together with what this is measured in, e.g. Tonnes/Lorry loads/Value £

	Volume	*(Please circle number below)*	
Approximate volume of IMPORTS		Tonnes	1
		Lorry Loads	2
		Value (£)	3
Approximate volume of EXPORTS		Tonnes	1
		Lorry Loads	2
		Value (£)	3

27 Who makes the decisions on routes and modes used?	EXPORT	IMPORT
In house within Yorkshire & Humber	1	1
In house outside Yorkshire & Humber	2	2
Logistics Provider within Yorkshire & Humber	3	3
Logistics Provider in rest of Britain	4	4
Logistics provider outside of Britain	5	5
Customer decides	6	6
Other *Please specify*	7	7

28 Do you have control over port of Entry/Exit?	EXPORT	IMPORT
No	1	1
Yes	2	2

29 Which Ports do you use? *(Circle all that apply)*	EXPORT	IMPORT
Yorkshire & Humber Ports	1	1
North East Ports	2	2
North West Ports	3	3
Ports on South Coast	4	4
Other - *Please specify*	5	5

30 If you do not use Yorkshire & Humber ports, why not? *(Circle all that apply)*	EXPORT	IMPORT
Have not considered the issue	1	1
Inadequate services	2	2
Too expensive	3	3
Sailing frequency not suitable	4	4
Unsuitable destinations	5	5
Unsuitable facilities	6	6
Other - *Please specify*	7	7

31 How important is the port of exit or entry to you?	EXPORT	IMPORT
Very important	1	1
Important	2	2
Neither important nor unimportant	3	3
Unimportant	4	4
No concern whatsoever	5	5

SECTION 4 LOGISTICS PROVIDERS

32 Given the choice would you prefer to use logistics providers based within Yorkshire & Humber?	
Always	1
Only if service criteria matched or exceeded that available elsewhere	2
No preference	3

33 If you use third party logistics providers, where are they based? *(Circle all that apply)*	
Yorkshire & Humber	1
Rest of Britain	2
Europe	3
Rest of World	4
Don't know	5
Cannot say – regularly change supplier	6

34 How often do you conduct service provider reviews?	
Monthly	1
Quarterly	2
Annually	3
Never	4
Other- *please specify*	5

35 What sources of information do you use when searching for third party logistics operators? *(Circle all that apply)*	
Past experience	1
Customer's experience	2
Experiences and recommendation of others	3
Own company databases	4
Internet Auction	5
Direct approach from logistics providers	6
Other Sources *(e.g. promotional materials, trade directories, the internet) - please specify which:*	

36 Do you periodically consider making substantial changes to your logistics arrangements?	Yes	No
Changing mode, i.e. road/rail/waterway	1	2
Changing proportion of own transport/third party	1	2
Changing control and location of warehousing	1	2

37 Do you feel that there is an adequate supply of logistics services in Yorkshire & Humber to meet your requirements? Is there:	
Significant undersupply	1
Slight undersupply	2
Supply meets demand	3
Slight oversupply	4
Significant oversupply	5

38 Do you think there are any gaps in the offer of logistics providers based in Yorkshire & Humber?	
No	1 *go to Q 39*
Yes	2

If Yes, please give details

39 In choosing a logistics supplier what service attributes are important?
And how well do logistics providers from Yorkshire and Humber perform

Firstly Please give a score between 1 and 7 where 1 is Very important and 7 is not at all important

Secondly please give a score for performance between 1 and 7 where 1 is Excellent and 7 is very poor

	Importance	Performance
Cost		
Past track record		
Quality of service		
Flexibility of service		
Availability of information		
Location of logistics suppliers operations		
Reliability		
	Very important=1 Not Important=7	Excellent =1 Very Poor=7

40 What barriers do you think prevent you or the logistics industry in Yorkshire and Humber supplying efficient logistics services today?
(Circle all that apply)

Skills - general driver shortage		1
- other skills shortage		2
Cost of Training		3
Road congestion	-within region	4
	-elsewhere	5
Lack of investment in new equipment		6
Rail operational constraints		7
Regulatory restrictions at delivery point		8
Other - please specify		9

41 Are there any particular issues that will hinder the logistics industry in Yorkshire & Humber supplying efficient services in the future?
(Circle all that apply)

Working Time Directives	1
Road Congestion Charging	2
Regulatory Restrictions at delivery point	3
Health & Safety legislation	4
Other- please specify	5

42 Do you wish to receive a summary report of the findings of this study?

No	1
Yes	2

43 Further stages of this research will involve case studies in the Yorkshire and Humber region. Would you be interested in participating in the development of such case studies?

No	1
Yes	2

Now please post back the questionnaire to us using the freepost envelope provided.

Thank you for your time.

APPENDIX 2: POSTAL QUESTIONNAIRE SENT TO PROVIDERS

SURVEY OF FREIGHT TRANSPORT AND LOGISTICS SERVICE PROVIDERS IN YORKSHIRE AND HUMBER

Please Help Your Views Are Important.

This survey is designed to **help you** so please spare about 10 minutes to complete this questionnaire and post back to us using the freepost envelope provided. The research is being carried out according to the Market Research Society's Code of Conduct so all answers will be treated in the strictest of confidence.

Please circle the relevant number to indicate your answer unless otherwise indicated. Where you are unsure about any answers, please give your best estimate.

SECTION 1 **Some Information About You and Your Company**	
(If you prefer, please attach a business card)	
1 Your Name:	
2 Job title:	
3 Company name:	
4 Address:	
5 Telephone:	
6 Fax:	
7 E-mail:	
8 Web Address:	

9 Where is your company's Head Office located?	
Within Yorkshire and Humber	1
Elsewhere in Britain	2
Outside Britain	3

10 Is your company part of an organisation / group of companies?	
No	1
Yes	2

If no, go to Q 12	**11 If Yes, what is the name and nationality of the parent company?**	
	Name	
	Nationality	

12 <u>Approximately</u> how many employees does your company have in total?	
13 <u>Approximately</u> how many of those employees are based in Yorkshire and Humber?	

14 What is the nature of your business, i.e. what does your business do?

15 What type of business are the users of your services involved with:
(Circle all that apply)

Raw Materials extraction	1	Wholesaling	
Raw Materials Processing	2	Retailing	5
Manufacturing of finished goods	3	other	6

If other, please specify

16 Do you provide specialist vehicles, handling or processing equipment?		
No	1	*Go to Q17*
Yes	2	*Go to Q16 a*

16a What are these?

17 What is the nature of your business? *(Please circle all appropriate services)*	
Road transport services	1
Rail transport services	2
Air transport services	3
Sea transport services	4
Inland waterway transport services	5
Storage and warehousing operator	6
Freight Forwarder / Integrator	7
Packaging or other added value activities	8
Other -*please specify*	9

SECTION 2 YOUR MARKETS AND SERVICES

18 Considering the logistics requirements of those that use your services, what is the approximate total volume moved per year? *(Please specify what this volume is measured in e.g. Tonnes/Lorry Loads/Value(£))*

Volume	*(Please circle number below)*	
	Tonnes	1
	Lorry Loads	2
	Value (£)	3

19 What is your typical usage of different transport modes for these movements?

Road	%	Sea	%
Rail	%	Air	%

20 Approximately what proportion of your company's current markets are in:
(Please enter approximate proportion for each)

Market	**% of Business**
Yorkshire and Humber	%
Rest of Britain	%
European Union	%
Rest of Europe	%
Rest of the World	%

21 For domestic transport journeys, where are the decisions made affecting your route and mode for customers in Yorkshire &Humber?
(Please circle one answer)

Your company inside region	1
Your company elsewhere in Britain	2
Your Company outside Britain	3
Customer inside Yorkshire & Humber	4
Customer outside Yorkshire & Humber but in Britain	5
Other - *please specify*	6

22 Do you undertake or arrange international transport?

No	1	*Go to Section 3*		
Yes	2	*If yes*, **is this**;	Into Britain	1
			Out of Britain	2
			Both	3

23 What volume do you operate internationally per annum? (*Please specify what this volume is measured in, e.g. Tonnes/Lorry Loads/Value (£))*

	Volume	*(Please circle number below)*	
Movements into Britain		Tonnes	1
		Lorry Loads	2
		Value (£)	3
Movements out of Britain		Tonnes	1
		Lorry Loads	2
		Value (£)	3

24 Who makes the decision on which route and mode is used?	Into Britain	Out of Britain
In House - within Yorkshire & Humber	1	1
In House - Rest of Britain	2	2
In House – Outside Britain	3	3
Customer within Yorkshire & Humber	4	4
Customer in rest of Britain	5	5
Customer at foreign delivery/collection point	6	6
Other - *please specify*	7	7

25 Do you have control over port of entry/exit?	Into Britain	Out of Britain
Yes	1	1
No	2	2

26 Which Ports do you use? *(Circle all that apply)*	Into Britain	Out of Britain
Yorkshire & Humber Ports	1	1
North East Ports	2	2
North West Ports	3	3
Ports on South Coast	4	4
Other	5	5

27 If you do not use Yorkshire & Humber ports, why not? *(Circle all that apply)*	Into Britain	Out of Britain
Have not considered the issue	1	1
Inadequate Services	2	2
Too Expensive	3	3
Sailing frequency not suitable	4	4
Unsuitable destinations	5	5
Unsuitable facilities	6	6
Other – specify	7	7

28 How important is the port of exit or entry to you?	Into Britain	Out of Britain
Very important	1	1
Important	2	2
Neither important nor unimportant	3	3
Unimportant	4	4
Of no concern whatsoever	5	5

SECTION 3 – ABOUT YOUR ACTIVITIES AND THE YORKSHIRE AND HUMBER REGION

29 Given the choice would you prefer to work for customers based within Yorkshire & Humber?	
Yes	1
No	2
No preference	3

30 What specific advantages can your company offer because of your base in Yorkshire & Humber?	
Cost related to close proximity of operating base	1
Past record and personal contact	2
Flexibility of service relating to closeness of operating base	3
Availability of information and communication	4
Other, *please specify*	5

31 How often, on average, do customers conduct reviews of your performance?	
Monthly	1
Quarterly	2
Annually	3
Never	4
Other - *please specify*	5

32 What sources of information do you use when searching for new customer contacts?	
Past experience	1
Customer recommendation	2
Invitation to tender	3
Internet Auction	4
Own company databases	5
Other sources of information *(e.g. promotional materials, trade directories, the internet) - please specify which*:	6

33 From your own experience do you believe that there is an adequate supply of logistics services in Yorkshire and Humber in your business sector? Do you think there is….	
Significant undersupply	1
Slight undersupply	2
Supply meets demand	3
Slight oversupply	4
Significant oversupply	5

34 In choosing a logistics supplier what service attributes do your *customers* think are important?
And how well do you think you perform?

Firstly Please give a score between 1 and 7 where 1 is Very important and 7 is not at all important

Secondly please give a score for your performance between 1 and 7 where 1 is Excellent and 7 is very poor

	Importance	Performance
Cost		
Past track record		
Quality of service		
Flexibility of service		
Availability of information		
Location of logistics suppliers operations		
Reliability		
	Very important=1 Not Important=7	Excellent =1 Very Poor=7

35 Do you believe that there are any gaps in what the logistics industry offers to customers based in Yorkshire & Humber?

No	1 *go to Q 36*
Yes	2

If Yes, please give details

36 What barriers do you think prevent the logistics industry in Yorkshire and Humber supplying efficient services today? *Circle all that apply*		
Skills - general driver shortage		1
- other skills shortage		2
Cost of Training		3
Road congestion	-within region	4
	-elsewhere	5
Lack of ability to invest in new equipment		6
Rail operational constraints		7
Regulatory restrictions at delivery point		8
Other - *please specify*		9

37 Are there any particular issues that will hinder the logistics industry in Yorkshire and Humber supplying efficient services in the future? *Circle all that apply*	
Working Time Directives	1
Road Congestion Charging	2
Regulatory Restrictions at delivery point	3
Health & Safety legislation	4
Other- please specify	5

38 Do you ever lose business to non British road transport operators?	
No	2
Yes	1

39 If Yes, which of the following do you consider true of non-British operators? *Circle all that apply*	
Lower taxation base	1
Lower wages	2
Lower fuel prices	3
More efficient operations	4
Ability to offer cheap back loads from Britain to Europe	5
Other – *please specify*	6

40 Do you wish to receive a summary report of the findings of this study?	
No	1
Yes	2

41 Further stages of this research will involve case studies in the Yorkshire and Humber region. Would you be interested in participating in the development of such case studies?	
No	1
Yes	2

Now please post back the questionnaire to us using the freepost envelope provided.

Thank you very much for your time.

APPENDIX 3: TELEPHONE FOLLOW-UP SURVEY OF USERS OF FREIGHT TRANSPORT AND LOGISTICS SERVICES IN YORKSHIRE AND THE HUMBER

Good morning/afternoon,

My name is…….. I am calling on behalf of the Regional Development Agency in connection with a survey of users of freight transport and logistics services in Yorkshire and Humber. We sent a questionnaire to you by post in January. The survey asked questions about your company, its use of freight transport and logistics services, and any difficulties facing your company……..

SECTION 1 Introduction

1 Do you recall receiving this questionnaire?

Yes 1 Ask Q2 No 2 GO TO Q4 Don't Know 3 GO TO Q4

2 Our records suggest that you have not completed the questionnaire. Could you tell me your reasons for not completing it? DO NOT PROMPT. CODE ALL MENTIONED.

Too busy	1	ASK Q4
Filled it in/in the post	2	TERMINATE AND THANK RESPONDENT
Did not feel it was relevant	3	ASK Q3
Other (write in)……..	4	ASK Q4

3 Why did you not feel that it was relevant?

……
……
……
……

4 Would it be possible to quickly run through some of the questions that were on the questionnaire now over the phone? Your views are important to the development of services in the region. It will take 5-10 minutes of your time. All the information you provide will be strictly confidential.

Yes 1 GO TO SECTION 2 **No** 2 ASK Q5

5 Is there anyone else in the company who could help us by answering some of the questions that were on the questionnaire now over the phone?

Yes 1 ARRANGE INTERVIEW AND GO TO SECTION 2 **No** 2 ASK Q6

6 Would you consider filling it in if we send it by fax or through the post?

Yes 1 ASK Q7 **No** 2 ASK Q8

7 Please provide details……**TERMINATE AND THANK**

8 If NO Why is that? (Write in)

……
……
……

TERMINATE AND THANK

SECTION 2 **The purpose of this survey is to identify ways in which the regional development agency and partners could assist in improving the competitiveness of the industry**

1 What barriers do you think prevent you or the logistics industry in Yorkshire and Humber supplying efficient logistics services today? *(DO NOT READ OUT LIST, CIRCLE ALL THAT APPLY)*		
Skills - general driver shortage		1
- other skills shortage		2
Cost of Training		3
Road congestion	-within region	4
	-elsewhere	5
Lack of investment in new equipment		6
Rail operational constraints		7
Regulatory restrictions at delivery point		8
Other - please specify		9

To help us analyse the information could I ask:

2 Approximately how many employees does your company have in total?	
3 Approximately how many of those employees are in Yorkshire and Humber?	

4 What is the nature of your business, i.e. what does your business do?	
5 Approximately what proportion of your <u>inbound</u> products are carried by logistics providers? **and approximately what proportion of your <u>outbound</u> products are carried by logistics providers?** *(IF NOT USING LOGISTICS PROVIDER GO STRAIGHT TO QUESTION 6)* **If you use third party logistics providers, are these based in**..? *(READ LIST TO RESPONDENT AND CIRCLE ALL THAT APPLY)*	% %
Yorkshire & Humber	1
Rest of Britain	2
Europe	3
Rest of World	4
Don't know	5
Cannot say – regularly change supplier	6

6 Where are the decisions made that affect the movement of goods to or from your locations in Yorkshire and Humber, are these decisions made …yes/no? *(READ LIST TO RESPONDENT AND CIRCLE ALL THAT APPLY)*

	No	**Yes**
In House - within Yorkshire & Humber	1	2
In House - elsewhere in Britain	1	2
In House - elsewhere in the World	1	2
Freight Forwarder/Agent in Yorkshire & Humber	1	2
Freight Forwarder/Agent outside Yorkshire & Humber	1	2
Your customers make decisions	1	2
Other - please specify/clarify	1	2

7 Do you Import?	No	1
	Yes	2

(IF YES CONTINUE TO QUESTION 8 IF ANSWER NO PLEASE GO TO QUESTION 12)

8 Do you have control over port of Entry?	No	1
	Yes	2

9 Which Ports do you use for import. Do you use…yes/no? *(READ OUT LIST TO RESPONDENT AND CIRCLE ALL THAT APPLY)*	No	Yes
Yorkshire & Humber Ports	1	2
North East Ports	1	2
North West Ports	1	2
Ports on South Coast	1	2
Other – Please specify	1	2

(ONLY ASK IF THEY DO NOT USE YORKSHIRE AND HUMBER PORTS) **10 Why do you not use Yorkshire & Humber ports for import, is this because….yes/no?** *(READ OUT LIST TO RESPONDENT AND CIRCLE ALL THAT APPLY)*	No	Yes
Have not considered the issue	1	2
Inadequate services	1	2
Too expensive	1	2
Sailing frequency not suitable	1	2
Unsuitable destinations	1	2
Unsuitable facilities	1	2
Other - *Please specify*	1	2

11 How important is the port of entry to you? Would you say it is….? (READ OUT LIST TO RESPONDENT AND CIRCLE ONE ANSWER)	IMPORTANCE
Very important	1
Important	2
Neither important nor unimportant	3
Unimportant	4
Of no concern whatsoever	5

12 Do you Export?	No	1
	Yes	2

(IF YES CONTINUE TO QUESTION 13. IF NO PLEASE GO TO QUESTION 17.)

13 Do you have control over port of Exit?	No	1
	Yes	2

14 Which Ports do you use for export. Do you use…? *(READ OUT LIST TO RESPONDENT AND CIRCLE ALL THAT APPLY)*	No	Yes
Yorkshire & Humber Ports	1	2
North East Ports	1	2
North West Ports	1	2
Ports on South Coast	1	2
Other – Please specify	1	2

(ONLY ASK IF THEY DO NOT USE YORKSHIRE AND HUMBER PORTS) **15 If you do not use Yorkshire & Humber ports for export, why not? Is this because** *(READ OUT LIST TO RESPONDENT AND CIRCLE ALL THAT APPLY)***….yes/no?**	No	Yes
Have not considered the issue	1	2
Inadequate services	1	2
Too expensive	1	2
Sailing frequency not suitable	1	2
Unsuitable destinations	1	2
Unsuitable facilities	1	2

Other - *Please specify*	1	2

16 How important is the port of entry to you on a scale of 1 to 5, with 1 being very important and 5 being not at all important?	Important
Very important	1
Important	2
Neither important nor unimportant	3
Unimportant	4
Not at all important	5

SECTION 3 LOGISTICS PROVIDERS

17 How often do you conduct service provider reviews? *(CIRCLE AS APPROPRIATE)*	
Monthly	1
Quarterly	2
Annually	3
Never	4
Other- *please specify*	5

18 What sources of information do you use when searching for third party logistics operators. Do you use…..yes/no? *(READ OUT AND CIRCLE ALL THAT APPLY)*		
	No	Yes
Past experience	1	2
Customer's experience	1	2
Experiences and recommendation of others	1	2
Own company databases	1	2
Internet Auction	1	2
Direct approach from logistics providers	1	2
Other Sources *(e.g. promotional materials, trade directories, the internet) - please specify which:*	1	2

19 Do you periodically consider making substantial changes to your logistics arrangements in terms of….? (READ OUT LIST TO RESPONDENT AND CIRCLE RELEVANT ANSWER)	Yes	No
Changes in terms of: Changing mode, i.e. between road/rail/waterway	1	2
Changing proportion of use of own transport/third party	1	2
Changing control and location of warehousing	1	2

20 Do you feel that there is an adequate supply of logistics services in Yorkshire and Humber to meet your requirements? Is there: (please circle relevant answer)	
Significant undersupply	1
Slight undersupply	2
Supply meets demand	3
Slight oversupply	4
Significant oversupply	5

21 Do you think there are any gaps in the offer of logistics providers based in Yorkshire & Humber?	
No	1 *go to Q 22*
Yes	2

If Yes, please give details

22 In choosing a logistics supplier what service attributes are important? I am going to read out a list of service attributes and would like you to please give a score of importance between 1 and 7 where 1 is very important and 7 is not at all important *(READ OUT LIST TO RESPONDENT AND CIRCLE AS APPROPRIATE, make sure understand what is meant by "1" and "7" repeat if necessary to clarify))*

	Importance						
Cost	1	2	3	4	5	6	7
Past track record	1	2	3	4	5	6	7
Quality of service	1	2	3	4	5	6	7
Flexibility of service	1	2	3	4	5	6	7
Availability of information	1	2	3	4	5	6	7
Location of logistics suppliers operations	1	2	3	4	5	6	7
Reliability	1	2	3	4	5	6	7
	Very important=1						Not Important=7

23 How well do logistics providers from Yorkshire and Humber perform in terms of these service attributes where 1 is excellent and 7 is very poor? *(READ OUT LIST TO RESPONDENT AND CIRCLE AS APPROPRIATE)*

	Performance						
Cost	1	2	3	4	5	6	7
Past track record	1	2	3	4	5	6	7
Quality of service	1	2	3	4	5	6	7
Flexibility of service	1	2	3	4	5	6	7
Availability of information	1	2	3	4	5	6	7
Location of logistics suppliers operations	1	2	3	4	5	6	7
Reliability	1	2	3	4	5	6	7
	Excellent=1				Very poor=7		

24 Further stages of this research will involve case studies in the Yorkshire and Humber region. Would you be interested in participating in the development of such case studies?

No	1
Yes	2

Thank you for your time taken in completing this survey.

APPENDIX 4: TELEPHONE FOLLOW-UP SURVEY OF PROVIDERS OF FREIGHT TRANSPORT AND LOGISTICS SERVICES IN YORKSHIRE AND THE HUMBER

Good morning/afternoon,
My name is…….. I am calling on behalf of the Regional Development Agency in connection with a survey of providers of freight transport and logistics services in Yorkshire and Humber. We sent a questionnaire to you by post in January. The survey asked questions about your company, the services it offers and any difficulties facing the industry……

SECTION 1 Introduction

1 Do you recall receiving this questionnaire?

Yes 1 Ask Q2 **No** 2 GO TO Q4 **Don't Know** 3 GO TO Q4

2 Our records suggest that you have not completed the questionnaire. Could you tell me your reasons for not completing it? DO NOT PROMPT. CODE ALL MENTIONED.

Too busy	1	ASK Q4
Filled it in/in the post	2	TERMINATE AND THANK RESPONDENT
Did not feel it was relevant	3	ASK Q3
Other (write in)……..	4	ASK Q4

3 Why did you not feel that it was relevant?

……
……
……

4 Would it be possible to quickly run through some of the questions that were on the questionnaire now over the phone? Your views are important to the development of services in the region. It will take 5-10 minutes of your time. All the information you provide will be strictly confidential.

Yes 1 GO TO SECTION 2 **No** 2 ASK Q5

5 Is there anyone else in the company who could help us by answering some of the questions that were on the questionnaire now over the phone?

Yes 1 ARRANGE INTERVIEW AND GO TO SECTION 2 **No** 2 GO TO Q6

6 Would you consider filling it in if we send it by fax or through the post?

Yes 1 ASK Q7 **No** 2 ASK Q8

7 Please provide details……TERMINATE AND THANK

8 If NO Why is that? (Write in)

……

SECTION 2 **The purpose of this survey is to identify ways in which the regional development agency and partners could assist in improving the competitiveness of the industry**

1 What barriers do you think prevent the logistics industry in Yorkshire and Humber supplying efficient services today? *(DO NOT READ OUT LIST, CIRCLE ALL THAT APPLY)*		
Skills - general driver shortage		1
- other skills shortage		2
Cost of Training		3
Road congestion	-within region	4
	-elsewhere	5
Lack of ability to invest in new equipment		6
Rail operational constraints		7
Regulatory restrictions at delivery point		8
Other - *please specify*		9

To help us analyse the information could I ask:

2	**Approximately how many employees does your company have in total?**	
3	**Approximately how many of those employees are based in Yorkshire and Humber?**	

4 What is the nature of your business, i.e. what does your business do?

5 Does your company currently have markets in: *(PLEASE READ OUT LIST AND CIRCLE YES/NO)*	**Yes**	**No**
Yorkshire and Humber	1	2
Rest of Britain	1	2
European Union	1	2
Rest of Europe	1	2
Rest of the World	1	2

6 For domestic transport journeys, where are the decisions made affecting your route and mode for customers in Yorkshire &Humber? Are these decisions made by: *(PLEASE READ OUT LIST AND CIRCLE ONE ANSWER)*	
Your company inside region	1
Your company elsewhere in Britain	2
Your Company outside Britain	3
Customer inside Yorkshire & Humber	4
Customer outside Yorkshire & Humber but in Britain	5

	Other - *please specify*	6

7 Do you undertake or arrange international transport? *(PLEASE CIRCLE RELEVANT ANSWER)*				
No	1	*Go to Q8*		
Yes	2	*If yes*, **is this**;	Into Britain	1
			Out of Britain	2
			Both	3

8 Do you have control over port of entry? *(PLEASE CIRCLE RELEVANT ANSWER)*	No	Yes
	1	2

9 Which Ports do you use for moving goods into Britain? Do you use…? *(READ OUT LIST AND CIRCLE YES OR NO)*	No	Yes
Yorkshire & Humber Ports	1	2
North East Ports	1	2
North West Ports	1	2
Ports on South Coast	1	2
Other	1	2

(ONLY ASK IF THEY DO NOT USE YORKSHIRE AND HUMBER PORTS) **10 Why do you not use Yorkshire and Humber ports for moving goods into Britain? Is this because:** *(Circle all that apply)*	No	Yes
Have not considered the issue	1	2
Inadequate Services	1	2
Too Expensive	1	2
Sailing frequency not suitable	1	2
Unsuitable destinations	1	2
Unsuitable facilities	1	2
Other – specify	1	2

11 How important is the port of entry into Britain to you? *(PLEASE CIRCLE RELEVANT ANSWER)*	
Very important	1
Important	2
Neither important nor unimportant	3
Unimportant	4
Of no concern whatsoever	5

12 Do you have control over port of exit out of Britain? *(PLEASE CIRCLE RELEVANT ANSWER)*	No	Yes
	1	2

13 Which ports do you use for moving goods out of Britain? Do you use…..? *(PLEASE READ OUT AND CIRCLE ALL THAT APPLY)*	No	Yes
Yorkshire & Humber Ports	1	2
North East Ports	1	2
North West Ports	1	2
Ports on South Coast	1	2
Other	1	2

(ONLY ASK IF THEY DO NOT USE YORKSHIRE AND HUMBER PORTS) **14 Why do you not use Yorkshire and Humber ports for moving goods out of Britain. Is this because….?** *(PLEASE READ OUT AND CIRCLE ALL THAT APPLY)*	No	Yes
Have not considered the issue	1	2
Inadequate Services	1	2
Too Expensive	1	2
Sailing frequency not suitable	1	2
Unsuitable destinations	1	2
Unsuitable facilities	1	2
Other – specify	1	2

15 How important is the port of exit to you? *(READ OUT LIST AND CIRCLE RELEVANT ANSWER)*	Importance
Very important	1
Important	2
Neither important nor unimportant	3
Unimportant	4
Of no concern whatsoever	5

16 How often, on average, do customers conduct reviews of your performance? *(READ OUT AND CIRCLE RELEVANT ANSWER)*	
Monthly	1
Quarterly	2
Annually	3
Never	4
Other - *please specify*	5

17 What sources of information do you use when searching for new customer contacts? Do you use…? *(PLEASE READ OUT AND CIRCLE ALL THAT APPLY)*	No	Yes
Past experience	1	2
Customer recommendation	1	2
Invitation to tender	1	2
Internet Auction	1	2
Own company databases	1	2
Other sources of information (e.g. promotional materials, trade directories, the internet)-please specify which:	1	2

18 From your own experience do you believe that there is an adequate supply of logistics services in Yorkshire and Humber in your business sector? Would you say there is….?	
Significant undersupply	1
Slight undersupply	2
Supply meets demand	3
Slight oversupply	4
Significant oversupply	5

19 In choosing a logistics supplier what service attributes do your *customers* think are important? I am going to read out a list of service attributes. Please give a score for each of these between 1 and 7 where 1 is Very important and 7 is not at all important.

	Importance						
Cost	1	2	3	4	5	6	7
Past track record	1	2	3	4	5	6	7
Quality of service	1	2	3	4	5	6	7
Flexibility of service	1	2	3	4	5	6	7
Availability of information	1	2	3	4	5	6	7
Location of logistics suppliers operations	1	2	3	4	5	6	7
Reliability	1	2	3	4	5	6	7
	Very important=1					Not Important=7	

20 **How well do you think you perform in terms of the following service attributes. Please give a score for your performance between 1 and 7 where 1 is excellent and 7 is very poor?**

	Performance						
Cost	1	2	3	4	5	6	7
Past track record	1	2	3	4	5	6	7
Quality of service	1	2	3	4	5	6	7
Flexibility of service	1	2	3	4	5	6	7
Availability of information	1	2	3	4	5	6	7
Location of logistics suppliers operations	1	2	3	4	5	6	7
Reliability	1	2	3	4	5	6	7
	Excellent =1					Very Poor=7	

21 Do you believe that there are any gaps in what the logistics industry offers to customers based in Yorkshire & Humber?

No	1
Yes	2

If Yes, please give details

22 Further stages of this research will involve case studies in the Yorkshire and Humber region. Would you be interested in participating in the development of such case studies?

No	1
Yes	2

Thank you very much for your time taken in completing this questionnaire.

APPENDIX 5: COVERING LETTER FOR POSTAL QUESTIONNAIRES

{date}

Dear Sir/Madam

Please make it your New Year's resolution to help improve freight and logistics services in Yorkshire and the Humber

Yorkshire Forward (the Development Agency for Yorkshire and the Humber) in association with the Transport and Logistics Research Unit at Huddersfield University have commissioned FaberMaunsell to carry out this survey as part of an ongoing programme of research into the freight and logistics industry in the region. This research is being supported by the Road Haulage Association.

The purpose of the survey is to identify the needs of users of freight and logistics services in the region and to explore how well service providers are currently meeting these needs. The results of this research will be used by Yorkshire Forward to help the freight and logistics industry provide excellent and competitive services.

Attached is a short questionnaire. We would be very grateful if you could spare us 10 minutes to fill it out and post it back in the freepost envelope provided. Please answer the questions as well as you can. If you are not sure about an answer please give your best estimate. The survey is being conducted under the Market Research Society Code of Conduct so confidentiality is assured.

By taking part you will play an active role in making the freight and logistics services in Yorkshire and the Humber better for all and for every completed questionnaire we receive we will make a donation to charity (National Society for Prevention of Cruelty to Children (NSPCC)), so please spare us 10 minutes of your time to take part.

If you have any queries relating to the survey please contact {name} on {telephone number}.

Yours sincerely

APPENDIX 6:	LIST OF CONFERENCE PAPERS REPORTING ON THE ORIGINAL INVESTIGATIONS OF THIS RESEARCH PROJECT

Stantchev, D S, Whiteing, A E and Bamford, C G (2006) 'Adaptation of the Scott and Westbrook Mapping Technique: A Supply Chain Investigation of Companies in the Yorkshire and Humber Region', In Bourlakis, M, Cullinane, K, Mulley, C and Nelson, J (eds.), *Logistics Research Network 2006 Conference Proceedings*, Newcastle University, 6-8 September 2006, pp421-426. ISBN 1-904564-17-8

Whiteing, A E and Stantchev, D S (2004) 'Freight Transport and Logistics in the Yorkshire and Humber Region: Addressing the Skills Gaps', Published in the non-refereed proceedings of the University Transport Studies Group (UTSG) Conference, University of Newcastle upon Tyne, 5-7 January 2004.

Whiteing, A E, Stantchev, D S, James, J and Murphy, P (2003) 'Logistics Service Provision in the Yorkshire and Humber Region: A Study of the Different Perceptions of Users and Providers', In D A Menachof, M S Sodhi, M Browne and J Allen (eds.), *Logistics Research Network 2003 Conference Proceedings*, Corby, Institute of Logistics and Transport, pp 447-453. ISBN 1-904564-02-X