Freight Logistics and Transport Systems in Europe

Trends in the location of European industry and its interaction with logistics and transport

European Council of
Applied Sciences and Engineering

Euro-CASE

CONTENTS

PREFACE

In 1996 Euro-CASE published the report "Mobility, Transport and Traffic - in the perspective of growth, competitiveness and employment in Europe". The report was the outcome of a study seeking to understand the dynamic process underlying the growth in transport demand, and evaluation of the long-term implications of alternative strategies for managing and accommodating the growth.

Besides the findings, the study also suggested recommendations for policy initiatives and proposals for further research and studies. One of those areas was freight transport and logistics. The European Commission, which contributed both financially and professionally to the study and subsequently made use of the findings, also found a need for further studies into freight transport.

Awareness has grown that freight transport is entwined with the location and logistics organisation of manufacturing industry. Efficient logistics requires strong and visible connectivity made possible through the elimination of as many friction areas as possible. What is further appreciated is that efficient and competitive freight transport is an integral part of the elements that promote economic growth and quality of life. Therefore it is important to understand better what constitutes efficient and competitive logistics and freight transport systems.

Finding the report on "Mobility, Transport and Traffic" of high quality and of value to the Commission as well as to national governments, the European Commission in March 1999 entrusted Euro-CASE to undertake a study on "Freight Logistics and Transport Systems" which is the subject of the present report. The study principally addresses trends in location of European manufacturing industry and related services and their interaction with logistics and freight transport.

The study aims at a better understanding of the opportunities for improving freight logistics and transport in Europe, identifying obstacles to change, and recommending to the European Commission and national governments those measures which lie within their competence which would enhance the competitiveness of European industry and services in an environmentally sustainable way. In order to ensure the broadest knowledge being available for the study, the Commission suggested that, besides representation from industry, freight transport operators/logistics providers, government authorities and academia, the European Logistics Association would also be represented throughout the study.

Many individuals with expert knowledge and experience from the above sectors have contributed to the study, including representatives from the European Commission, and Euro-CASE wants to extend its appreciation and thanks for the expertise, time and efforts that those people have devoted to the study. The report documents experiences and views at European level on the subject, supported by literature studies. It also provides recommendations for policy as well as practical initiatives that the European Commission and national governments may take to promote a seamless freight transport system and related logistics services.

Ivar Schacke
Chairman, Euro-CASE "Freight" Steering Group

Paris, 25.11.2000

SUMMARY

1. Objectives and General Approach

The purpose of this study is to increase understanding of the opportunities for improving freight logistics and transport in Europe, identify obstacles to change, and recommend to the European Commission and national governments those measures which lie within their competence which would enhance the competitiveness of European industry and services in an environmentally sustainable way.

The study concentrates on three key questions:
- what are the main driving forces behind changes in the location of economic activities in Europe?
- how, and to what extent, are these decisions influenced by supply chain management considerations?
- what public policy initiatives would improve the efficiency of European freight logistics and transport?

The study has addressed these questions through a combination of desk research and workshops involving senior managers of large European companies operating in three sectors – retailing, pharmaceuticals and automotive. The conclusions derived from the workshops have been discussed by an Expert Panel of logistics specialists, which has advised on the extent to which they are applicable to other economic activities.

2. The Changing Nature of the Supply Chain

The general trend in European logistics has been from manufacturer-led to retailer-led supply chains (from "push" to "pull" supply chain economics). This is occurring in all three of the sectors studied, but at a different speed.

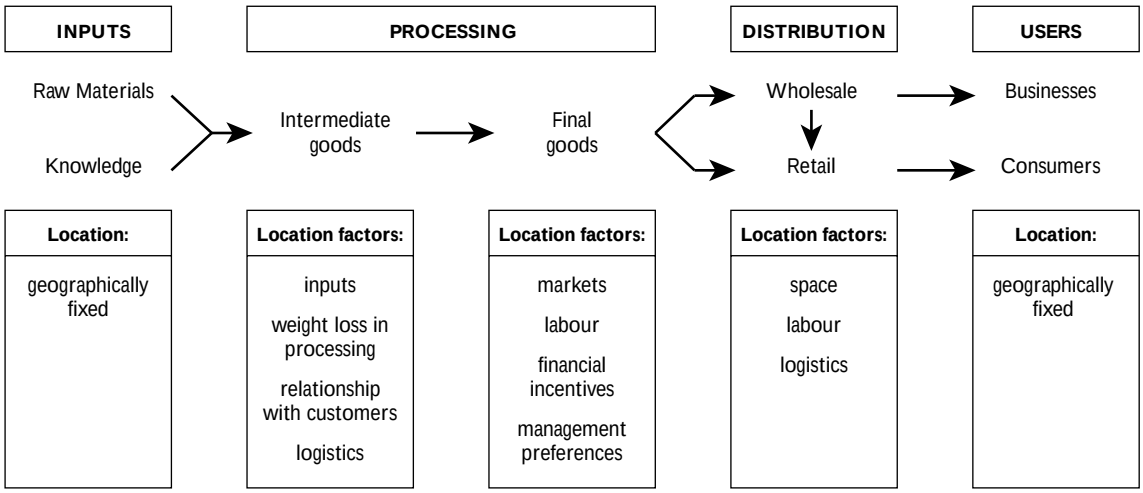
Retailing is undergoing a period of consolidation, with the emphasis on continuous small improvements to existing location and distribution patterns. The highly regulated pharmaceuticals industry will see major changes in its European distribution network as national markets are merged. These will affect the location of wholesaling depots but will have relatively little effect on the location of primary manufacturing and retail sales outlets. In the automotive industry there will be large changes over the next 5-10 years in the location of manufacturing - particularly of components - and the location and format of retailing and post-sales servicing.

3. Location

Transport and logistics have relatively little effect on the global location of primary activities - the manufacture and sale of final products. This is determined by markets, labour conditions, financial incentives, and the social or cultural preferences of senior management. However they influence regional and local location decisions where site accessibility is a significant factor.

Transport and logistics play a more important role in the location of secondary activities such as components manufacture, wholesaling and distribution, and service sector industries. Their importance varies according to the bulkiness of the product and its weight loss during manufacturing, the premium attached to quality/technological leadership, the level of competition within the industry, and the location of the activity within the supply chain.

Figure 1. Factors Influencing Location Decisions at Different Points in the Supply Chain



4. Logistics

The most important recent trends in logistics are towards:
- shorter order cycles;
- smaller, more frequent, more reliable deliveries;
- more varied delivery patterns related to product shelf life, product customisation, production/ retailing strategy, and the reliability of short-term forecasting;
- closer relationships with fewer suppliers;
- greater use of IT;
- outsourcing of logistics to third party logistics managers (otherwise known as 3PLs or TPLMs);
- more use of recycling, which has resulted in additional back-haul cargoes.

There is still considerable uncertainty about the future of E-commerce, and the impact which this will have on logistics.

The number of freight journeys has not increased as quickly as expected because of steps taken by industry to keep transport costs under control. These include:
- development of sophisticated software to optimise vehicle routeing;
- increased use of cross-docking to maintain vehicle load factors;
- use of smaller vehicles designed for urban driving conditions in the final stage of distribution;
- trip spreading throughout the day, which reduces peak-hour goods vehicles movements;
- more vehicle sharing as TPLMs consolidate the flows of different clients;
- improvements in vehicle design to use the space within the vehicle more effectively.

In future, more varied delivery patterns will result in a mixture of different stock-holding strategies. The move towards longer-term partnership arrangements should regularise freight movements, encourage investment in more efficient vehicles, and make it easier to consolidate flows.

5. Transport

Traffic congestion costs are underestimated because official statistics do not take into account the "unseen" costs of the remedial measures used to maintain supply chain reliability – more dense depot networks, longer scheduled journey times, investment in reserve vehicles. There is also a difference between the economists view of the "optimal" level of congestion, which takes into account the capital costs of improving the situation, and the road user's view of congestion which is largely based on current costs. Nevertheless in both approaches the measurement of road congestion should include the cost of avoiding potential delays as well as the costs incurred as a result of actual delays.

Concern about road congestion has resulted in a widespread aspiration to move more freight by rail. However there is a large gap between industry's requirements for a high quality transport service and the standards provided by non-road modes. Industry's requirements include:

- uninterrupted international services;
- the ability to handle small consignments (generally less than trainload and sometimes less than wagonload);
- frequent point-to-point services at scheduled times;
- guaranteed delivery times;
- conveniently located and easily accessible inter-modal terminals, and/or door-door delivery by intermodal transport;
- specialist wagons designed to meet the needs of individual cargo flows;
- automatic cargo tracking and monitoring;
- a faster response to queries and problems;
- support for the development of private sidings.

European railways are perceived to fall far short of meeting these needs, and industry representatives attending the three sector workshops offered several explanations of why this is happening:

- national railways pay too much attention to costs and not enough to quality of service;
- railway networks in northern Europe are congested, with key bottlenecks restricting flows over much wider areas;
- priority is usually given to passenger services;
- large public sector organisations lack an entrepreneurial and customer-oriented culture;
- railways have not sought to expand the range of services they provide to customers, by offering door-to-door collection and delivery, consolidation and groupage, warehousing, IT-based order processing and Just-In-Time delivery;
- high charges for the use of rail infrastructure make it difficult for rail to compete with road;
- most long-distance traffic (for which rail has a natural competitive advantage) crosses frontiers, which are obstacles to guaranteed high quality services.

However where railways have restructured their services to meet industry's needs, the market response has been positive.

There is a conflict between the steps needed to make road transport more efficient – authorisation of larger vehicles, relaxation of restrictions on driving hours, construction of more motorways, limits on the growth of car traffic in towns – and sustainability arguments for limiting the growth of road freight. Road pricing has a role to play in resolving this conflict. However, the demand for road transport of freight is fairly inelastic, so higher road user charges will have little effect on the modal split of freight unless they are combined with structural reforms to make other modes of transport (particularly railways) more acceptable.

The industrialists taking part in the study were unanimous in their demand for efficient door-to-door transport, and saw the various modes as complementary rather than competitive. There was a general willingness to consider multi-modal solutions to their requirements, but a cautious approach was taken to making any commitments until the quality, reliability and cost-effectiveness of such solutions had been clearly demonstrated.

6. Recommendations

6.1. Location

Recommendation 1*: Investment Incentives*
The European Commission should promote the harmonisation of national and regional investment incentives, to reduce distortions in competition between different regions for new investment and ensure that manufacturing and service industries locate in the areas which are most advantageous in terms of long-term socio-economic costs (defined to include costs such as the provision of transport infrastructure and environmental protection which are largely external to the industry).

It should also seek to ensure that transport and logistics considerations are taken into account in the design of projects receiving direct EU assistance

Recommendation 2*: Removal of Barriers to European Logistics and Trade*
The European Commission should continue to work towards the removal of logistics barriers which affect international trade, such as high rail track charges or restrictions on weekend driving. These affect not only intra-European trade, but also European competitiveness in global markets.

Recommendation 3*: Better Planning Guidelines*
National governments should develop guidelines for local authority planning regulations which take into account the social and environmental impact of industrial location decisions. The development of closer links between transport and land use planning is essential if the economic efficiency of industrial location patterns is to be improved.

Recommendation 4*: Industrial Clusters*
The European Commission should – in association with national governments - sponsor pilot projects aimed at the promotion of industrial clustering, where this can be shown to reduce transport needs or make a significant contribution to the success of urban freight plans.

6.2. Logistics

***Recommendation 5**: Assistance to Small and Medium Enterprises*
The European Commission should encourage national governments to make assistance available to Small and Medium Enterprises (SME's) to encourage them to move faster in adopting modern logistics techniques.

***Recommendation 6**: Urban Freight Plans*
More technical assistance should be given to local authorities, in association with industry, for the development of urban freight plans which will reduce distribution costs within urban areas, improve the reliability of distribution schedules, and minimise the environmental impact of freight movements.

***Recommendation 7**: E-Commerce*
The European Commission should set up a special unit with high level reporting lines to monitor the growth and impact of E-commerce, in order to produce fast and effective policy responses.

6.3. Transport

***Recommendation 8**:* Survey of Shipper Requirements
The European Commission should sponsor a study to identify – at company or plant level - the 500 largest European freight flows which are suitable for transfer from road to other modes, including the conditions which have to be satisfied in each case to allow this to occur.

***Recommendation 9**: Monitoring Transport Performance*
The European Commission should become more closely involved in monitoring transport service quality, defined in terms of specific criteria such as:
- frequency, minimum consignment size, door-to-door collection and delivery times, security and reliability;
- the use of vehicles and rolling stock which satisfy the technical requirements of the cargo flows they are intended to handle;
- response times to customer queries and changes in shipping instructions;
- provision of information about cargo status and the use of cargo tracking systems;
- guaranteed service standards, for example for cargo arrival times;
- willingness to accept liability, and offer compensation, when things to wrong;
- a commercial and flexible approach to the negotiation of price and quality of service;
- willingness to provide freight consolidation services, or work closely with other companies in this area;
- resolution of problems relating to the movement of goods across national frontiers

Resources should be assigned to developing new transport performance indicators which reflect shipper requirements more closely.

***Recommendation 10**: Infrastructure Pricing Policies*
The work that has been done (separately) on road and rail infrastructure pricing should now be integrated within a unified policy framework to provide a common approach to infrastructure pricing.

***Recommendation 11**: Capacity Constraints in Transport Infrastructure*
The European Commission, through its transport research programme, should continue its present work in developing an economic evaluation methodology which can determine the most appropriate balance between alternative strategies for resolving road and rail capacity constraints

***Recommendation 12**: Institutional Changes*
The European Commission should offer some limited financial support for pilot projects which promote institutional change in inter-modal transport. The priorities should be:
- encouragement of new entrants and new types of service;
- establishment of a regulatory framework which will protects consumer interests without impeding the growth of large, vertically integrated logistics providers;
- allocation of capital investment by national governments on a corridor or "problem" basis, rather than by mode.

***Recommendation 13**: Clarification of Carrier Liabilities*
The European Commission should take the lead in clarifying and harmonising carrier liabilities throughout Europe, building on the findings of two studies, which it has already commissioned. Issues to be addressed include the standardisation of legal procedures for resolving claims, improvement of communications between the regulatory authorities in different member states, and raising the minimum acceptable quality standard for vehicles, drivers and the organisations managing freight transport.

***Recommendation 14**: Transit Corridors*
Much of Europe now has a "7 day " economy, whose efficient working is hindered by weekend and night-time driving restrictions in certain transit countries. The European Commission should take the lead in negotiating the waiving of these restrictions in multimodal transit corridors, without necessarily requiring any change in national transport policies in the surrounding territory.

***Recommendation 15**: Extension of Structural Funds Assistance*
The European Commission should consider, on a pilot scheme basis, extending Structural Funds assistance from transport infrastructure to selected transport services such as cargo consolidation facilities, cargo tracking, communications and training, where this would result in the faster spread of best practice or remove significant bottlenecks in European distribution networks.

INTRODUCTION

1. INTRODUCTION

This study was commissioned by the Research Directorate of the General Directorate of Transport of the European Commission in March 1999, to improve understanding of the opportunities for and obstacles to the development of seamless logistics and transport systems for European manufacturing industry. Its second main objective is to make national governments and the European Commission aware of their role in promoting efficient, smooth and competitive logistics and transport systems for freight.

1.1. Study Objectives

The study has as its central theme the relationship between industrial location, transport and logistics. It addresses three main questions:

- what are the main driving forces behind changes in the location of economic activities in Europe?
- how, and to what extent, are these decisions influenced by supply chain management considerations?
- what public policy initiatives should be developed by national governments and/or the European Commission (DG TREN) to improve the efficiency of European logistics and freight transport?

1.2. Approach and Methodology

The European Council of Applied Sciences and Engineering (Euro-CASE) is a non-profit-making organisation consisting of the Academies of Applied Sciences and Engineering in seventeen European countries. As such, it has access to the views of a wide range of senior industrialists and distinguished experts in the fields of logistics and transport. It has used this unique position as the basis for its approach to the study, which has been based on group discussion and debate of the main issues, backed by desk research and background papers prepared by an external transport consultant.

To give the discussions a sharper focus, the study has concentrated on three sectors – retailing, pharmaceuticals, and the automotive industry. These account for 15% West European GDP, and were selected on the basis of several criteria:

- size;
- interaction with other sectors of the economy;
- diversity of structure (size and ownership of production units, together with the role of small and medium enterprises);
- diversity of growth rates and speed of organisational change;
- differences in approach to logistics (location of control over the supply chain, extent of outsourcing, use of IT);
- wide international spread, combined with significant national differences in business attitudes.

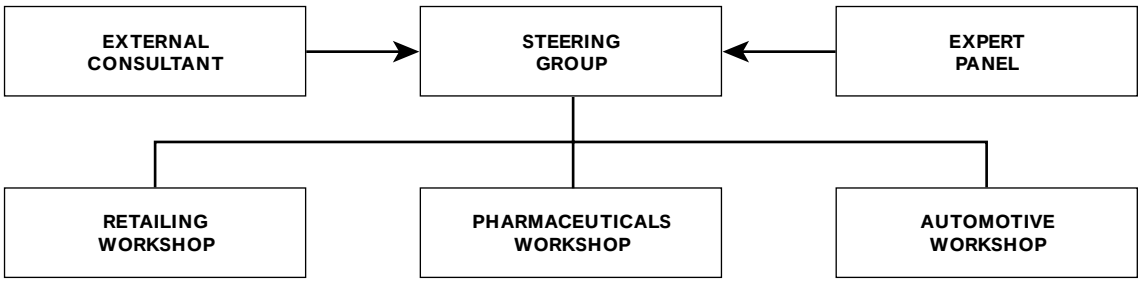
The study was restricted to Western Europe (EU plus Norway and Switzerland), as transport and logistics in Eastern Europe are still in transition and do not yet fall within the competence of the European Commission.

For each of the three sectors, Euro-CASE has organised a high level workshop involving senior managers from large manufacturing companies in the sector. These meetings have also been attended by the Steering Group of transport and logistics specialists set up by Euro-CASE to oversee the study, and the findings of each workshop have been summarised in separate sector working papers. Euro-CASE has also been advised by a broader Expert Panel including people from outside of the three sectors, about the extent to which conclusions drawn from the three sector studies can be applied to other parts of the economy. The Expert Panel met twice – once at the beginning and once at the end of the study – and has also provided valuable written comment on the sector working papers, as well as input to the desk research.

There is a surprising amount of diversity between the three sectors studied, which has made us reluctant to generalise about the relationship between location and logistics for European industry as a whole. But there are some common trends in the relationship between logistics and transport which are worth highlighting because of their implications for future transport policy. However the wide range of factors which affect location, logistics and transport at company level means that considerable care is needed in drawing conclusions even within a single sector of the economy.

The organisational structure of the study is shown in Figure 1.1, and a list of study participants is given in Annexe C.

Figure 1.1. The Organisational Structure of the Study



The Workshops were held in different European countries in order to capture national differences of opinion, and involved participants of different nationalities. The timetable for the meetings is shown in Table 1. In addition, there were several supplementary meetings of the Steering Group.

Table 1. Meeting Schedule

MEETING	LOCATION	DATE
Expert Panel No.1	Brussels	30 June 1999
Workshop No.1 (Retailing)	London	15 September 1999
Workshop No.2 (Pharmaceuticals)	Milan	20 October 1999
Workshop No.3 (Automotive)	Dusseldorf	10 November 1999
Expert Panel No. 2	Copenhagen	10 December 1999

1.3. Report Structure

There are five main parts to this report. Chapter 2 discusses general trends in industrial location, logistics and transport within Europe, pulling together the results of various surveys undertaken by other organisations. This provides the context for Chapters 3-5, which contain the three sector studies on retailing, pharmaceuticals and the automotive industry. Chapter 6 summarises the conclusions which can be drawn from this work, and make a series of recommendations for action by the European Commission and national governments.

BACKGROUND

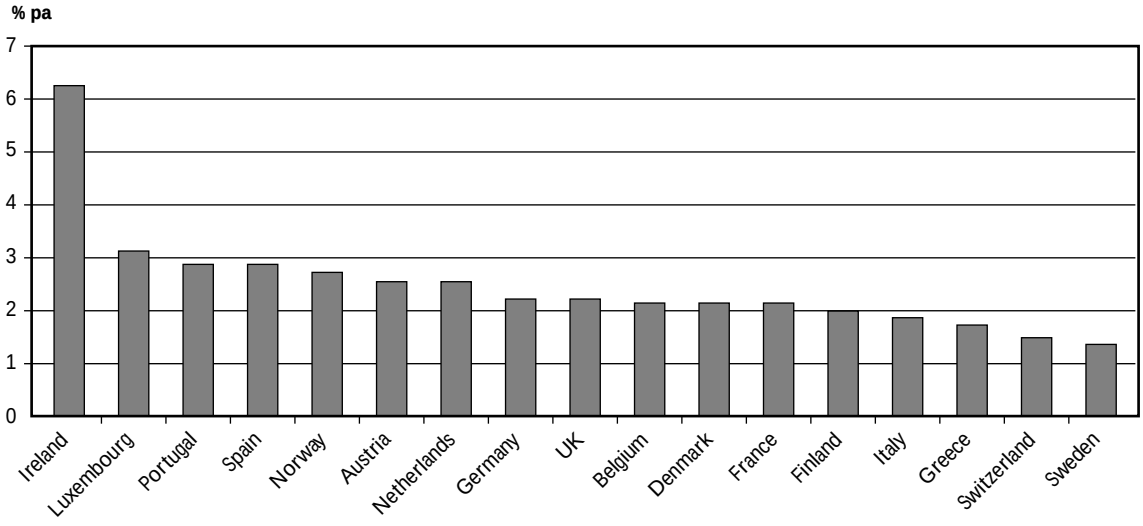
2. BACKGROUND

This Chapter describes some of the general trends taking place in the European economy during the 1990s, and summarises the results of previous multi-sector surveys of location, logistics and transport. It is not intended to be a comprehensive review – its purpose is simply to provide a context for the three sector studies, which follow.

2.1. Economic Growth and Industrial Structures

Since the mid 1980s the average economic growth rate for Western Europe (EU countries plus Norway and Switzerland) has been around 2.2% pa. Apart from the exceptionally high growth rate experienced in Ireland, long-term growth has been fairly uniform at between 1.5-3.0% pa. Perhaps surprisingly, the statistics show very little variation between Northern and Southern Europe: Spain and Portugal have performed better than the European average, but Italy and Greece have performed worse.

Figure 2.1. Average GDP Growth Rates 1985-98 (% pa, constant prices)



Source: Eurostats *Data for Short-Term Economic Analysis, Theme 1, Series B* - UN Statistical *Yearbooks (various)*

The value added by the services sector has grown more rapidly than for manufacturing, which saw its share of total EU value added fall from 24.4% to 20.8% between 1987 and 1996.

Distribution (including wholesaling and retailing) accounts for just over 12% of European output, and has been declining in relative importance since the mid-1970s, when it accounted for around 12.7% of output.
Transport and related services such as freight forwarding account for around 4% of European output, and have been declining in importance at about the same speed as distribution.

Table 2.1. Changes in the Composition of European Value Added (EU 15)

	% OF EU VALUE ADDED		INCREASE IN VALUE ADDED (% PA AT CURRENT PRICES)
	1987	1996	
Agriculture, forestry and fisheries	3,2%	2,3%	1,3%
Manufacturing	24,4%	20,8%	3,5%
Construction	5,8%	5,2%	4,2%
Fuel & power	5,0%	4,6%	4,4%
Market services	45,8%	51,7%	6,7%
Non-market services[a]	15,8%	15,4%	5,1%
TOTAL	100,0%	100,0%	5,4%

Note: (a) mainly government administration and non-chargeable welfare services
Source: Eurostat *Yearbook* 1997

Within manufacturing there have been some high growth sectors such as chemicals, electrical goods and office machinery which have actually been increasing their share of European value added, but most industries have been growing slowly in absolute terms, at rates well below the increase in GDP, and therefore declining in relative importance.

Table 2.2. Changes in Share of European Output Accounted for by Manufacturing (EU 12)

MANUFACTURING	% OF EUROPEAN OUTPUT		
	1975	1987	1991
High growth			
Chemicals	1,8%	2,3%	2,3%
Electrical goods	1,9%	2,4%	2,5%
Office machinery	0,6%	0,7%	0,7%
Average growth			
Paper & printing	1,8%	1,8%	1,7%
Rubber & plastics	0,9%	0,9%	0,9%
Slow growth			
Food, drink & tobacco	3,8%	3,4%	3,2%
Textiles, clothing & footwear	2,5%	1,9%	1,7%
Non-metallic minerals	1,5%	1,2%	1,2%
Ferrous & non-ferrous metals	1,4%	1,0%	1,0%
Metal products	2,4%	1,8%	1,9%
Machinery	3,1%	2,1%	2,0%
Transport equipment	2,5%	2,4%	2,3%
Other manufactures	1,5%	1,1%	1,1%
TOTAL	25,7%	23,0%	22,5%

Source: European Commission *Regional Growth and Convergence* 1997

Some recent figures produced by the OECD[1] allow the manufacturing structures of European countries to be compared, using 23 main categories of industry (ISIC Revision 3 classification). This has been done by calculating the share of manufacturing value added contributed by each industry in each country, and within Europe as a whole, then using the ratio of national: European shares to calculate a concentration index for each industry.

The results show a surprising degree of similarity, with relatively few countries having more than twice or less than half the average European share of any particularly industry. The main exceptions to this are the clustering of textiles, clothing and leather in Southern Europe, and the paper industry in Scandinavia. The concentration of textiles reflects a mixture of low wage rates and lack of development of the more sophisticated manufacturing activities, whilst the concentration of the paper industry reflects its dependence on natural resources. In general, it is the smaller European economies which display the largest differences in industrial structure from the European average – the larger economies (Germany, France, UK, Italy and Spain) rarely appear in the list of countries with abnormally high or low industrial concentration indices.

Table 2.3. Comparative Manufacturing Structures

INDUSTRY	% OF EUROPEAN VALUE ADDED[a]	HIGH CONCENTRATION INDEX[b] (2.0+)	LOW CONCENTRATION INDEX[b] (UNDER 0.5)
Food & beverages	12,2%	Greece (2.0), Norway (2.0)	-
Tobacco	1,4%	-	-
Textiles	2,8%	Portugal (3.0), Greece (2.5), Italy (2.4)	Finland (0.4), Norway (0.4)
Clothing	1,8%	Greece (3.2), Italy (2.2)	Netherlands (0.2),Norway (0.2)
Leather & footwear	0,9%	Portugal (4.4), Italy (3.3)	Belgium (0.1),Netherland (0.2), Norway (0.2), Denmark (0.4)
Wood	1,7%	Finland (2.6),Austria (2.5)	-
Furniture	2,2%	Denmark (2.0)	-
Paper	3,0%	Finland (5.2), Norway (2.0)	-
Publishing	5,2%	-	-
Petroleum & coke	4,2%	Portugal (3.3), Ireland (2.4)	Denmark (0.2), Norway (0.2), Finland (0.3), Spain (0.4)
Chemicals	10,4%	-	-
Rubber & plastics	3,9%	-	-
Non-metallic minerals	4,3%	Portugal (2.0)	-
Basis metals	4,9%	Switzerland (2.1)	Portugal (0.3)
Metal products	6,6%	-	-
Machinery nes	11,2%	-	Greece (0.3), Portugal (0.3)
Office equipment	0,8%	UK (2.8)	Austria, Greece, Portugal (0.1), Ireland (0.2), Norway (0.3), Italy (0.4), Switzerland (0.4)
Electrical machinery	6,2%	Switzerland (2.4)	Denmark (0.4)
Radio & telecoms	2,0%	Finland (4.1),Austria (3.0)	Netherlands (0.2),Switz. (0.4)
Medical, optical, clocks	2,1%	-	Portugal (0.1), Greece (0.2)
Motor vehicles	8,2%	-	Greece, Norway (0.1), Denmark, Finland (0.2), Portugal, Switzerland (0.4)
Other transport	2,5%	Norway (3.9)	Ireland (0.2),Austria (0.4)
Manufactures nes	1,5%	Belgium (4.3), Switz (4.3)	Greece (0.3), Netherlands (0.3), Ireland (0.4)
TOTAL	100%		

Note: (a) excludes Sweden and Luxembourg, for which figures are not available, but includes Norway and Switzerland. Figures for Germany, which are given in terms of gross output rather than value added, have been scaled down by an appropriate ratio
(b) the concentration index is the %age of national value-added contributed by each industry divided by the %age of European value-added contributed by that industry

Source: (1) OECD *Industrial Structure Statistics* 1998

Changes in the location of economic activity over time are complex and poorly documented, particularly for moves that take place within a single country. Most investment is still directed towards existing plants, and some surveys suggest that even two of the major forces for locational change – foreign inward investment and merger and acquisition activity – have focussed more on the upgrading of existing facilities than on the development of greenfield sites. Nevertheless, because these two types of investment are relatively mobile, they have been used as indicators of country attractiveness within Europe.

2.1.1. Foreign Direct Investment

Foreign direct investment in West European countries amounts to around €70bn pa (1% of GDP). Approximately a quarter comes from outside of Europe, principally the United States and Japan, whilst the remainder represents intra-EU investment.

The UK is particularly favoured as a destination for long-distance moves, accounting for over 40% of inward investment into Western Europe from the United States and Japan. Companies from outside of Europe seeking a second European location, or wishing to service large parts of Europe from a single site, have tended to favour the Benelux countries, particularly if they expect to import large quantities of raw materials or components from overseas. Intra-European investment, in contrast, has tended to move towards the countries with the largest domestic markets – Germany, France and the UK.

Table 2.4. The Importance of Foreign Direct Investment

RECIPIENT	% OF INTRA-EU FOREIGN DIRECT INVESTMENT 1992-97	INTRA-EU FOREIGN DIRECT INVESTMENT AS A % OF GDP
Netherlands	16,7	3,1
UK	16,4	1,0
Belgium	13,7	3,5
Germany	12,3	0,4
France	12,1	0,6
Spain	7,0	0,9
Italy	6,9	0,4
Sweden	4,9	1,4
Ireland	2,9	3,2
Austria	2,2	0,7
Portugal	1,7	1,2
Denmark	1,7	0,7
Finland	1,0	0,6
Greece	0,6	0,4
Total	100	0,8

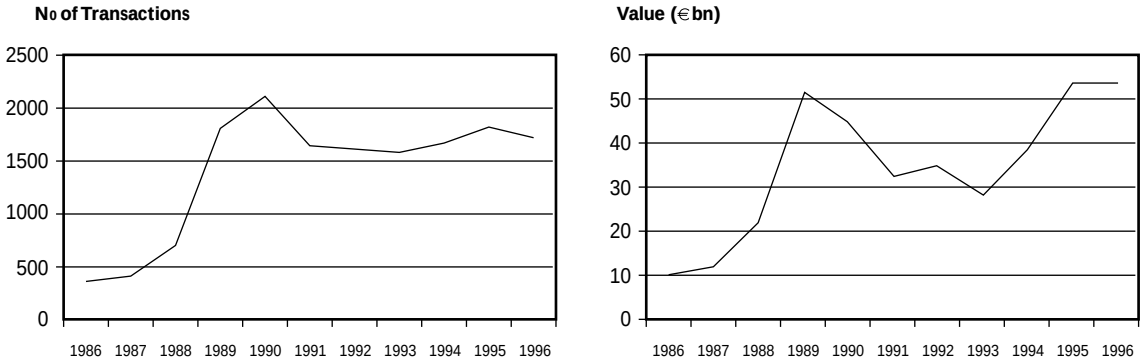
Source: EC Directorate for Economic and Financial Affairs *European Economy Supplement A: Report on Structural and Economic Reform in the European Union* January 1999

A growing number of alternative locations are competing for foreign direct investment as trade becomes increasingly liberalised, transport and communications are improved, and more public agencies are set up to support disadvantaged regions. There are now around 1000 areas and agencies in Europe with the remit to attract inward investment, offering a complex variety of financial and fiscal incentives which distort the comparative advantages of different locations.

2.1.2. Merger and Acquisition Activity

Merger and acquisition activity surged in the late 1980s and again the late 1990s, after a period in which the number of cross-border transactions remained stable at around 1700-1800 pa, but their value declined.

Figure 2.2. Cross-Border Merger & Acquisition Activity Targeting an EU Enterprise



Source: EC Directorate for Economic and Financial Affairs *European Economy Supplement A: Mergers & Acquisitions* November 1997

Mergers and acquisitions have a potentially large effect on location and logistics because of the opportunities they create for rationalisation. However a recent report on cross-border mergers by KPMG[2] suggests that many are undertaken for financial reasons (under priced shares, opportunities for asset stripping or the demerger of non-core businesses) and do not exploit potential synergies between the companies involved.

There are around 5,500 mergers and acquisition each year involving European firms. Of these, around 60% involve firms of the same nationality. In 15-20 % of the deals both firms are European, but of different nationalities, and in the remainder (20-25%) one of the firms is European and the other from outside of Europe.

The geographical distribution of cross-border M&A activity is significantly different from that of direct foreign investment, due to the regulatory regimes in place in different countries, company ownership structures, and the enthusiasm of national banks for M&A activity. The UK is by far the most important country for M&A activity – as both a target and a source for bids – because of its liberal financial regime. The smaller countries of northern Europe are also over-represented, particularly as a source of bids, as their more dynamic companies try to escape from the confines of a small domestic market.

The countries with a low level of M&A activity fall into two groups – the large conservative economies of France and Germany where foreign ownership is a political issue, and the countries of southern Europe which are still developing the institutional structures needed to support extensive M&A activity.

Source: (2) KPMG *Mergers and Acquisitions: A Global Research Report Unlocking Shareholders value: The Keys to success* 1999

Table 2.5. Geographical Distribution of Cross-Border Mergers 1995-8

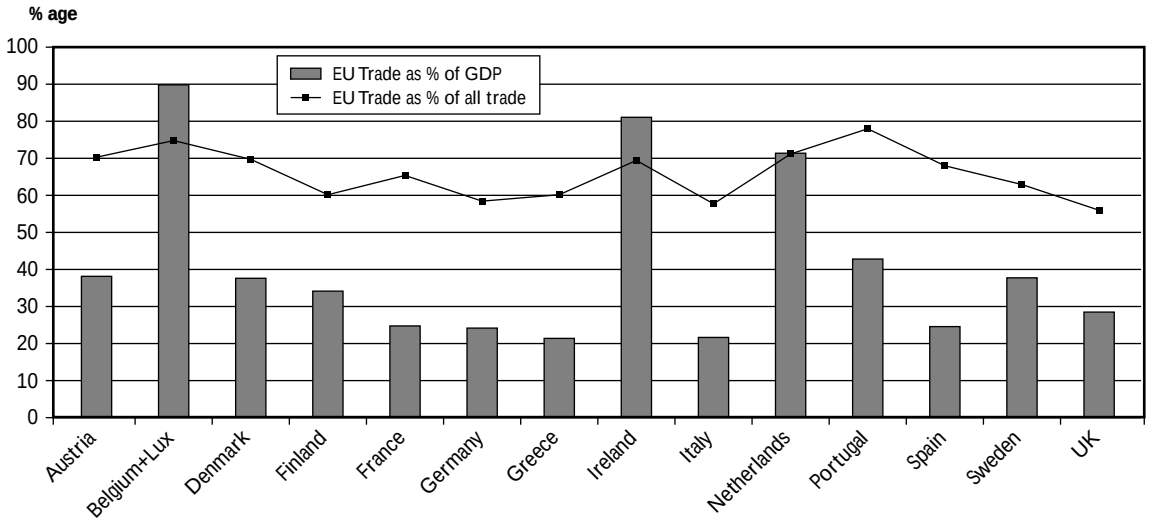
COUNTRY	% of Eu target firms[a]	% of Eu bidding firms[b]	Country GDP as % of EU GDP
High Share of M&A activity			
UK	22.6%	28.4%	13.4%
Netherlands	7.2%	12.4%	4.6%
Sweden	4.9%	8.1%	2.9%
Finland	3.8%	3.1%	1.5%
Ireland	1.3%	3.3%	0.8%
Luxembourg	0.6%	1.0%	0.2%
Average Share of M&A activity			
Belgium	4.4%	3,3%	3.1%
Denmark	3.2%	4.7%	2.0%
Austria	2.2%	1.6%	2.7%
Portugal	1.1%	0.4%	1.3%
Low Share of M&A activity			
Germany	20,8%	14,3%	27,4%
France	14,4%	14,6%	17,8%
Italy	7,5%	3,2%	14,1%
Spain	5,6%	1,7%	6,8%
Greece	0,4%	0,2%	1,4%
TOTAL	100,0%	100,0%	100,0%

Notes: (a) takeovers of EU firms by firms in other member states or outside of the EU
(b) takeovers by EU firms of firms in other member states or outside of the EU
Source: EC Directorate for Economic and Financial Affairs *European Economy Supplement A: Report on Structural and Economic Reform in the European Union* January 1999

2.1.3. Intra-European Trade

Intra-European trade volumes provide one indicator of how well individual countries have become integrated into the EU.

Figure 2.3. Intra European Trade 1998



Source: European Commission (DG VII) *Transport in Figures* 1998
The trade figures shown in Figure 2.3 need to be interpreted with care, as large countries generally have a lower trade: GDP ratio than small ones. The volume and direction of trade is also significantly affected by each country's industrial structure.

2.2. Industrial Location Decisions

This section looks at the main drivers of industrial location decisions, summarises the conclusions of past surveys which indicate the priority which companies attach to different criteria, presents some statistics which show whether or not industrialists' perceptions about inter-country differences are actually correct, looks at the extent to which the drivers of industrial location decisions vary by sector, and ends by summarising the perceived strengths and weaknesses of different European countries.

It concentrates primarily on manufacturing and distribution decisions, limiting observations on the office and service sectors to matters that may affect the location of manufacturing and distribution, and hence the majority of logistics and freight transport activity.

2.2.1. Main Drivers

The factors driving locational change can be loosely grouped into the following categories:
- availability of resources;
- costs;
- revenues;
- risks;
- customer-supplier relationships;
- information;
- internal organisation;
- external environment;

Availability of Resources

The main inputs to any manufacturing process are labour, land, raw materials, capital:

- **labour** skills and educational standards are becoming increasingly important as manufacturing processes become more complex and computer-dependent. The attitude of the labour force, and its willingness to respond flexibly to change, is another key factor. Many industrialists are aware that inflation will erode the current wage cost advantage of locations in Southern and Eastern Europe, and are attracted to these markets by less invasive government regulations, weaker trade unions, and a more co-operative workforce which puts job creation high on the political agenda;
- **land** availability is becoming a serious constraint in some parts of Northern Europe, as environmental concerns and planning regulations increasingly restrict development;
- **raw materials** are an important locational factor for industries whose products have a low value per tonne. Reliance on imports has caused some industries to seek locations close to major "gateway" ports such as Rotterdam and Antwerp, whilst other industries which use resources which are very common, such as water, have preferred to locate close to their markets (for example, Coca-Cola);
- **capital** is becoming more mobile – and equally priced - within Europe as monetary policies converge, but there are still significant international differences in banks' willingness to lend, particularly to small and medium sized enterprises (SMEs). As a result, the business environment for new enterprises is more favourable in some countries than in others.

Costs

Cost factors driving locational change include:

- **increased awareness of costs**, including ability to identify the costs of increasingly small parts of the production/distribution process, and more information about the costs of alternatives, which may result in a greater willingness to relocate specific parts of the enterprise, for example distribution depots;
- **economies of scale** resulting from product standardisation, price discrimination in favour of larger customers (volume discounts), faster production lines, the high "threshold" costs of introducing new technology, and the greater ability of large companies to absorb fluctuations in demand. These are behind a Europe-wide trend towards consolidation in fewer, larger units;
- **geographical changes in the labour market** affecting costs. These include not only comparative wage costs but also labour flexibility, productivity, and quality. Acceptance of part-time working, multi-skilling, variable hours of work, insecurity of employment and performance-related pay vary quite considerably between and even within European countries;
- **variations in the cost of capital**. As capital becomes more mobile and European interest rates converge, any differences will become increasingly "political" - the result of public policy initiatives to increase competitiveness, secure jobs, and protect the disadvantaged regions of Europe. Second-guessing political pressures is already an important part of choosing a new location;
- **the shrinking availability of land** in environmentally sensitive areas, particularly in the densely populated areas of Northern Europe. This is dispersing activities by increasing the cost of prestige (urban) or physically attractive (greenfield) sites.

It is still not clear whether economic convergence is causing costs to become more or less similar throughout Europe – which will make logistics a more important factor in location decisions - or whether new, more local variations in cost structures are emerging, often caused by micro-factors which are not recorded in national accounts.

Revenues

Revenues depend on market size and market share, and on local price levels. In spite of the Single Market, there are still large price differences for identical products sold in different countries, caused by differences in production costs, indirect taxation, marketing strategies and competition, as well as barriers to the flow of goods across national boundaries.

Price differentials have been falling slowly since the creation of the Single European market, but standard pricing should now become more widespread as the Euro makes price differentials more transparent, and the Internet facilitates cross-border purchasing by individual consumers.

It is perhaps for this reason that the existence of different profit margins in different countries does not appear to have had any effect on industrial location within Europe, as companies increasingly serve several national markets from a single plant.

Risks

Businesses are affected by many types of risk:

- **uncertainty about the volumes and types of product** the market will be demanding in future. Some countries have more stable markets, or are more responsive to demand management techniques, than others;
- **security of supplies.** This is dependent on distance from suppliers, the number of alternative suppliers available, the reliability of suppliers and their transport links, and the development of special relationships between companies and their suppliers;
- **economic risks** (inflation, interest rates and foreign exchange rates);
- **labour market risks** (industrial action, negotiation of labour contracts, trade union power)

Some locations carry a higher level of risk than others, but this is partly offset by the wide range of attitudes towards risks in business, with large companies generally being more risk averse than smaller ones.

Customer-Supplier Relationships

Traditional customer-supplier relationships are becoming less numerous, more partnership-based, and longer-term. On the other hand more and more functions are being outsourced. This has at least three implications for the location of economic activity:

- greater industrial mobility, as firms are more willing to undertake new investment when it is backed by long-term contracts;
- the creation of "clusters" of economic activity around large plants, as suppliers migrate to be close to their main customers;
- more need for local representation in national markets, on an agency basis or - more commonly - through a regional office, partners firm or franchise.

Information

Although information is becoming critically important in many aspects of business, it is not clear how much information companies have (or need) when they make their location decisions. Many suitable locations may miss the shortlist because companies are not aware of them, have misperceptions about them, or simply do not have the time to consider them.

There is a tendency for economic activity to gravitate towards the best known and most popular locations, particularly when these are backed by strong promotional efforts, resulting in higher social costs than would be associated with a more dispersed location pattern.

Internal Organisation

The importance of personal prejudices should not be under-estimated, as many location decisions depend on who takes them. A decision led by a Production Director could be quite different to one taken by a Marketing Director, whilst the preferences of older personnel who have been with the company for many years may be quite different from those of younger, more change-oriented staff who still have their future ahead of them.

External Environment

Both the physical environment (quality of life) and the business environment (ease of doing business) are important factors in industrial location. The physical environment tends to be more important for industries which need to attract scarce, highly qualified labour, whilst the business environment is more important for companies which are dependent on sub-contractors for inputs and services, or which need to operate very flexibly.
It is always easier to do business in some places than others. Locations are deemed "responsive" if people and organisations - workers, governments, suppliers, customers - are more prepared than elsewhere to adjust their behaviour patterns to the needs of wealth-generating companies. But there are signs of a "European" culture gradually emerging in which everyone has to provide a high level of responsiveness in order to survive.

2.2.2. The Importance of Different Location Criteria

There have been many studies of the factors which different types of firm consider being important when making location decisions. One of the most comprehensive surveys, which also summarises the results of several previous studies, was undertaken for the European Commission by NEI/Ernst & Young[3] in 1993 . This section summarises the findings of that report, which includes in-depth interviews with large multi-national companies involved in 91 key location decisions within Europe.

The NEI/Ernst & Young survey asked companies to assess the importance of a range of criteria in location decisions relating to five different types of economic activity: manufacturing, offices, distribution, services and research and development. The results for manufacturing plants are shown in Table 2.6. There are few cases where a single factor stands out as the primary determinant of location, and considerable diversity in the combination of factors influencing location choice.

Proximity to markets, language skills, transport infrastructure and (perhaps surprisingly) labour factors become more important for location decisions relating to distribution activities, whilst for offices, services and R&D quality of life factors, telecommunications, access to airports and ease of travel for senior staff assume greater significance.

The main conclusions which can be drawn from this report are:
- there is a difference in the emphasis on different location factors according to whether the location decision is being taken at global, national, regional, or local level;.
- at global level, many non-European companies which have chosen to invest in Europe have done so because of fears about loss of market share, or as a defensive measure against tariff and non-tariff

Source: (3) NEI/Ernst & Young *New Location Factors for Mobile Investment in Europe* 1993

barriers. The trade facilitation measures associated with the Single European Market have also encouraged many European companies seeking new markets to move across borders within Europe, rather than investing in overseas markets which have higher growth rates but longer supply chains;

- at national and regional level, the most important factors in location decisions appear to be market size and growth (or alternatively, access to one or more major customers), the quality and cost of labour, fiscal/financial incentives for new investment, language/cultural affinity with the host country, and the quality of land transport services. Around 75% of the companies surveyed selected the country first, then decided on the region or site, whist 25% made their final choice between regions located in different countries;
- at local level a suitable, accessible site is the primary requirement, but financial incentives were also an important factor in 30-40% of location decisions.

Table 2.6. Survey of Critical Factors in Locational Choice : Manufacturing Plants

	% of companies considering factor important in:			
	Choice of country		Choice of region	
	Critical	Important	Critical	Important
Business Factors				
Proximity to markets	34	51	19	31
Availability of raw materials/components	9	23	12	17
Proximity to major customers	17	14	18	6
Availability of suitable sites	5	5	17	17
National and Local Characteristics				
Financial assistance	11	20	19	20
Promotion/government support	6	19	9	23
Language	15	14	2	2
Corporate taxation	6	15	3	-
Labour				
Availability general labour	8	26	15	32
Availability skilled labour	9	19	11	22
Quality	8	22	9	29
Labour relations	6	17	5	6
Labour attitudes	8	14	-	17
Cost Factor				
Premises	5	17	11	18
Labour	11	22	9	17
Infrastructure				
Quality of raod/rail services	23	20	15	32
Proximity to port	8	11	6	15
Proximity to major airport	9	14	6	31
Quality of telecoms	5	12	2	11
Quality of Life and Personal Factors				
Cultural factors	5	17	-	23
Expatriate schools	2	11	2	9
Educational facilities	-	6	2	12
General attractiveness of area	5	6	6	8

Source: NEI/Ernst & Young *NewLocation Factors for Mobile Investment in Europe* 1993

A later survey by the same authors came to broadly similar conclusions, but highlighted the importance of sporadic (industry-specific) factors in location decisions.

Table 2.7. The Relative Importance of Different Location Criteria

Decision Level	Key criteria	Significant criteria	Sporadic importance[a]
National	• proximity to markets • labour • tax • management preferences • clustering of related activities	• transport costs • government attitudes • financial incentives • language • location of suppliers • location of competitors	• raw materials • economic/political stability • industrial relations • environmental regulations
Regional/local	• proximity to markets • site availability • labour • financial incentives • road transport access	• labour quality • transport costs • location of suppliers • location of competitors • government attitudes	• availability of specific skills

Note: (a) factors that influence only a small number of location decisions, but are very important in them
Source: Ernst & Young *Regions of the New Europe* 1995

Around half of the firms surveyed in 1993 were influenced by industrial clustering – the location of other companies carrying out similar or related activities. Customer-supplier relationships were the main cause of industrial clustering in manufacturing and distribution, whereas in offices and other services (but not, surprisingly, R&D) access to qualified staff was the main reason for clustering. The tendency towards clustering was most pronounced in the electronics sector, where it was driven by both labour and components supply considerations.

2.2.3. Differences between European Countries Which Could Affect Location

This section looks at intra-European differences in five factors which have a significant effect on location decisions, particularly within the manufacturing and distribution sectors: corporate taxation, wage rates, access to and costs of finance, property prices and language ability,

Taxation

There are significant differences in corporate taxation within Europe, although the figures shown in Table 2.8 are in many respects over-simplistic as they do not take into account significant differences in tax allowances, tax holidays and double taxation agreements.

Table 2.8. Corporate Tax Rates 1998

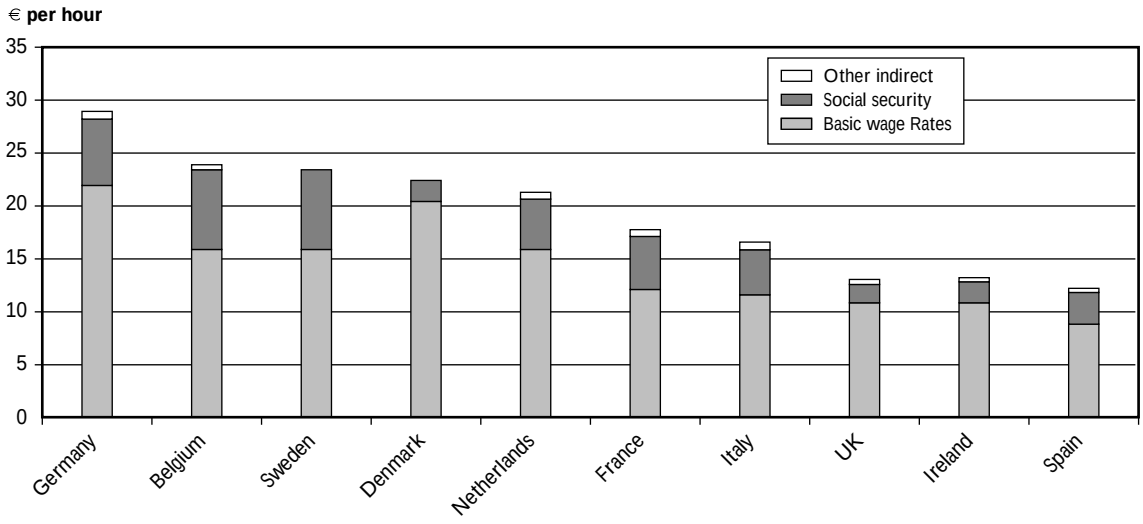
Corporate tax rates (%)					
High		**Medium**		**Low**	
Belgium	39%	Netherlands	35-36%	UK	31%
Italy	37%	Denmark	34%	Finland	28%
Germany	30-45%	Portugal	34%	Sweden	28%
Greece	35-40%	Austria	34%	Ireland	25-32%
		France	33%	Luxembourg	20-30%
		Spain	25-35%		

Source: EC Directorate for Economic and Financial Affairs

Wage Rates

Average labour costs in the most expensive European country (Germany)are more than twice those in less expensive areas such as the UK, Ireland and Spain. This is partly because of higher basic wage rates, and partly because of onerous social security charges and other indirect benefits.

Figure 2.4. Labour Costs in Selected European Countries



Sources: US Department of Labour, Bureau of Labour Statistics 1997 (for totals), Eurostats Yearbook 1997 (for breakdown)

Access to and Costs of Finance

Access to risk capital is easiest in the UK, which has the largest venture capital market in the world after the United Sates, but interest rates on conventional bank debt and yields on shares have been consistently higher by around 2% for much of the 1990s. Access to finance is becoming less important as capital becomes more mobile and European interest rates converge. However the financial services sector may become more important as a secondary factor in location as it becomes more sophisticated and innovative

Table 2.9. European Venture Capital Markets

Country	% of European venture capital investement 1998
UK	51.3
France	15.2
Germany	9.2
Italy	7.3
Netherlands	4.9
Sweden	3.4
Spain	2.1
Belgium	1.9
Switzerland	1.0
Ireland	0.8
Other	2.9
Total	100

Source: UK Government *Invest in Britain* 1999

Property Values

The property market is extremely complex, with sharp price gradients close to the most sought after locations. Nevertheless, the figures for warehouse rentals given in Table 2.10 demonstrate the amount of variation which exists between and within countries, and emphasises once again the advantageous position of the Benelux countries and Northern France as locations for distribution-related activities.

Table 2.10. Typical Warehouse Rentals (€ per m2) 1998

Country	City/region	€ per m²
Austria	Vienna, Linz, Salzburg, Innsbruck	35
Belgium	Brussels Antwerp	50 38
France	Paris Lyon	66 39
Greece	Athens	80
Ireland	Dublin Cork	94 43
Italy	Milan Bologna	58 37
Netherlands	Amsterdam Utrecht	53 35
Spain	Madrid Barcelona	71 59
UK	London (outer area) Birmingham Newcastle	90-115 83 62

Source: M.Pellew Pan European Logistics 1998

Language Ability

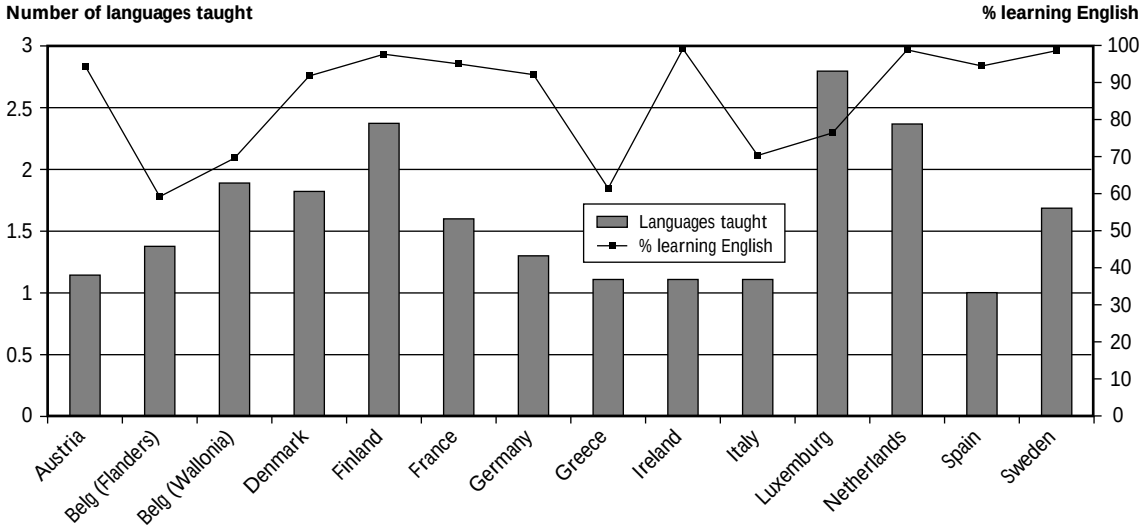
The ability of staff to speak several European languages, with fluency in English, is an attraction to many firms, particularly those handling large volumes of international transactions. Linguistic abilities are highest in the Benelux countries and Scandinavia, and lowest in Southern Europe, although current education programmes are gradually eliminating these differences amongst younger workers.

Table 2.11. Languages Known Well Enough to Take Part in a Conversation

COUNTRY	% OF POPULATION SPEAKING		
Language	**English**	**French**	**German**
Austria	48%	9%	100%
Belgium	42%	70%	18%
Denmark	76%	10%	51%
Finland	51%	3%	17%
France	35%	100%	8%
Germany[a]	45%	12%	100%
Greece	33%	4%	6%
Ireland	100%	16%	6%
Italy	29%	23%	3%
Luxembourg	46%	86%	77%
Netherlands	79%	23%	66%
Portugal	22%	22%	1%
Spain	19%	9%	1%
Sweden	72%	7%	24%
UK	100%	25%	10%

Note: (a) 26% in East Germany and 49% in West Germany
Source: Eurostat *Yearbook* 1997

Figure 2.5. The Teaching of Languages in Schools



Source: Eurostat *Yearbook* 1997

2.2.4. Differences in Choice of Location Between Sectors

Whilst many location decisions are influenced by customer service requirements or the business strategies of the companies taking the decisions, there are some sectors which are more responsive to the characteristics of the product or manufacturing process.

Generic factors affecting industrial location include:

- **availability of inputs**. This is particularly important in the food & drinks sector, where many of the inputs are perishable, in heavy industries such as oil refining or iron & steel which require large qualities of raw materials, in light manufacturing which is dependent on the supply of components (one of the reasons why there is such a high degree of clustering in the electronics sector), and in industries where there is a significant weight loss, such as paper and furniture manufacturing;
- **perishability of products**. This is important for sectors which have to get their product to market within a very short time period, such as chilled foodstuffs and newspapers, but is also becoming a significant consideration for products with a slightly longer shelf life such as fashion goods and home entertainment;
- **dominant markets**. This is important for industries such as soft drinks where there is a significant weight gain during manufacturing, or which need a certain size of market to achieve a viable level of demand (for example speciality plastics);
- **product-specific trade barriers** (physical, technical, or fiscal). In spite of the progress made towards trade liberalisation these are an important source of foreign direct investment, and affect some sectors (e.g. cars) much more than others (e.g. textiles);
- **environmental controls**. These are now forcing some "dirty" industries out of Europe altogether, and within Europe have a significant effect on the location of industries such as heavy chemicals and ammunitions manufacturing;
- **regulatory regimes**. Although there has been extensive deregulation of West European manufacturing and distribution, regulation is becoming a more important issue in the services sector, often driven by consumer protection needs.

It is these product-specific location factors, combined with an industrial heritage which reflects location decisions taken many years ago, which accounts for the rich diversity of economic activity patterns within Europe.

2.2.5. Perceptions of Different European Countries

The factors taken into account by companies locating in Northern Europe are slightly different from those that are important to companies locating in Southern Europe:

- the UK is popular because of language, market, labour and business promotional factors, but has logistics problems because of its physical separation from mainland Europe;
- Northern France and the Benelux countries are often preferred by companies wishing to access multiple markets because of the quality of their transport infrastructure;
- Germany is attractive because it is the largest of the European markets, accounting for 26% of Western Europe's GDP, but there is widespread concern about its high wage rates and inflexible working practices, and its sometimes unwelcoming attitude towards foreign investment;

Table 2.12. The Perceived Advantages and Disadvantages of Different European Countries[a]

Country	Advantages	Disadvantages
Germany	• central location within Europe • large domestic market • skilled labour force • low inflation • stable political environment	• high labour costs • short working week
France	• large, rather protected, domestic market • "quality" image of products • high quality of labour force • good road and rail connections to other member states	• French language (including reluctance to speak English) • lack of affinity with other cultures • style of doing business (perceived as rather inflexibly)
Belgium	• central location • access to EU and other international institutions	• small market size
Netherlands	• accessibility to major industrial areas in N. Europe • excellent transport infrastructure	• small market size
UK	• large domestic market • cost and quality of the labour force • language	• poor industrial relations • high land costs in SE England • preference for mainland Europe • existence of previous investments/ competitors
Ireland	• low cost base • low taxation • high level of financial incentives • language • skilled labour (especially for electronics and IT)	• peripherality • high transport costs/poor availability of transport services • low standard of living
Italy	• large domestic market	• peripherality • language barriers • political instability • relaxed attitudes towards work • additional investment risks
Spain	• strong market growth • low production costs • high level of financial incentives	• peripherality • language barriers • low technology base/poor quality image
Greece/Portugal	• low production costs • high level of financial incentives	• peripherality • poor transport infrastructure • high transport costs • limited availability of skilled labour • under-developed business infrastructure (support services, legal framework, suppliers attitudes towards transactions)

Note: (a) based on a survey of 91 large companies which had recently established a plant or office at a new European location
Source: Ernst & Young *Survey of Industrial Location Decisions* 1991

- companies locating in Southern Europe tend to pay particular attention to labour costs and the growth of the domestic market, in contrast to NW Europe where physical distribution and the availability of skilled labour have been more important;
- transport problems are perceived as a deterrent to economic development in Ireland, Portugal and Greece, but Italy and Spain also are considered peripheral because of the logistics barriers formed by the Alps and the long haul through French territory.

Although transport infrastructure and services are sometimes viewed as a positive factor in industrial location decisions, for example by many of the firms which have chosen to locate in the Netherlands, they are more often regarded as a barrier, causing firms to move away from their first choice of location. This is particularly so when firms are considering locations within large urban areas, or close to historic centres of excellence for the manufacture of a specific product.

2.3. Logistics

2.3.1. Logistics and Location

Logistics affects the location of economic activity in at least four ways, through:

- **an integrated approach to costs**, which attempts to minimise total costs for the whole supply chain. This often leads to:
  - the relocation of individual activities within the supply chain, to reduce transport costs, speed up deliveries, or improve service reliability
  - the differential growth of units supplying similar services within the chain, in extreme cases leading to plant closures and the creation of new establishments elsewhere
  - the generation of new activities, when savings in one functional area can only be achieved by expanding another one, or requires the use of new intermediate facilities such as regional distribution centres
  - outsourcing to specialist suppliers whose location pattern is determined by different considerations to those affecting the main business
  - changes in business processes, in which different ways of doing things affects the location at which they are done.
- **an emphasis on reliability**, which leads to the development of risk management strategies. These may include:
  - closer and stronger relationships with customers and suppliers, which may cause them to move closer together
  - use of more than one supplier for critical components, leading to some dispersion of supply sources
  - contingency plans for the replacement of non-performing partners or unsatisfactory transport and communications links.
- **a large expansion in information**, through improved monitoring of potential as well as actual markets and suppliers;
- **analytical and data processing skills** which allow a wider range of alternatives to be evaluated faster and more cheaply. Computer algorithms allow the multiple dimensions of a decision - location, size, timing, process, linkages - to be considered simultaneously instead of in isolation, and depersonalise the decision-making process.

But it is still unclear how many firms, particularly smaller ones, take a “supply chain” approach to business management, and base their decisions on rational criteria related to the cost, quality and reliability of the finished product. Other factors such as responsibilities to the workforce, the

interests of other stakeholders, and familiarity with the status quo may be equally important.
Some industrial sectors make more use of logistics than others, so it is necessary to consider the question on a sector-by-sector basis. The use of logistics also appears to be less developed in southern Europe than in northern Europe, although there are important exceptions to this rule, such as car manufacturing.

2.3.2. Recent Developments in Logistics

Logistics is becoming more important, particularly in large companies, which suggests that location patterns will become increasingly determined by supply chain cost considerations, and linkages between specific customers and suppliers.

Other changes which can be observed include:

- **harmonisation of technical standards**, **product design**, **and consumer tastes**, resulting in smaller differences between national markets. This has allowed companies to concentrate their primary production (manufacturing and distribution) at a smaller number of sites, with customisation of products for local markets as far down the supply chain as possible. The fading of brand loyalties and clearly differentiated products has increased the importance of cost and immediate availability, reinforcing the need for good logistics;
- **vendor domination of the supply chain**, as the marketing of production is replaced by manufacturing to meet demand. This causes:
  - a demand for smaller, more frequent deliveries, with the use of intermediaries for the consolidation of goods whose demand do not justify full truckload deliveries
  - direct selling to high volume customers, cutting out intermediaries. Direct selling also occurs for some customised products for which the consumer is prepared to wait, and is growing rapidly as use of the Internet spreads
  - replacement of demand forecasting by demand management
  - displacement of control over day-by-day supply decisions further back in the supply chain as retailers operate with lower stocks and function more like manufacturers' display areas, protecting their own business by offering a range of substitutable products
- **fewer but longer-term relationships** between customers and suppliers, leading to joint planning of supply chains taking into account the cost structures of all parties. This results in a greater willingness to make changes, and provides better access to the information needed to plan change, but may slow down the change process by making it more complicated;
- **E-commerce**, which will allow manufacturers to by-pass traditional retailers and sell to the consumer direct. This is still a niche market, but will become much more important over the next 10 years;
- **changes in the trade-off between cost and quality of service** in favour of the latter. However there is increasing differentiation between market sectors, with firms providing different levels of service for different products and different types of customer;
- **shrinking product life cycles**, leading to shorter-term but more reliable forecasts of transport flows. This should make it easier for the firms arranging transport to find backhaul cargo. Better quality control systems and the use of preventative maintenance have a similar effect because they result in fewer disruptions to product flows;
- **willingness to invest in new supply sources** (often outside of Europe) when these offer medium-long-term cost advantages. Back-to-back supply contracts are increasingly used to spread the risks of opening up new supply sources;
- **greater use of outsourcing** to specialist companies, which may help to preserve existing location patterns;

- **growing consumer concerns** about the supply chain, and demands for more information about where the product has been supplied from. This reflects a desire for safety (for example, recent concerns about contamination from genetically modified foodstuffs) as well as ethical issues such as the avoidance of products based on the use of child labour;
- **greater awareness of environmental issues** on the part of manufacturers and third party logistics managers. However the desire to improve corporate image by adopting "green" policies is often over-ridden by cost considerations or the need to satisfy customer requirements for a frequent and high-speed distribution service.

There has been a reduction in the importance of transport in the supply chain due to:

- the fall in transport costs resulting from transport deregulation, improved vehicle design, expansion of the motorway network and more efficient fleet management procedures. The savings are not always passed on to customers, but may be used to widen the catchment areas for customers and suppliers;
- the growing unreliability of transport due to congestion and driving restrictions (on night and weekend driving, vehicle weight and dimensions, and route choice). Some firms will respond by favouring nearby suppliers in order to reduce delivery risks;
- flat rate pricing of transport services as fixed costs (order assembly, loading, cross-platform docking at break-bulk/consolidation hubs, and queuing at the delivery point) increase relative to distance-based costs. This is reducing the importance of location as a cost factor;
- improved monitoring and tracking of goods, which alongside improved packaging and better security, is reducing the risks associated with long supply lines.

Finally, logistics is increasing the transparency of supply chains by allowing them to be broken down and costed on a modular basis. This should increase competition by making market entry easier and cheaper (particularly where there is a high level of outsourcing) and by facilitating legal action against products whose prices are poorly related to production and distribution costs (cases of monopoly and dumping).

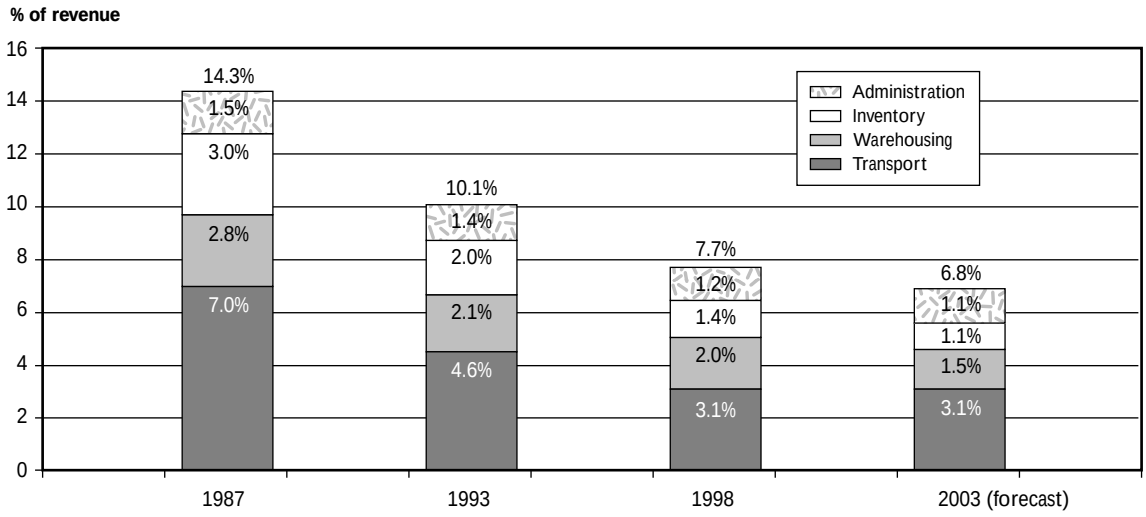


Figure 2.6. The Declining Importance of Logistics and Transport in Overall Costs

Source: European Logistics Association/A.T Kearney *Insight to Impact: Results of the Fourth Quinquennial European Logistics Study*

2.3.3. Comparisons Between Europe and the United States

Although European logistics costs have fallen significantly during the 1990s, there is still concern that they are higher than in the United States. In the mid-1990s they accounted for 11.8% of European GDP compared with 10.5% in the US, leading to the conclusion that European industry could reduce its costs by around €1bn if it could match US logistics performance. However such conclusions should be treated with caution as it is notoriously difficult to standardise the data for this type of benchmarking exercise.

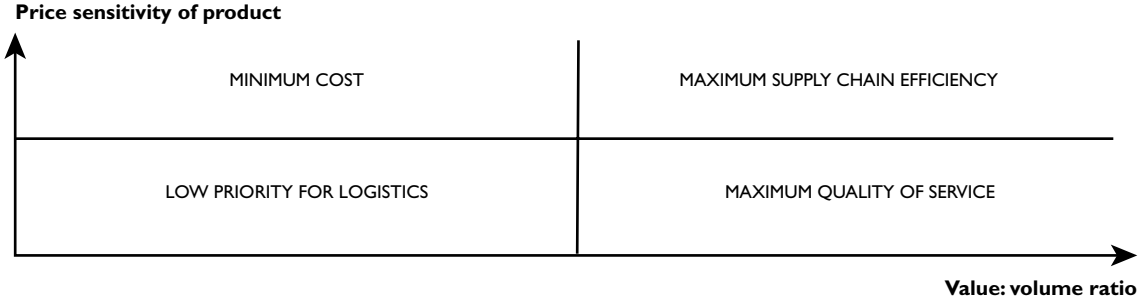
There are some differences between the two trade areas that are difficult to remove. Europe is hampered by national differences in language, product preferences, and legal and regulatory conditions, whilst distances are much greater in the United States. However many of the differences in logistics costs arise because of differences in corporate procedures, giving rise to the hope that some of the more efficient US practices can be imported into Europe.

American companies have traditionally controlled their logistics in-house, whereas European companies rely more heavily on freight forwarders, who have generally adopted a rather defensive position in relation to supply chain management initiatives and have not been very innovative or pro-active. Freight forwarders have achieved their powerful position in Europe because of national differences in language, documentation requirements, business procedures, and taxation, which in the past made it necessary for manufacturers to employ a specialist firm to deal with intra-European transport. Although these differences are gradually withering away, the harmonisation of European trading practices has been a slow and irregular process. As a result, European companies have had less incentive than their counterparts in the US to assume central control over the supply chain, resulting in the current fragmentation of responsibility for supply chain logistics.

Progress towards reform in Europe has been very patchy. It has been easier to streamline and integrate logistics practices within the earliest EU members (France, Germany, Italy and the Benelux countries) than amongst later ones, which tend to constitute a separate series of logistics "areas" e.g. UK/Ireland (differences in culture and business practices), Scandinavia (peripheral location and low population densities) and Iberia/Greece (smaller companies still doing business on the basis of personal contacts).

However throughout Europe firms are gradually becoming more willing to restructure their logistics systems as a result of competitive pressures, the desire for a more integrated European management structure, and a more relaxed attitude towards the decentralisation of authority. But reconfiguring logistics systems without a clear business strategy is a waste of time – to achieve maximum benefits logistics should be linked to business process re-engineering. The type of restructuring which firms are willing to undertake will depend on two main factors: customer sensitivity to price and the value:volume ratio of the product

Figure 2.7. Alternative Supply Chain Strategies



2.3.4. Responsibility for Supply Chain Management

One of the keys to success in logistics in the United States has been the existence of a dominant entity within the supply chain with the competence and incentive to manage it more efficiently. Such organisations have been easier to find than in Europe because of the higher degree of vertical integration in American industry, and the existence of large transport undertakings with exemption from Anti-Trust law.

A recent world-wide survey of 1,000 major shippers, covering all sectors of the economy, showed that quite a wide variety of shipment terms are used, leaving no single type of organisation (buyer or seller) in charge of the transport chain.

Table 2.13. Terms of Trade Used for Goods Movements Involving Sea Transport

Trade terms	Per cent of respondents	
	Terms of sale	Terms of purchase
FOB only	13%	51%
CIF only	34%	13%
Door-to-door	9%	11%
Door-to-port or Port-to-door	7%	8%
Combination	37%	17%
Total	100%	100%

Source: Containerisation International November 1999

Just under 30% of respondents outsourced their logistics and transport arrangements to a third party manager, but opinions were sharply divided about where responsibility for supply chain management should be vested:

Responsibility for supply chain management	*Shippers preferences (%)*
In-house logistics departments	36%
Third party logistics managers	13%
Freight forwarders	12%
Carriers	23%
Combination	16%
	100%

The difficulty of organising logistics when there is no one obviously in charge is a theme that recurs throughout this report. The retailing sector has made considerable progress in resolving this problem as the purchasing power of large retailers has allowed them to dictate their own supply terms. But in other sectors supply chains are generally longer and more complex, and there is not always the concentration of market power, or the clarity of purpose, that is found in Europe's large supermarket chains.

2.4. Transport

2.4.1. The Growth in Freight Transport

Since 1970 European non-seaborne freight (ton-km) has been growing at an average rate of 2.7% pa. The fastest growth has been in road freight (4.0% pa) and sea transport (3.2% pa) with rail transport in decline (-1.0% pa), inland waterway traffic virtually static, and pipeline traffic growing at only 0.9% pa. As a result there has been a marked change in modal split.

Table 2.14. Changes in Land Transport Modal Split (ton-km)

	Road	Rail	Inland waterway	Pipeline	Sea transport (intra EU)	Total
1970	30,8%	21,2%	7,7%	4,9%	35,3%	100,0%
1997	43,4%	8,6%	4,3%	3,1%	40,6%	100,0%

Source: EC (DG VII) *Transport in Figures* 1998 (update from www.europa.eu.int/en/comm/dg07/tif)

All modes of transport have experienced an increase in the average distance over which freight is moved. For road transport, for example, there has been an increase in average distance travelled of around 1.5% pa, compared with growth of around 2.3% pa in the tonnage transported.

The railways have had a sharp decline in the tonnage carried (over 30% between 1984-94 alone) combined with an increase in distance travelled which has been only slightly slower than for road.

On the inland waterways there has been a very small decline in tonnage terms combined with a very small increase in average distance. One of the most significant changes has been in the commodity composition of the traffic, with the decline in bulks offset by new container traffic, particularly on the Rhine.

Table 2.15. Average Journey Distance for Freight (km)

	Road	Rail	Inland waterway	Sea transport (intra EU)	Total
Distance (km)	108	244	275	1426	200

Source: EC (DG VII) *Transport in Figures* 1998 (update from www.europa.eu.int/en/comm/dg07/tif)

The figures for the increase in average distance travelled are almost certainly under-estimates because of the exclusion of international traffic. This comprises around 5% of total European traffic in tonnage terms (perhaps double that share in ton-km), but is growing more rapidly than domestic freight. The last important statistic relates to the distribution of journey distances for freight. Around 57% of goods by weight move less than 50km , although these account for only 11% of total transport demand when this is expressed in ton-km. The high proportion of total transport demand (ton-km) accounted for by journeys of 150-500 km (44%) suggests that there is a large potential market for intermodal transport services.

Table 2.16. Distance Travelled by Freight (Land Transport Only)

Distance travelled (km)	% of tonnage carried by each mode				% of total freight transport activity ton-km
	Road	Rail	Ireland waterways	Total	
0-49	59%	28%	31%	57%	11%
50-149	25%	26%	35%	25%	23%
150-499	15%	36%	30%	16%	44%
Over 500	3%	10%	4%	3%	22%
Total	100%*	100%	100%	100%	100%

* Figures do not total 100% because of rounding
Source: EC (DG VII) *Transport in Figures* 1998 (update from www.europa.eu.int/en/comm/dg07/tif)

2.4.2. Transport Infrastructure and Services

Developments in logistics – smaller, more frequent deliveries, multiple drops, narrow time windows for delivery - have so far favoured the use of road transport. The extent to which this will continue to be the case in future will depend on government commitments to infrastructure improvements in different modes, and on the quality and price of services offered by different transport operators.

The different regions of Europe face quite different problems in respect of infrastructure and services. In North West Europe the problem is primarily one of congestion, on rail as well as road, whereas in Southern Europe the problem is one of low density networks and poor quality infrastructure, resulting in slow speeds and high accident rates. In Scandinavia low population densities produce a dispersed pattern of demand, making it more difficult to achieve the critical mass required to support frequent, low cost transport services.

Table 2.17. Factors Affecting Network Expansion (Road and Rail)

Infrastructure development	Uncongested	Congested	Congested	Uncongested
High	Austria, France (provinces)	UK, Paris Région	Benelux, N.Italy, NW Germany	S. Germany Switzerland
Medium	Spain, Sweden, Denmark			Portugal S. Italy
Low	Greece, Ireland			Norway Finland
	Centralised		**Decentralised**	

Source: ECIS *Bottlenecks in European Transport Infrastructure* 1997

The ease with which transport networks can be expanded depends on three main factors: the existing level of development (in particular the existence of alternative paths through the network), the level of congestion (which determines how much disruption will be caused by the improvement works) and the degree of centralisation. In general decentralised networks, like those found in Germany, are easier to expand than highly centralised ones like those found in France and the UK.

However network expansion will occur only slowly, and it is changes in service provision – and in the regulation and pricing of services – which will have the greatest effect on future freight flows.

Road

The European road haulage industry is very fragmented, with the top 50 companies accounting for just over one third of the market. Although there is a trend towards large management units, the supply of drivers and trucks is often subcontracted to smaller companies or owner-drivers.

The second change in the industry is towards an increased variety of services. There is a basic segmentation of the market into:

- less than truckload freight (for example express parcels);
- contract hire operations, in which vehicles are made available for time periods rather than journeys, operating according to the customer's instructions. This is important for customers whose schedules involve multiple collection or delivery points, or who have special security or timing requirements;
- point-to-point services, priced per trip.

However there are many variations within these categories, as haulage firms tailor their offerings to match the requirements of specific customers, and specialist vehicles/services evolve to meet the needs of particular products.

Public concerns about the growth in road transport, the desire to raise standards in the road haulage industry, and the need to ensure fair competition within the Single European Market are leading towards the re-regulation of an industry which has only recently been liberalised. And it is the regulatory environment, perhaps more than anything else, which will determine the future modal split of freight transport.

Considerable progress has been made towards establishing a single pan-European legal framework for road transport, but there are still several important areas where national differences are perceived as creating barriers to transit traffic.

The first of these is vehicle weight restrictions, which makes it difficult to integrate fleets of different nationalities into a single pan-European distribution system. A vehicle combination which is legal in one country may well be illegal in the next.

The second restriction relates to the timing of vehicle movements. Many countries have imposed restrictions on goods vehicle movements at the weekend or public holidays (which fall on different dates in each country), even though these are often the prime times for long-distance goods movements because of lower traffic volumes on congested sections of motorway near towns, and customer demand for a Friday evening pick-up/Monday morning delivery.

The third issue – taxation and user charges – relates partly to the loss of economic efficiency that results from unfair competition, and partly to the effect of high transport taxes on the competitiveness of European industry.

Table 2.18. Restrictions on Goods Vehicle Movements 1998

Country	Restrictions[a]
Austria[b]	• goods vehicles over 7.5 tons drawing trailers are banned after 15.00 hours on Saturday, all day Sunday, and on public holidays • goods vehicles above a certain power/noise rating are banned from driving between 22.00 and 05.00 hours
France	• goods vehicles of over 7.5 tons laden weight are banned from 22.00 hours on Saturday to 22.00 hours on Sunday, and on public holidays • additional restrictions apply in summer, and on major routes in and out of Paris
Germany	• vehicles of over 7.5 tons laden weight and all vehicles towing trailers are banned from 00.00 to 22.00 on Sundays and on public holidays • goods vehicles are banned from using the autobahns on summer Saturdays between June-September (07.00-22.00)
Greece	• goods vehicles are banned from 17.00 on Saturday to 24.00 on Sunday and public holidays
Ireland	• movements through Customs posts are restricted to 09.00-17.00 except by special request (with payment)
Italy	• goods vehicles over 7.5 tons or drawing trailers are banned on Sundays and public holidays from 08.00 – 22.00 in winter, and 17.00-24.00 in summer • Saturday bans are in operation at certain (irregular) times
Luxembourg	• goods vehicles en route to France or Germany cannot cross the border between 21.30 on Saturdays and 21.45 on Sundays and public holidays
Portugal	• goods vehicles are banned from using certain national routes from 14.00-22.00 on Saturdays and 06.00-24.00 on Sundays and public holidays
Spain	• goods vehicles of over 7.5 tons are banned from 17.00-24.00 on Sundays and public holidays • regional restrictions also apply
Sweden	• vehicles over 12m long are restricted on the routes which can be used between 22.00 and 06.00
Switzerland	• goods vehicles over 3.5 tons are banned from 22.00-05.00 daily, and all day on Sundays and public holidays

Note: (a) in many cases there are waivers for perishable goods, and additional restrictions for hazardous cargoes or vehicle movements in large urban areas
(b) in addition, Austria sets annual limits for pollution by goods vehicles in transit, which are enforced by the Eco-points quota licensing system
Source: M.Pellew *Pan European Logistics* 1998

Rail

Whereas the main problems with road transport are capacity constraints in respect of infrastructure (congestion) and the distortion of competition caused by regulations, for rail the main problem is quality of service, particularly for international journeys. This is a theme which recurs throughout this report, and which forms the basis for several of its recommendations.
Lack of inter-operability is another serious problem, with three rail gauges, twelve different power

systems, nine sets of safety procedures, and five different coupling systems.
The poor image of the railways will take some time to dispel. A more positive approach to freight services, will only be possible after there has been a change of culture, which may be more difficult to achieve than the physical investments which are also required. There has been considerable debate about best way of stimulating cultural change, but several different approaches are now beginning to produce results:

- the separation of freight from passengers within the railways' organisation structures, and the establishment of a more commercial business framework for freight, with greater pricing flexibility, more appropriate labour contracts, and the recruitment of senior management from outside of the railway industry;
- alliances between European railways, for specific (usually short-distance) cross-border shuttle services or more general co-ordination purposes (e.g. the merger of the cargo divisions of Dutch and German railways to form Railion);
- new entrants, often from the private sector, who have taken responsibility for the financing and marketing of regular block train services. These often involve deep-sea shipping lines (for example in the NDX consortium) who are seeking to emulate the success of American railways in building up large volumes of intermodal container traffic;
- rail Freight Freeways, first introduced by the EC in January 1998, in which a single organisation takes responsibility for timetabling and infrastructure charging for international rail services within a specific long-distance corridor (for example Rotterdam-Gioia Tauro). This is intended to make it easier for potential customers to obtain long-distance train paths, although in practice the legal/administrative framework continues to impose many obstacles such as the requirement for long periods of advance notice;
- the Trans-European Rail Freight Network, agreed by the Council of Ministers in December 1999. Within the designated network any European rail operator licensed by one EU member state will be permitted to operate freight services within another member state.

Air

Like rail, air transport is dominated by passenger considerations. Nevertheless air freight has been growing rapidly, stimulated by the fall in unit prices following deregulation.

There are three current trends in air transport that will affect its future role in logistics:

- separation of freight from passenger services, and the use of different types of alliances (with express parcels carriers and logistics providers rather than other airlines) to build up market share. Lufthansa is seeking an independent partner for its freight subsidiary to give freight a stronger voice at Board level. And Cathay Pacific has recently announced that it will be using short-haul overnight freight services (using passenger aircraft) to provide extra late night passenger services, a reversal of the traditional view of freight as a marginal user of spare space on passenger services:
- direct selling of cargo space to a wider range of customers as capacity (led by passenger demand) increases faster than freight demand (led by economic growth and changes in logistics). Automated cargo management systems will allow airlines to develop a larger and more varied customer base, and to combine passenger and freight services more effectively;
- airport congestion. This will almost certainly reduce the reliability of air freight carried on passenger services within Europe, and is likely to push pure freight operators (including the express parcels carriers) further into off-peak slots at major airports and/or less popular regional airports and air traffic corridors.

Sea

Between 1990-97 short sea shipping increased by 23% in ton-km terms, almost as much as road, and it now accounts for around 36% of all intra-European freight. It has moved up the political agenda within the last two years, and several measures are under discussion[4] which may increase its future role:

- an improved legal framework for door-to-door transport involving short sea shipping;
- codes of conduct to simplify documentation and administrative formalities;
- grants for new port infrastructure, in particular inter-modal interchange facilities, and short-sea terminals where cargo will not be delayed by the more rigorous documentation procedures used for deep-sea shipping ;
- measures to overcome lack of transparency in port charging, the requirement for 100% cost recovery (compared with 30% for rail) and the cross-subsidisation of deep-sea shipping (for which there is greater competition) by short-sea shipping
- development of an Internet-based information service, and increased use of EDI;
- preparation of key performance indicators for short-sea shipping, comparable with those which have been developed for air freight by the European Air Shippers Council, to provide an incentive for service improvements and enhance customer awareness of the quality of the services on offer.

But at the same time there are proposals to improve the pay and conditions of employment of non-EU crew members to the level applying to EU nationals, which will increase costs for mixed passenger-freight RoRo ferries by around 4-5%. There has been concern amongst smaller shipowners about the investment of time and expertise required integrating their operations successfully into the logistics chains established by large shippers (who have quite different operating and control procedures). And there is a widespread belief that political statements supporting short-sea shipping as an environmentally friendly alternative to road and rail are not being backed up by the necessary financial resources.

Inland Waterways

Inland waterways offer a slow but low cost transport service which is environmentally friendly and reliable (except when affected by weather conditions such as ice, drought or flooding).

After a long period of decline in its traditional cargo base (bulks), the reform of its highly protectionist institutional structure, and investment in fleet renovation (larger self-propelled vessels and pusher-barge convoys), it is undergoing a partial renaissance. The main cause has been the development of scheduled container services along the Rhine, which are linked to deep-sea shipping operations at Rotterdam and Antwerp. Speed becomes less important when the door-to-door journey times are measured in weeks rather than days, whilst the precision of container ship scheduling and the increasing size of container ships demands not only a high degree of reliability, but also the ability to deliver large numbers of containers at the same time, in some cases pre-sorted to match the ship's loading plan.

It s not clear to what extent success in this one niche market can be rolled out to other sectors, and in particular to domestic markets. The inland waterway network is largely confined to Northern Europe and is very small – not much larger than the motorway network in France, Germany and the Benelux countries. So for European transport its use will probably remain limited to movements between companies close to its banks, unless inland ports such as Duisburg are able to build up much improved intermodal connections on the back of the deep-sea traffic.

Source: (4) EC (DG VII) *Communication on the Development of Short Sea Shipping in Europe* 1999

One possible exception could be the use of river-sea vessels on some intra-European trades – low draft, self-propelled ships designed to withstand ocean weather conditions. These have not been very popular so far because of the instability of the bulk trades, and the unwillingness of other large shippers to enter into the long-term contracts needed to justify their additional investment costs. But changes in logistics, such as fewer, longer-term relationships and better short-term forecasting, may give them a more significant role in future.

2.4.3. Intermodalism

Attempts to encourage inter-modal transport have met with mixed success. There has been phenomenal growth of express parcels services during the 1990s, but much slower growth – and mixed financial results – for companies providing combined transport services for larger items of freight.

Express Parcels Services

The express parcels business was slow to take-off in Europe compared to the United States due to:

- postal monopolies, which restricted entry into the documents sector;
- differences in national regulations relating to freight transport, which made it difficult to offer a standard service throughout Europe;
- Customs barriers, which increased transit times for international freight;
- the unreliability of national sub-contracting arrangements.

However most of these obstacles had been overcome by the mid-1980s, with the liberalisation of the postal services, the development of pan-European road freight networks by large hauliers, and action by European airlines to set up express freight services (Air France) or acquire shares in express parcels operators (Lufthansa/DHL).

Nevertheless the European express parcels business remains strongly concentrated in the UK and Germany. Most of the international business, and a significant proportion of the domestic business, in the five largest European markets, is handled by large international operators, and the sector has been characterised by frequent changes in their operational strategies and a high level of merger and acquisition activity. All operators are now diversifying away from their core business of parcels (up to 30 kg) towards small consignments of conventional freight.

Prices have been falling because high fixed costs, economies of scale, and inability to offer a differentiated service have encouraged carriers to seek increased market shares through discounting. The carriers responded by developing a wider range of value-added services, such as order processing, storage, packaging and services linked to sales, bringing them increasingly into competition with TPLMs. Some parcels carriers have responded by setting up alliances with established freight forwarders to offer services which cover a wider range of freight demand (e.g. TNT/Schenker, UPS/Kuhne & Nagel). They have also been sub-contracting collection and delivery work to local hauliers, and interwork (carry parcels for each other) to the more remote destinations within Europe.

The express parcels market has several distinguishing characteristics, including:
- door-to-door delivery;
- fast, guaranteed transit times;
- consignment identification and tracking;

- hub-and-spoke transport patterns, with consolidation of trunk-haul flows which reduces costs in spite of an increase in total distance travelled;
- extensive use of air transport, although within Europe this is becoming restricted to the longer routes as the reliability of trucking increases and its costs fall.;
- flat rate charges which are not distance related. Although there is some cross subsidisation between flows for administrative/marketing reasons, most of the carriers total costs – collection and delivery, sorting, handling and monitoring – are not distance-related;
- a high proportion (85%) of contract rather than ad hoc business.

Rail is little used at present, but could become significant in future if high speed scheduled overnight freight services were introduced

These features make express parcels the preferred form of transport for many small deliveries, and the primary form of transport for E-commerce. It remains to be seen whether traditional freight carriers will adopt some of its more popular characteristics in their own businesses, or whether the express carriers will gradually expand into the high value end of mainstream freight transport.

Combined Transport

Combined transport – the carriage of goods by road and rail using a single document - should in theory be able to offer shippers a competitive price/quality of service package for land transport, providing there is enough traffic to support frequent trunk haul services.

However there are several problems which have seriously impeded its growth:
- it is difficult to accumulate the critical mass of traffic needed to support acceptable trunk-haul rail service frequencies. Less than daily services are not attractive, and many carriers would prefer the option of 2-3 services per day;
- there is a significant risk of missed connections, and no standard procedures for rectifying this apart from sending cargo on the next service, which may delay it for 24 hours or more;.
- technology is advancing at different speeds and in different ways for each mode. Because road and rail are under different ownership/control they are being developed to meet different "core business" requirements, and face different market pressures. Each of the partners may wish to pursue its own policies in relation to new technology, as well as having a different commercial strategy, so that improvements in door-to-door services are inevitably constrained by the leg which is changing most slowly;
- combined transport often relies on equipment handed down from the operator's mainstream business. As a result it is not always up to date, and the equipment used for different legs of the journey may not be fully inter-operable;

Finally, the main combined transport operators – ICF for containers and the UIRR companies for swap bodies and trailers – have a quasi-monopoly on most important European freight routes, and have adopted a fairly conservative, low risk approach to marketing and business development. ICF is a grouping of European railways set up originally to handle maritime container traffic and has diversified only slowly into other sectors, whilst the UIRR companies, set up by road haulage interests, also have substantial minority railway participation

Although it has been growing steadily, combined transport still has only an 8% share in the European freight market. Success factors have generally been:

- a journey distance equivalent to more than eight hours driving;
- corridors with high density freight flows;
- barriers to road transport : geographical, infrastructural, cost or regulatory.

Because of its political acceptability, the EU has taken steps to promote combined transport, initially on the basis of pilot projects . These are beginning to produce results in terms of innovative operating procedures, but have not yet had time to have a major impact on the freight market.

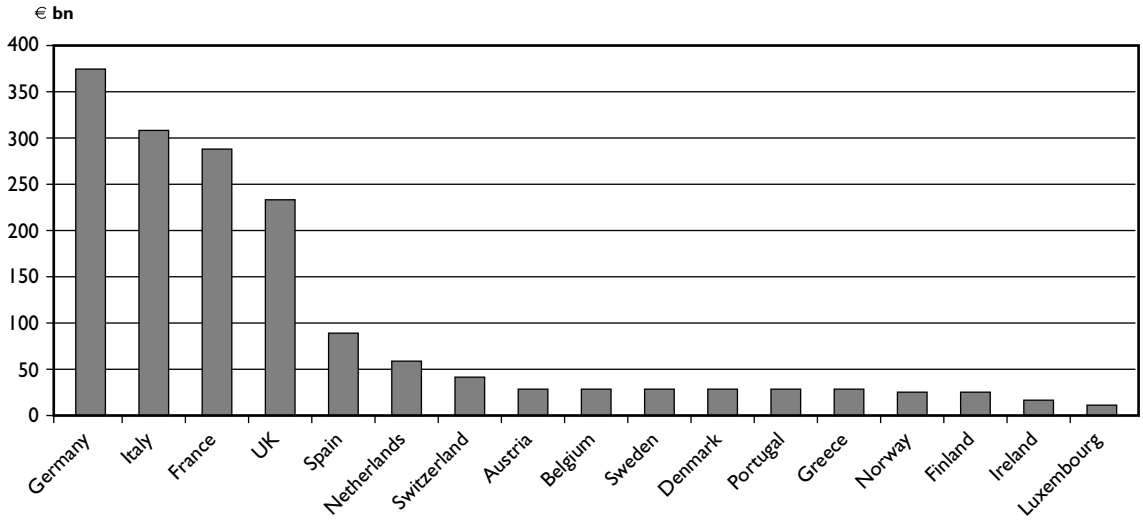
WORKSHOP FINDINGS: RETAILING

3. WORKSHOP FINDINGS: RETAILING

3.1. The Structure of European Retailing

Retailing is one of Western Europe's largest service industries, with 1997 sales of over €1,600bn. There are around 3.5m retail outlets employing 14m people and accounting for around 13% of GDP. Retailing activity is closely correlated with population and income levels, with the four largest markets – Germany, Italy, France, and UK – accounting for almost three quarters of all W. European sales.

Figure 3.1. Retail Sales in Western Europe by Country 1997 (€ bn)



Source: Corporate Intelligence on Retailing *The European Retail Handbook* 1009

The values of per capita retail sales in the richest countries (Luxembourg and Switzerland) are 3-4 times those in the poorest countries (Greece, Spain and Portugal), although the figures are increased by cross-border shopping (Luxembourg), sales of high value luxury items (Switzerland), and low rates of indirect taxation.

The density of retail outlets – shops per 100,000 population – is inversely related to per capita sales, reflecting the predominance of small, family-owned shops in the poorer Mediterranean countries and Ireland, and larger stores owned by retailing chains in the richer countries of N. Europe – Germany, France, UK. But the concentration of sales in fewer, larger outlets is happening everywhere, helped by increasing car ownership, dense urban development, improvements in accessibility and heavy investment in "modern" shopping facilities.

In Scandinavia low population densities have kept the number of retail outlets per 100,000 population higher than one might expect, by limiting the number of people living within the practical catchment areas of shops. The main exceptions to the inverse relationship between density of retail outlets and per capita expenditure are Italy and the Netherlands, both of which have more retailing outlets than might be expected from their level of economic development.

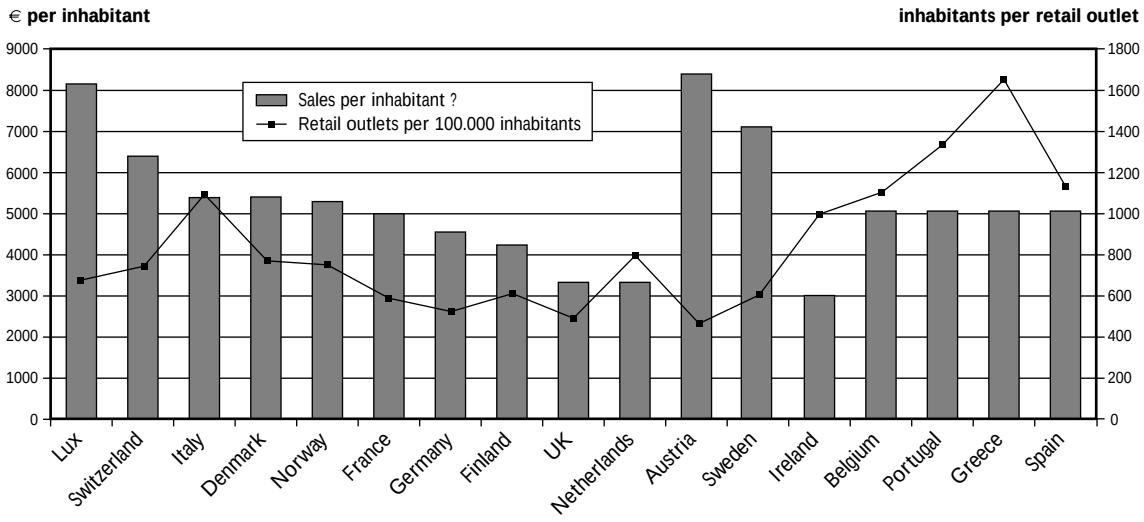


Figure 3.2. Relationship Between Per Capita Sales and Density of Retail Outlets

Source: Corporate Intelligence on Retailing *The European Retail Handbook* 1009

Countries differ in the way in which they classify retail outlets, particularly in relation to the types of goods sold. The main distinction is between food, drink and tobacco (FDT) and non-food retailing, but some countries (e.g. Greece) show only food outlets in their statistics, whilst other (e.g. Sweden) use wider definitions which include with food various non-food household items of the type normally sold in supermarkets.

Food, Drink & Tobacco

For Europe as a whole, food drink and tobacco accounts for around 43 per cent of retail sales and 40 per cent of retail outlets. However there is a wide variation from one country to the next. Food, drink and tobacco accounts for the highest proportion of retail sales in lower income areas such as Ireland and Southern Italy and consume speciality foodstuffs which are imported over long distances or involve a high degree of processing (for example France and the UK).

Food, drink and tobacco account for the highest proportion of retail outlets in areas where there are still many small, family owned shops (Italy, Ireland, Portugal). In N. Europe (France, Germany, Netherlands) the strength of supermarkets has significantly reduced the proportion of retail outlets selling food, drink and tobacco.

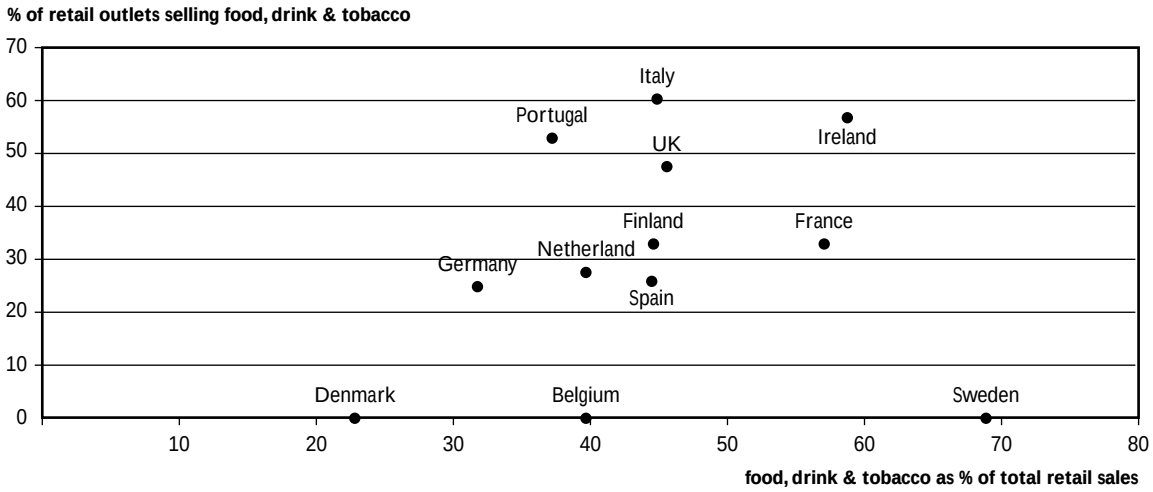


Figure 3.3. The Importance of Food, Drink and Tobacco in European Retailing

Note: (a) figures for food, drink and tobacco as a % of retail outlets are not available for Denmark, Belgium and Sweden
Source: Corporate Intelligence on Retailing *The European Retail Handbook* 1998

There is a marked difference between European countries in the way in which food retailing is organised (Table 3.1). Hypermarkets account for a high proportion of sales in France (43%) and in Portugal (28%) where the "modernisation" of retailing in recent years has been led by French groups such as Promodès. They are also important in Sweden (35% of sales) but are less popular in other parts of Scandinavia where low population densities cannot support large floor areas (Norway) or planning restrictions have deliberately curtailed their growth (Denmark). Planning controls have also been an important constraint on the growth of hypermarkets in Belgium, the Netherlands and (to a lesser extent) the UK. The development of out-of- town shopping centres has been particularly restrained in the Netherlands, where retail floor space per capita is only half of that in France or the UK.

In Greece, hypermarket development has been held back by lack of finance, lack of space in the main urban areas (Athens and Thessaloniki) and the relatively low level of foreign investment in retailing. In Italy the retail licensing system and the resistance of the politically powerful independent retailers have been the main constraints on hypermarket growth. And in Spain planning constraints, political opposition and the recession of the early 1990s have slowed down the development of hypermarkets even though, like Portugal, the retail sector has seen a large inflow of investment from France and there has been strong commercial interest in hypermarkets. The increase in hypermarkets in Spain (from 89 in 1987 to 279 in 1995) has been closely linked to the development of out-of-town shopping centres, most of them developed on the French model and anchored by French-owned superstores.

In Germany and Austria, the emphasis is on small-medium size supermarkets and self-service stores, many of them located in pedestrianised city centres or shopping malls. In both countries there is a strong emphasis on discount stores, which stock a much smaller range of goods than supermarkets but offer lower prices. Discount stores are also becoming very popular in neighbouring countries such as Denmark, Sweden and N.Italy, which have been attracting German retail chains and/or have a strong cultural preference for this type of shopping.

Table 3.1. Food, Drink & Tobacco : Retail Outlets by Type

	% OF OUTLETS				% OF SALES			
	hypermarket[a]	supermarket[b]	self-service	other	hypermarket	supermarket	self-service	other
Austria	2	15	54	29	15	20	21	44
Belgium					15	70	7	8
Denmark	-	11	37[c]	52				
Finland	1	10	na	89	16	42	na	42
France					43	28	10	19
Germany	2	9	62[c]	27				
Italy	-	2	2	96				
Norway					4	64	29	3
Portugal	1	2	8[c]	90	28	16	21[c]	35
Spain	-	10	20	70				
Sweden	na	64	8[c]	28	na	74	19[c]	7

Notes: (a) most countries define hypermarkets as having a floor area of over 2500m2, except for Sweden where the threshold is 1500m2
(b) the distinction between supermarkets and self-service stores is made in terms of floor area (with supermarkets normally starting at 500m2), product range, employment or ownership
(c) discount stores account for all Swedish self-service outlets apart from supermarkets, half of Portuguese self-service outlets and around one fifth of German and Danish self-service outlets
Source: Corporate Intelligence on Retailing *The European Retail Handbook* 1998

The expansion of hypermarkets, and the concentration of food sales in the larger retail outlets has led to a general decline in the number of shops selling food, drink and tobacco. This has been largest in Italy, where the number of food outlets has fallen by 40-50% since the mid- 1980s, and Denmark (a fall of 30% between 1985-92) where many sole proprietors have gone out of business. The main countries to go against this trend have been:

- Portugal, where the number of food outlets increased by 53% from 1987-93 on the back of a consumer boom and a major expansion in all forms of retailing;
- Italy, where small retailers have formed buying groups to improve efficiency, and have been protected by licensing regulations;
- Spain, where the hypermarket/supermarket development has absorbed much of the growth in spending, but has not been allowed to put traditional retailers out of business; and
- Greece, the country least affected by modernisation of the retailing sector

In northern Europe the limited growth prospects offered by a mature market and price competition/low margins led to a wave of mergers & acquisitions in the late 1980s/early 1990s, although in some countries (Germany, Finland, Sweden) this was brought to an end by government concern about the concentration of ownership and lack of competition. In many countries, however, over two thirds of food sales are now controlled by the 5-7 largest chains.

Table 3.2. Concentration of European Food Retailing

Country (Number of leading food chains)	% of food sales controlled by leading food chains
Finland (5)	98%
Sweden (5)	94%
Belgium (7)	90%
Germany (7)	86%
Austria (8)	85%
Denmark (7)	76%
Spain (7)	75%
France (7)	70%
Netherlands (6)	68%
UK (5)	66%

Source: Corporate Intelligence on Retailing *The European Retail Handbook* 1998

Lower levels of concentration are found in countries such as France and Denmark where there is a high proportion of single product food shops (butchers, bakers, greengrocers), or in countries such as Ireland, Portugal and Greece where low population densities and low income levels have maintained the traditional pattern of small family-owned general stores. In countries where figures exist, they suggest that speciality, single-product shops now account for around 40-70 % of the non-chain area of food retailing.

Non-Food Retailing

Unlike food, drink & tobacco, where turnover was fairly static in most countries during the early-mid 1990s, the non-food retailing sector is still generally expanding, particularly those parts of it related to leisure activities and personal image (DIY, photographic, books, toys, music, clothing & footwear, and pharmaceuticals). The number of retail outlets increased by 10-15% in most countries during the period 1985-95, the main exceptions being Portugal (+68% 1987-93) and Sweden (-5% 1990-97).

Non-food retailing is very diversified, and there is no common statistical basis that allows comparison of its structure in different countries. The distribution of retail outlets by type of product is shown for selected countries in Table 3.3.

Table 3.3. Profile of Non-Food Retailing

Type of retailing	% of non-food outlets			
	Austria	Germany	Ireland	Portugal
Clothing	23	26	26	33
Footwear	23	n.a	5	n.a
Home goods	10	16	9	16
Furniture	n.a	n.a	n.a	10
Electrical	6	11	6	10
Book & office	9	9	n.a	n.a
Phamarceuticals	10	13	12	9
Other	36	25	42	32
Total	100	100	100	100

Source: Corporate Intelligence on Retailing *The European Retail Handbook* 1998

In most countries ownership of non-food outlets is widely dispersed, although this is beginning to change as specialist chains assert their market power. In Germany there is a polarisation of retailing between "boutique" shops for luxury goods and large stores for fast-moving items; the non-food sector also contains many multiples and small buying groups which are still trying to develop national networks, and which are ripe for amalgamation. Austria also has few national chains, although there is a high level of concentration in toys following the entry of the American chain ToysRUs and , like Germany, some large drug store chains.

In France, there are several large clothing chains, whilst non-food products are beginning to be sold by the large grocery chains (a trend also in the UK). This pattern is beginning to be repeated in Spain where multiples account for 20% of clothing sales and supermarkets a further 11%. Clothing chains such as Zara, Mango and Cortefiel have been amongst the first Spanish retailers to move abroad.

Italy has very few national chains – clothing and footwear outlets have very individual styles, furniture and household goods are often sold by manufacturers through their own shops, and many electrical goods are sold direct or through non-fixed outlets (catalogues, mobile shops and markets) In the past there have been regulations governing the mix of products which can be sold in any one shop, and restrictive practices favouring the small proprietor in sectors such as newspapers and magazines have also prevented the emergence of national chains.

The UK is the country with the highest concentration levels in non-food retailing, and the large retailing chains are still extending their control through mergers and acquisitions between the larger players.

Table 3.4. Concentration in UK Non-Food Retailing

Type of retailing	% of retail sales controlled by the top five multiples (1995)
DIY	63,5%
Chemists	58,0%
Jewellery	43,5%
Footwear	39,0%
Toys & sports equipment	38,0%
Electrical	36,5%
Clothing	33,0%
Books	20,0%
Hardware	16,0%
Furniture	14,5%

Source: Corporate Intelligence on Retailing *The European Retail Handbook* 1998

3.2. Growth And Restructuring of Retail Sales

Most European countries experienced stagnation or a downturn in the volume of retail sales in the early 1990s, after the buoyant growth of the 1980s. Food sales have been hit more badly than non-food items. But even fast-moving consumer goods are now facing competition from "service" expenditures such as holidays, beauty treatments and restaurants, and are accounting for a declining share of consumer expenditure.

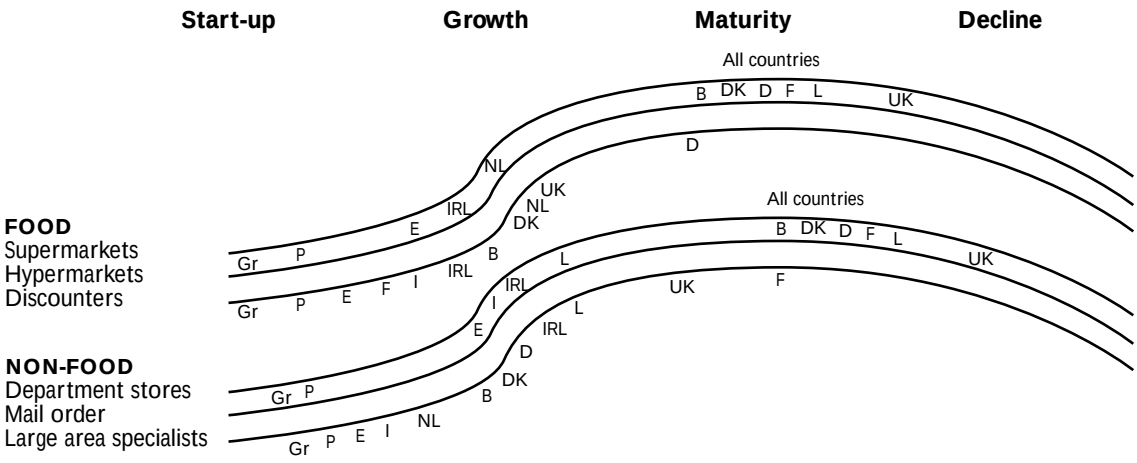
The UK is rather unusual in the way in which it has been able to maintain its strong growth in retail sales, particularly in the food sector. It has done this by steadily widening product ranges to include more exotic, higher value-added products (with higher profit margins), in contrast to Continental food retailing where the emphasis has been on cost-cutting and discounting, which generally leads to smaller product ranges.

Figure 3.4. Growth in Volume of Retail Sales (1990=100)

Source: Corporate Intelligence on Retailing *The European Retail Handbook* 1998

There have also been changes in retail formats such as convenience stores and hypermarkets. Each format has its own life cycle, shown in Figure 3.5, and European countries are at different stages in the life cycle of each of the new formats which have emerged since the 1960s.

Figure 3.5. The Life Cycle of Retailing Formats



Source: Eurostat *Retailing in the Single European Market* 1993

In the food sector in NW Europe, for example, supermarkets are now in decline, hypermarkets are reaching maturity, discounts stores are in their main growth phase, whilst small "metro" stores for fast moving products, convenience stores which stay open until very late at night (some on petrol station forecourts) and franchising operations are just beginning to take off. S Europe, in contrast, is at a much earlier stage in the life cycle of almost all modern retailing formats, with the exception of supermarkets and department stores.

There are four other trends that are significantly affecting the structure of European retailing:

- concentration of purchasing power amongst retailers through mergers and acquisitions or the creation of powerful buying groups;
- he use of new store formats, as retailers attempt to target particular groups of customers and/or make shopping a more enjoyable experience;
- the development of new technology, including E-commerce; and
- increased cross border retailing activity, to sustain earnings growth through the development of new markets

3.2.1. Concentration of Purchasing Power

Concentration in retailing has several different aspects – larger stores, unification of store ownership, diversification of major retail groups into new products (sometimes sold at existing outlets, but more commonly requiring the establishment of a new retailing identity), and the use of various forms of buying association.

Small and medium size businesses have responded to competition from big groups by joining forces in buying groups, co-operatives, voluntary chains and franchises. Initially, these were single country associations, but there are now several large, multi-country buying groups which include as members some of Europe's largest supermarket chains.

Table 3.5. European Alliances/Buying Groups

Alliance/Buying Group	Members	Group Turnover 1997 (€bn)
European Marketing Distribution	Leclerc (F), Markant Handels (D), Euromadis (I), Euromadis Iberica (E), Iniarme (P), ZEV (A), Supervib (DK), Nisa Today's (UK), Unil (N), Musgrave (IRL), Dagab (SWE), Syntrade (CH)	103,8
Associated Marketing Services	Ahold (NL), Safeway (UK), Casino (F), Edeka (D), ICA (SWE), K-Group (FIN), Mercadona (E), Hakon (N), Superquinn (IRL), JMR (P)	75,8
Eurogroup	Rewe (D), Vendex (NL), Coop Suisse (CH)	41,2
NAF International	SOK (FIN), Tradeka (Fin), CWS (UK), Coop Italia (I), NKL (N), KF (SWE), FDB (DK), Coop Schleswig-Holstein (D)	29,6
Spar International[a]	Spar Österreich (A), Spar Handels (D), Dagrofa (DK), Tuko (FIN), Hellaspar (GR), Bernag Ovag (CH), Despar Italia (I), Unigro (NL), Unidis (B), Spar (UK), BWF /Spar (IRL)	25,3
SED	Sainsbury's (UK), Esselunga (I), Delhaize le Lion (B)	24,3
Intergroup	Tradeka (FIN), CWS (UK), Coop Hungary (H), Coop Italia (I), NKL (N), KF (SWE), FDB (DK), Grupo Eroski (E)	18,6

Note: (a) includes BIGS
Source: Institute of Grocery Distribution *European Fact File* 1998

In Germany, affiliated retailers account for around 22% of retail sales, and in the Netherlands their share is over 40%. In southern Europe, however, the weak financial base of many retailers has acted as a constraint on joint purchasing organisations; independent retailers have also been better protected by laws controlling commercial development. In Italy around 7% of retailers are affiliated, but they are heavily concentrated in the food sector; in Spain the average rises to 12% , but with a strong concentration amongst petrol stations and car salesrooms, chemists and (to a lesser extent) food retailing.

Large companies, particularly in the food sector, are trying to offset competition from buying groups by introducing "own brand" products at even lower prices. Medium sized manufacturers of products which do not have strong branding are particularly at risk from this strategy.

3.2.2. Shopping Centre and Store Layouts

The growth in retail expenditure has supported the development of modern, custom-built shopping centres, many of them located in the suburbs or out-of-town. Again there has been quite a lot of diversity in European experience and attitudes, with countries falling into five main groups

Table 3.6. The Growth of Shopping Centres in Different European Countries

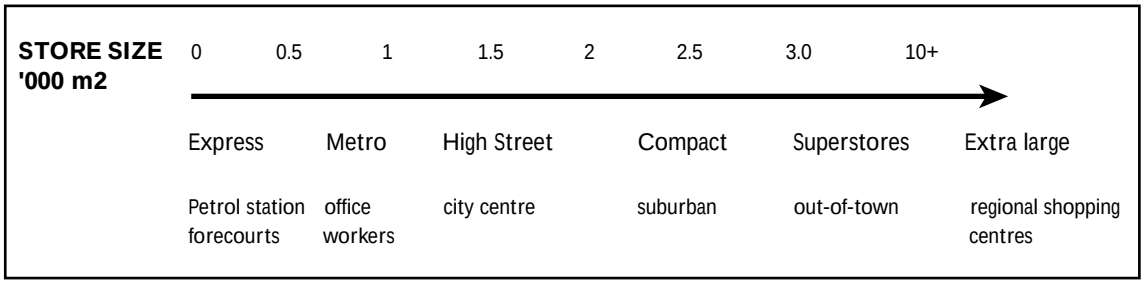
Country	Development Profile of Shopping Centres
Denmark, Sweden, Netherlands	early development of shopping centres in 1960s and 1970s, followed by restrictions on the use of new sites and modernisation/refurbishment of existing facilities
France, UK	expansion over a long time period (mid 1960s-mid-1990s) but with recent changes in policy likely to restrict future growth
Spain	boom in late 1980s/early 1990s leading to current restrictions on growth
Austria, Germany, Italy, Portugal, Ireland	moderate growth in 1990s, with emphasis on city centre sites and mixing of retail and leisure activities. Scope for further development
Greece	little development to date

A more recent development has been the arrival of warehouse clubs from the USA. In contrast to shopping centres – which try to make shopping a recreational activity - these sell bulk packs of a small range of products from large sheds, with a "no frills" service – turnover is so rapid that stocks can be funded entirely from manufacturers' credit.

Factory outlets, where manufacturers sell direct to the public at discounted prices, are another US innovation becoming popular in Europe, although the types of product sold – clothing, designer household goods etc – introduce a "leisure" element into this type of shopping.

However perhaps the most important development has been the emergence of a wider range of retail formats within individual companies. These are now developing a portfolio of stores of different sizes, aimed at different types of shoppers and carrying different ranges of goods (particularly for food and daily goods)

Figure 3.6. Alternative Store Formats Used by Large Food Retailing Chains



Shopper boredom is still seen as a major constraint on growth, particularly for routine products. To overcome this, retailing "think tanks" such as the Henley Centre (UK) envisage the development of five new types of shopping centre:

- supermarkets - change in format to resemble traditional markets, with manned "stalls" within the store selling specialist products
- community centre stores – with child care facilities, keep-fit classes, space for local events
- showcase stores – offering demonstration space for suppliers of new products (and/or companies otherwise offering goods by mail order, Internet etc)
- entertainment stores – usually in shopping malls, with restaurants, cinemas etc
- high street stores – offering services as well as products (medical care, banking, electrical and plumbing, cleaning etc)

3.2.3. New Technology

New technology which is influencing retailing patterns includes:

- information databases about customer spending patterns;
- electronic stock control;
- E-commerce, including television as well as Internet shopping;

Customer Information

Retailers' own "club" cards provide an enormous data base about customer purchasing patterns which would be very expensive to acquire in any other way, and this provides invaluable information for logistics management. This is because it is closely linked to the development of Efficient Consumer Response (ECR) procedures.

Electronic Stock Control

Although the main impact of IT is to reinforce economies of scale, it also introduces an element of flexibility into retailing, making possible small-scale operations that were previously rejected as uneconomic. One example of this is the decision by several UK supermarket chains to develop smaller city centre "metro" stores, catering for the purchasing needs of a particular niche market. These can offer quite a wide range of goods because of the use of electronic sales monitoring to manage the need for frequent re-stocking; this records the draw-down of stock in a city centre store and sends automatic replenishment orders to distribution depots at less expensive locations.

However the take-up rate for new technology has been much higher in N Europe than in S Europe – in 1992, for example, over half of the 15,600 European retailers using electronic data processing were located in the UK. By 1998, around 90% of UK stores were using electronic point of sales (EPOS) scanning technology, whereas in Italy only 40-50% of stores had EPOS systems in place.

E-commerce

Mail order, accounting for between 2-6% of retail sales in most European countries, has had a static market share for many years, but may receive a boost from new technology in the form of television shopping channels and the Internet, as smart software which can search the Web for best buys is already in existence.

Satellite channels, in particular, provide an opportunity for global retailing, although this has not yet become popular because of broadcasting restrictions in some countries, fears about the financial security of telephone/Internet transactions, and the need to set up satisfactory contractual relationships between the three main players – sellers, network providers, and payments systems providers.

Distance selling also brings with it its own set of logistics problems – the packing and delivery of single items is expensive, particularly when the consumer is away from home during working hours – and this opens the way for a fourth player – a parcel company, Post Office or newspaper distribution company – to join the other three as the logistics provider.

Although there are savings in store costs (premises, staff, inventory, heating & lighting) equivalent to around 20% of the goods' delivered price, there are higher delivery costs and manufacturers need to invest more in marketing and branding. Consumers often have a limited attention span when scanning lists of products and prices, and there is a risk of dissatisfaction with the product if it cannot be inspected before purchase. Internet ordering could have a significant effect on some sectors of retailing – for example cosmetics and home entertainment – but home delivery is only viable for items of over £35 (€55) value which are small enough to go through a letterbox, and for destinations to which a 48 hour delivery service can be offered.

The viability of electronic retailing has still to be proven. Experience with on-line grocery shopping in the US has shown it to produce mixed results, with several companies making large losses. Europe may be in a better position to exploit the Internet because of shorter delivery distances, well-developed postal/parcels networks, and greater time pressures on certain classes of consumer. But there is still no clear view within the retailing industry on the future market share that E-commerce will obtain.

On the contrary there appears to be a convergence between different forms of retailing, as hypermarkets begin to offer home deliveries, and mail order firms/Internet suppliers set up display centres where their goods can be inspected.

The transport implications of the growth of E-commerce are still far from clear. There is likely to be a small but significant switch from passenger transport to goods transport as express deliveries replace personal shopping trips. The small average consignment size in E-commerce means that the growth in goods vehicle mileage will outstrip the growth in ton-miles travelled, although there will be a decrease in average vehicle size. However there will also be an improvement in transport efficiency through the use of shared delivery services for small, irregular flows of goods. Local collection/delivery points will develop for goods which are too bulky to deliver to the home, or

which cannot be delivered at convenient times of day : these are likely to use conventional retail outlets such as petrol stations, village stores and post offices, strengthening and stabilising small business particularly in remote areas with low population densities.

3.2.4. Cross Border Retailing

Cross-border retailing first began in the 1920s, with the move of the Dutch clothing chain C&A into Germany, but it remained unimportant until the late 1970s. Since then expansion has occurred in waves, involving:

- border-hopping by supermarkets into neighbouring countries with similar consumer characteristics, for example Germany/Austria/Benelux, France/Spain/Portugal, UK/Ireland;
- European chains set up by fashion retailers with a strong brand image (Benneton, Laura Ashley, Gucci)
- Europe-wide operations for specific types of product, often involving partnerships or franchises (IKEA, ToysRUs, Body Shop)

Around 11% of cross-border moves took place pre-1980, 34% between 1980-89, and 55% in the 1990s.

Fashion goods have been the most active area for cross-border moves, accounting for around 37% of all moves between 1980-97. This is partly because they comprise highly differentiated products that can absorb high distribution costs, and partly because they need a large potential market in order to achieve economies of scale. Food retailing accounts for around 10% of cross border moves, and here the main factors have been existing economies of scale, which allow large foreign firms to compete on price, and the introduction of new technology or retailing formats (discount stores, hypermarkets). The next three most important sub-sectors are furniture/household goods, health/beauty products, and footwear, each accounting for around 6% of all cross border moves since 1980.

Most cross-border moves since 1980 have originated in France (23%), UK (20%) and Germany (17%), Europe's three largest and most sophisticated retail markets. There has also been a rise in inward investment from outside of Europe, most notably the USA, although this is still relatively small in relation to intra-European moves.

French retailers have been particularly dynamic and innovative, and have been willing to invest overseas in the type of prestige out-of-town developments which are now becoming increasingly difficult at home : the Loi Royer of 1973, which regulates large retail development, was greatly strengthened in 1996, monopoly legislation has been used to restrict the development of individual stores, and limits have been imposed on the size of delivery lorries to reduce the disadvantages of city centre sites. French food retailers have invested heavily in Spain & Portugal, whereas clothing retailers have preferred to remain in the N European market. Inward movement into the French market has been mainly German discount stores and foreign clothing chains.

German cross-border expansion has taken place mainly in the 1990s and has been strongly influenced by the surge of interest in discount food stores (Aldi, Lidl), where Germany enjoys a comparative advantage through economies of scale. German retailers have shown, a geographical preference for other German-speaking countries (Austria, Switzerland), Eastern Europe (particularly Czechoslovakia), large markets (UK, France) and neighbouring countries (Denmark, Netherlands). However Germany is not as well represented overseas as the size of its domestic retailing sector might suggest, and the German market has not attracted as many foreign firms as expected because of its high costs and restrictive labour practices.

UK retailers have shown a more mixed approach to the targeting of European markets – both geographically and by product - and unlike the French and the Germans have not been led by the large food chains (except for Tesco in E. Europe). Locations outside of Europe compete for management attention and funds, and over half of new entrants to the UK market have been from outside of Europe (mainly US).

Dutch retailers such as C&A moved abroad quite early because of the small size of the Dutch market, which is also one of the most open in Europe as far as competition from foreign retailers is concerned. Swedish retailers such as IKEA and Hennes & Mauritz have moved abroad for much the same reasons, but the small size and high costs of the Swedish market have made it less attractive to outsiders than the Netherlands.

Other countries which have a significant involvement in cross-border retailing include:

- Belgium, where the overprovision of retail outlets, planning controls and a mature, slow growth market have encouraged the three largest retailers (GIB, Louis Delhaize and Delhaize Le Lion) to move abroad;
- Austria, where EU membership has facilitated outward movement to Germany and N. Italy and new entrants from Germany;
- Denmark, where discount food stores have moved both in (Aldi, Edeka) and out (Netto);
- Switzerland, which is used by some foreign retailers such as Metro as the base for their purchasing and finance operations, even though they are not active there

The UK, Spain and Germany have been the most favoured destinations for foreign retailers in the 1990s, displacing the Benelux countries which were more important in the late 1970s/early 1980s. In the UK the boom in shopping centre development has created opportunities for foreign retailers to enter the market on the back of attractive property deals, encouraged by relatively high retailing margins and the UK's ability to avoid the worst of the 1990s recession in consumer expenditure. Spain's attraction has been its low level of retail development, potential for long-term economic growth, and need for modernisation. Whilst in Germany's case, foreign investment has been attracted by the size of the domestic market, the largest in Europe, and the opening up of a completely new market in Eastern Germany.

Cross-border moves have been the result of a combination of push and pull factors

Table 3.7. The Causes of Cross-Border Moves by European Retailers

	Push factors	Pull factors
Market growth	• mature, slow growth domestic market • economic recession • increased competition	• different competitive structure • economic & population growth • new, untapped markets • economies of scale
Regulatory	• planning restrictions • high rents/rates • high labour costs • restrictive labour practices • taxation	• more relaxed regulatory framework • favourable costs • removal of barriers to entry
Other	• shareholder pressure for profits growth • desire to become a global business • imitation of competitors • financial markets which encourage expansion • labour shortage • poor infrastructure • political instability	• geographic diversification to spread risks • good infrastructure/technology • access to new sources of capital • property investment potential • access to new management ideas • favourable exchange rates

Source: Oxford Institute of Retail Management/Jones Laing Wooton *Shopping for New Markets : Retailers Expansion Across Europe's Borders* 1997

There are four common methods of expanding overseas:

- organic growth, the approach used for border hopping by well-established food retailers such as Carrefour (FR) and Aldi (GER);
- acquisitions, an approach favoured by many UK retailers who have access to a sophisticated banking system for finance;
- joint ventures, the approach most suitable for moving into quite different markets such as Eastern Europe and parts of the Mediterranean (Greece, Southern Italy);
- franchising, a relatively low risk method of expansion which gives the franchisee a strong customer base and the logistics support of an established company in exchange for local investment

Overseas expansion of whatever form often involves significant changes in the product mix. Some of this is due to longer supply chain distances, but it also reflects:

- differences in consumer tastes and preferences;
- import duties and other non-tariff barriers;
- differences in competition for the retailing of individual products;
- the problems of finding suitable property at the right location, which can lead to a reduction or change in the mix of products offered

At the same time, branding acts in the opposite direction by persuading firms to retain the product lines with which they are most closely associated, even if these are now supplied from a different source.

3.3. Location of Retailing Activities

There are three main nodes in the supply chain whose location is determined by quite different factors:
- the stores at which the products are sold to consumers;
- regional distribution centres (RDCs) which hold large stocks of goods supplied by different manufacturers; and
- local distribution centres which make up orders for individual stores, often using cross-docking techniques to group items for which there is a less than full truck-load demand.

3.3.1. The Location of Stores

The location of stores is driven by the need to be accessible to customers. This favours city centres, transport nodes, uncongested sites on the periphery of urban areas, and proximity to other enterprises which attract large numbers of potential customers. The importance of "anchor" clients in establishing the viability of new shopping centres – supermarkets or other large retailing chains that will automatically draw in loyal customers – is well known. Cinemas, sports facilities and popular restaurant chains such as McDonalds are now taking on a similar role.

The second main requirement is the availability of sufficient space to display the increasingly large range of goods which are needed to encourage "one stop" shopping trips and give customers a wide range of choice. This has been one of the most important reasons for the move of retailers to out-of-town sites, where they can occupy large, modern premises designed to their own specifications. Traffic congestion and the shortage of city-centre car parking spaces has also encouraged the drift of retailers to out-of-town locations.

Labour supply considerations marginally favour city centre locations. The retail labour force is dominated by young female workers, part-time workers, and (more recently) elderly workers, many of whom do not have access to a car. Out-of-town centres are often poorly served by public transport, whilst young workers are also attracted by the leisure, shopping and entertainment facilities available in city centres. However wage rates in retailing are very low, EU employment legislation requires the payment of a minimum wage, and large retailing chains generally have national wage agreements. This, combined with high rates of unemployment and rapid expansion of the female labour force, means that there is very little difference between wage rates at different locations.

The cost of the space has generally been a less important factor in choice of location, particularly in the UK where retailing margins are higher than in Continental Europe. But the way in which rents are determined, and the terms and conditions of retail leases, have a significant effect on the size of retail outlets, and on the turnover rate of retail premises in city centres.

Lease terms can also affect the mobility of retailers, the turnover of property and the general prosperity of particular retailing locations. UK retail leases are much longer than those used in Continental Europe, and make the tenant rather than the landlord responsible for maintenance of the property. Small retailers, who are concentrated in city centres, have traditionally had a high turnover rate, with many new entrants and many bankruptcies. But the property market has not responded very flexibly to the need to transfer tenancies - with the fall in property prices since the boom of the late 1980s, institutional investors have been reluctant to negotiate lease transfers at lower rents, so many city centre shops (particularly in depressed regions) have remained vacant, reducing the attractiveness of city centre shopping.

Table 3.8. Retail Lease Terms in Different European Countries

Country	Rents indexed to	Level of rent	Typical duration of lease (years)	Automatic renewal
Austria	Consumer prices or turnover	Hight	5	No
Belgium	Consumer prices		9	
Denmark			10	Sometimes
France	Consumer prices	Low	12	Yes
Germany	Turnover		10	Yes
Italy	Market prices for property		5	Very little security of tenure
Netherlands	Consumer prices		10	
UK	Inflation built into initial rental + periodic reviews	Hight	25	Change of tenure sometimes difficult

Sources: Corporate Intelligence on Retailing *The European Retail Handbook* 1998. Burke & J R Shackleton (UK Institute of Economic Affairs) *Trouble in Store: Retailing in the 1990s* (1996)

How will things change in future? Retailing is one of the sectors most immediately affected by socio-economic changes, several of which are likely to influence future shopping patterns. These include:

- expansion of the 45-65 age group, whilst the population as a whole remains stable (at least in N.Europe). This age group has a high car ownership level, a reasonable amount of time for discretionary shopping, and a fairly high-income level. It favours spacious, out-of-town shopping centres providing a wide range of personal goods in comfortable, leisure-oriented surroundings;
- a higher proportion of the population, particularly women, doing paid work (perhaps a more pronounced trend in the UK than in Continental Europe). This results in higher disposable incomes per family, a high valuation of time, and a desire for "routine" shopping facilities located close to the workplace. It has also led to an increase in the size of the shopping basket as working women make fewer shopping trips, and is one of the trends thought likely to favour the growth of home deliveries for groceries;
- longer, more flexible working hours, combined with the removal of restrictions on retailers' opening hours, which is smoothing out expenditure peaks during the week, but creating a need for more, smaller deliveries from depots. There has been a particularly large increase in night and weekend deliveries to support new shopping habits, and a niche market has developed for small retailers (corner shops and petrol station forecourts) which stay open late at night;
- increasing car ownership, which supports the growth of out-of-town shopping;
- wider use of credit cards, which has boosted consumer spending, and encouraged the development of direct selling through newspapers, mail shots and the Internet;

The retailers' response to previous trends – large, out-of-town shopping centres leading to the decay of traditional city centres, and the reduction in consumer choice produced by market concentration – have been unwelcome in most European countries, leading to the creation of a more restrictive policy environment. In N Europe this has focused on keeping retailers in the city centres, protecting greenfield sites, and preventing abuses of monopoly power. In S Europe there has been more emphasis on the protection of smaller retailers.

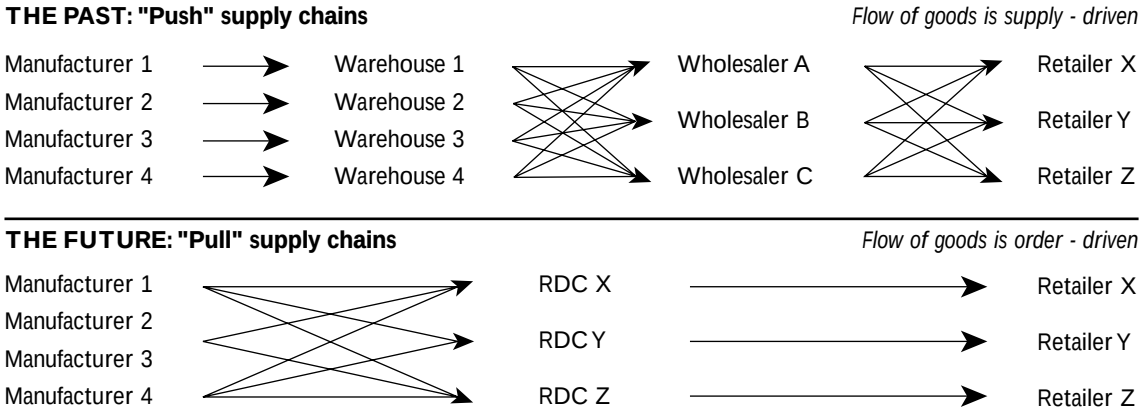
As a result there is a general perception that the trend towards out-of-town shopping is slowing down, and that retailers are beginning to turn their attention to developing new forms of shopping which exploit the advantages of high density urban locations.

3.3.2. Regional Distribution Centres (RDCs)

Regional distribution centres are the facilities at which wholesalers or large retailers store the items they have purchased from manufacturers. Over the last 10-15 years there has been a major change from manufacturer-driven to retailer-driven supply chains (from "push" to "pull" supply chain mechanics) which has had a big effect on the size and location of warehouses. Because the ownership of retailing is more concentrated than that of manufacturing, there has been a large reduction in the number of warehousing units required, but at the same time a considerable increase in their size. This has been encouraged by:

- new developments in warehouse automation, which has large economies of scale;
- on-going concentration in the retailing sector;
- the centralisation of purchasing and distribution within individual retailing groups;
- the outsourcing of distribution to third party logistics managers, who may store goods for several different retailers in the same warehousing complex

Figure 3.7. The Effect of Changes in Supply Chain Control



The shift in responsibility for supply chain management is causing manufacturers to lose control over their own pricing and promotional strategies, further consolidating the power of major retailers and forcing manufacturers into partnership agreements with them. Because retailers are no longer prepared to accept large stock-holding costs, and intermediaries such as wholesalers are becoming confined to small sectors of the market (speciality goods, cash and carry, and the supply of small retailers), manufacturers are increasingly producing to order, resulting in the closure or down-sizing of warehouses close to their plants.

In the UK this process is now virtually complete, with the six main grocery chains all taking over 90% of their deliveries from Regional Distribution Centres. The benefits of this are reduced inventory costs, improved availability of goods to the customer, and a strengthening in the bargaining position of retailers relative to their suppliers

In France and Spain the development of regional distribution networks came slightly later than in the UK, in the early-mid 1990s, stimulated by:

- automated ordering systems;
- sharing of some product lines between sales outlets owned by the same company but using different retailing formats;
- the search for a homogenous quality of service at stores of the same type;
- harmonisation of sales plans between the different parts of large retailing groups such as Carrefour and Promodès.

As more products have crossed the "critical mass" threshold required to justify full truckload deliveries, and as larger trucks and extensions to the motorway network reduced long-distance transport costs, there has been a gradual consolidation of retail distribution centres, which were originally located so as to minimise part-truck load movements from small suppliers, particularly those located outside of France. This trend is still occurring to some extent, but is offset by the more recent fashion for "category management" – different supply chains for different products – and by more direct deliveries to small, local cross-docking platforms.

Retailers are now prepared to accept different service standards for different types of product (perishables, frozen foods, non-food items etc) resulting in a portfolio of overlapping logistics services for different types of retail product, which can be partially integrated at the individual depot or store level.

Table 3.9. Average Order Lead Times in the UK (hours)

Time (hours)	% of items			
	slow moving grocery	fast moving grocery	frozen food	non-food
under 24	33%	73%	42%	42%
24-36	20%	20%	17%	8%
36-48	47%	7%	42%	25%
48-60	-	-	-	-
over 60	-	-	-	25%
Total	100%	100%	100%	100%

Source: Institute of Grocery Distribution *Retail Distribution* 1998

The "take-over" of the distribution chain by retailers has led to improved asset utilisation, both in terms of the percentage of space occupied by goods and the annual throughput per m2 of space. Within the UK grocery trade there has been a reduction in empty space from 17.5% to 11% between 1994-9, and the replacement of long-term storage by cross-docking operations, in which depots become locations for the transfer of loads between vehicles, rather than storage locations.

There has also been a reduction in the number of days inventory held in stock as a result of Efficient Consumer Response procedures (the retailing equivalent of JIT), which attempt to reduce the total amount of inventory in the pipeline through improved information flows. This is an area in which Europe leads the USA, and order lead times are expected to continue falling in future.

Table 3.10. Length of the Grocery Supply Chain (Days)

	USA	Germany	France	Spain	Italy	UK
time from end of factory packing line to supermarket checkout (days)	72	50	43	41	41	28

Source: A.McKinnon *Retail Logistics* 1999

The conclusion is that improvements in warehousing productivity will generally keep pace with the slow growth in demand, so that relatively few new regional distribution centres will be built in Northern Europe in the next few years.
There are four main exceptions to this rule:

- overseas manufacturers seeking to enter the European market, who favour large European distribution centres (EDCs) at the import gateway. So far, these have shown a clear preference for locations in the Benelux countries, with the UK and Ireland also favoured for their liberal trade regimes and use of the English language;
- companies replacing regional distribution centres with national replenishment centres. These group together not only goods but also services such as marketing, purchasing and accounting, and are usually backed up by sophisticated multi-channel logistics systems;
- European retailers setting up Pan-European distribution networks as a result of cross-border moves into new markets. Retailers moving into a new country are likely to take their existing logistics supplier(s) with them, rather than using companies which are already established in the local market but are unknown to them. This is because logistics is about systems management, and requires trust, information, and sophisticated IT systems that are standard throughout the retailers' operations.
- Southern Europe (particularly Italy and Greece) where the modernisation of retailing still has a long way to go, and there are still very few large distribution centres.

The location of regional distribution depots is dependent on:

- the product categories being handled (food, textiles, white goods etc). Food depots need to be within 100km of the stores, although economies of scale in cross docking will soon increase this to 200km. Because non-food deliveries are made only 2-3 times per week, these depots can be located much further away from the stores, and there is also more flexibility in terms of the depots from which individual stores are supplied;
- size of flows received from manufacturers. Retailers increasingly take suppliers' costs into consideration when considering depot location, and attempts to minimise total system costs for both parties;

- the size and geographical distribution of markets. This depends on population density (Scandinavia requires more depots per 1,000 population than the Netherlands), the shape of the country (Italy has less flexibility in depot location than Germany), and the extent to which the population is crowded into urban areas. Austria and Greece, for example, each have more than 25% of their population living in or close to their capitals, which leads to the clustering of depots within a much smaller geographical area than in Germany;
- transport costs. These are a major consideration in choice of location for regional distribution centres, and there are several computer programs available which will optimise location in relation to transport costs. However these have resulted in a high proportion of depots choosing to locate in the same area, driving up land prices and labour costs. Labour shortages are becoming a major problem for warehouse operators – the jobs are boring and badly paid, attract poor quality staff, and suffer from high labour turnover. So access to cheap land and labour are now becoming more important relative to transport costs, which are easier to pass on to customers.

National boundaries are no longer such a relevant factor in warehouse location as they used to be, and some large retailers now supply stores in one European country from depots in another one. Firms which distribute throughout Europe often divide it into five logistics "regions", each with different practices and distribution requirements : Scandinavia, North-Central Europe, UK/Ireland, Mediterranean (sometimes sub-divided between Iberia and Italy/Greece) and Eastern Europe.

National transport policies – for example weekend driving bans – have some influence on choice of country for European warehouse location, but EU transport policies appear to have very little impact, with logistics operators remaining firmly committed to road transport. This is because rail is only viable at long distances, and this means crossing national boundaries, which causes a sharp decline in quality of service.

The warehousing associated with E-commerce and mail order has much greater locational freedom than that associated with conventional retail outlets, as it requires only good access to transport infrastructure and the existence of a competitive parcels carrier service. As express delivery firms usually quote a fixed price irrespective of distance (in a fiercely competitive market) transport costs are not borne by the firm responsible for warehouse location, and there is no difference in the delivered price to individual customers

Although the geographical pattern of regional distribution centres is now changing only slowly, after the restructuring of the 1980s and early 1990s, there is a continuous turnover in their ownership/leasing, as individual firms continuously adjust their supply networks to accommodate new product lines or changes in their suppliers.

The outsourcing of logistics has made very little difference to the overall pattern of depots, as the logistics supplier is usually willing to take over the retailers' warehouses (with staff) to reduce redundancy/staff resistance problems.

3.3.3. Local Distribution

Congestion – urban traffic congestion and the peaking of deliveries at stores – is forcing retailers to review local distribution requirements. The allocation of reserved 15 minutes slots for the unloading of vehicles which have to travel long distances is forcing transport companies to build delays into their scheduling, increasing costs. Serious attention is therefore being given to other ways in which deliveries can be made more reliable:

- greater use of satellite depots within a hub and spoke distribution system. These would combine the use of larger vehicles for the long-haul section of the route with the use of smaller vehicles more suitable for urban driving conditions for the last few miles. The separation of long-haul from short-haul movements would improve vehicle utilisation rates for the last part of the journey by reducing the number of drops which had to be undertaken by each vehicle, and would increase delivery frequencies for fast moving items, particularly to small city centre stores;
- "cross-docking" at satellite depots to reassign inward deliveries to depots into (mixed) full vehicle loads for stores, without any intermediate warehousing. This not only reduces the ratio of depot space : store space (easing pressure on greenfield sites on the fringe of urban areas) but also requires fewer vehicle trips to be made to the stores;
- the use of smaller, quieter vehicles which can deliver at night without protests from local residents;
- the use of unmarked "white" vehicles for urban distribution to competing retailers on a shared vehicle basis, which could also involve retailers sharing local distribution depots operated by independent third-party logistics managers;

Local distribution depots could also be used for consolidating goods from local manufacturers which are being sent to the regional distribution centres, improving backhaul load factors, and (in countries such as Germany) for the collection of packaging materials and other waste products whose disposal is the responsibility of the retailer.

So it seems that local (urban) distribution centres may be the next part of the supply chain to come under scrutiny, leading to a considerable amount of new construction over the next decade, perhaps comparable with the boom in regional distribution centres during the 1980s. They will be much smaller and more dispersed than the RDCs, but will have the same requirement for accessibility to the motorway network.

3.4. Changes in Retailing Logistics

European performance in retailing logistics still lags behind that of the USA and Japan, if efficiency is benchmarked in terms of criteria such as:

- logistics costs as a percentage of sales revenue;
- reliability of delivery;
- availability of goods from stock;
- order completeness;
- accuracy of invoicing;

The main areas in which Europe is still ahead of the US are delivery frequency and order lead times.

Within Walmart logistics costs in the US are generally 1-2% lower than for its European operations, mainly due to lower land costs, the "regionalisation" of distribution networks, and smaller product ranges. US logistics costs have fallen sharply in the last five years, and this trend is likely to be mirrored in S. Europe as major changes are made to business procedures. In N. Europe there is less scope for improvements in logistics efficiency, particularly in the UK which already has very lean distribution systems.

Table 3.11. UK Grocery Retailing : Key Parameters of a Lean Distribution System

- distribution costs average 3.5% of the value of sales (range 2.1-5.1%);
- transport costs account for 35% of distribution costs (compared with 56% for warehousing , 7% for systems, and 2% for other expenses);
- average stock levels are 13.0 days, varying from 9.3 days for fast moving grocery items to 15.1 days for non-food daily goods;
- 95% of goods move from manufacturer to supermarket via an intermediate depot. Centralising stock in depots allows retailers to obtain 1-2% price discounts, but increases distribution costs by the equivalent to 3-4% of price. The main reasons for depots are to reduce inventories, increase flexibility of supplies, and avoid backdoor congestion at supermarkets;
- the average depot size is 15,000 m2;
- the average journey distance (round trip) to distribute goods from depots to supermarkets is 163 km;
- most retailers own and operate a part of their distribution business, whilst subcontracting other parts to specialist companies. 47% of transport and 34% of warehousing activities are outsourced.

Source: Institute of Grocery Distribution *Retail Distribution* 1998

There are still considerable differences between European retailers in the development and use of logistics systems. These are partly the result of differences in retailing structures (particularly the dominance of large chains) and partly the result of different framework conditions (salaries, infrastructure, tax and regulations). The UK is generally regarded as being the most advanced European country in retailing logistics, 7-8 years ahead of S. European countries such as Italy and Spain. However common external trends are causing different regional practices to converge.

3.4.1. Recent Trends in Retailing Logistics

There appear to be five common trends:
- increased customer orientation;
- more frequent deliveries;
- globalisation of supply sources;
- outsourcing of logistics management;
- IT systems improvements.

Customer Orientation

Although all companies are now paying more attention to their customers, there are still significant variations in the way in which consumer satisfaction is measured. So far more attention has been paid to performance indicators which measure retailer satisfaction (timeliness of deliveries, completeness of orders, and avoidance of damage) than to indicators reflecting consumer satisfaction (shorter lead times for orders, faster responses to changes in demand, greater product customisation).

Delivery Frequency

A reduction in the number of days inventory held in stock as a result of Efficient Consumer Response procedures will cause order lead times to fall further, resulting in more frequent deliveries to stores.

In addition, over the last 10 years retail opening hours have increased by 70% in the UK, whilst the average product range (number of items stocked) has increased by 100%, resulting in a large increase in the frequency of deliveries to each retail outlet

In the UK grocery trade this is expected to cause a decline in the average consignment size of deliveries to stores from 12 pallets to 8 pallets between 1995-2001. Such a large change will have major transport implications.

Globalisation

An increasing proportion of the products sold in European stores are manufactured overseas. Transport costs usually account for a higher proportion of their delivered price than for goods sourced in Europe, although the difference is much less than proportional to the distance because sea freight rates are so low.

Decisions on overseas supply sources are often very price sensitive – more so than for European manufactured goods, where branding and "partnership" relationships are more important. In addition, multi-national manufacturers are very mobile, and liable to change the location or product mix of their overseas plants.

As a result, large retailers regularly switch overseas suppliers, and need logistics systems which can cope with frequent change. The result is:

- outsourcing to global logistics managers, particularly those which can offer consolidation facilities in a wide range of countries of origin (or even at transhipment hubs en route);
- "global" shipping contracts with the container shipping lines which have global networks;
- use of air freight for "top up" deliveries due to unforeseen demand changes, shipment delays, or last minute switches in supply sources;
- a preference for depots at ports such as Rotterdam and Antwerp which have shipping services to all major overseas destinations. The German ports (Bremen and Hamburg) are still seen by some shippers as retaining their traditional specialisations in N. America and the Far East trades respectively, although they now suffer more from their "last in, first out" position in intercontinental shipping schedules.

There are a variety of locational strategies for dealing with complex and perpetually changing procurement patterns, varying from a large number of local warehouses through fewer regional warehouses to a single European hub, often with satellites. The last of these is still relatively rare, but will become more important in future.

Outsourcing

The outsourcing of logistics is continuing to increase. In 1997 39% of all expenditure on UK retail logistics went to third party service providers, and this is expected to increase to 42% by 2000.

Outsourcing is popular because it provides:

- specialist management skills and greater operational experience;
- economies of scale through the consolidation of flows and the use of shared services;
- flexibility in the use of resources (warehouses, vehicles, staff);
- security against disruption of supplies;
- increased flexibility in the sourcing and distribution of goods;
- lower capital expenditure requirements;
- access to lower cost services (better vehicle utilisation, use of more experienced or lower cost staff , purchasing discounts, for example on transport services) due to the higher volumes of business controlled by the third party manager.

In addition, it frees management time, allowing the retailer to concentrate on core business.

However the benefits of using third party logistics managers are often offset by loss of control, so that some companies remain cautious and prefer to carry out some of their distribution activities in-house. In the UK grocery trade there are indications that the outsourcing of logistics is unlikely to progress much further. Indeed, there may even be a small movement away from out-sourcing as a result of the desire to integrate logistics into long-term corporate strategy, and re-assert control over short-term operations

IT Systems

The emergence of common standards is making IT a more important factor in supply chain management, and is allowing manufacturers and retailers to segment their markets more effectively. This allows them to develop different sales and supply strategies for a whole series of separate micro-markets.

Information databases are becoming better integrated with Advanced Planning & Scheduling Systems, allowing the market leaders in logistics to offer a higher quality of service at lower cost.

3.4.2. Current Concerns

Improvements in logistics are now being sought which will give retailers:

- the ability to offer wider product ranges;
- the flexibility to cope with longer opening hours;
- insurance against delivery delays caused by road congestion;
- higher utilisation and return on assets;
- a reduction in product handling costs;
- increased scope and accuracy of data recording
- ability to cope with the surges in demand resulting from promotional offers.

There has been a large increase in the use of “in-store” promotions during the 1990s, as manufacturers fight to retain brand loyalty: at any one time around 50% of grocery items available in the UK are being sold somewhere as a “special offer”. The large swings in brand loyalty caused by these offers are a significant source of supply chain instability, and require better management.

A recent survey carried out by the Institute of Grocery Distribution (UK) covering 17 leading UK retailers (mainly in the food sector) identified the following as the most important logistics issues currently affecting their businesses:

Table 3.12. Ranking of Key Logistics Concerns 1998

Issue	Value	Ranking
On-time and accurate delivery	4.80	1 (7)
Reduction in distribution costs	4.73	2 (1)
Reduction in stock levels	4.29	3 (4)
Access to town centres/urban areas	4.27	4 (9)
EDI links and information sharing with suppliers	4.13	5 (10)
Road congestion	4.13	5 (8)
Reliability of distribution	4.07	7 (5)
Road pricing/user charges	4.07	7 (10)
Managing fluctuations in demand (promotional and seasonal)	4.00	9 (5)
Changes in working hour regulations	4.00	9 (12)
Shorter order lead times	3.73	11 (2)
New IT systems	3.53	12 (3)
Backhaul/consolidation initiatives	3.40	13 (12)
Increased frequency of delivery	3.13	14 (17)
Increase in vehicle weights	2.87	15 (15)
Increased automation of distribution	2.73	16 (16)
Vulnerability to disruption (strikes etc)	2.60	17 (na)
Multi-modal transport	2.21	18 (na)
Use of third party distribution companies	2.00	19 (18)

Notes: (a) each issue was ranked in importance from 1 (not important) to 5 (very important). The scores represent the average for all survey respondents
(b) figures in brackets are 1997 rankings

Source: Institute of Grocery Distribution *Retail Distribution* 1998

3.5. Transport

Lower logistics costs are reducing the importance of logistics in business development strategies, whilst at the same time environmental costs and road congestion make logistics an increasingly important item on the public policy agenda.

Gridlock is becoming a major problem not just in the UK, but also in the Benelux countries and some parts of France There is widespread agreement that road congestion in W.Europe substantially increases transport costs. However the scale of the problem may be underestimated because past studies have failed to pay sufficient attention to the "unseen" costs of the remedial measures which manufacturers and retailers have had to adopt to reduce supply chain unreliability – more dense depot networks, longer scheduled journey times, over-investment in vehicles. In a world in which service reliability has become more important than cost, the key parameter for measuring road congestion is the cost of avoiding potential delays, rather than the costs incurred as a result of actual delays.

3.5.1. Vehicle Load Factors

In addition to the problems of road congestion, retailers (or their logistics managers) have to find ways of improving vehicle utilisation in the face of declining consignment size. It is not only the size of consignment from depot-store which is declining – faced with the retailers' demands for "production to order" and an increasingly differentiated product range, few manufacturers now have the order volumes required to justify daily deliveries to depots, so there is awareness of the need

for collaboration between manufacturers in vehicle sharing. This may produce another link in the supply chain, namely consolidators who will break-up full vehicle loads from manufacturers and regroup them into full vehicle loads for retailers.

Small consignment sizes, frequent deliveries and complex distribution patterns, combined with the desire of transport companies to invest in large multi-purpose vehicles capable of meeting a wide range of market demands, inevitably leads to empty running. A synchronised audit of the performance of 36 UK road haulage fleets, carried out by Heriot Watt University, showed that vehicles used for grocery distribution had average utilisation rates of 55% by weight and 80% by volume. Similarly a study by A.T Kearney concluded that there are 15% more grocery trucks on European roads than are needed because of failure to make optimum use of the height of the vehicle.

One way of improving vehicle utilisation rates is by integration of the primary and secondary distribution networks, with vehicles delivering to shops being used to carry supplies from manufacturers as return loads. Packaging and other waste materials for disposal by the retailer, together with returnable crates, are increasingly absorbing backload space, although in many cases the vehicles are classed as "empty" because they are not carrying a revenue generating load. Software is now available for managing return flows of waste materials (8% of all grocery-related HGV trips), and this is becoming a significant part of the supply chain as environmental concerns grow

Another way of improving vehicle utilisation is to use the Internet for freight brokerage services, by publishing on-line records which match cargoes seeking transport with vehicles seeking return loads. Several such systems have been set up, but have not attracted much support. This is because:

- vehicle movements are quite tightly scheduled, with little slack time for diversion to pick up other companies' cargoes;
- many vehicles serve specialist markets – food (temperature controlled), garments (hanging equipment), bulk chemicals – and are suitable for a limited range of cargoes;
- transport companies are reluctant to risk contamination or damage by carrying cargoes for customers they do not know;
- the administrative costs of arranging single-trip contracts with road hauliers are high, especially if it involves any form of quality assurance vetting;
- the financial incentives to carry back-haul cargo are fairly small, particularly in directions where spot-market rates are low or there is a long diversion distance.

Logistics products are very sophisticated, and choice of transport sub-contractors is based on quality of service rather than cost. The relationships are set up on a long-term basis, and the networks are quite stable, involving large companies. Better utilisation of spare back-haul capacity within a single company (or a group of companies managed by the same logistics supplier) may bring down costs, but large retailers appear to have little interest in short-term spot market contracts with road hauliers who have spare capacity available only for a single trip.

3.5.2. Delays and Idle Time

On average vehicles spend only one third of their time on the road, although some of their time off-the-road is caused by slackness in drivers' schedules to ensure "on time" delivery. In the UK around one quarter of all journeys undertaken for retailers suffer delays, but only 23% of the delays can be directly attributed to road congestion.

Table 3.13. Time Allocation of an HGV Used for UK Grocery Distribution

	On-road	Loading/ unloading	Awaiting departure	Delayed/ inactive en route	Daily rest periods	Maintenance	Idle (empty & stationary)
% of time	35%	16%	12%	4%	6%	6%	21%

Source: A.McKinnon *Retail Logistics* 1999

Delivery performance (the proportion of deliveries made on time + 15 minutes) has been steadily falling, whilst in the UK it is estimated that congestion adds one hour per day to the time a vehicle needs to complete its daily trips (time actually taken minus the time that would be taken if the vehicle could operate at free flow speeds with no loading/unloading delays). However the majority of delays are due to peaks in the delivery pattern – the inability of retailers to accommodate vehicles – or occur when internal systems failures result in goods not being ready on time or lorries being loaded well in advance of their planned departure time.

Table 3.14. Causes of Delay to UK Grocery Distribution Vehicles

	Delivery point problem	Road congestion	Own company actions	Collection point problem	Break down	Lack of driver	No single cause
Delays (%)	31%	23%	13%	10%	2%	2%	19%

Source: A. McKinnon *Retail Logistics* 1999

Many delivery schedules are based on optimising the use of warehouse labour, rather than making most effective use of the vehicles. Most distribution companies still treat warehousing and transport as separate activities, and there are few computer programs available which jointly optimise the use of vehicles and warehouse labour.

3.5.3. The Future Growth in Vehicle Trips for Retail Distribution

Retailing turnover is expected to grow at a slower rate than GDP in N. Europe, where the market is mature, and at a rate close to or slightly higher than GDP in S. Europe, where consumer expenditure is still booming.

However there are two factors which will cause retail transport requirements (vehicle-km) to increase faster than retail turnover.

Firstly the processes of concentration and centralisation have been steadily increasing the average distance between manufacturers and regional distribution centres, and between regional distribution centres and shops. This will continue to be a significant contributor to road traffic growth over the next 10 years, although it will be less important than in the past because of the slow-down in network reconfiguration and the outsourcing of logistics to large companies which own or lease warehouses in many areas.

Secondly there will be a further increase in the frequency of local deliveries, due to:

- lower back-room stock levels in stores;
- changes in product mix which favour perishable and fast moving items (chilled foods, fashion goods etc);
- retailers' renewed interest in city centre stores close to customers' workplaces, supported by the planning authorities' commitment to urban renewal;
- use of smaller, more environmentally friendly vehicles.

It is not clear to what extent these will be offset by more efficient use of distribution vehicles, for example through vehicle sharing or the use of cross docking to consolidate full truckloads.

In spite of the deterioration in road transport conditions, rail transport will not be regarded as a viable alternative until there is more investment (particularly in sidings) and better international co-operation between national railway operators;

To make rail more attractive, action is needed to identify and consolidate potential flows. European railways have not been very good at this because their focus is mainly on passengers, so some form of public sector/EU initiative may be needed to increase the railways' awareness of freight opportunities in the retailing sector.

3.5.4. The Effect of Changes in Road Vehicle Taxation

Increases in road vehicle taxation are seen in some countries as a means of curbing traffic growth, reducing vehicle emissions, and encouraging rail transport. UK road vehicle and fuel tax rates have increased particularly sharply over the last five years, and are now considerably higher than those in Continental Europe. But the increases have not achieved their objectives because of inelastic demand and the absence of a real rail alternative for freight – the main short term effect has been to give Continental companies a competitive advantage in the UK haulage market.

To some extent higher vehicle taxes in the UK are offset by lower wage rates and social costs for drivers. As a result, total vehicle operating costs for UK haulage firms are not much higher than those in Continental Europe. However Continental firms have a significant marginal cost advantage when operating in the UK, as UK road costs are recovered largely through vehicle and fuel taxes which are avoidable by non-resident vehicles (French vehicles can bring with them 1000-1500 litres of fuel purchased in France) whereas cost recovery mechanisms in Continental Europe place more emphasis on tolls and vignettes, which apply to all road users.

In most European countries road-related taxes now bring in revenues which are well in excess of public expenditure on roads. If the policy of using taxation as part of a package of measures to reduce road traffic growth is to be continued, it should be implemented uniformly throughout Europe rather than leaving the initiative to national governments. This would reduce distortions in the supply chain, as well as providing a more level playing field for competing road haulage firms of different nationalities.

WORKSHOP FINDINGS: PHARMACEUTICALS

4. WORKSHOP FINDINGS : PHARMACEUTICALS

4.1. Industry Structure

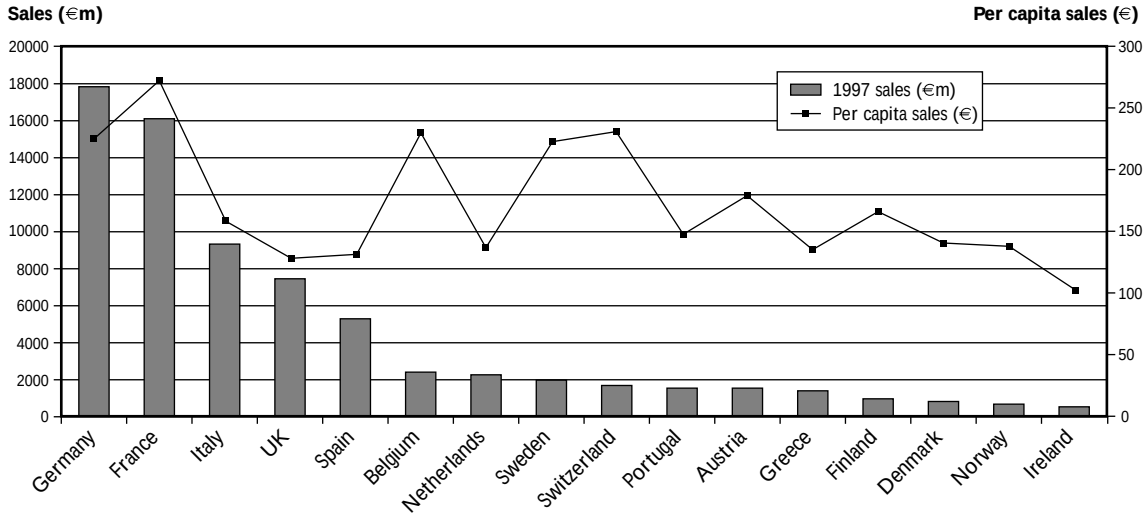
The European pharmaceuticals industry has a turnover of more than €85bn pa, with spending on pharmaceuticals ranging from 0.7% of GDP in Ireland to 2.2% of GDP in Portugal

Pharmaceuticals differs from retailing in several important respects:

- manufacturing is dominated by a small number of large, world-class companies. Ten companies account for almost 40% of world pharmaceuticals sales, and four of them are European – Glaxo Wellcome, Novartis, Hoechst, and SmithKline Beecham;
- the manufacturing and distribution of drugs is highly regulated, with many differences between countries in dosage, packaging and labelling requirements. Governments rather than market forces determine the price of most drugs, and there are large differences in price between European countries, leading to the development of parallel imports;
- a high proportion of customers do not pay for the drugs they consume, or have their consumption subsidised by the State. Around half of all medicine costs in Europe are reimbursed by the State, either directly or through public health insurance schemes;
- licensed pharmacists have a monopoly over the supply of drugs in many European countries, whilst in others a patient's ability to claim back the costs of a drug may depend on where and how it has been purchased. As a result, drug store chains are not well-developed outside of the UK, although they are now increasing in importance in countries such as Germany which have introduced major reforms in drug purchasing during the 1990s;
- the pharmacies themselves are generally small and widely dispersed. The population supported by a single public pharmacy varies from 1,150 in Greece to 17,900 in Denmark. Hospitals account for around 15-20 % of drug sales in volume terms, although this increases to almost 50% when considered in value terms;
- most drugs are still distributed through wholesalers, who are the greatest single influence on supply chain management. Wholesalers are obliged to carry very large numbers of product lines, with the number of prescription drugs on sale varying between 4,500 in Portugal and 10,000 in Austria and Germany. In most countries they are required to stock all (or a high proportion) of these drugs, and in some countries they are required by law to stock a minimum quantity of each drug (for example a month's supply). This leads to high inventory levels;
- a high quality of service has traditionally been provided in drug distribution, with pharmacies receiving two deliveries per day in most parts of Europe, and up to five deliveries per day in some areas. This has been sustainable because of high margins on most prescription medicines;
- until recently, transport and logistics have not been considered to be an important business issue in the pharmaceuticals industry because they have accounted for less than 0.5 per cent of sales revenue in the US, and around 2 per cent in Europe This situation is now changing.

In the pharmaceuticals sector Europe still operates as a collection of separate national markets. Their comparative size is shown in Figure 4.1.

Figure 4.1. The Size of the European Pharmaceuticals Market



Source: Groupement International de la Répartition Pharmaceutique Européenne
Pharmaceuticals Database 1999

Per capita expenditure on pharmaceuticals varies quite significantly from one country to the next, with expenditure levels related not only to GDP but also to the average price of drugs. France, which has the highest per capita expenditure on drugs in Europe, also has the lowest prices, whilst the top four countries in terms of price are amongst those with the lowest per capita expenditures.

Table 4.1. National Variations in Drug Prices 1993

COUNTRY	INDEX (EU=100)
Netherlands	148
Ireland	133
Denmark	133
UK	123
Belgium	116
Germany	105
Luxembourg	97
Italy	96
Spain	94
Greece	85
Portugal	67
France	53

Source: EC COM(93) 718 *Communication to Council and Parliament on the Outline of an Industrial Policy for the Pharmaceuticals Sector in the European Community*

4.1.1. Manufacturing

Drug manufacturing is an industry with a very high industrial concentration index, partly because of the very large amounts of money spent on research and development, and the high risks associated with the development of new drugs.

Ten companies account for around 35% of European sales, including two which are US-owned. In total around 40% of European pharmaceutical capacity is US-owned. Japanese penetration of the European market, in contrast, is surprisingly low.

Table 4.2. Major Suppliers to the European Market 1997

COMPANY	NATIONALITY	% OF EUROPEAN SALES
Novartis	Switzerland	5.14%
Glaxo Wellcome	UK	4.85%
Merck	US	3.91%
Astra	Sweden	3.76%
Hoechst	Germany	3.56%
Rhône Poulenc	France	3.21%
SmithKline Beecham	UK	2.95%
Roche	Switzerland	2.88%
Bristol Myers SQB	US	2.68%
Bayer	Germany	2.42%
Total		35,36%

Source: Groupement International de la Répartition Pharmaceutique Européenne *Pharmaceuticals Database* 1999

Concentration of ownership has increased sharply since the mid-1980s, following a wave of merger and acquisition activity. This has been based on mergers between large international players with complementary product portfolios, rather than the absorption of small companies into larger ones. Recent examples include the merger of Ciby-Geigy AG (Switzerland) and Sandoz to form Novartis AG, and the merger of Hoechst AC (Germany) + Rhône Poulenc (France) to form Aventis SA.

Market concentration is even more important at the level of the individual drug. Because of the high level of patent protection and limited possibilities for substitution, the pharmaceuticals industry comprises many separate micro-markets in which there are very few competitors supplying each product.

Governments have had an ambivalent attitude towards the high level of concentration that exists in drugs manufacturing. On the one hand they are anxious to prevent abuse of monopoly power, but on the other hand they want to act as host to prestigious international companies. So merger and acquisition activity is likely to continue, particularly amongst the larger players.

However there are several other factors which are working to reduce the level of concentration in manufacturing:

- the outsourcing of work related to the development of new drugs. In France, for example, R&D represents approximately 13% of the turnover of pharmaceuticals manufacturers and 25% of R&D work is outsourced;

- the issue of manufacturing licenses for older products whose patents will soon expire. This allows large companies to continuously renew their product range and focus on recent high value products whilst obtaining the last drop of profit from products which are becoming out of date. Manufacturing under license means that there are approximately 500 production sites for pharmaceuticals in Europe, even though the industry is dominated by only 20-25 major manufacturing groups;
- the growing use of generic drugs as governments attempt to control escalating health care costs. Generic drugs contain the same active ingredients as patent-expired branded products, but are usually manufactured by smaller pharmaceuticals companies who do not have to recover the original R&D costs of the drug, and can therefore sell it at a much lower price than the original product. Today they account for around 20% of the European drugs market;
- the growing use of over-the-counter (OTC) drugs which do not require a prescription. Consumers are becoming more knowledgeable about health care, and are using self-medication to prevent health problems and resolve minor problems more quickly – without a visit to the doctor - when they do occur. Whilst the "Top 25" manufacturers dominate the market for prescription drugs, they account for less than two-thirds of the market in OTC drugs;
- new concerns about safety and environmental protection. These are changing the role of the large drugs companies from manufacturing to product stewardship, managing each drug throughout its life cycle from initial concept through manufacturing under license to replacement by newer drugs. As their product management role grows, more traditional functions such as drug discovery and validation are being outsourced to partner institutions.

In addition, a distinction should also be made between the different types of plant owned by large manufacturers:
- plants manufacturing the active ingredients for drugs (usually a small number, distributing throughout Europe);
- smaller plants converting the active ingredients into products suitable for sale in different national markets.

Most plants do not supply the whole of a manufacturer's product range, so there are significant intra-firm movements of products across Europe even before the drugs are sold.

The European manufacturing sector is best viewed as a pyramid, with 20-25 large companies dominating R&D. Below them are 200-300 medium sized companies licensed to exploit their products or manufacturing less sophisticated products of their own. Finally there are several hundred small, specialist companies.

Public sector procurement is still important and national markets are still protected, partly in order to attract jobs. National regulations have led to a proliferation of similar but not identical products, with the final stages of processing usually carried out close to the market. This is one of the reasons why there is substantial over-provision of manufacturing capacity - some industry observers estimate that around 50% of European manufacturing plants could probably be closed without any serious effect on output.

4.1.2. Wholesaling

Pharmaceuticals distribution is dominated by wholesalers, with relatively few drugs being supplied directly to end-users (hospitals and pharmacies). This is because of the high frequency with which deliveries have to be made, the large range of available products, and stringent EU and national regulations relating to the distribution of drugs.

EU Directive 92/25 requires all pharmaceutical wholesalers to be licensed, and to comply with rules designed to guarantee optimum conditions for the storage, transport and handling of products. The distribution path of every item must be traceable, and there must be emergency plans for the recall of products..

Table 4.3. Wholesalers' Share of Drugs Distribution to Pharmacies 1998

COUNTRY	MARKET SHARE OF DELIVERIES TO PHARMACIES (%)	MARKET SHARE OF TOTAL DELIVERIES (%)
Austria	92%	na
Belgium	85%	90%
Finland	100%	na
France	80%	82%
Germany	92%	80%
Ireland	97%	na
Italy	87%	79%
Netherlands	93%	91%
Norway	97%	na
Portugal	98%	na
Spain	82%	85%
Switzerland	98%	na
UK	96%	72%

Sources: Groupement International de la Répartition Pharmaceutique Européenne *Pharmaceuticals Database* 1999
Healthcare Delivery Services *Issues in the Healthcare Industry No. 3* 1995

Direct deliveries by manufacturers to pharmacies are still relatively small. However in some countries direct deliveries to hospitals have become important (hospitals usually account for between 15-20% of drug sales) and in the UK and Germany there are also significant direct deliveries to retail drug chains.

As in the case of pharmaceuticals manufacturing, the European wholesaling market shows a high degree of concentration, particularly in Scandinavia. As one move towards southern Europe, the number of wholesalers per country increases and the market share controlled by the larger companies declines. This is because of the continuing importance of regional wholesalers and – the case of Spain – the ownership of many wholesalers by local pharmacists' co-operatives.

Table 4.4. Market Concentration of Wholesaling in Different European Countries

COUNTRY	TOTAL NUMBER OF WHOLESALER	No. OF LARGE WHOLESALERS	MARKET SHARE (%) OF LARGE WHOLESALERS
Norway	2	2	100%
Sweden	2	2	100%
Finland	2	2	100%
Denmark	3	1	69%
Ireland	4	2	95%
France	6	2	72%
Switzerland	6	2	63%
Netherlands	9	3	84%
Austria	9	3	80%
UK	20	3	75%
Germany	18	4	78%
Belgium	27	3	47%
Portugal	22	3	39%
Italy	193	3	35%
Spain	112	4	36%

Source: Prof. F-L Perret *Euro-CASE Workshop Presentation, Milan, October 1999*
Groupement International de la Répartition Pharmaceutique Européenne
Pharmaceuticals Database 1999

Differing levels of concentration are also apparent in warehouse turnover and the population served by individual distribution depots. Scandinavia, in spite of its low population density and the need to offer 24-hour delivery of drugs, has by far the largest warehouses, suggesting an efficient distribution system making extensive use of air transport and/or relatively large stock levels at the pharmacies. North-Central European wholesalers have the most warehouses per company because of the large areas which have to be covered by national wholesalers in France and Germany, whilst southern Europe is characterised by regional distributors with only one or two warehouses.

Table 4.5. The Structure of European Pharmaceuticals Distribution 1999

COUNTRY	No.OF WHOLESALERS	MAJOR WAREHOUSE/ DISTRIBUTION CENTRES	TURNOVER PER WAREHOUSE (US$mpa)	POPULATION PER DISTRIBUTION CENTRE
Scandinavia[a]	6	6	175	0.90m
N-Central Europe	130	519	96	0.47m
S.Europe	458	693	19	0.17m

Note: (a) Norway, Sweden and Finland
Source: Prof. F-L Perret *Euro-CASE Workshop Presentation, Milan, October 1999*

At the corporate level, wholesaling is dominated by three groups which together account for over 60 per cent of the European market:

IPSO*	28%
Gehe	25%
Phoenix	10%

* includes Alliance Unichem, Sanacorp Anzag, OPG and Galenica

But although these companies operate in several different countries, their subsidiaries still behave like collections of national companies, with no pan-European strategy or multi-cultural management. Different legal requirements in different countries and the unique features of their health care systems inhibit trade in standard products, and this is preventing the major wholesaling groups from operating as truly Pan-European organisations.

In addition to the large international groups there are several large wholesalers which dominate the market in a single country, and a long "tail" of smaller national and regional wholesalers.

Table 4.6. Major Wholesalers' Share of National Markets 1998

Company \ Country	Germany	France	Italy	UK	Spain	Benelux	Nordic	Switz. Austria	Portugal Greece
Gehe	19	41	-	33	-	9	-	-	5
Alliance Unichem	-	30	26	33	12	-	-	-	15
Phoenix	31	4	10	4	-	10	-	-	-
Sanacorp Anzag	30	-	-	-	-	-	-	-	-
Tamro	-	-	-	-	-	-	-	-	-
CERP-Rouen	-	13	-	-	-	-	-	-	-
Cofares	-	-	-	-	20	-	-	-	-
OPG	-	-	-	-	-	25	-	-	-
Tamro	-	-	-	-	-	-	55	-	-
Kranans Drog	-	-	-	-	-	-	20	-	-
Galenica	-	-	-	-	-	-	-	27	-
Herba	-	-	-	-	-	-	-	23	-
Other	20	12	64	30	68	56	25	50	80

Source: S.Pessina *Euro-CASE Workshop Presentation, Milan, October 1999*

However the structure of wholesaling in some individual countries is more complex than Table 4.6 might suggest. In the UK, for example, there are:

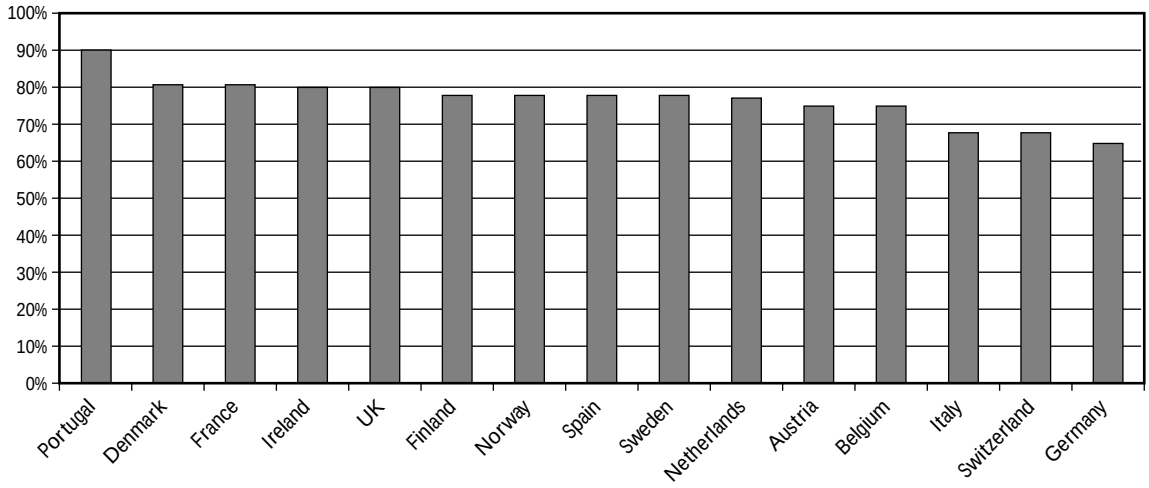
- three large conventional wholesalers;
- three national wholesalers who are also major retailers;
- voluntary buying groups such as Numark;
- wholesalers who distribute drugs for a fee rather than buying them from the manufacturer for resale to retailers; and
- a significant level of direct sales by manufacturers, who are keen to retain control over the marketing of their drugs.

The structure of wholesaling is changing quite rapidly in some countries, particularly Spain where around 60% of the market was controlled by regional pharmacists co-operatives in the mid-1980s, and a further 5-10% was supplied by private limited companies. Large foreign wholesalers are now buying out many of these enterprises in order to increase their own market share.

The nature of wholesaling is also changing, as companies diversify to protect profits. This has several different aspects, including:

- widening of the product range to include own-label over the counter (OTC) drugs and non-pharmaceuticals products such as cosmetics and health foods;
- provision of value added services to the drugs manufacturers, such as assistance with product launches or the recall of drugs, and the supply of information about customer buying patterns;
- development of new markets such as hospitals (replacing direct deliveries from the manufacturer) or the supply of cheaper parallel imports from overseas.

Figure 4.2. Sales of Prescription Drugs as a Percentage of Wholesalers' Turnover



Source: Groupement International de la Répartition Pharmaceutique Européenne
Pharmaceuticals Database 1999

As a result, the development of wholesaling has reached different stages in different countries,

• fragmentation	Greece
• concentration	Spain, Portugal
• consolidation	Italy, France, Germany
• value-added services	UK

Wholesalers' margins are being squeezed from both ends, and they will have to provide a wider range of services in order to survive. There is also likely to be further consolidation in this sector.

4.1.3. Retailing

The retailing of drugs is still dominated by pharmacies, even though drug store chains and supermarkets are beginning to make inroads into sectors such as over the counter (OTC) drugs, which can be sold without a prescription. These now account for around 23% of European drug sales.

There are several different categories of pharmaceutical product, according to whether or not they have to be prescribed by a doctor, where and how they can be sold, and whether or not their cost can be reclaimed from the State.

In most countries prescription drugs have to be bought from a qualified pharmacist. But although OTC drugs can be obtained without a prescription, some countries still require them to be bought from pharmacies and/or will only reimburse their cost if they are prescribed by a doctor and purchased from a pharmacy. In Europe as a whole just over half of the costs of OTC drugs are reimbursed, and this provides a powerful incentive for customers to buy from pharmacies

Table 4.7. The Importance of Over The Counter Drugs 1992

COUNTRY	SALES OF OTC DRUGS AS A % OF TOTAL EXPENDITURE ON DRUGS
Germany	33%
France	33%
Belgium	25%
UK	28%
Spain	16%
Netherlands	11%
Italy	9%
Portugal	5%
EU average	23%

Source: European Proprietary Medicine Manufacturers Association

The other legal requirement which has had a major effect on the structure of drugs retailing has been the widespread restriction preventing individual pharmacies from operating more than one retail outlet. This has recently been lifted in some countries as part of the liberalisation of pharmaceuticals retailing, but remains an important factor in southern Europe.

In Germany pharmacies have a monopoly on the sale of prescribed drugs, and around 80% of OTC drugs must by law be purchased from pharmacies. In spite of this the pharmacies have been losing market share for OTC drugs to supermarkets and health food stores, which have concentrated on popular fast-moving items.

Table 4.8. Outlets for OTC Drugs in Germany 1992

TYPE OF OUTLET	% OF OUTLET	% OF SALES
Pharmacies	29%	27%
Independent drugs retailers	13%	5%
Drug store chains	10%	26%
Supermarkets	8%	13%
Grocery stores	36%	4%
Health food stores	4%	20%
Total	100%	95%[a]

Note: (a) 5% of OTC drugs are sold though other outlets
Source: Economist Intelligence Unit *Over The Counter Pharmaceuticals in the European Union* 1995

To increase competition after the 1993 Health Act, which required consumers to pay a part of the cost of their medicines, the German Government lifted the restriction-limiting pharmacists to a single retail outlet. The result has been a rapid increase in the number of retail outlets, and the formation of pharmacy chains.

In France all medicines – including OTC drugs - must be sold through pharmacies, which are not allowed to combine into chains. Only miscellaneous health products not classed as medicines – for example vitamin and mineral supplements – can be sold elsewhere. Sales are dominated by long-established products, with 100 leading items accounting for 40% of retail turnover.

In the UK large numbers of products have been switched to OTC status following the streamlining of National Health Service listing procedures in the mid-1990s, and this has supported further growth of the large retailing chains specialising in pharmaceuticals and related products, which account for around 20% of pharmaceutical outlets other than supermarkets and grocery stores.

The UK retailing pattern, with its emphasis on pharmacy chains, is likely to be followed by Switzerland, Germany, Austria and the Netherlands but is not very popular elsewhere. However retail chains tend to have a higher market share for generic and OTC drugs than for prescription drugs, so the faster growth of this sector should gradually increase their market share.

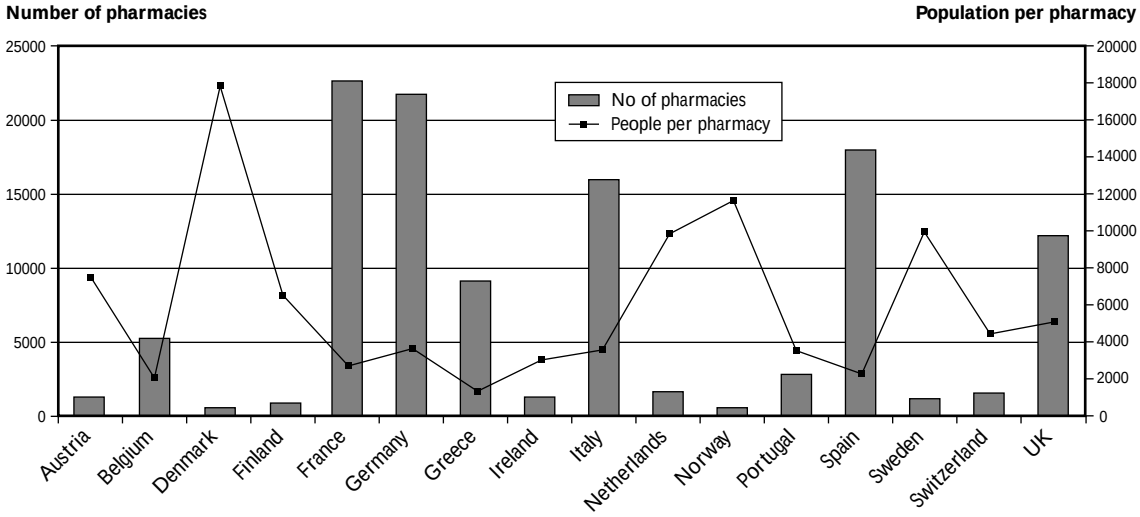
In Italy doctors prescribe a very wide range of drugs, and the market penetration of generic and OTC drugs is still low, in spite of the de-listing of many drugs. Demand has been contracting as more restrictions are placed on cost reimbursement for drugs, and this – combined with political pressure on manufacturers for reductions in the price of drugs - has been squeezing pharmacists' margins. Pharmacists are not allowed to own more than one outlet, and this limits the scope for achieving cost reductions through economies of scale.

In Spain pharmacists have a monopoly over the sale of all medicines, and the range of products pharmacies sell over the counter is smaller than elsewhere. New pharmacies are licensed by Regional Councils only in areas of strong population growth or where the existing pharmacies are unable to meet demand, protecting existing businesses from unwanted competition.

Nevertheless Spain has one of the highest levels of provision in the EU, although Spanish pharmacies are very small (averaging 40m2) compared with those in Northern Europe (200m2 in Germany). There are no pharmacy chains, and Spanish pharmacies have not been very active in trying to diversify their non-pharmaceuticals product range. As a result, pharmacies are regarded as secure, medium income businesses, and sell for a higher price than other retail outlets.

The number and density of pharmacies in different European countries is shown in Figure 4.3. As with manufacturing and wholesaling, there is a high level of concentration in Scandinavia, where the number of people served by each pharmacy is 3-5 times higher than in southern Europe. This is largely a result of the high degree of planning underlying the health service in Scandinavia, which has created a more rational and cost effective network for the delivery of drugs.

Figure 4.3. Number and Density of Pharmacies



Source: Groupement International de la Répartition Pharmaceutique Européenne
Pharmaceuticals Database 1999

4.1.4. Specialist Distributors and Third Party Logistics Providers

In some countries such as Italy specialist drugs distribution companies (often regional rather than national in extent) provide an important link between manufacturers and wholesalers. In this situation supply chain efficiency comes from:

- synergies between manufacturers who are able to share specialist facilities and staff;
- greater visibility of costs (including inventory costs);
- consolidated purchasing of items such as transport on behalf of more than one supply chain.

In contrast the international movement of drugs from the manufacturing plant in one country to the manufacturer's warehouse or secondary processing plant in another is normally carried out by road haulage companies or multi-product third party logistics providers. The latter are now competing with specialist national distributors and with wholesalers themselves for the movement of drugs from the manufacturer to the wholesaler.

To counter this threat the specialist distribution companies are searching for:

- economies of scale, which will make maximum use of their specialist knowledge, and provide capital for investment in purpose-built facilities;
- a more innovative business approach (especially in IT) which will differentiate them from general purpose logistics managers on the one hand and wholesalers on the other;
- more stringent regulation of the industry, at national and EU level, in respect of compliance with legal requirements relating to contamination risks, temperature, light and humidity control, the use of general purpose vehicles, and rules for subcontracting. In Italy, for example, Decreto Lei 6.7.99 has significantly reduced the number of companies interested in pharmaceuticals distribution;
- greater control over the various stages of the journey, which in the past were frequently sub-contracted. This is no longer acceptable because of the need for stricter quality control, resulting in an industry-wide requirement for stronger transport management.

Specialist distribution of pharmaceuticals is no longer very profitable because the entry of many small, new companies into the business has eroded profit margins, whilst legal requirements and advances in logistics have increased investment needs. However some of the larger manufacturers are now replacing conventional one-year distribution contracts by longer-term agreements which give their distributors the incentive to purchase modern warehousing facilities and specialist vehicles.

4.1.5. International Trade

In spite of the existence of protected national markets Europe has a high level of international trade in drugs, at least in value terms. But because pharmaceuticals are a high value commodity, trade volumes are still relatively small with individual drugs moving in small consignments suitable for road or air transport.

There has always been a high level of integration of European markets, and even small producers often have facilities outside of their home markets. This is because R&D costs are high (often over US$250 million per new drug) and profits decline rapidly once patents expire, so companies have to market their products over a wide geographical area to recoup their investment costs during the life of the patent.

Table 4.9. The Balance Between Domestic and Other EU Sales

MANUFACTURERS LOCATED IN	MARKET SHARE %		HOME SALES AS % OF EU SALES
	DOMESTIC MARKET	EU MARKET	
Belgium	10	2	20
France	49	14	79
Germany	55	24	63
Italy	42	10	92
Netherlands	18	2	18
Spain	31	3	31
UK	43	13	38
Switzerland	n.a	8	n.a
USA	n.a	21	n.a
Japan	n.a	1	n.a

Source: A. Silbertson and C.P Raymond *The Changing Industrial Map of Europe* 1996

In addition large manufacturers, particularly in the UK, Germany and France, have substantial exports to countries outside of Europe. Only 65% of EU trade in pharmaceuticals is with other EU countries.

A high proportion of intra-EU trade is in active ingredients, which it is generally economic to manufacture at a single site, whilst a high proportion of EU trade with other parts of the world is in finished or semi-finished products.

Trade exists not just because of the great diversity of pharmaceuticals products, or the comparative advantages which some countries have in manufacturing them, but also because of large differences in the prices agreed between governments and manufacturers. This results in a small but significant amount of parallel trade – the re-import of a drug into its country of origin from another country where it is on sale for a lower price. Parallel imports account for the highest proportion of drug sales (7-9%) in the UK, Netherlands and Denmark, and a much smaller proportion (1-3%) in Germany and Scandinavian countries other than Denmark. The main countries supplying drugs for the parallel trade are Belgium, France, Italy and Greece.

The growth in parallel trade from low price to high price countries has been constrained by national regulations on dosage, packaging etc, and by the need for imports to be accompanied by marketing permits from the manufacturer. However parallel trade is likely to increase in future as a result of actions taken by the European Medicines Evaluation Agency to create a single European market in drugs by issuing marketing authorisations valid across the whole of the EU. The agency was established in 1995 to allow manufacturers to supply the end product from a small number of locations instead of from separate sites in each country, increasing manufacturing efficiency. This will almost certainly lead to an increase in parallel trade unless it is accompanied by additional action to harmonise prices.

4.2. Future Changes in the Pharmaceuticals Industry

The pharmaceuticals industry has had one of the highest and steadiest growth rates of any industrial sector in recent years, averaging around 6% pa during the 1980s and 1990s, due to:

- a steady increase in life expectancy following new medical discoveries. This has resulted in an ageing population with higher drug needs;
- the direct relationship between health expenditure and per capita GDP (the main exception to this is the United States, which spends around 60 % more on health care than its per capita GDP would suggest).

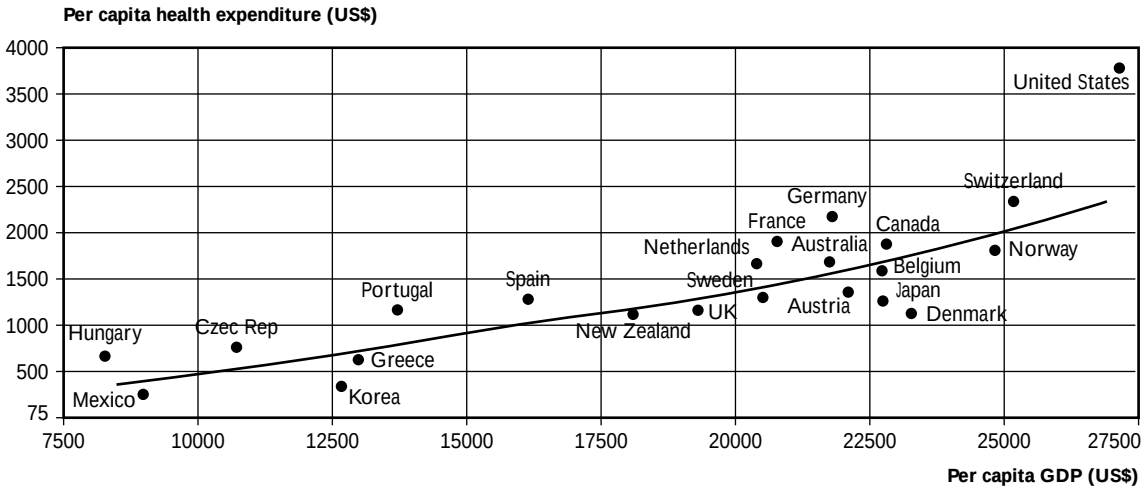
However the period of rapid growth and high profits is now coming to an end, at least in the prescription drugs sector because:

- the scope for traditional products is diminishing as the industry matures, as solutions to chronic diseases such as cancer and AIDS are more difficult and expensive to find than cures for infectious diseases;
- the costs of product development are rising rapidly, whilst licensing delays reduce the scope for making enough profits to cover R&D costs before the patent expires;
- it is becoming easier to manufacture similar, competing products (generic drugs) once the patent protection lapses;
- public sector cost controls designed to contain escalating health care costs are reducing the consumption as well as the price of many drugs;

- the EU has been given powers under clause 130 of the Maastricht Treaty to promote greater competitiveness and innovation in the area of public health. Before 1991 it had no specific competence in this area, and under Delors concentrated on promoting the interests of large European manufacturers in the global market for pharmaceuticals.

On the other hand self-medication using over the counter (OTC) drugs is booming, and is being used by manufacturers to prolong product life. This is one of the factors underlying the current restructuring of pharmaceuticals manufacturing, and has major implications for the way in which drugs are marketed and distributed in future.

Figure 4.4. The Relationship between Health Expenditure and GDP



Source: F-L Perret *Euro-CASE Workshop Presentation, Milan, October 1999*

Concern about escalating health care costs raises a fundamental question about the way in which European health care is organised – will Europe stick to its traditional model of national public health services or move gradually towards the US model with budgets controlled by private health insurance companies? The US model sometimes appears to offer an easier route towards the creation of a single European market than current attempts to establish common standards and Europe-wide access within a collection of national markets whose rules are determined as much by ideology as by sound business practice. But such a fundamental change would require a high level of political consensus within Europe because of its implications for economic convergence, so a process of piecemeal reform of existing markets seems more likely.

One of the main responses to the slowdown in growth will be the further consolidation of manufacturers, wholesalers and pharmacists, and the emergence of global, pan-European and national groups (respectively).

The concentration of manufacturing is taking place in spite of the rapid growth in demand and the ever wider range of products available, and is the result of:

- merger and acquisitions activity;
- the escalating costs of research and development;
- scale economies in production and in the outsourcing of post-production services;
- the closure of older plants using superceded technology (for example by Novartis and Glaxo Wellcome).

The concentration of wholesalers is taking place even faster, due to:

- the need for wholesalers to provide a wider range of value-added services to protect themselves against the growth of direct deliveries from manufacturer to consumer;
- the desire to offer a wider geographical coverage, with the ultimate objective of establishing pan-European distribution systems.

Table 4.10. Expected Market Share of the "Top 3" European Wholesalers

YEAR	% OF EUROPEAN MARKET
1991	25%
1995	40%
1998	48%
2003 (forecast)	67%

Source: S. Pessina *Euro-CASE Workshop Presentation, Milan, October 1999*

Even pharmacies are now being consolidated into chains, although progress to date has been very dependent on the regulatory environment within different European countries:

- a high level of regulation has led to single pharmacies remaining the norm in Germany, France, Spain, Portugal and Italy;
- semi-regulation of the sector has led to small chains in Belgium and in Italy (where municipal pharmacies are being privatised) and large chains in Scandinavia (where State pharmacies are being privatised);
- a deregulated environment has led to small chains in Switzerland, the Netherlands and Eastern Europe, and large chains in the UK and Ireland where Boots, for example, has over 1200 retail outlets.

In addition to corporate concentration there are several other trends which will affect future location and logistics policies:

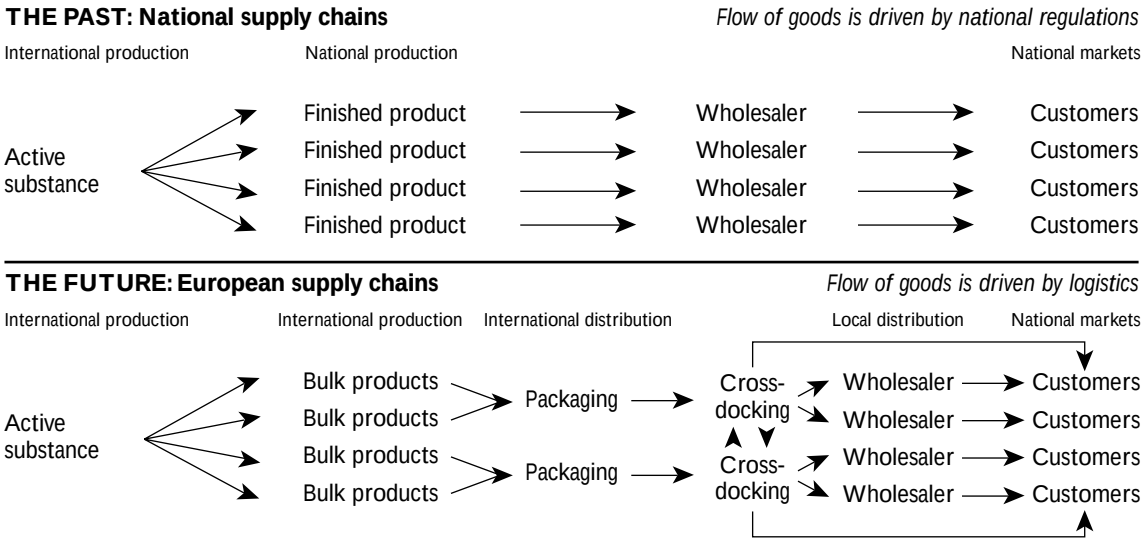
- pressure on costs, resulting in increased sales of over the counter (OTC) drugs, more direct sales of drugs by the manufacturers, fewer daily deliveries, and the rationalisation of distribution networks. Cost reductions have been carried further in the US than in Europe because it is easier to shed labour and there is less institutional resistance to change. In addition private health care insurers are able to negotiate changes which would be politically unacceptable in Europe;
- greater customer awareness of health care issues, leading to more use of self-medication and higher expectations about the level of service to be provided in drugs distribution:
- the use of E-commerce, which will increase the globalisation of manufacturing and trade;

- rapid technological change in areas such as order processing, bar coding, and warehouse automation. These are particularly important in view of the large product range which has to be handled, a business environment in which there is zero tolerance of errors, and the need for traceability of all product flows;
- more sophisticated knowledge management, through the use of Customer Information Files which analyse the medical and demographic characteristics of each customer, including his purchasing history and potential profitability. This allows manufacturers to evaluate different distribution strategies, including:
  - product customisation: the presentation or further development of a standard product in many different ways
  - yield management: discriminatory pricing of the same product for different customers
  - customer capture: the gaining of market share through strong promotional activities
  - event-oriented prospecting: anticipation of customers' life-style changes
  - decision support systems: computer-based decisions based on the detailed analysis of customer information
  - organisational interactions : the use of other organisations to build up market share.

As a result there is likely to be a shift in management priorities from the discovery of new drugs to the marketing of existing ones, causing location and logistics – neglected by senior managers because of their small contribution to profits – to move higher up the agenda.

Because of this, and the harmonisation of national regulations on drug manufacturing and distribution, significant changes are expected in the organisational structure of the industry. National manufacturing of the finished products close to the market will be gradually replaced by fewer European plants competing against each other for shares in multiple markets. International distributors will package and label drugs for these markets at centralised international distribution centres, and will sell from these directly to large customers (hospitals and drug store chains) as well as distributing to pharmacies in each country through national wholesalers (in some cases subsidiary companies).

Figure 4.5. Changes in the Organisational Structure of the Pharmaceuticals Industry



Source: B. Secrétan *Euro-CASE Expert Panel Meeting, Copenhagen, December 1999*

4.3. Location

The factors influencing location depend on which part of the supply chain is being considered, and whether the company is a new or established one.

Table 4.11. Factors Influencing the Location of Pharmaceuticals Activities

Production stage	R&D	Manufacturing	Packaging	Marketing/ sales	Warehousing/ distribution
Factors	• research facilities • living standards • talent • tax	• tax • labour skills • infrastructure	• proximity to markets • labour costs	• language • culture	• country-specific products
Prefered locations	USA Switzerland	Ireland Puerto Rico Singapore	Spain	National	National

Source: M. Koch *Euro-CASE Workshop Presentation, Milan, October 1999*

As supply chain management matures, the physical location of activities will also be influenced by IT (web-based ordering and operations planning) as well as by traditional factors such as labour availability, the location of related industries and services, taxation policy, and access to markets.

4.3.1. The Location of Pharmaceuticals Manufacturing

There is very little statistical information available on the location of manufacturing activity, as pharmaceuticals are usually grouped with other types of chemicals in surveys of industrial production, and the distinction between secondary processing and distribution (product preparation, packaging and labelling) is rather blurred. However anecdotal evidence highlights the pull of large markets such as Germany, France and the UK, and the location of important specialist producers of active ingredients in Sweden and Switzerland.

Present location patterns are to some extent the result of accidents of history, as the industry has displayed a high degree of locational inertia. A better indication of present day comparative advantage can be obtained by looking at the countries chosen by large manufacturers (particularly those from the US) for plants outside their country of origin. Italy and Spain appear to be the preferred locations – probably because of a combination of low labour costs and protected national markets – whilst large markets such as France, Germany and the UK have also attracted substantial amounts of outside investment.

One surprising feature of Table 4.12 - in view of the importance of the Benelux countries for European distribution activities – is the small number of pharmaceuticals plants that have been attracted to the Netherlands. This may be due to the bias of its world-class research programmes towards civil engineering and water control rather than chemicals. Belgium, which has traditionally had a much stronger coal-based chemicals industry appears to have done better, although some of its recent success may be due to the location there of various international drug authorisation agencies.

Table 4.12. Foreign Production Facilities for Pharmaceuticals in EU Countries 1988

Nationality of companies	Number of plants in other EU countries									
	Belgium	France	Germany	Greece	Italy	Neth.	Portugal	Spain	UK	Total
Belgium	-	2	1	-	1	1	-	1	-	6
France	5	-	4	3	7	-	2	6	2	29
Germany	1	5	-	2	10	1	2	10	5	36
Italy	1	1	1	-	-	-	-	4	1	8
Netherlands	1	1	1	1	2	-	-	1	1	8
Portugal	-	-	-	-	1	-	-	-	-	1
UK	4	6	3	3	5	-	1	5	-	27
US	9	18	14	7	19	2	5	17	19	110
Switzerland	4	3	3	2	4	1	-	4	3	24
Other	-	-	1	-	-	1	-	2	1	5
Total	25	36	28	18	49	6	10	50	28	254

Source: A. Silbertson and C.P Raymond *The Changing Industrial Map of Europe* 1996

It is probably more realistic to split manufacturing into a series of activities, each of which has slightly different locational requirements:

- R&D, which has strong locational links to academic institutions, other manufacturers' research centres, and areas with a pleasant living environment. R&D accounts for around 15% of all manufacturing employment, with around half of it requiring graduate labour;
- product development, including clinical trials and product approval by the regulatory agencies in each country. This requires access to progressive medical institutions, government agencies, and information/communications centres;
- manufacturing of the active ingredients. This is a specialist activity undertaken at relatively few sites, and is often very capital intensive. The availability of government grants and/or favourable tax concessions are important locational factors, and there is also a need for skilled labour. Low tax rates have been particularly important in the growth of pharmaceuticals manufacturing in Switzerland and (more recently) Ireland;
- preparation of the active ingredients into dosage form. This is usually undertaken close to the market using fairly standard technical processes but with high quality-control standards. Factors influencing location include the availability of cheap modern premises, low labour costs, and ease of access for distribution purposes.

Access to markets is probably a less important factor than it has been, as trade liberalisation removes the protection previously given to local manufacturers. Only five countries in the world (including Mexico and Indonesia) now require local manufacturing as a condition for market access, although some governments still use market share as a "carrot" to attract new manufacturing plants. However the need to comply with local regulations still encourages manufacturers to locate the final stages of product preparation within national markets.

Logistics considerations have virtually no effect on the location of manufacturing plants, particularly for companies that have expanded largely through mergers & acquisitions, and inherited many of their plants. Even for those companies which are expanding organically, the geographical distribution of existing assets is a more important determinant of future location patterns, because of synergies between the different parts of the organisation and the economies of scale which come from shared facilities and knowledge.

4.3.2. The Location of Wholesalers' Distribution Centres

The location of wholesalers' warehouses is influenced by the need to make deliveries to pharmacies at least twice a day in most European countries, with a delivery time of less than three hours from receipt of order. This limits the scope for centralisation/warehouse closures.
In addition, wholesaling is more competitive than manufacturing, with fewer opportunities for warehouse closures because of fears that this would reduce quality of service and allow other firms to move in to fill gaps in the market.

In countries like France and Italy a large national wholesaler typically has around 45 warehouses, although this could be cut to 30-35 if service standards to the more remote areas were relaxed. More compact markets with a higher population density such as the UK and Benelux countries can be served by 10-15 warehouses per company.

Some wholesalers have been forced by lower margins to move from city centre to out-of-town sites. Such moves have sometimes been associated with a fall in delivery frequency : city centre depots in Italy, for example, make up to five deliveries per day compared with 2-3 deliveries per day from suburban sites. Pharmacies have to increase their stocks to compensate for lower delivery frequencies, although this is a slow process as many pharmacies do not have the capital or space to support larger inventories. However considerable progress has been made in countries such as the Netherlands where relatively large pharmacies holding more stock have significantly reduced the number of deliveries required, allowing wholesalers in turn to concentrate their activities on fewer larger sites.

Most wholesalers choose their warehousing locations on the basis of national or regional markets, and have separate operations in different European countries. The concentration of warehousing into a single European location is physically possible, using sophisticated logistics and transportation systems, but brings limited benefits due to the need to stock separate products for different countries, and the high cost of closing down national operations.

Transfer pricing (and its tax implications) will be an important consideration in the design of any future pan-European distribution systems. The involvement of express parcels carriers in pharmaceuticals distribution will also have an influence on future warehouse locations, which will be near to the hubs they use for other products, although the express parcels carriers are still building new facilities in response to rapid market growth and regard pharmaceuticals as a major opportunity for expansion.

4.3.3. The Location of Retail Outlets

At national level the location of pharmacies broadly follows the distribution of population, subject to international differences in the density of pharmacies already noted. At local level, they are most closely related to the distribution of doctors, clinics and hospitals, although this is now changing in favour of sites which support a large number of other retail establishments, particularly supermarkets and single-product chain stores.

There are three trends that will affect future choice of location, at least in countries where the ownership of pharmacies has been deregulated:

- pharmacies are becoming bigger;
- drug store chains are capturing a larger share of the market;
- over the counter pharmaceuticals are becoming more widely available in supermarkets.

This will lead to an increase in direct deliveries, with local distribution centres holding stocks for different groups of retail outlets than those served by traditional wholesaling methods.

4.4. Logistics

Logistics costs in the pharmaceuticals industry are very low compared with other sectors (0.5-2.0 % of sales revenues) due to:

- the high value/low volume nature of the product;
- cost-plus pricing which includes a generous allowance for industry-specific items such as research & development, clinical trials, product approval procedures, product tracking, and the withdrawal and disposal of time-expired stock;
- the small number of manufacturers involved, which simplifies drug collection.

This is why improvements in logistics have so far attracted so little attention.

Logistics affects three different parts of the supply chain:

- movement of drugs from place of manufacture to the manufacturers' warehouse in the country of destination, where the drugs are usually customised for the local market to meet dosage standards, packaging and labelling requirements etc. This is usually outsourced under simple "transport-only" contracts, although it requires the use of special temperature controlled vehicles;
- movement of drugs from the manufacturer's warehouse to wholesalers and major users such as hospitals and drug store chains. In some countries this is undertaken by specialist distribution companies, in others by road haulage companies or third party logistics providers;
- distribution of drugs by wholesalers to the pharmacies and other "unconcentrated" end users.

This is usually regarded as one of the basic functions of wholesaling.

There are some common trends in logistics whose effects are spread over the whole supply chain, and some unique trends that affect certain parts of the supply chain more than others.

4.4.1. Common Trends in Pharmaceuticals Logistics

Several changes are taking place which will lead to the streamlining of logistics within the pharmaceuticals industry:

- many of the simpler logistics functions – transport, warehousing, transport management and IT – are already outsourced, but this seems likely to decline over the next five years, as firms retreat from their previous policy of divesting all non-core operations. However there will be continued growth in the outsourcing of more complex logistics tasks such as order handling, logistics management, and the provision of value-added services (for example quality control, repackaging, and the withdrawal of date-expired drugs);
- transport costs will continue to fall as a result of transport deregulation, the use of larger vehicles, more efficient planning of delivery schedules, and the use of express parcels carriers;
- greater use will be made of automated warehousing to improve the management of the very large number of product lines which wholesalers must hold in stock;
- there is a trend towards the consolidation of storage and cross-docking facilities, often at multi-user sites;
- it will become recognised that pharmaceutical products with different shelf lives have different warehousing and distribution requirements, although the UK is the only country which has so far developed a two-tier service, with less frequent deliveries for slower-moving items;
- there will be more interest in Pan-European distribution networks as national legislation is harmonised and Europe moves towards a Single Market in pharmaceutical products. So far pharmaceuticals has lagged behind almost all other industrial sectors - catching up could produce some major changes in future distribution patterns.

4.4.2. Logistics Issues of Concern to Manufacturers

Manufacturers' logistics are affected by national differences in:

- legal requirements for health care products;
- product approval procedures;
- pricing policy;
- advertising regulations;
- prescription and price reimbursement procedures;
- dispensing and distribution channel structures.

Changes now being introduced by large drug manufacturers include the outsourcing of logistics to "shared" third party managers, who bundle together the distribution activities of several pharmaceutical companies, or act as European distributors for a range of non-pharmaceuticals products.

The advantages of outsourcing include:

- greater service flexibility in a multi-user environment (sharing of facilities with non pharmaceuticals products);
- substitution of variable for fixed costs;
- lower inventory costs;
- greater purchasing power for outsourced functions such as transport;
- improved access to market information (particularly demand patterns) through use of the logistics supplier's more sophisticated IT systems.

However the sharing of warehouses, vehicles and information systems has been fairly slow to take off because of fears about loss of control, including the leakage of information to competitors. The outsourcing of pharmaceuticals distribution is most advanced in the UK and Italy. Elsewhere there is particular resistance to the outsourcing of operations which involve cross-border movements, perhaps because of the financial complexity of the transactions involved.

One manufacturer participating in this study (Glaxo Wellcome) also identified some more practical problems occurring at the level of the individual company:

- intra-company transport chosen by the manufacturing unit despatching the drugs but paid for by the marketing unit receiving them. In this situation the sending unit has no incentive to chose the most cost-effective form of transport, whilst the receiving unit cannot influence transport costs, for example by requesting a lower frequency of deliveries or a different form of transport;
- use of an excessive number of warehouses for finished products because of the need to store them separately for each national market, resulting in very high inventory costs;
- failure to consolidate cargoes which travel along shared routes, to improve purchasing power and achieve economies of scale in transport;
- highly aggregated transport costs, with no breakdown by product and route, making it difficult to identify priorities for cost savings.

Because of pressure for improvements in profitability, Glaxo Wellcome is outsourcing its transport operations to a single pan-European transport contractor, to be followed (18 months later) by a review of the number and location of its warehouses. Two reasons were given for considering transport and warehousing needs separately, rather than as part of an integrated logistics package:

- separate national markets within Europe limit the scope for achieving economies of scale in warehousing, except through some very limited consolidation;
- the outsourcing of transport operations can be achieved much more quickly than the restructuring of warehousing operations, which involves the transfer of responsibilities within the company, redundancies, recruitment and training, consultations with the workforce, assessment of tax implications, engineering contracts for the development of new sites, and the acquisition or disposal of property.

Drug manufacturers are becoming more sophisticated in their approach to supply chain management, but are surprisingly backward for a high technology industry. Five stages of development in supply chain management can be identified:

- ad hoc: unstructured and ill-defined, with no clear processes;
- defined: supply chain processes are well-documented, but no major changes are made to the company's organisational structure;
- linked: supply-chain oriented organisational structure, with co-ordination of different corporate functions;
- integrated: close co-operation with customers and suppliers, with supply chain management procedures deeply embedded in the organisation;
- extended: multi-firms supply chains based on collaboration, trust and mutual dependency.

The Top 20-25 companies are at different stages in their approach to supply chain management, but on average are closer to the starting point than they are to current best practice. However they do not have to progress steadily through the sequence of stages listed above, and some may chose to jump straight from simple systems to relatively complex ones.

4.4.3. Logistics Issues of Concern to Wholesalers

The trends in European pharmaceuticals distribution which are of specific concern to wholesalers are:

- direct distribution of drugs from manufacturers to large users, leaving the wholesaler with the high cost end of the business (distribution to small, dispersed customers);
- increased use of the Internet for the direct supply of drugs from manufacturer to customer (e.g. Viagra). This is accelerating the trend towards global markets much faster than deregulation, and is also increasing the pressure for regulatory reform as national regulations become redundant or unenforceable;
- the globalisation of drugs distribution as a result of the standardisation of national regulations. This is expected to lead to further concentration in pharmaceuticals wholesaling, through merger & acquisition activity and network consolidation
- the creation of retail pharmacy chains with the ability to undertake their own drugs distribution;
- competition for distribution services from third party logistics providers, specialist distribution firms, express parcels carriers, and other transport firms offering "less than truckload" services.

Some wholesalers are seeking to reduce distribution costs by cutting back delivery frequencies to pharmacies. But there is a large education exercise to be undertaken first, as pharmacies are largely unaware of the costs of different levels of service, and receive no direct benefit.

In Switzerland one wholesaler (Galenica) has actually begun buying pharmacies in order to control its customers , and streamline the distribution system. But it has only been able to implement measures such as warehouse closures because of its large market share. Reform of the supply chain has proved more elusive in countries where there is strong competition between wholesalers, except in cases where it has produced large cost savings and these have been passed on to the customer (e.g. in Spain).

Partnering skills are an increasingly important success factor for the wholesaler's survival, as partnership arrangements with manufacturers protect wholesalers against the perceived market threat from multi-product distribution firms, third party logistics managers, and the express parcels carriers.

Such partnerships generally involve:

- sharing of financial risks;
- the feedback of real-time and processed information about local market conditions;
- assistance in marketing, including pro-active contacts with end-users (within the framework of national regulations on the advertising and promotion of drugs) and advice on the best way to respond to new market threats (for example the introduction of competing drugs). Wholesalers can also help in improving the market visibility of manufacturers;
- optimisation of distribution systems, including the centralisation of ordering and delivery, and drugs distribution to users other than pharmacies (hospitals, drug store chains etc);
- development of value-added services.

Smaller wholesalers are also developing partnership agreements with each other (between companies in different countries) to reduce the investment needed to create pan-European supply chains.

Public policy initiatives which are required to make pan-European supply chains work effectively include the standardisation of :

- pricing policies;
- approval procedures for new products;
- legislation relating to packaging;
- advertising legislation.

In addition, there are a number of measures required to improve transport efficiency for pharmaceuticals.

Large wholesalers envisage the eventual replacement of national warehouses with 1-3 European Distribution Centres (EDCs), although this is still quite a long way off in time. The Benelux countries have several advantages as a location for EDCs, including:

- proximity to global port and airport hubs;
- flexible working practices;
- good industrial relations;
- access to the major markets of France and Germany.

However there are more limits on the benefits of centralisation in pharmaceuticals wholesaling than in almost any other industry, including:

- the high transport costs associated with the requirement for rapid delivery;
- the fragmentation of European pharmaceuticals national regulations; and
- the use of postponement technology, which favours smaller Regional Distribution Centres, based on dedicated rather than shared facilities.

4.4.4. Logistics Trends of Concern to Pharmacies

The main logistics trends of concern to pharmacies are:

- the transfer of responsibility for short-term stockholding from the wholesaler to the pharmacy, requiring pharmacies to become larger and better capitalised:
- reductions in the delivery frequency of drugs, as wholesalers attempt to reduce costs;
- the growth in direct contacts with manufacturers, which are usually of advantage to the larger, more progressive businesses.

There is also concern about the role of over the counter drugs, and their sale by retail outlets – particularly supermarkets - which do not have a qualified pharmacist.

4.5. Transport

Within Europe pharmaceuticals travel almost exclusively by road. There has been some use of airfreight on the longer-distance routes (for example UK-Greece) but this is being replaced by road transport as haulage companies and express parcels carriers become more efficient and dependable.

Road congestion reduces the reliability of deliveries, but this is not a serious issue for the drug manufacturers, whose national product warehouses carry several weeks of inventory. It is a more serious (and less easily solved) problem for the wholesalers, who carry smaller stocks of each drug and are committed to delivering them to the pharmacies within very narrow time windows (often 2-3 hours).

Production sites are multi-product, but do not usually manufacture a company's full product range, so they serve a mixture of national and European markets. The drug manufacturers back-haul quite a lot of their own products, improving vehicle load factors but creating complex routeing patterns. Consequently transport management is regarded as a high value added task, which is one of the reasons why it is frequently outsourced.

Manufacturers selling internationally can reduce transport costs by consolidating their own flows. There is less to be gained by combining the distribution of pharmaceuticals with that of other products, as procedures for the handling of pharmaceuticals (batch tracking, temperature control, quality assurance etc) are more stringent than for other products, whilst combined deliveries reduce the quality of service offered by distributors. Pharmaceuticals are often carried by the same sub-contractors as other products, which creates some economies of scale (for example in the purchase of fuel) but they rarely use the same vehicles or warehouse space because of contamination risks.

Driving restrictions in Austria and Switzerland make combined transport a possibility for the future in some markets, but concerns about the railways' consignment tracking and temperature control capability, and the unreliability of delivery times, means that rail is only used when there is no alternative.

The use of isothermic containers, which guarantee that the cargo is kept within a small temperature range for 72 hours (normally 2-8oC or 15-25oC) is one solution to reliability problems in road transport, although many rail journeys exceed the maximum period for which temperature control can be guaranteed. However rail transport would still present problems:

- European railways are reluctant to accept penalty clauses if they fail to meet the temperature conditions specified in the contract;
- temperature control is difficult during cross-docking operations, and may require investment in specialist depot facilities;
- there is not the same level of equipment availability as exists in road transport, where the demands of the food distribution industry have led to rapid expansion of the refrigerated vehicle fleet.

Even in the US, which is much larger geographically and operates as a single unified market, there is no significant use of rail transport for pharmaceuticals – most still move by truck, with air transport used for long-distance, urgently needed consignments.

Although the Benelux countries are a favoured location for distribution centres because of their excellent port facilities, hardly any use is made of short sea shipping for drug distribution within Europe. This is because it is less frequent and less flexible, and because southbound trucking charges for refrigerated transport are low because of freight flow imbalances : northbound movements predominate from Iberia and (to a lesser extent) Italy, allowing southbound pharmaceuticals products to obtain low freight rates as back-haul cargo.

The main changes in transport policy which industry representatives involved in this study believe would improve supply chain efficiency are:

- removal of driving hours restrictions in certain countries (e.g. the ban on weekend movements);
- 24-hour operation of airports;
- fiscal incentives for the development and use of innovations in vehicle design, for example multi-temperature trailers which can carry products requiring different ambient environments, or reefer containers for rail transport. These are not widely available because very few companies are prepared to guarantee the necessary traffic volumes;
- further liberalisation of road haulage;
- measures to ensure that “best practice” spreads rapidly within the road haulage industry.

These recommendations are reviewed in Chapter 6.

WORKSHOP FINDINGS: AUTOMOTIVE INDUSTRY

5. WORKSHOP FINDINGS : AUTOMOTIVE INDUSTRY

5.1. The Structure of the European Automotive Industry

The automotive industry is the most complex, and perhaps the most rapidly changing, of the three sectors examined in this report.

In the last 10 years there have been several changes to the traditional relationships between manufacturers and their components suppliers and dealers:

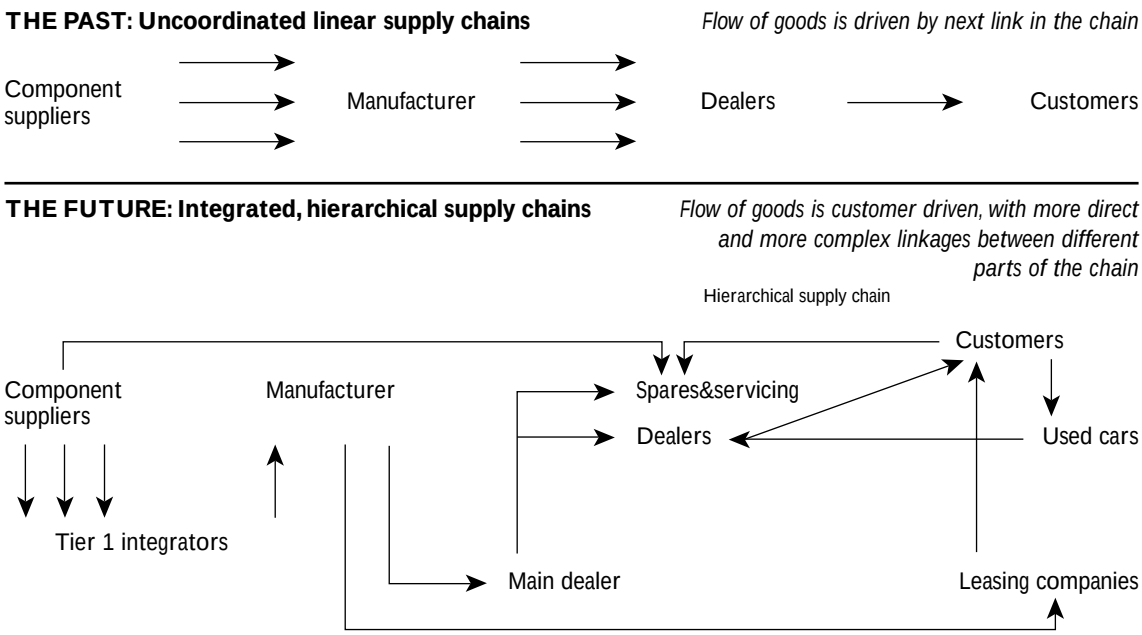
- both the components suppliers and the dealers are forming hierarchies, in which "first tier" suppliers and dealers provide the main point of contact with the manufacturer, and have developed an important management role in relation to second and third tier suppliers and dealers:
- new market entrants, particularly Asian car manufacturers, have not always had the sales volume to justify a national sales organisation, and have made extensive use of independent distribution networks (for example the Toyota/Inchcape partnership). The growth of these networks has in turn encouraged some dealers to move from exclusive to multi-product franchises;
- some parts of the supply chain are being short-circuited, as:
  - components manufacturers supply spare parts for after-sales servicing directly to the dealers, rather than selling them through the manufacturer as a branded product;
  - national sales organisations sell direct to the customer, often via the Internet, by-passing the dealer altogether
- responsibility for stocks has been transferred away from manufacturers. For finished cars it has been transferred forwards along the supply chain to dealers, who now hold an average of 50 days inventory in Europe, compared with the 8 hours inventory of finished cars held by the manufacturers. For components responsibility has been transferred backwards, particularly to Tier 1 suppliers;
- there has been a switch from "push" to "pull" manufacturing which – combined with increased customisation of the product – has made it more difficult for customers to buy a car off-the-shelf. Waiting times from order to delivery are now around two weeks for volume cars, and can be 2-3 months for luxury cars where more variations are on offer;
- third party logistics providers are being used to manage the flows of goods, although manufacturers still tend to split the supply chain into two halves (inflow of components and outflow of finished vehicles) for outsourcing purposes.

However the supply chain can still be divided into four main elements:

- manufacturers;
- components suppliers;
- franchised dealers;
- other organisations providing after sales services

This section describes briefly the structure, and recent changes, in each of these groups.

Figure 5.1. The Automotive Supply Chain



5.1.1. Manufacturers

Although car manufacturing is regarded as a prestige industry by politicians, its financial performance in recent years has been dismal, with average operating margins of only 2-3%, and slower profits growth than for manufacturing industry as a whole. There is a large margin of over-capacity – usually estimated at between 20-30% - whilst demand has been growing slowly.

Manufacturers are generally inward looking, and innovations have come largely from outside of Europe, or even from outside of the motor industry altogether. New entrants are less bound by industry conventions – and political pressures – than established firms, and have been able to redesign their supply chains more radically.

The companies manufacturing in Western Europe fall into four main categories:

- the eight large European and US car manufacturing groups, which account for around 95% of car output;
- around 15-20 speciality car manufacturers (mainly sports cars and off the road vehicles) with low production volumes and an uncertain future;
- new entrants from Japan; and
- commercial vehicle manufacturers.

The European and US car manufacturers have experienced a great deal of merger and acquisition activity within the last five years, which has extended their product range and widened the geographical spread of their manufacturing activities. As a result, they now comprise families of brands which appeal to different sectors of the market and have different supply chain patterns. The scope for rationalisation is enormous.

Table 5.1. Automotive Groups Created by Recent Merger and Acquisition Activity

BMW	DAIMLER CHRYSLER	FIAT	FORD	GM	PSA	RENAULT	VAG
BMW Rover	Chrysler Dodge Eagle Jeep Freightliner Maybach MCC Mercedes Benz	Alfa Romeo Ferrari FIAT Iveco Lancia Maserati New Holland	Aston Martin Daimler Ford Jaguar Mazda Mercury Volvo	GMC Opel Saab Saturn Vauxhall	Citroen Peugeot	Mack Renault	Audi Bentley Lamborghini Rolls Royce SEAT Skoda Volkswagen

Source: KPMG *Europe on the Move : The KPMG Review of Automotive Retail and Manufacturing* 1998

The comparative size and key performance indicators for the main European car manufacturers are shown in Table 5.2. The figures have to be interpreted with care, as some of the differences are due to the use of outsourcing, variations in product mix, wage rates or capacity utilisation. However there is a significant difference between the luxury car makers (BMW and Mercedes Benz) who earn €25-35,000 per car but produce only 10 cars pa per employee, and the volume car makers who earn around €15,000 per car whilst producing 15-20 cars per employee..

Table 5.2. Major European Car Manufacturers 1998

	Sales (€bn)	Production ('000 units)	Employees ('000)	Vehicles per employee	Revenue per employee (-)	Revenue per car (-)
VW of which	41.48	3,703.6	224.6	16.5	184.6	11.2
VW[a]	35.75	2,180.6	139.5	15.6	256.3	16.2
Audi	6.20	619.0	42.1	14.7	147.3	10.0
SEAT	4.79	500.5	17.3	20.0	277.1	9.6
Skoda	2.26	403.5	21.3	19.0	106.4	5.6
BMW of which	32.28	1,204.0	119.9	10.0	269.2	26.8
BMW	17.94	706.4	76.0	9.3	236.1	25.4
Rover	7.74	497.6	36.8	13.5	210.3	15.6
Mercedes Benz	32.59	947.5	95.2	10.0	342.5	34.4
Renault Cars	29.74	1,942.7	109.4	17.8	271.8	15.3
PSA Automotive	29.27	2,024.0	121.1	16.7	241.7	14.5
Ford Europe[b]	25.36	1,731.3	105.4	16.4	240.7	14.6
FIAT	24.79	1,601.2	93.5	17.1	265.2	15,5
GM[c]	23.45	1,996.0	91.0	21.6	257.7	11.9

Notes: (a) cars and commercial vehicles
(b) excludes Volvo
(c) includes Saab
Source: Economist Intelligence Unit *Europe's Leading Car Plants : Comparative Productivity Audit* in Motor Business Europe, August 1999

Table 5.2. also illustrates the large amount of employment – almost one million jobs – directly dependent on car assembly lines, before taking into account the even larger number of jobs created by components suppliers

Although the demand for new cars has been growing slowly, manufacturers have continued to invest in additional production capacity. This has been partly due to the development of new production facilities for new models, and partly due to the drift to lower cost locations in Spain and (more recently) Portugal. Because car assembly is such a prestigious economic activity, and a perceived creator of jobs, governments offer generous financial incentives to manufacturers to set up new plants in their areas, whilst exerting strong political pressure to prevent the closure of older plants.

Capacity has also been increased by the arrival of Japanese manufacturers, who set up European manufacturing plants initially to overcome voluntary export restraints and other trade barriers, but are now using their European plants as a hedge against the strength of the Yen, and a means of lowering their production costs. The first Japanese company to set up in Europe was Nissan (1986), followed by Toyota (1989) and Honda (1992), all in the UK. Smaller manufacturers such as Suzuki (Spain), Daihatsu (Italy), and Mitsubishi (Netherlands) have chosen to become established through joint ventures with European manufacturers, whilst the "second wave" of Korean car manufacturers such as Daewoo and Hyundai have concentrated on lower cost locations in Turkey and Eastern Europe.

Many of the large car manufacturers also make commercial vehicles – light vans, trucks, buses and speciality vehicles such as fire engines or street cleaners. Production volumes in Western Europe are much smaller – 2m vehicles pa compared with 14m cars pa– and the market is more segmented with a different mix of manufacturers for each vehicle size/purpose and a larger number of specialist manufacturers such as DAF, MAN and Scania. Most automotive manufacturers keep their car and truck divisions separate, but there is an overlap in the rapidly growing area of light commercial vehicles, which are sometimes built from the same platform as passenger cars. There is also less competition from imports, and a much higher proportion of direct sales, which results in a totally different type of distribution network.

Table 5.3. West European Production of Car and Commercial Vehicles by Manufacturer 1996

MANUFACTURING GROUP	% OF CARS	% OF COMMERCIAL VEHICLES
Big Eight		
BMW/Rover	7%	-
Daimler-Chrysler	6%	10%
FIAT/Iveco/Sevel	10%	18%
Ford/Volvo	12%	15%
GM	12%	6%
PSA	13%	15%
Renault	12%	13%
VAG	21%	7%
Japanese manufacturers	5%	5%
Other	2%	11%

Source: Society of Motor Manufacturers and Traders *World Automotive Statistics* 1997

5.1.2. Components Suppliers

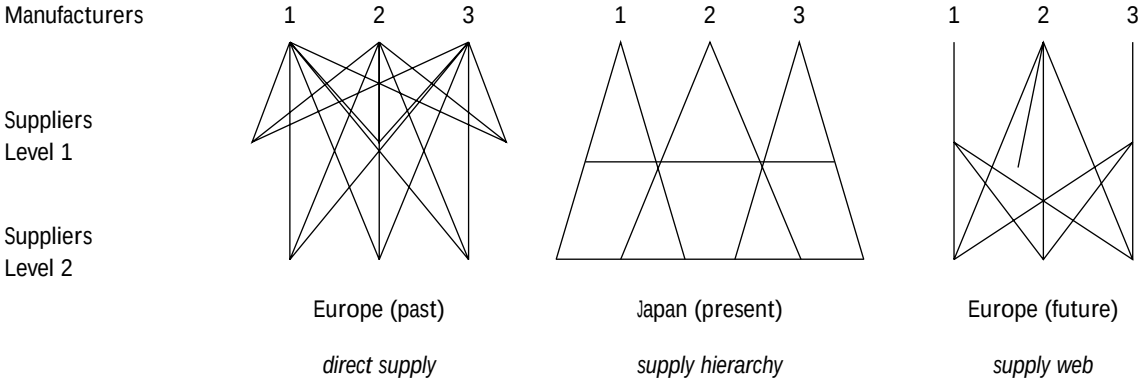
Manufacturers are supported by a multitude of component suppliers. Some provide a dedicated service to a single manufacturer, some compete for the business of several car manufacturers, and some also produce components for other industries.

European component suppliers differ from those in Japan and the US in four important respects:

- the European car industry has always been less vertically integrated, large components suppliers are more powerful relative to the car manufacturers, less likely to have an exclusive supply arrangement with a single manufacturer, and do not have an interlocking ownership structure or close informal relationships of the type found in Japan. This gives them greater independence in terms of location;
- the supply chain structure is less hierarchical, with more suppliers delivering direct to the assembly line : around 1000 per manufacturer in Europe, compared with 200-300 in Japan, where responsibility for collecting and pre-assembling smaller components has been delegated to Tier 1 suppliers. This complicates logistics, and requires the manufacturers to play a larger role in supply chain management;
- more use is made of short-term contracts based on competitive tendering. This increases the variability of the supply chain, and makes smaller suppliers reluctant to invest in dedicated facilities;
- European suppliers have a more diverse product range, often enlarged by recent merger and acquisition activity. As a result, they may supply some components directly to the manufacturer, act as a Tier 1 assembler of components from other suppliers, and supply some components of their own to other Tier 1 assemblers, occupying more than one position within the same supply chain.

The European supply industry is therefore developing a fairly complex web-like structure that makes location and logistics decisions more difficult than those faced by their counterparts in Japan and the US.

Figure 5.2. Alternative Models of the Components Supply Chain



The number of component suppliers has been falling sharply, partly because small suppliers lack the financial resources to achieve modern quality standards.. World-wide, the number of direct suppliers has fallen from 30,000 to 8,000 over the last 15 years, as companies have become second and third tier suppliers in extended supply chains, been absorbed into larger enterprises, or gone out of business. Some analysts have forecast that by 2010 there will be only 100 Tier 1 suppliers servicing 10 global automotive manufacturers.

5.1.3. Dealers

The automotive industry is unusual because of the high degree of control which manufacturers have over the distribution of their product, even though this is achieved in most countries through contracts with independent franchised dealers rather than direct ownership of retail outlets. A Europe-wide regulatory framework – the Block Exemption given to car manufactures from the competition provisions of the Treaty of Rome – allows them to franchise the right to sell their cars, and to exercise a high degree of control over how this is done.

The Block Exemption was renewed, in a slightly modified form, in 1995 and runs until 2002. It gives car manufacturers the right to:

- choose which dealers they franchise, and the standards they must meet;
- grant exclusive sales rights within specific territories, and prevent dealers from selling cars outside of these areas to importers or "re-sellers", or to individual customers by direct mail or telemarketing;
- sell directly to corporate customers, bypassing the dealer network.

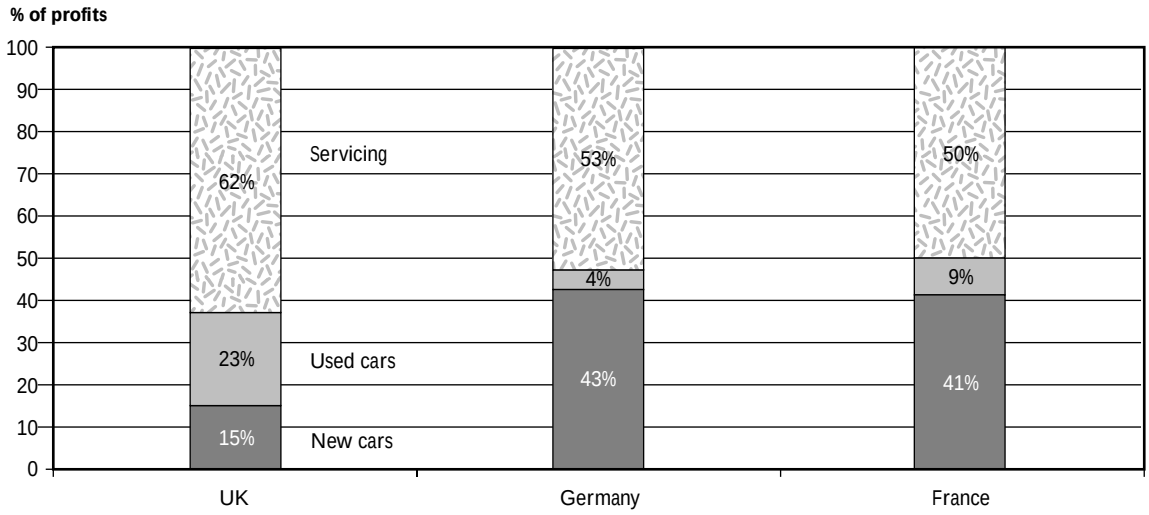
However the 1995 revisions to the Block Exemption did introduce some new elements of competition, which will have a significant effect on the future shape of dealer networks:

- dealers are now allowed to sell the products of more than one manufacturer (multi-franchising) providing the premises and management are kept separate;
- dealers can sell parts provided by organisations other than the manufacturer, providing they are of equivalent quality, and are used only for vehicles outside of their warranty period;
- manufacturers must supply technical information to independent garages which will allow them to compete with franchised dealers for after-sales servicing work.

After sales servicing and the sale and purchase of used cars are important activities for franchised dealers. Although they face greater competition from "outsiders" in these two secondary activities, they still make larger profit margins, and both activities have expanded relative to the "core" business of selling new cars. However there are significant variations within Europe in the relative size of the three markets and the amount of outside competition faced by dealers, which results in different "business profiles" for dealers in different countries.

Profit margins on new car sales are low because there is a general over-supply of dealerships, leading to a low level of sales per outlet. Manufacturers have tried to address this problem by pruning their dealership networks. Since 1982, for example, the number of UK dealerships has fallen from just over 8,500 to just under 6,500, whilst sales per outlet have more than doubled.

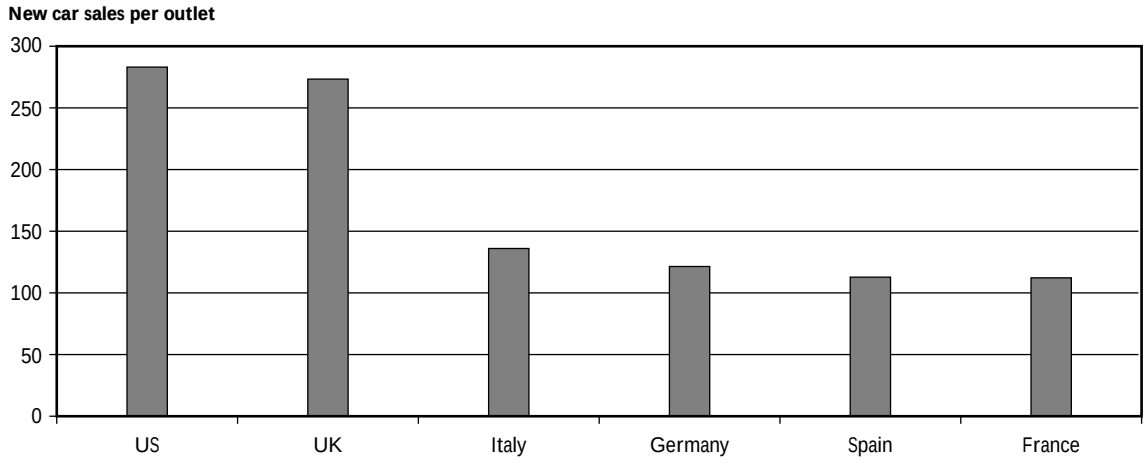
Figure 5.3. Sources of Profit for Franchised Dealers 1995



Source: M. Harbour *Winning Tomorrow's Customers : Future Directions in Car Retailing and Servicing in the UK* 1997

In the last five years there has also been a decline in the number of dealerships in France, Spain and Italy, but not in Germany where new dealerships are still being established to exploit the sales opportunities opened up by re-unification. However sales per outlet are still low in Continental Europe compared with the UK and USA.

Figure 5.4. New Car Sales per Retail Outlet 1996



Source: M. Harbour *Winning Tomorrow's Customers : Future Directions in Car Retailing and Servicing in the UK* 1997

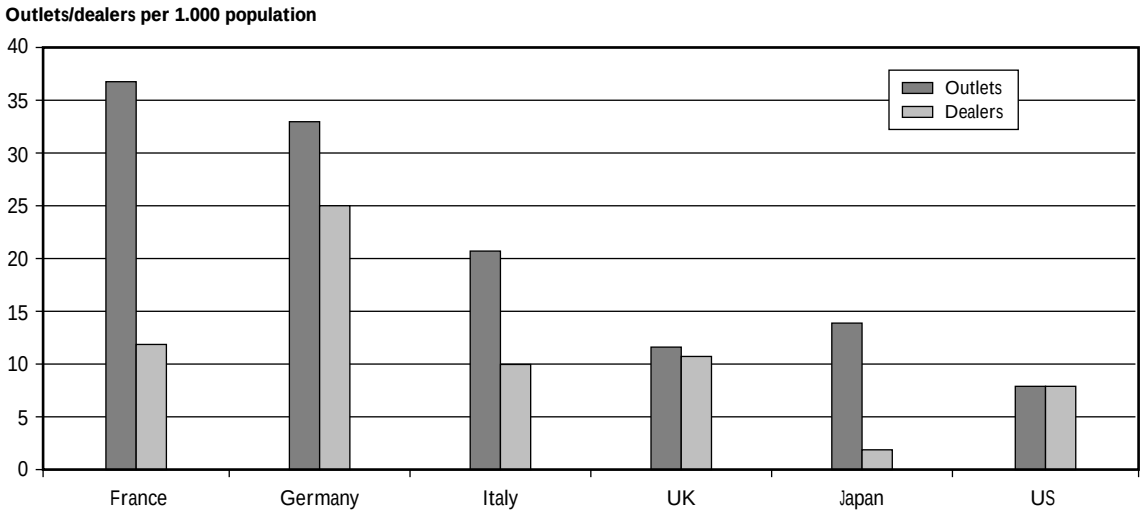
Part of the large difference in sales per outlet between the UK and Continental Europe arises because of differences in the structure of dealer networks:

- UK dealers serve larger populations because manufacturers have been more disciplined about handling out franchises, and have acted earlier to reduce over-supply in a business/legal environment which offers less protection to small dealers;
- there are fewer sub-dealers because the UK lacks the large rural areas of low population density that characterise countries such as France and Spain. In areas where full service dealerships cannot be justified, manufacturers have allowed sprawling networks of sub-dealers (petrol stations and independent garages) to develop simply to maintain a low cost presence in the market place;
- the UK has a lower proportion of single-outlet dealerships (42%), with sales biased towards large dealer groups covering large territories. The UK has several of the world's largest independent car retailing organisations, and these achieve a higher level of sales per outlet than the small family-owned business which are predominant in southern Europe;
- unlike their counterparts in Continental Europe, most large car retailing groups in the UK are listed on the Stock Exchange, and so face pressure from institutional investors for an increase in yields;
- there has been faster growth of multi-franchising, although the UK still lags behind Scandinavia where low population densities and the absence of strong national manufacturers (except in Sweden) have made multi-franchising the preferred mechanism for car distribution. In the UK the number of multi-brand franchises increased from 240 in 1992 to 860 in 1997. But although the power balance between dealers and manufacturers in the UK is less biased in favour of manufacturers than elsewhere, normal practice has still been to add a low volume franchise which will not compete strongly with the dealer's main business, rather than to retail two or more major brands.

In Germany the predominant model is the single franchise, multi-site dealer, with a strong regional concentration. The sites controlled by each dealer are small, but have a strong local monopoly. However dealer "teams" are now appearing, in which small dealers for the same manufacturer share facilities such as new and used car showrooms, whilst retaining individual control over servicing and spare parts

In France, **Italy and Spain** there is often a two-tier dealership structure, with small independent outlets specialising in vehicle servicing acting as sales agents for larger groups rather than having direct contracts with the manufacturers. Almost 80% of Renault and Citroen's dealers, for example, act as secondary dealers, whereas for Japanese firms such as Nissan and Toyota – who have been able to design their European distribution networks from scratch – the figure is much lower at between 15-25%. In total around 40% of French dealers are now second tier "service only" agents. France and Italy also have the highest proportion of manufacturer-owned outlets, and this appears to be an increasing trend : in 1998 1,200 European sales outlets were manufacturer-owned, compared with only 1,000 in 1997.

Figure 5.5. Density of Dealerships and Sales Outlets in Various Countries



Source: A.T Kearney *The Future of Automotive Distribution* 1999

5.1.4. Other Organisations in the Supply Chain

There are five other organisations that have an important influence on the supply chain:
- car importers, including overseas manufacturers with their own European dealer networks;
- independent providers of spare parts and after sales servicing;
- used car dealers;
- Internet service providers; and
- third party logistics managers

Car Importers

Just under 60% of the new cars sold in Western Europe each year are imported from another country, including approximately 8% which are imported from outside of Western Europe. This is equivalent to one million cars pa.

West European car registrations 1996

Total	12.8m
of which manufactured in another W.European country	6.3m
manufactured outside of W.Europe	1.0m

Western Europe in turn exports around 2.0m cars pa to Eastern Europe and countries overseas.

France and Germany import a lower percentage of their national consumption of cars, and export a higher percentage of their national production, than do Italy and the UK. This is partly due to the reputation of German cars at the top end of the market and the ability of the French manufacturers to judge the market for small cars at the bottom end, but it also reflects a strong national preferences for domestically produced cars which is enhanced by the favourable purchasing terms which some manufacturers give to employees. Sweden and Spain stand out from the other European countries through their very open trading regimes, with a high proportion of both imports and exports.

Table 5.4. Trade in Cars in Major European Manufacturing Countries 1996

COUNTRY	% OF CONSUMPTION IMPORTED	% OF PRODUCTION EXPORTED	IMPORTS (M CARS)	EXPORTS (M CARS)
France	47.4%	64.4%	1.010	2.206
Germany	46.0%	58.4%	1.607	2.650
Italy	60.9%	48.5%	1.058	0.640
Spain	54.9%	79.0%	0.504	1.534
Sweden	71.5%	85.8%	0.131	0.315
UK	63.7%	54.2%	1.354	0.914

Source: Society of Motor Manufacturers and Traders *World Automotive Statistics* 1997

Not all of the major manufacturing countries in Western Europe are net exporters – France, Germany and Spain have net exports of just over 1.0m cars pa each, but Italy and the UK are now net importers (of around 0.4m cars pa each) whilst Sweden has only a small positive trade balance of around 0.2m cars pa.

Perhaps surprisingly, Asian manufacturers have the highest market penetration rates in Germany, France and the UK. This is partly because these are the largest markets, which justify the use of dedicated dealer networks, and partly because consumers in these countries tend to regard other European cars as similar to domestically manufactured vehicles, but lacking the wider range of accessories which come with Japanese cars. Asian manufacturers have made less effort to penetrate smaller markets such as Finland and Ireland, where potential sales are insufficient to justify dedicated franchises.

European car manufacturers have set up dealer networks in other European countries which broadly resemble those in their home countries. However they face competition from third party importers who take advantage of the large differences in price for major brands in different European countries, and may buy from franchised dealers in a different country in order to obtain a lower price.

The 1995 Block Exemption agreement requires that in the long-term car prices for each model in Europe should not diverge by more than 12%, but the results of the EU's six monthly price monitoring exercise suggest that this is still far from being complied with. The UK is the most expensive country in Europe for 61 out of 72 of the most popular models. Although the average price premium paid by UK purchasers in 1998 was only 6%, there was a price disadvantage of over 40% for 16 of the 72 models, leading to a substantial growth in "grey" trade (sales which are handled outside of the authorised national dealer networks). This is not confined to the UK, where it has been restricted by technical requirements (right-hand drive) and national regulations which until October 1998 allowed independent UK distributors to import no more than 50 "grey" vehicles pa from other countries offering cheaper prices. It is equally prevalent in Continental Europe, where in 1998 VW was fined €102m by the European Court of Justice for banning its Italian dealers from selling cars to customers in Austria and Germany.

Table 5.5. Proportion of Car Imports Coming from other European Countries 1996

Importing country	% of car imports coming from outside of Europe	Imports ('000 units) from:	
		W Europe[a]	Elsewhere
Austria	n.a	211	n.a
Belgium/Luxembourg	n.a	307	n.a
Denmark	30%	100	42
Finland	28%	69	27
France	41%	595	416
Germany	59%	657	950
Greece	26%	78	28
Ireland	33%	78	37
Italy	33%	711	346
Netherlands	n.a	313	n.a
Norway	n.a	n.a	n.a
Portugal	42%	156	114
Spain	4%	605	25
Sweden	39%	80	51
Switzerland	n.a	n.a	n.a
UK	44%	757	597

Note: (a) excludes imports from Spain and Belgium
Source: Society of Motor Manufacturers and Traders *World Automotive Statistics* 1997

Asian car manufacturers have taken three distinct approaches to marketing their cars in Europe:

- the larger ones such as Nissan and Toyota have set up pan-European distribution centres that supply vehicles to individual dealers from a central pool. They use a mixture of independent outlets (many of them recently discarded by European manufacturers) and dealers representing European manufacturers who have chosen to add a Japanese brand as a second or third franchise;
- the smaller Asian manufacturers supply vehicles to dealers directly from the factory, in small batches with long lead times;
- finally some manufacturers, like Daewoo and Daihatsu, have been experimenting with direct sales to the customer, cutting out the dealer altogether.

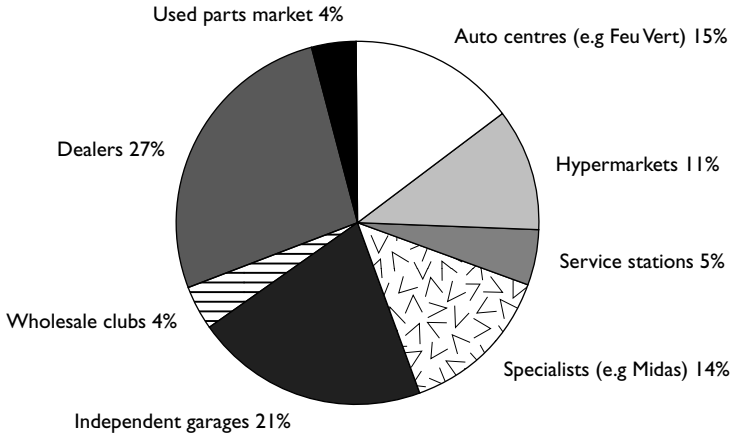
Because of large international differences in car prices before and after tax, a new type of independent distributor is starting to emerge, specialising in vehicles that have not been bought directly from the manufacturer. These are either imports, or vehicles purchased from other European dealers who are seeking to download unwanted stock. A good example is the Cardoen chain of car supermarkets in Belgium, which sells many different brands. Around half of the vehicles are imported from distributors outside of Europe - at prevailing exchange rates new car prices in Japan and the US are up to 40% lower than in Europe for equivalent models – whilst the remainder represent "bargains" purchased at deep discounts from other dealers or "nearly new" cars from rental chains. Prices for new cars are 10-12% below those offered by franchised dealers.

Spare Parts and After Sales Servicing

After sales servicing and the sale of spare parts is a €30bn pa market in Europe. In an average car ownership period of 4-5 years, expenditure on car-related services is equivalent to around 70% of the original price of the vehicle. However only around half of this is captured by manufacturers or their franchised dealers – the other half goes to independent garages, quick fit repair centres, parts manufacturers, and insurance and finance companies.
There are big differences between European countries in the organisation of servicing and repairs. The UK market is the most competitive, and splits into three roughly equal parts : franchised dealers (most important for cars up to three years old), independent garages, and direct parts sales for the do-it-yourself market. "Fast fit" service chains such as Kwik Fit (1200 outlets) still account for a relatively low proportion of the total market, but are very important in three sectors – brakes, exhausts and tyres – where they offer low prices and a level of customer convenience which the franchised dealers have so far been unable to match.

The French market is also very diverse. Like the UK, it has specialist quick-fit chains such as Midas, but it also sells a high proportion of spare parts through hypermarkets like Carrefour, and has some unique features like auto centres (Fer Vert) and wholesale clubs.

Figure 5.6. Distribution of French Aftermarket Sales 1997



Source: AT Kearney *The Future of Automotive Distribution* 1999

In Germany and Italy after-sales servicing is still carried out mainly by franchised dealers, but in Spain these play only a small role, with most of the work carried by independent garages,

The Used Car Market

The used car market is almost the last link in the supply chain, before the vehicles are finally disposed of for scrap. But it also has a significant impact on the new car market, as it affects the viability and geographical distribution of car dealerships.

The used car market is now larger than the new car market in almost all European countries in terms of the number of vehicles sold, although it is broadly similar in size in terms of the value of sales. In addition, most used car sales are still organised on a local or regional basis, so they do not involve such high distribution costs as new car sales.

Table 5.6. New and Used Car Sales per 1,000 population 1996

	NEW CARS	USED CARS
UK	35	118
Germany	42	92
France	37	74
Netherlands	31	66
Belgium	40	61
Italy	31	44
Spain	23	20

Sources: Society of Motor Manufacturers and Traders *World Automotive Statistics* 1997
M. Harbour *Winning Tomorrow's Customers : Future Directions in Car Retailing and Servicing in the UK* 1997

The used car market has been growing faster than the new car market as:

- the growing reliability of cars extends their physical life;
- a higher proportion of new cars are sold to the corporate market (leasing companies, car rental firms and company car fleets) and are replaced more quickly than would occur with an individual purchase;
- low selling costs and fairly fast stock turnover relative to the new car market.

The main constraints on growth have been the introduction of subsidised scrapping schemes in some European countries, the provision of tax incentives to encourage new car sales, and increasingly stringent requirements for road worthiness certificates (the main reason why the Japanese used car market is so small).

Corporate sales account for the highest proportion of new car sales in the UK (50%), which is one of the reasons why the ratio of used:new car sales is much higher than elsewhere. The used car market is also important in Sweden, which has the next highest proportion of corporate sales (30%) and manufacturers vehicles (Volvo and Saab) which have a longer life expectancy than the European average (17 years and 10 years respectively).

The used car market has low entry costs, so that independent dealers now account for one third of all UK sales. Unlike franchised dealers, who obtain almost half of their used car stocks through part-exchange schemes, the large independent dealers tend to buy in batches from company fleets and car auctions, often moving the vehicles over relatively long distances 100-300 km on specialist car transporters.

The Internet is beginning to play an important role in used car sales, as it allows dealers to buy and sell stock at "remote" auctions without leaving their own premises. Electronic auctions also allow car dealers to offer "trade in" facilities to customers for new cars knowing that the car which is handed in can be sold on (at a fairly predictable price) within a few days. In the US the proportion of used cars sold at auctions increased from 6% to 30% from 1982-99. The UK is now following a similar trend, but used car auctions are still relatively rare in Continental Europe.

Car manufacturers are beginning to take an increasing interest in control of the used car market, and 27 manufacturers now have branded marketing programmes for used cars. These offer comprehensive vehicle checks, a warranty, and in many cases a breakdown recovery service. However not all customers wish to pay the additional costs associated with used car preparation, so franchised dealers are increasingly offering a two tier product comprising a manufacturer-branded scheme and a cheaper range of cars sold under the dealer's own brand name.

Internet Service Providers

Sales of vehicles via the Internet will become more common in future - in the US around 12.5% of all cars are already being sold this way. However most Internet sites provide only:

- technical and price information about the cars on sale (new and used); and
- contacts with the most conveniently located or lowest price dealer.

Direct purchases from the manufacturer via the Internet still represent a very small proportion of sales.

Internet service providers such as autobytel.com, autoweb.com. and Microsoft's Carpoint give customers access to information, allowing them to compare prices between brands, models and dealers. They are also being used to link dealers together, feeding them potential customers and allowing them to locate suitable stock held by other members of the network. The autobytel.com system owned by Chase Manhattan and GE Capital Finance has been so successful in the US, particularly for used car sales, that two European dealers – Inchcape and Bilia – have each taken a 3% share in the company, giving them the right to set up a similar system in the UK and Scandinavia respectively.

Internet service providers such as autochain.com are also helping manufacturers to manage their relations with components suppliers better, replacing sequential transactions with an "information partnership" in which advance warning of future requirements is given simultaneously to suppliers at all levels. The use of the Internet as an alternative to EDI is a major breakthrough, as it offers a more flexible and much cheaper service that is particularly suitable for small suppliers unwilling to invest heavily in equipment and staff training. It makes the supply chain more interactive, whilst its "open systems" technology allows it to communicate better with suppliers' own computer systems, showing that relatively unsophisticated technologies can produce big improvements in procurement if they are widely accepted.

In November 1998 Ford and GM announced that they intend to move their entire supply chains onto the Internet. Ford has formed a JV with Oracle to develop the AutoXchange database, whilst GM has linked with Commerce One, a supplier of web-based procurement systems, to develop MarketSite. Both systems are expected to be operational by mid 2000, and will be the manufacturers' preferred method of purchasing. Lower level suppliers will be encouraged (but not compelled) to do business with each other in this way, and the Ford system will also be available for use by other car manufacturers.

However the Internet has so far failed to make inroads into the spare parts market, even though its basic philosophy – catalogue sales – makes it highly suitable for E-commerce. The main reasons given for the lack of progress are:

- limited use of the Internet by independent garages;
- the failure of components manufacturers to link up with a company capable of managing the complicated logistics involved (a large, multi-product inventory, complex order picking, fast, frequent deliveries, and large numbers of financial transactions);
- lack of consumer interest in direct sales, in a market where the purchase of spares is closely linked to the provision of technical services.

Third Party Logistics Managers

European manufacturers vary in their attitude towards the outsourcing of logistics, but are generally more conservative than in the USA. Some companies such as Rover and Ford have made a large commitment to the use of third party logistics managers, but other companies such as BMW have kept supply chain management functions largely in-house. Overall third party logistics managers (TPLMs) are believed to account for around 25% of the €130bn European market in automotive logistics.

The role of TPLMs in the automotive industry is more difficult to define than in other sectors because of the range of value added services which some of them provide. These extend from basic functions such as packaging, quality control, and telecommunications through Customs clearance, bonded warehousing, and VAT reporting right up to simple module assembly. The latter is becoming a TPLM function because the increase in product variation has made the sequenced supply of parts a critical support function, and this has led to the pre-assembly of some parts into modules to simplify delivery to the assembly line and reduce the scope for errors. Although module assembly is normally the work of Tier 1 suppliers, some TPLMs are beginning to venture into this area as an extension of their normal services.

There is also an unclear relationship between TPLMs and freight forwarders, with some companies using both. Where this happens, the TPLM is usually responsible for order management, flow consolidation and quality control, with the freight forwarders organising the actual collection and delivery of materials. As a general rule, TPLMs are more prominent when transport arrangements are controlled by the manufacturer, and freight forwarders when they are the responsibility of the suppliers.

5.2. Future Changes Affecting the Industry

The main changes affecting the automotive industry over the next 5-10 years relate to:
- regulation;
- consolidation/restructuring;
- new entrants;
- technology;
- consumer purchasing patterns; and
- the move towards lean manufacturing.

Changes in logistics, which will also have a significant effect on the long-term structure of the industry, are described later.

5.2.1. Regulatory Changes

West European motor manufacturers face four important regulatory changes:
- price harmonisation following the introduction of the Euro;
- the ending of the Japanese Voluntary Export Restriction in 1999;
- the expiry of the Block Exemption from EU competition rules in 2002; and
- new consumer protection legislation.

The European Courts have been trying for some time to lift the restrictions on cross-border trade which manufacturers place on their dealers. These have kept parallel trade fairly low, in spite of the large price differences that exist between European countries. Greater transparency in pricing following the introduction of the Euro should accelerate moves towards price harmonisation and remove the incentive for parallel trade, strengthening the position of franchised dealers in the country of sale

The lifting of the Voluntary Export Restriction (VER), which limits Japanese exports to the UK, France, Spain, Portugal and Italy as well as to the EU as a whole, will have very little effect on European manufacturers as Japanese sales are constrained by the quota only in the UK : elsewhere they are less than 80% of the ceilings set out in the VER. In addition, several Japanese firms now manufacture their cars within Europe, whilst car imports from Korea - now perceived to be a more serious threat than car imports from Japan - are not covered by the VER.

The ending of the Block Exemption from competition rules has not yet been confirmed, and may be done in a way, which offers continued protection for small retailers. If it is lifted manufacturers will probably offer their large dealers special support schemes, based on larger geographical territories, in exchange for the voluntary continuation exclusive single-franchise agreements.

Consumer protection legislation is likely to increase the risks to manufacturers and dealers alike, and is another factor which will make them seek closer partnerships than have existed in the past, with more attention to quality control and risk pooling.

5.2.2. Consolidation/Restructuring

All parts of the industry are moving towards more concentrated ownership structures, and the current wave of merger and acquisition activity still has a long way to run. But companies are also changing the balance of their activities, in ways which alters their relationship with other companies in the supply chain.

Manufacturers are outsourcing increasingly large amounts of "upstream" design and production work to Tier 1 suppliers, whilst becoming more involved in "downstream" activities such as marketing and sales.

They have been pruning their dealer networks by buying up smaller family-owned businesses in an attempt to reduce competition, maintain dealer profitability and improve service standards. They have taken shareholdings in large dealers and used them to build up hub-and-spoke distribution systems in which smaller dealers centralise their purchasing and marketing under the umbrella of the manufacturer-controlled dealer, which also provides a mechanism for the regional pooling of stocks. They are establishing loss-making prestige showrooms at high cost city centre locations which would be enviable for commercial dealers, and have taken the initiative in setting up "auto malls" – showrooms with up to 300 cars on display, which incorporate smaller shops selling related goods and services. They have set up branded distribution networks for used cars, in an effort to raise resale prices and improve the perceived "whole life" value of new cars. They are becoming increasingly involved in the supply of consumer credit – most now have their own in-house finance companies, and are making larger margins on credit deals than they are achieving in manufacturing.

So the emphasis in large motor companies is moving away from manufacturing towards product management throughout its whole life cycle, making supply chain management a strategic issue at Board level. It is a more important activity in the automotive sector than in almost any industry, yet still has a long way to go before achieving the levels of efficiency which should theoretically be possible.

Suppliers are also changing quite markedly. Tier 1 suppliers are becoming increasingly involved in design work, often in joint teams with the manufacturer. Module and systems assembly is increasing in importance relative to the fabrication of individual components. And Tier 1 suppliers are playing an increasingly important role in logistics and supplies management, competing indirectly with TPLMs.

Tier 1 suppliers are becoming both larger and more international as manufacturers reduce the number of firms with which they have direct contact. One reason for this is the scale of financial penalties for assembly line stoppages – US$0.3-1.0m per day – which would bankrupt smaller suppliers (at present the delay costs caused by smaller suppliers are either absorbed by the manufacturer or result in a nominal penalty unrelated to the value of lost production). Manufacturers therefore wish to deal with suppliers who are in the same financial league, to whom such penalties are meaningful.

Manufacturers often take with them overseas suppliers with whom they have built up a good relationship in the home market, rather than using local suppliers, but they are also increasingly seeking a competitive edge by using "best in class" technical expertise wherever it can be found, rather than relying on the expertise of fellow nationals. So although the number of Tier 1 suppliers is falling steadily, supply lines are actually lengthening in some cases.

Dealers are also regrouping and changing their service portfolios in response to low profit margins. Their earnings have been badly hit by various long-term trends:

- the sluggish growth in new car sales;
- increased competition for sales via the Internet, which is eroding the concept of exclusive sales territories;
- vehicle reliability, which is reducing servicing requirements;
- the reduction in servicing work caused by automatic fault indication/diagnosis and a "replace rather than repair" philosophy;
- loss of profit from the sale of accessories as features once regarded as luxuries become standard,
- manufacturer-imposed investment and training requirements intended to improve quality of service to the customer. These add significantly to costs without a compensating increase in revenues;
- the fall in basic commission from 15-17% to 4-8% as responsibility for stockholding is transferred from the dealer to the manufacturer via the use of central stocks or demand-driven production, and manufacturers move from a fixed percentage commission to a lower basic commission plus performance-related incentives.

Incentives are usually linked to performance indicators such as sales volume, customer satisfaction, willingness to invest, user of the manufacturer's car finance scheme, and commitment to a single brand franchise. They are leading to a major rethink of the role of competition between dealers selling the same brand , reinforcing the trend towards larger dealer groups responsible for larger territories and speeding up the separation of different functions within the same group into "core" and satellite activities. They may eventually lead to the disappearance of the single site, single franchise multi-service dealer.

Dealers are themselves seeking economies of scale, swapping franchises to build up strong geographical concentrations and increasing their involvement in other activities such as used car sales and leasing. Lean dealership techniques (often imported from the US) include:

- joint marketing campaigns;
- stock pooling;
- measures to promote faster stock turnover, including deep discounting and disposal of slow moving items to independent distributors;
- recording and sharing of information about potential customers;
- use of buying groups to obtain volume discounts from the manufacturer.

Dealers are also moving away from a standard retailing format designed to meet the needs of a wide range of customers towards market segmentation and a range of different formats designed to meet individual needs.

5.2.3. New Entrants

There are three main groups of new entrants who could affect future production and consumption patterns:

- "second wave" car manufacturers from outside of Europe;
- companies from outside the industry with ideas for unconventional cars (electric and other low emission vehicles or small city cars like the MCC Smart Car, originally pioneered by Swatch);
- mainstream retailers whose brand strength allows them to sell a new product of which they have no previous experience.

Second wave car manufacturers already include Asian companies from Korea and Malaysia, who may be joined companies from other low wage cost countries such as China, India and Taiwan. South American producers, for long ignored because of currency instability, are beginning to gain a reputation for efficient production and attractive designs. But above all West European car plants will face competition from Eastern Europe, where lower productivity is more than offset by the large wage rate differential.

Some of the early joint ventures in Eastern Europe have had start-up problems, and a number of plants which were privatised are now owned by Korean firms such as Daewoo which are in financial difficulties. But the experience gained to date has shown that East European plants can be very effective providing they are fully integrated into the international distribution networks of major manufacturers, and not restricted to supplying their home market only. Poland, Hungary, the Czech Republic and Slovakia all seem likely to become important producers for the West European market, and Poland is also gaining a reputation as a good supply source for components.

New entrants from outside of the industry are notoriously difficult to predict, but seem likely to materialise in view of slowness of the majors to respond to public concerns about congestion, safety and environmental protection. However experience with the Smart Car suggests that they are likely to be a temporary phenomenon, and that new ideas which are marketable will rapidly be taken over by one or more of the large manufacturing groups.

The idea of mainstream retailers selling cars is not new – Ads (UK) tried it in 1995-6 and only gave up because of financial difficulties elsewhere in the group. It is reported that Carrefour is planning to sell Smart Cars in selected hypermarkets, and that Simsbury's has also been looking at a car-retailing project. However high distribution and stock holding costs, combined with increasing product customisation, suggests that the most likely outcomes may be:

- car "boutiques" in supermarkets at which customers can obtain information on different models from computer terminals, assisted when necessary by trained sales staff responsible for developing their interest into firm orders; and
- auto malls that use supermarket techniques to sell cars at large space-intensive display sites. These could be owned by the supermarket chains themselves, but at this stage investment by manufacturers or large dealers seems more likely, perhaps in a joint venture arrangement with a supermarket chain.

5.2.4. Technology

IT and telecommunications are likely to have a major impact on the structure of the industry. At the "upstream" end they will speed up the manufacturing process, increase the amount of product customisation which the manufacturer is prepared to offer, reduce product life cycles and expand the area from which materials can be sourced. But the need for systems compatibility will reduce the number of viable manufacturer-supplier partnerships, and lead to closer long-term relationships.

At the "downstream" end the main effect will be to raise consumer awareness of price and quality of service differences, force dealers into market-sharing arrangements in order to avoid wasteful competition, and support the centralisation of stocks and common services.

There is an argument that new technology – in particular the sophistication of modern car electronics - may force independent garages out of business. This does not seem likely to be the case, as the Block Exemption requires manufacturers to provide a lot of back-up information about their product, whilst it takes only a short time for copies of proprietary equipment to appear on the market.

5.2.5. Consumer Purchasing Patterns

The new car market in Northern Europe is fairly static because of an ageing population and car ownership levels approaching saturation point. Growth rates are higher in Southern Europe, but the younger population and lower average income results in a preference for smaller, cheaper cars.

Other significant changes in consumer demographics include:

- higher levels of education and computer awareness;
- the increasing number of women car owners;
- the increase in the average age of drivers, which is putting a premium on the vehicle reliability and "minimum inconvenience" servicing;
- the growing urbanisation of the population, particularly in countries such as France where it has been a significant influence in the re-shaping of dealer networks;
- the 24 hour economy, with its longer and more flexible working hours.

Financing arrangements will also have an increasing effect on consumer behaviour. Personal Contract Purchases boost the new car market by making payments more flexible and responsive to the customer's cash flow, but are also designed to tie the customer to a single manufacturer by offering automatic car replacement after 3-4 years and full life servicing. With these contracts, the distinction between car ownership and leasing is becoming increasingly blurred

The company car, leasing and daily rental markets also seem likely to grow faster than demand from individual consumers, although they are very sensitive to changes in tax arrangements. The way in which these markets are supplied also seems likely to change, as manufacturers press for vehicles to be supplied from the nearest dealer (the most efficient solution) rather than the dealer prepared to offer the lowest discount (the most popular solution).

5.2.6. Lean Manufacturing

In the past, the automotive sector has placed a great deal of emphasis on the development of lean manufacturing techniques. These include:

- pipeline manufacturing (building cars to order rather than to stock, to reduce inventory charges). This technique was first introduced at the luxury end of the market, where it has been closely linked to product customisation As a result 70% of German cars are now built to order, compared with only 10% in Spain;
- reductions in the cost of bought-in products, through:
  - partnership arrangements with a limited number of suppliers, who are also involved in product design;
  - a wider search area for out-sourcing, including the growing use of overseas suppliers;
  - greater use of competitive tendering;
  - avoidance of over-production of parts;
  - rationalisation of supply networks to reduce logistics costs;
  - pooling of procurement for different brands within the same group;
  - use of common platforms for different models of car (for example, Nissan is extending its Sunderland plant to allow the Renault Clio to be made from the same platform as the Nissan Micro);
- shorter assembly line times, through:
  - zero tolerance of stoppages due to absence or defects of parts:
  - increased automation:
  - greater use of IT to monitor and control flows;

- renegotiations of labour costs. The threat of production relocation is an important bargaining tool in the negotiation of more flexible labour agreements, so more time is now spent benchmarking the performance of different plants.

All of these changes have had a very significant effect on logistics requirements.

5.3. Location

The factors influencing choice of location are different for each of the three main players in the supply chain – manufacturers, suppliers and dealers.

For manufacturers, the key issues are whether to locate new capacity inside or outside of Europe, whether to move to the low wage countries of Southern or Eastern Europe or stay in northern Europe where there is an established supply network and the opportunity for modifying an existing plant rather than building a completely new one, and how to balance the production of new models between existing plants.

For suppliers, the key issue is whether to invest in dedicated facilities close to individual manufacturers or supply them from a single multi-client site. This is often linked to the decision about whether to follow a client overseas or supply it from an existing plant, with the risk of losing the contract to a local firm or a major competitor who is prepared to invest overseas.

For dealers, the main locational issues are how to restructure distribution networks so that the market can be served from a smaller number of outlets, and whether to develop small highly accessible sites which specialise in computerised sales information or fast fit servicing versus the alternative of large display sites on the outskirts of town. The segmentation of the market and the way in which dealerships are being restructured suggests that these are complementary rather than competing choices, and that the pattern of dealerships will remain varied in spite of changes in the rationale underlying location decisions.

Finally, the role of intermediaries in the supply chain is becoming more important. Some, like Internet service providers, will have relatively little effect on the distribution of economic activity (whether measured as physical development or jobs) but others like third party logistics managers and importers are becoming large economic activities in their own right, as well as an influence on the location of others in the supply chain.

5.3.1. Manufacturers

Manufacturers' location decisions take place at four levels: global (choice of continent), national (choice of country), regional (choice of area) and local (choice of site).

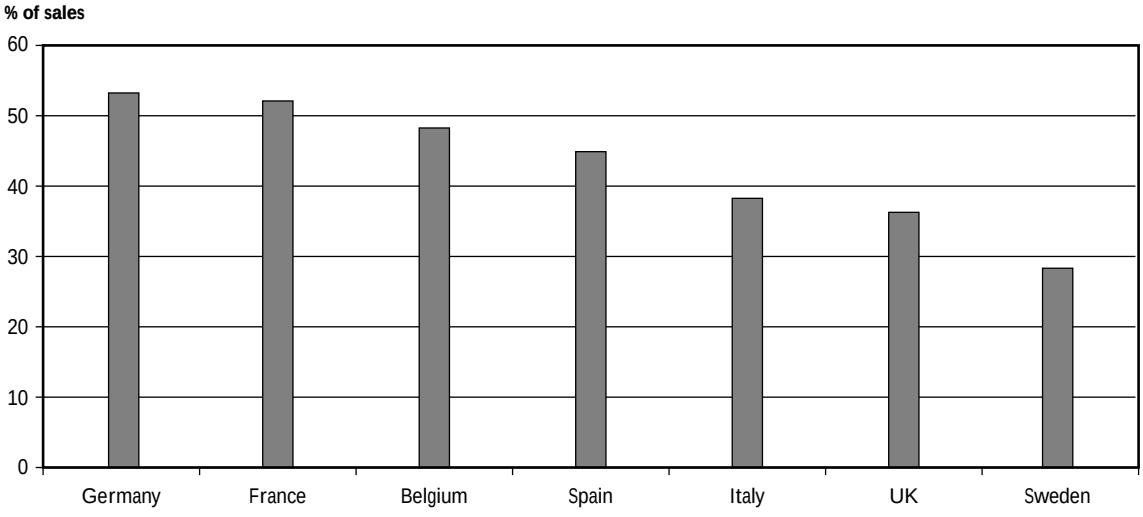
Global Decisions

The first location decision to be taken by manufacturers considering expansion is whether or not to move into a new area of the world. This is a strategic, global decision that involves consideration of the following factors:

- overall market and product development strategy;
- possibilities for local co-operation, joint ventures, or acquisition of smaller manufacturers;
- position of the target market within the manufacturer's existing global supply network, including the probability that major suppliers will move with it, rather than forcing it to become involved in the creation of a completely new supply network;
- the social and political environment, including industrial and environmental legislation, the strength of trade unions, Customs and other trade regulations, the availability of government subsidies, and distance/ accessibility to company headquarters and other key production sites;
- labour productivity and costs;
- the financial viability of a completely new stand-alone project;
- language and cultural affinities.

The main European car manufacturers are all setting up production plants in new markets overseas, albeit cautiously. More overseas countries are passing the threshold market size needed to justify local manufacturing, and whilst this is not obligatory for market access experience shows that consumers have a strong preference for locally manufactured products.

Figure 5.7. Domestic Manufacturers' Shares of their Home Markets (%)



Source: Society of Motor Manufacturers and Traders *World Automotive Statistics* 1997

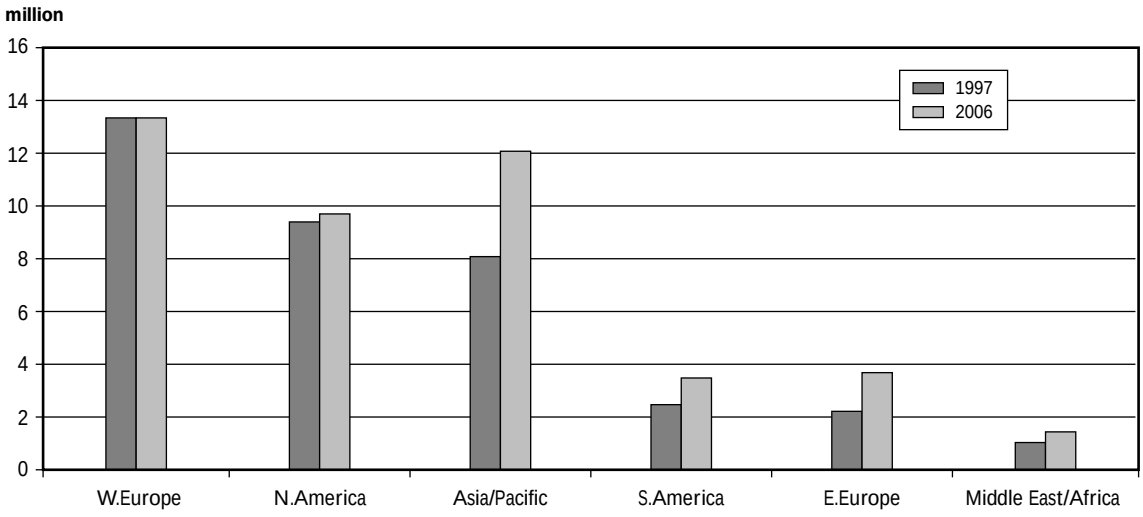
In addition, the new overseas markets to which manufacturers are moving all have significantly better growth prospects than the mature European market. Manufacturers do not always take such a broad view of location decisions as one might expect, and their choice of new countries has been dominated by their assessment of the market size and growth prospects, rather than global logistics considerations.

Ten years ago there was serious concern that car manufacturing might be driven out of Europe because of a 30-40% cost disadvantage compared with new manufacturing locations in Asia and South America. With higher overseas wage rates and the move towards lean manufacturing at home this is no longer the case, but there is concern that the European market will be depressed by restrictions on the use of the private car, and that this will continue the shift of manufacturing activity towards non-European locations.

This focus on achieving a wider international spread, as manufacturers strive to be the survivors of a relentless concentration process, has two implications for European investment decisions:

- it reduces the availability of funding for new greenfield site development, leading to a natural preference for the rehabilitation/modernisation of existing plants;
- the experience of some manufacturers with greenfield site development overseas – more difficult and expensive than expected – has also reinforced conservative attitudes towards relocation.

Figure 5.8. Forecast Car Sales 1997-2006



Source: KPMG *Europe on the Move : The KPMG Review of Automotive Retail and Manufacturing* 1998

National Decisions

Within Europe there has been a significant drift of manufacturing activity southwards towards Spain and (more recently) Portugal, mainly at the expense of France, Italy and the UK.

Table 5.7. Changes in the Balance Between the Main European Car Manufacturing Countrie

	% OF COMBINED OUTPUT						
	1965	**1970**	**1975**	**1980**	**1985**	**1990**	**1995**
France	19.4	24.4	28.0	29.1	24.2	25.1	24.0
Germany	37.7	35.0	32.0	34.9	38.3	35.5	34.3
Italy	15.0	17.1	14.9	14.3	12.8	14.3	11.2
Spain	2.0	4.5	7.7	10.2	11.3	12.8	15.4
Sweden	2.5	2.8	3.5	2.3	3.7	2.6	3.1
UK	23.4	16.3	14.0	9.2	9.6	9.9	12.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Society of Motor Manufacturers and Traders *World Automotive Statistics* 1997

This change is attributable to four main factors:
- differences in market size and growth rates;
- wage rate and productivity differentials;
- the influence in inward foreign investment; and
- government support for the motor industry.

Market growth rates in Spain and Portugal have been very fast over the last ten years, although the markets are still fairly small and a high proportion of production is exported. Italy, in contrast, shows all the signs of a mature market, although other manufacturers may also have been deterred from entering this market by the strong position held by FIAT.

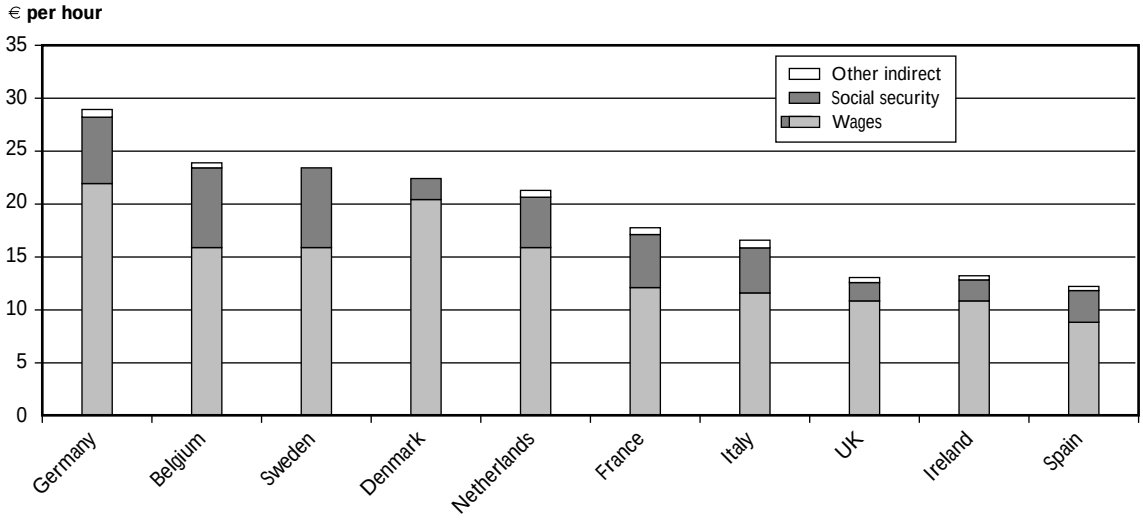
Table 5.8. European Market Size and Growth

	New car registrations (m)		**Growth (% pa)**	**Commercial vehicle registrations (m)**		**Growth (% pa)**
	1985	**1998**		**1985**	**1998**	
S.Europe						
Spain	0.575	1.190	5.8%	0.132	0.280	6.0%
Portugal	0.104	0.248	6.9%	0.023	0.124	13.7%
Italy	1.745	2.364	2.4%	0.101	0.180	4.5%
N.Europe						
Germany[a]	2.379	3.740	3.5%	0.135	0.296	6.2%
France	1.766	1.943	0.7%	0.342	0.398	1.1%
UK	*	*		*	*	
Benelux	0.875	0.999	1.0%	0.095	0.178	4.9%
Scandinavia	0.718	0.655	(-0.7%)	0.122	0.109	(-0.8%)
Austria/Switzerland	0.508	0.792	3.5%	0.043	0.063	3.0%

Note: (a) includes effects of re-unification
Source: Society of Motor Manufacturers and Traders *World Automotive Statistics* 1998

In Germany the strong market growth produced by re-unification has provided an important anchor for motor manufacturing in the face of high wage rates and failure to match other countries' productivity growth. Wage differentials are weakening, although Germany still has a significant labour cost disadvantage, particularly when social costs are included.

Figure 5.9. European Wage Rates in Car Manufacturing 1994



Source: Eurostat *Panorama of EU Industry* 1999

However wages rates cannot be divorced from other labour considerations such as skills, productivity and – of growing importance – flexibility. Skill requirements are changing as assembly lines are automated and become more IT-driven, reducing the labour training advantage of established producing areas. Productivity is increasingly becoming a function of plant design and the manufacturer's management philosophy rather than a national characteristic. And overcapacity, homogeneity between models and the use of common production platforms have allowed manufacturers play off one plant against another to obtain more flexible working practices. Even in Germany many workers have accepted a variable working week, time off in lieu of overtime pay, and cuts in pay in exchange for a shorter working week and more job sharing. So labour factors are becoming less important in new plant location decisions in Europe.

They do, however, have a significant effect on the allocation of new models between existing plants, and on the sourcing of production in cases where a model is produced at more than one plant. Because of mergers, joint ventures and past investment decisions, most manufacturers now have plants in several European countries, which compete for investment within the same group. Many of these make models that can be produced just as easily elsewhere.

Table 5.9. Distribution of Plants Owned by Major European Automotive Group

	Germ	France	Italy	Spain	Belg	Austria	Sweden	UK	Other
Cars									
BMW	3	-	-	-	-	-	-	3c	-
Daimler-Chrysler	4	1	-	-	-	1	-	-	-
FIAT	-	1	10	-	-	-	-	-	-
Ford	2	-	-	1	1	-	-	6	-
GM	3	-	-	1	1	-	1	3	1(P)
Honda	-	-	-	-	-	-	-	1	-
Hyundai	-	-	-	-	-	-	-	-	1(NL)
Nissan	-	-	-	-	-	-	-	1	1
PSA	-	5	-	2	-	-	-	1	1(P)
Renault	-	4	-	2	1	-	-	-	1(P)
Suzuki	-	-	-	2	-	-	-	-	-
Toyota	-	-	-	-	-	-	-	1	1(P)
Volvo[a]	-	-	-	-	1	-	2	-	1(NL)
VAG	5	-	-	2	1	-	-	1	1(P)
Commercial vehicles[b]									
Daimler-Chrysler	5	1	-	1	-	-	-	-	1(CH)
FIAT	1	-	4	4	-	-	-	1	-
Ford	-	-	-	-	-	-	-	1	1(P)
Nissan	-	-	-	3	-	-	-	-	-
Renault	-	7	-	1	-	-	-	-	-
Toyota	1	-	-	-	-	-	-	-	-
Volvo	1	-	-	-	1	1	1	1	-
VAG	1	-	-	-	-	-	-	-	-
MAN	2	-	-	-	-	-	-	-	-
Scania	-	1	-	-	-	-	2	-	2(DK,NL)

Note: (a) now part of the Ford group
(b) light commercial vehicles, trucks, buses and speciality vehicles
Source: KPMG *Europe on the Move : The KPMG Review of Automotive Retail and Manufacturing* 1998

Foreign investment has had a small, but significant effect on the location of manufacturing activity, particularly in the UK where the collapse of the car industry during the 1970s (due to high production costs, industrial unrest and failure to invest) was followed by a brief recovery during the 1980s and a more significant improvement during the 1990s after its selection as the European manufacturing base for Japanese companies such as Nissan, Toyota and Honda.

The choice of the UK by Japanese manufacturers was partly in response to cultural factors (language and a flexible labour force that could be easily dismissed if the enterprise did not do as well as expected). But it was also supported by considerable amounts of government aid. However it is not a phenomenon unique to the UK, as car manufacturers elsewhere in Europe have also received substantial government support.

State support has also been an important factor in the growth of the East European car industry, although there it has taken a rather different form – the transfer of State assets at bargain prices in exchange for a commitment to invest in new technology and worker training. This type of government aid has been less attractive to Japanese car manufacturers, who have adopted a very cautious approach to Eastern Europe, but has been taken up with enthusiasm by Korean manufacturers and by some of the large West European groups.

Regional Decisions

Regional location decisions are usually based on:
- the availability of skilled staff;
- location of suppliers;
- logistics infrastructure, including access to transport infrastructure and services, telecommunications networks and availability of sufficient space;
- the location and condition of the company's existing plants and other fixed assets;
- marketing considerations; and
- the availability of subsidies.

Government support also has a major influence on plant location within a country, both for new greenfield sites and for the safeguarding of older sites against closure.

Some companies, such as Nissan at Sunderland (UK), have decided that the absence of skilled workers and components suppliers is an advantage rather than a disadvantage, as it allows them to set up new types of manufacturing process unhindered by the less efficient practices of the past. But others such as BMW and FIAT see the use of existing assets and labour as their path towards lower marginal costs. Several European manufacturers have developed Greenfield sites, but these are mostly in Eastern Europe.

Productivity comparisons between plants in locations which have/have not previous motor manufacturing experience provide little insight into this decision. This is because there are few plants operating regularly at their rated capacity (the main exception is the GM plant at Zaragosa). Other modern plants designed to achieve high productivity levels – the FIAT Melfi, GM Luton, and Ford Saarlouis plants – have all been under-performing because of weak demand.

Table 5.10. High and Low Productivity European Car Plants

Hight productivity		Average productivity		Low productivity	
Plant	**Cars pa / employee**	**Plant**	**Cars pa / employee**	**Plant**	**Cars pa / employee**
Nissan Sunderland	105			VW Emden	37
VW Navarra	76			Skoda Czech R	35
GM Eisenach	76	many	40-70	PSA Sechaux	31
Fiat Melfi	73			Rover Longbridge	31
Toyota Burnaston	72			Daimler Rastatt	30

Source: Economist Intelligence Unit *Europe's Leading Car Plants : Comparative Productivity Audit* in Motor Business Europe, August 1999

Local Decisions

Local decisions - the final choice of site - are dependent mainly on:
- transport links;
- space availability; and
- proximity to existing plants and suppliers.

Transport has not been a key driver in industrial location decisions that it should have been – transport costs are particularly high in the automotive sector, and congestion at the assembly line delivery ramps has become a serious problem. However the solution to this has been to push responsibility for transport further down the supply chain, by enhancing the role of Tier 1 suppliers or employing third party logistics managers to consolidate flows and manage supplies from a holding point not far away from the assembly line.

European car manufacturers are very conservative, and continue to use factories that are badly located from a transport perspective. This is because of their reluctance to move away from established sites where high redundancy or environmental clean-up costs would incur. In addition, the industry's high fixed investment costs are recovered over long time periods, creating internal pressure for companies to remain where they are rather than face a large capital write-offs. BMWs Olympic Park plant in Munich, for example, has major transport problems, but has not been considered for closure because of its historic role in BMW's development, the employment consequences of closure, and complex linkages with a network of local suppliers which cannot be easily reproduced elsewhere.

Space is becoming an increasingly important factor in site selection. Two storey factories are no longer acceptable because of the need to dock trailers immediately adjacent to the assembly line. The use of trailers rather than warehouses for short-term storage has also increased the need for space around the assembly line. However the cost penalties associated with poor assembly line layout fall as more of the value added in car production moves away from vehicle assembly towards first and second tier suppliers, and as research and development are relocated to make more space for final assembly work.

Proximity to suppliers is becoming increasingly important as:
- the variability of the product grows : customised luxury cars, for example, are more dependent on close links with a large and nearby community of parts suppliers than standard volume cars;
- cars are produced in a continuously varying sequence, according to customer requirements and date of order, rather than in batches of identical product;
- the lead time from receiving to producing the order is cut

However as the number of major car manufacturers falls, their hold over suppliers increases, making them more willing to move closer to the plant. This has been enhanced by the popularity of supplier parks, which provide premises for a whole range of supply chain partners within easy reach of the main assembly line.

5.3.2. Suppliers

There are two conflicting trends in the location of components manufacturing – towards fewer, larger suppliers clustered around each manufacturer, and towards global sourcing from new low cost suppliers. The latter are becoming important for high value items such as electronics which can justify the use of air freight, or where the suppliers themselves are prepared to bear the costs and risks of holding buffer stocks at European gateways such as the Benelux ports. In reality the two trends may be complementary rather than conflicting trends, each appropriate for components with specific characteristics.
The variability in ordering, combined with JIT delivery and pressure to keep inventories low, is pushing national components suppliers closer to manufacturers, as small batch deliveries are uneconomic over long distances and delivery times more difficult to guarantee. A UK survey of motor manufacturers showed that just under 30% of incoming materials are sourced from within 50 miles of the plant.

A key factor in the location decision is whether or not the supplier (or plant) is dedicated to a single manufacturer. Dedicated plants have been increasing due to:

- lack of interchange ability of parts between manufacturers, which reduces the economies of scale available in a single plant located to serve several customers;
- the need for more frequent information exchanges;
- the need to cement personal relationships in a world in which the number of suppliers is being cut back, but new business opportunities are opening up for those which can help their customers to articulate changes in product design.

However as component suppliers become more closely involved in the design process they develop their own proprietary technologies and intellectual property rights, which strengthens their position relative to the manufacturers. They may also seek commonality in the basic design for major customers in order to reduce their own manufacturing costs, which will give them more freedom of location.

Supplier Parks

Supplier parks have played a significant role in drawing suppliers closer to manufacturers. They provide a single site close to the assembly line space for suppliers' warehouses and some pre-assembly production processes, often controlled by a third party logistics manager. Exel, for example, manages a 27-company supplier park for SEAT at Martorell (Barcelona), with a throughput of 20m parts pa.

Supplier parks are of greatest benefit for high value, high volume, high variety cars which require the product to be changed in some way prior to delivery to the assembly line – otherwise they represent no more than an additional link in the supply chain. They are also effective in allowing components to flow more smoothly to different parts of the assembly line using overhead conveyors or underground tunnels, and make supply and logistics costs more transparent.

American and Japanese manufacturers are very enthusiastic about the concept, particularly in Europe where space is at a premium. Supply parks are now a preferred feature for all of Ford's European assembly lines, and are being introduced at Valencia (mid 1990s), Saarlouis (1998), Halewood (2001), Dagenham (2001), Cologne (2001) and Genk (2002). In some parks components are pre-assembled into modules, reducing the number of items to be moved, and this has become an important design feature in recent models: Ford, for example, has reduced the number of components received by the main plant from 4,600 (Ford Escort) to 3,000 (Ford Focus).

There are many different contractual models for the creation of supplier parks – sometimes the manufacturer pays for all park development costs, leasing units to its suppliers at cost; sometimes suppliers take responsibility for the construction of their own premises; sometimes the park is built as a commercial proposition by a third party and the costs recovered through market-based rents. And sometimes the basic infrastructure is provided free of charge or at a concessionary price by central or local government. Public bodies may also offer concessionary finance or fiscal privileges for companies locating within the parks, and may absorb a significant part of the development risks.

5.3.3. Dealers

Although dealership structures vary considerably from one country to the next, there are five main locational models for dealers:

- small, long established single franchises (often family-owned) in rural or low cost urban areas. These survive through a combination of good local reputation, low investment costs, and a high reliance on revenues from vehicle servicing and used car sales;
- medium-high volume urban dealerships selling around 700 cars pa (often single franchise or manufacturer-owned) which seek high profile, accessible sites;
- manufacturers' showrooms at prestige, high cost city centre locations. These have fairly low sales volumes and rarely make money, but are seen as an important element in group selling, reinforcing the image of the brand and offering spin-off benefits to other retailers;
- high volume, purpose-built outlets offering the full range of services. These are often located in suburban retail parks, which provide large areas of space at "affordable" prices;
- new dealerships set up by new entrant brands with low market share (often Asian). These favour low cost accessible sites, and are buying up many of the businesses and premises which are becoming available as established manufacturers prune and rationalise their dealer networks.

There are three main trends that will change this pattern:

- the coalescence of dealers into larger, more co-operative groups managing a portfolio of sites which meet the needs of different types of customer;
- the unbundling of different types of dealer activity, in particular the separation of sales and servicing;
- new methods for managing direct deliveries to customers, whether these are individuals ordering via the Internet or large company fleets with the buying power to negotiate special discounts from the manufacturer.

Better educated consumers are becoming more selective, not only about what they purchase but also where they buy it. However there is no clear trend – some people have a preference for buying close to home, from a dealer conveniently located for maintenance purposes. Some people prefer to drive to large showrooms on the outskirts of town where they can inspect many cars and easily arrange test drives. Others, who are pressed for time, will visit dealers close to their workplaces. Whilst others prefer to cut out the dealer altogether, choosing their vehicle on the basis of information obtained from the Internet or directly from the manufacturer.

As IT- based sales become more important, locational requirements are likely to change in favour of small, premium sites in busy retailing centres or close to the customers' workplace where customers can seek advice from trained staff and access sales databases, and larger, low-cost sites at accessible locations suitable for displays of new cars, stock-holding of used cars or servicing activities.

But even though dealer outlets will become more differentiated, the reduction in numbers seems likely to continue. Dealers may even be by-passed altogether as manufacturers distribute directly to customers using third party logistics managers. However this trend may be limited by two factors:

- the customer's need for a local contact for reassurance and warranty purposes. Although there have been big improvements in quality, customers' perceptions of the failure rate (based on past experience) are still sufficiently high to make many of them hesitant about dealing directly with a global manufacturer;
- the manufacturer's need for a strong and stable dealership network for marketing purposes. There is a limit to how many sales the manufacturer can divert away from the dealership system without damaging its basic structure. So the delivery of company cars may become the responsibility of the nearest dealer (for a fixed delivery fee) rather than being undertaken by the manufacturer or by whichever national dealer is prepared to offer the largest discount for bulk purchases.

Case Study: Nissan (Sunderland)

The establishment of the Nissan plant at Sunderland (UK) in 1986 provides an example of how location decisions filter down the supply chain, and can – at greenfield sites – be strongly influenced by transport and logistics considerations.

Nissan (Sunderland) has by far the highest productivity of any European car plant, due to:

- incorporation of manufacturing considerations into vehicle design;
- insistence on quality, which eliminates rework effort;
- a high degree of vertical disintegration; and
- the efficiency of its Just-In-Time logistics support

To meet "local content" requirements for recognition as an EU manufactured vehicle, 80% by value of the car must be European in origin. The company therefore uses two types of supplier:

- affiliated Japanese first tier suppliers, some of whom have located on land owned by Nissan adjacent to the plant. The relocation of these suppliers has been assisted by Nissan's policy of single-sourcing items on a long-term partnership basis;
- non-affiliated European suppliers, two-thirds UK-based, but some US or European-owned and located in either the UK or Continental Europe (mainly France and Germany).

Around one quarter of Nissan's UK suppliers (including Japanese firms) are based in the North East of England (not a traditional car manufacturing area) but these account for around one half by value of all UK suppliers. Around one quarter of the inputs by value come from the West Midlands (the traditional manufacturing area)

Nissan's supplier selection process depends on the nature of the component:

- for braking systems, power train and electronics the sourcing decision is based on the technical competence of suppliers, irrespective of their location;
- for specification sensitive, bulky or easily damaged items logistics and location are key factors

Because Nissan has very low inventory levels the programme for reducing logistics costs has concentrated on transport: maximising space utilisation on large lorries for long-distance transport and improving the reliability of delivery times. Proximity to suppliers has allowed Nissan to use synchronous supply for some components – delivery of components as a sequenced flow, with only 30 minutes advance notification. This enhances quality/reliability by removing the choice of component from the assembly line worker, but requires a maximum separation of supplier from plant of only a few miles. Synchronous production is used for products that are high value, high variance and space intensive to store.

Nissan suppliers elsewhere in the UK usually deliver 2-5 times per week. Because many are located in the West Midlands, Nissan's TPLM (Ryder Distribution Services Ltd.) developed a cross-docking centre at Alfreton (Derbyshire) for the consolidation of flows from multiple suppliers. Maximum dwell time for components at the cross-docking centre is 8 hours. The location was chosen to allow a return trip to Sunderland to be made in a single shift, and avoid road congestion within the West Midlands conurbation. Mixed truckloads of components are made up at Alfreton to match Nissan's production schedule, and the vehicles are despatched at regular intervals to avoid congestion at the delivery bays. Load factors for short-haul collection vehicles in the Midlands is low – Ryder has the choice to collect in batches or "as required" for the individual trunk haul vehicle, and has preferred the latter approach. - but vehicle utilisation on the trunk haul is very high, and the vehicles bring back returnable packaging (the vehicles are "full" in volumes terms even though they are considerably lighter. In addition, returning vehicles collect supplies from Sheffield for cross-docking at Alfreton.

The consolidation of European supplies is more difficult because suppliers are more dispersed. Suppliers with several plants (e.g. Bosch) tend to do their own consolidation en-route to the port of shipment. Other (non-dedicated) suppliers group parts for Nissan with those for other UK manufacturers. Parts from Japan are transhipped from Rotterdam to various UK ports or from Amsterdam to Tyne Dock (UK) on a dedicated service.

Conclusion: Nissan's original location decision was based on access to low cost flexible labour rather than on transport and logistics considerations. However large parts of the supply chain have relocated to remain close, whilst those which have not relocated have used logistics management to overcome the problem of distance.

5.3.4. Third Party Logistics Managers

There is so far no clear picture about how TPLMs are responding to the needs of the motor industry in locational terms. Some appear to be setting up new facilities to serve their major clients. For example at Rover's Cowley (UK) plant a new Integrated Logistics Centre has been built on a brownfield site next to the assembly line. The number of suppliers has been cut from 450 to 150, and the supply of components is managed by Exel which collects them on a 24-hour basis, often at night to reduce exposure to traffic congestion. Components are sorted into the right sequence for the plant, and moved to the assembly line in containers using electronic tow trains. This has replaced the one-hour road journey from Exel's former site.

However for Rover's Longbridge plant TNT holds stocks from over 50 suppliers at its own Northampton hub, delivering to Longbridge on a daily basis. This is partly because uncertainty about the future of the Longbridge plant has discouraged investment in new logistics facilities.

The conclusion is that the location process for TPLMs is very much driven by the manufacturers – if the TPLMs already have suitable facilities at a "reasonable" location they are used, if not they are asked to provide new facilities or (in some cases) to take over the manufacturer's own facilities as part of the contracting out process.

TPLMs have been expanding across borders more rapidly than the motor manufacturers they hope to serve, but attempt to establish pan-European distribution networks specifically for the motor industry have produced poor financial results because the demand for this type of service has not developed as quickly as expected. As a result, most TPLMs are now following rather than leading their clients into other European countries.

5.4. Logistics

Logistics accounts for around 8-10% of the retail price of a new car, rather more than the average for European industry as a whole (7%). It still has considerable potential for streamlining, particularly in relation to distribution of the finished product.

Logistics costs are particularly high in relation to pre-tax profit levels, which for the "Big 8" European manufacturers were between (-2%) and 7% of gross revenues in 1999.

5.4.1. International Comparisons

European logistics costs (as a percentage of sales) are said to be around 2% higher than for US-based car manufacturers, mainly because:

- US manufacturers have spent more time optimising their transport networks;
- US manufacturers usually use a single lead logistics provider, who controls all flows of materials, whereas European manufacturers either attempt to control the process themselves or outsource it to several logistics managers or freight forwarders;
- European supply chains are less tightly controlled by the manufacturers. Transport is often organised by the suppliers, and goods are moved when ready rather than to schedule;
- US manufacturers set shorter time windows for collection and delivery, and discipline suppliers who do not comply with these requirements;

Logistics costs are lower in the US because of the use of better business processes:

- many logistics costs are built into a car at the design stage. US manufacturers involve logistics specialists in car design more and at an earlier stage than Europeans manufacturers;
- European manufacturers concentrate on optimising individual supply chains (for up to 150,000 components) rather than seeking to standardise the supply chain management process – this represents a major difference on logistics philosophy;
- US manufacturers achieve a higher accuracy of deliveries – only 40% of European deliveries provide all of the right goods at the right time. Missing parts are rare in the US, and the sequencing of parts takes place 3-4 days in advance of their delivery to the assembly line, rather than on the day as in Europe;
- US manufacturers have abandoned the "milk run" concept (a scheduled transport service which collects fixed amounts of goods from a fixed sequence of suppliers) in favour of more flexible hub-and-spoke collection systems which make better use of the space inside the vehicle;
- US manufacturers have invested more in transport and materials handling technology close to the plant;

- inventory costs at the production line are lower in the US than in Europe;
- US manufacturers have achieved better integration of logistics with purchasing . Their logistics systems focus on the final delivered cost, taking into account differences in the ex-works price quoted by different suppliers as well as transport and warehousing costs.

Transport costs are actually higher in the US than in Europe because of the longer distances involved, but land costs are lower, resulting in the construction of larger warehouses.

Table 5.11. Breakdown of Logistics Costs in the US Automotive Industry

Item	% of logistics costs
Transport	41%
Warehousing	25%
Inventory	22%
Customer order processing	7%
Administration	5%
Total	100%

Source: C. Wright, H. Hunston, A. Lewis *Automotive Logistics* 1998

To squeeze even more cost savings out of the system US manufacturers are now trying to move from "car model" logistics – the integration of supply chains for several plants making the same model – to "plant based" logistics – combined supply chains for one plant making several models. European manufacturers appear to be moving in the opposite direction, perhaps to reduce their vulnerability to national strikes and to keep their options open for future development.

The idea that European logistics are inferior to those of the Japanese appears to be receding, as many of the Japanese manufacturers' problems can no longer be concealed by rapid growth. Vertical integration, which has always been based on informal relationships with small suppliers or linkages with other companies within the same group, appears to be breaking down. Levels of automation and computerisation are now believed to be broadly comparable. European labour practices (at their best) are more flexible, allowing production to be varied in line with demand. European manufacturers make greater use of outsourcing and competitive tendering, and there is less division of responsibility for supply chain management between different departments of the company (or different companies in the same group). However Japanese manufacturers give their suppliers much more notification of their required delivery schedule, and make fewer last-minute changes to the production process.

However, performance benchmarking is difficult, especially at the international level, because logistics efficiency is dependent on many different factors - product mix, location of suppliers, differences in unit costs – which it is difficult to standardise.

So far, attempts in all countries to reduce production costs have concentrated on the "upstream" processes before the car rolls off the assembly line, as this is where two-thirds of the delivered cost is incurred. "Downstream" logistics – the distribution of the finished car to the customer - have been given less attention, in part because the existing regulatory framework gives manufacturers less power over their dealers than over their suppliers.

Table 5.12. Typical Cost Breakdown for Producing and Distributing a Car (%)

Item	% of sales price
Components	30%
Assembly plant wages	20%
Manufacturers overheads	8%
Manufacturer's gross margin	10%
Total: production costs	68%
Distribution costs	4%
Warranty	3%
Manufacturer's marketing expenses	5%
Dealers marketing expenses	5%
Dealer's gross margin	15%
Total: distribution costs	32%

Source: L'Argus de l'Automobile, quoted in A.T Kearney *The Future of Automotive Distribution* 1999

5.4.2. Upstream Logistics

The main changes taking place in "upstream" logistics are the growing role of Tier 1 suppliers in the sub-assembly of modules and the use of IT by manufacturers to improve the flow of information within the supply chain, allowing suppliers at different levels in the hierarchy to integrate their production and transport processes more closely.

Tier 1 Suppliers

Tier 1 components manufactures are gradually becoming systems integrators, blurring the boundary between parts manufacturing and the marshalling of components. The outsourcing of modules – which is reducing the role of carmakers in the manufacturing process – is often justified by efficiency gains. Module sub-assembly is generally more productive when it is carried out at a separate plant where it can be given more space, providing easier work layouts and more opportunities for automation. In addition, the outsourcing process transfers to Tier 1 suppliers responsibility for organising the flow of components from lower level suppliers, giving them effectively an important logistics management role.

There are three different models for the movement of components from Tier 1 suppliers to car assembly lines:

- through warehouses;
- direct delivery (Just In Time); and
- direct delivery of parts in a pre-arranged sequence.

The choice of model depends on:
- the "forecastability" of materials flows;
- the total cost and size of the items to be moved through the supply chain; and
- the ability of suppliers to respond quickly to changes in end-demand.

Cheap standard products such as nuts and bolts still tend to move through warehouses, which are used to convert batch deliveries from the suppliers into smaller, more frequent flows to the assembly line.

Luxury cars with a high degree of product variability are able to make less use of JIT deliveries than standard, high volume cars, and so rely more heavily on intermediate warehousing to achieve the correct sequencing of parts. Around 40-50% by value of the components of a luxury car is delivered JIT, but the volume of these items is still relatively small. Japanese cars have a higher proportion of direct delivery components than European cars, particularly in respect of the volume of components delivered JIT.

IT Systems

IT is an essential tool for the improvement of logistics, but it is also an area in which the automotive industry is facing several specific problems:
- individual manufacturers cannot agree on common standards, and still want to use their own systems;
- many suppliers (particularly at second and third tier level) are not equipped for EDI, or have refused to adopt the EDI standards recommended for the motor industry, particularly when they are also supplying other sectors of the economy which use different IT standards;
- EDI standards for the motor industry (ODETTE and EDIFACT) already exist, but are applied to different types of cargo and are not applied uniformly in all European countries;
- the development of IT systems specifically for automotive logistics has been constrained by skill shortages;
- lack of standardisation in communications protocols have made it difficult to integrate the operations of manufacturers and Tier 1 suppliers with those of second and third tier suppliers, who are often opt for very simple systems or fail to make full use of the systems which they have.

As well as moving to an Internet-based system, US car manufacturers are beginning to explore the use of electronic communications as a tool for unified management of the whole supply chain. One pilot study for Ford and Chrysler in the US which looked at the use of on-line EDI for managing the supply chain for seat assembly identified savings of US$71 per vehicle (=US$1bn pa). These resulted from:
- lower freight rates through reducing or combining transport flows ;
- shorter information lead times leading to less over-production and stock obsolescence;
- lower error rates with fewer unplanned changeovers;

Chrysler now intends to rollout the improvements identified by this project to its production facilities in Europe.

Although IT linkages between manufacturers and suppliers are improving, linkages between the upstream and downstream ends of the supply chain are still poor, requiring the raw data to be reconfigured by the manufacturer. Most dealerships have weak internal IT systems which will require improvement as their territories become larger and less reliance is placed on direct selling techniques.

IT investment for the automotive industry as a whole remains low – in 1998 a survey by KPMG showed that as a percentage of sales, the automotive industry was investing less in IT (just over 1%) than almost any other industrial sector.

Other Developments in Logistics

Other lean logistics techniques that are now becoming common in European car manufacturing include:

- restriction of purchasing to the parts needed to build the vehicle orders already received from customers (pull-led manufacturing) plus real time rather than batch processing of orders;
- purchasing components ex-works rather than C&F, allowing the manufacturer to control transport scheduling and costs;
- direct competitive tendering for transport services;
- small, frequent shipments delivered Just In Time to minimise inventory costs;
- greater use of bar code technology for rapid intelligent stock replenishment;
- zero tolerance of defects and a reduction in the incidence of missing parts – Europe's 300 motor assembly plants are stopped on average 20 times per month because of missing parts, costing them an estimated €1bn in lost production time;
- consolidation of flows of components with products not related to car manufacturing, to allow freight forwarders, logistics managers and transport providers to achieve economies of scale. This is becoming more important as supplies are sourced over a wider area, as many flows of automotive products are still too small to justify dedicated pan-European supply networks;
- greater use of hub-and-spoke transport, particularly for less than truckload consignments which can be consolidated at the carrier's hub to achieve high vehicle space utilisation for the trunk haul;
- reduction of double handling, for example through the use of containers
- central budgeting and accounting for transport.

There is now much greater flexibility in supply chain design, with more frequent modifications and a permanent on-going review of supply chain effectiveness.

5.4.3. Downstream Logistics

Downstream logistics are likely to attract more attention in future, if only because existing distribution costs are higher than they should be. This is particularly true if the figures include items that are not normally measured by conventional costing systems, for example:

- discounts given by dealers to persuade customers to buy cars which do not exactly match their needs;
- costs of late delivery, including depreciation in vehicles accepted in part exchange;
- costs of matching cars to customers, including the administrative costs of locating stock and the costs of transferring vehicles to the place at which they are needed;
- extra discounts for the liquidation of old stocks.

Typical supply costs for a €15,000 car are shown in Table 5.13. They account for 4.3% of the delivered price.

Table 5.13. Typical Distribution Costs for a European Car

	€ per car
Direct costs	
Storage	54
Security	20
Maintenance	8
Interest	210
Transport	158
Management	80
Total: direct costs	530
Indirect costs	
Discounts on surplus stock	51
Discounts for acceptance of alternative specifications	26
Dealer swaps	22
Inaccurate delivery	18
Total: indirect costs	117

M. Harbour *Winning Tomorrow's Customer: Future Directions in Car Retailing and Servicing in the UK*

New Cars

Changes in the logistics of supplying new cars will include:

- greater use of forward ordering systems which maximise customer choice in respect of vehicle specifications. Customers will also be given more information on vehicle availability; including the choice between instant availability within a fairly narrow range of specifications, versus a larger range of choice if they are prepared to wait a little longer. A change in the trade discount system for dealers could also be used to encourage pipeline ordering rather than delivery from stock, although the economics of this proposal and its impact on production schedules still require more attention;
- a large fall in the volume of stocks held at dealers, which will become limited to demonstration models and showroom displays;
- central pooling of stock by dealers, particularly for slow-moving items and cars or parts with long shipment times. But although stock transfer from dealers to central pools is now well advanced in the UK, less progress has been made in Continental Europe;
- use of the factory pipeline as virtual stock, with dealers entitled to reserve unallocated vehicles at any stage in the production process;
- improvements in the traceability of finished vehicles. Whilst almost all components are now bar coded, the finished vehicles are not, which make it difficult to track them when problems arise in the distribution system;
- greater use of rail for the trunk haul of vehicles from centralised stockholding locations, although the replacement of batch orders by individual orders may reduce the scope for full trainload movements of cars;
- home delivery of the vehicle. Daihatsu is already offering this in London – the costs of personalised distribution are almost equivalent to those of distribution via a conventional dealership, but allow the company to sell cars in areas of the country where a dealership would not be viable.

Virtual warehousing of imports into the EU will allow manufacturers to save time and money by dealing with a single Customs authority, selected on the basis of tax implications, communications links with Customs authorities in other European countries, and labour costs (primarily for accounting staff). The decoupling of financial from physical flows will allow more imported vehicles to be delivered directly to where they are needed, rather than being held in bonded warehouses selected for tax reasons rather than efficiency of distribution.

Used Cars

The used car market is also likely to benefit from greater use of the Internet to allow customers to locate bargains and dealers to pool stock. However a two tier market is likely to develop comprising manufacturers' branded schemes (operating as national networks) and independent dealers serving local/regional trading areas. Manufacturer-certified cars normally command a premium of US$ 300-1500 over used cars sold by independent dealers, some of which is spent on the logistics of matching cars to customers over a relatively wide area..

Servicing

Servicing will become more oriented towards the needs of specific groups of customers. Garages will work longer hours to meet the needs of high mileage fleet drivers who place a premium on mobility and convenience, perhaps even to the extent of offering an overnight service. Private customers will become more willing to accept servicing outside of workshop peak hours if this can be linked to a lower price. Some customers will want a while-you-wait service, whilst others will prefer to have their vehicle collected from their homes, with a replacement vehicle provided. This all points to the need for more flexible logistics systems.

Traditionally manufacturers have encouraged workshops to buy more parts than they need, and discouraged requests for rapid delivery by offering lower profit margins on 24-hour orders. In the US and Japan, however, spectacular improvements have been made in the supply of spare parts by using centralised warehousing with daily delivery runs to dealers. For faster moving parts, or the supply of more distant regions, two-tier delivery systems have been set up in which main dealers act as wholesalers to other franchised dealers and independent workshops. In both cases the result has been a reduction in expensive "emergency" deliveries, and the provision of an equivalent level of service with reduced stock holding costs.

5.5. Transport

The automotive industry makes more use of rail transport than almost any other manufacturing sector, and yet is far from content with the level of service it receives. It is a suitable candidate for rail transport, generating many regular, high volume long-distance flows, and most of the large car manufacturing plants are rail connected. However very few components suppliers have their own rail sidings, and rail has only a small share in the distribution of finished vehicles.

When selecting transport services car manufacturers look for:

- quality, including appropriate ISO accreditation, and compliance with the Quality Operating System and QSA industry standard set by GM, Ford and Chrysler;
- reliability;
- predictability;
- flexibility;
- fast transit times;
- low prices;
- the balancing of flows with those of other customers to achieve high vehicle space utilisation and reduce empty running, and the minimisation of cargo handling requirements en route;
- appropriate technology, for example mega-cube swap bodies for cargoes with a high volume: weight ratio;
- environmental friendliness

The comparative ranking of road and rail performance against these criteria given by one manufacturer (Ford) is shown in Table 5.14

Table 5.14. Ranking of Road and Rail in Relation to Key Performance Criteria

CRITERION	ROAD	RAIL
Quality	Good	Poor
Reliability & predictability	Good	Medium
Flexibility	Good	Poor
Transit times:		
long haul	Medium	Good
short haul	Good	Good if high volumes
Price	Poor	Poor
Service	Good	Poor
Technology	Good	Poor

Source: *Euro-CASE Workshop Presentation on Behalf of Ford, Dusseldorf, November 1999*

5.5.1. Rail

Most car manufacturers are prepared to use rail transport where it is competitive. In some cases this is because they have made public commitments to environmental protection and see the use of rail as helping them to fulfil this obligation. But private manufacturers are under relentless pressure to reduce costs, and are more likely to fulfil these commitments if they are obligatory rather than voluntary.

Rail is extensively used by some manufacturers – in 1997, for example, BMW moved 54% of its components (ton-km) and 60% of its finished vehicles by rail - but other manufacturers are more reticent, and components manufacturers make relatively little use of rail.

Contrary to the belief that rail is only economic for distances of 500+ km, it is sometimes used for quite short distances where the volumes are enough to justify a regular shuttle service, for example the 120 km movement of body pressings from Swindon to Longbridge (Birmingham) by Rover UK, and the 100 km movement of finished vehicles from Genk (Belgium) to Neuss (Germany) by Ford. The manufacturers operate regular shuttle services several times per day using specially designed wagons to increase train payload.

Rail has several advantages over road, such as safety, energy efficiency, environmental friendliness, and its suitability for scheduled through services, but these are more than offset by its perceived disadvantages:

- unreliability;
- the unsuitability of the network for multiple drops;
- the priority given to passenger services;
- lack of investment;
- slowness, which is partly due to delays at border crossings;
- the small number of suppliers who are rail connected, even though many of the large assembly plants would like to increase the use made of rail;
- lack of customer sensitive operators;
- inability to provide a turn up and go service;
- inadequate cargo tracking systems;
- reluctance to enter into contracts offering guaranteed transit times with realistic penalties;
- high prices; and
- lack of convenient road-rail interchange points.

Rail service providers need to be more flexible in re-routing equipment and providing replacement or alternative services at short notice. But unlike road transport, this requires the co-operation of several different organisations, particularly for international movements.

There are serious shortages of railway infrastructure and rolling stock. The TPLMs working for large car manufacturers are unable to buy train paths at the times they want them because of a shortage of track capacity and the preference given to passengers over freight. Large investments are needed to create additional train paths, but the TPLMs are reluctant to commit to buying train paths 5-6 years in advance because of uncertainty about future traffic flows and contracts. At the same time the lack of committed customers makes it difficult for new lines to be financed by third party investors such as banks and other financial institutions.

One problem is that new railway track comes in large, indivisible amounts, unlike new motorways which can be opened incrementally in short sections. In addition, politicians may be reluctant to invest in rail because they fear the railways will let them down by failing to make the operational and management changes necessary to secure the desired change in modal split. The railways have an entrenched, conservative culture with a poor track record of delivering past promises, whilst there is not the same belief in traffic growth as there is for road and air traffic.

There has been little recent investment in car transporter wagons because of low margins in car distribution. Road haulage companies are able to secure back-to-back distribution contracts which allow them to write off car transporter costs over 5-7 years but rail wagons are designed for a longer life and require longer contracts (15-20 years) to recover their costs if the railways are to offer prices which are competitive with road. Road-rail interchanges also represent large investments with long cost recovery periods (20 years).

Tax incentives may be needed to overcome the problem of long payback periods, and encourage more use of leasing for specialist equipment. There are plenty of private wagon operators in Europe who are prepared to accept long-term investment risks, particularly for an industry such as car manufacturing which is regarded as very stable and predictable. Improving the inter-operability rolling of rolling stock in different European countries would also reduce third party investment risks by making the equipment more mobile and allowing a second-hand market to develop.

In view of these criticisms it seems that the key elements for the railways' survival as a major supplier to the automotive industry are:

- more emphasis on commercial, profit-driven activities (if necessary with the ending of subsidies);
- the transfer of cost responsibility for infrastructure to national governments;
- a business environment which allows both competition and co-operation, for example between national railways concentrating on high volume long-distance freight flows, and private sector niche players specialising in either consolidation activities, the wholesaling of space on freight trains, or local distribution of less than wagon load freight;
- greater focus on customer needs, based on more sophisticated consultations with shippers about a wider range of different railway products and alternative pricing mechanisms;
- technical inter-operability of networks in terms of train length, loading gauge, speed, standardisation of equipment and signalling, together with the use of international train crews;
- an end to national self-interest in the allocation and pricing of train paths;
- renewal of rolling stock, with the introduction of more appropriate technology;
- direct services between the ports and inland industrial areas, avoiding the need for train marshalling, combined with acceptance that in some circumstances customers needs may involve shuttle services with empty back-hauls;
- the improvement of overnight services;
- development of consolidation skills to exploit the large European market for less than trainload freight;
- unified control of the whole production process, particularly for international services.

There are several steps that need to be taken by European railways before these objectives can be achieved. The first step is the separation of freight from passengers and infrastructure so that it forms a separate business unit with clear commercial objectives. This will increase the ability of the railway's freight division to differentiate between markets and negotiate more appropriate labour contracts. Steps must also be taken to streamline national railway administrations, reducing costs, improving response times, and introducing a more customer-oriented commercial culture.

Secondly there is a need for national railways to form alliances, beginning with short-distance cross-border movements, then building on this to create more complex network-wide co-operation agreements covering larger areas, more aspects of railway operations, and more national railway companies. A new approach is needed to revenue allocation for international freight transport, with companies allowed to buy track space on the basis of train capacity, without any reference to what the train is carrying. This will make it easier to transfer risk to the organisation most willing to accept it, as well as simplifying the administration of international train movements.

If the railways are to offer their customers guaranteed delivery times for freight, with penalties for failure, there must be a system for allocating the blame for any delays, both between national railways and within the different operating divisions of a single national company (a freight train could be delayed by an Inter-City passenger train, for example). There should also be an agreed system of internal compensation charges for delays which is linked to the compensation payable to customers: quality guarantees are an important tool for persuading national railways to strengthen their commitments to each other, particularly within the context of international operating alliances.

Thirdly there is a need to open access to European rail tracks to private freight operators, on terms which enable them to offer services which are competitive with the national railways and, more importantly, road transport.

Finally it is necessary to identify corridors within which priority will be given to freight. Management time must be committed to building up rail's market share of freight within these corridors, and resolving commercial or operational problems encountered.

The Council of Ministers meeting in Helsinki (9-10 December 1999) approved the creation of a Trans European Rail Freight Network. Within this network:

- higher priority will be given to freight;
- there will be open access for the service providers licensed by any national railway along the route; and
- efforts will be made to standardise infrastructure charges throughout the network (German charges, for example, are high relative to those of other railways and have undermined competitive advantages of the railways for long-distance transport).

5.5.2. Road

Although rail is more of a competitor than in other sectors, road is still the dominant mode of transport, and the concerns noted in other industries about road congestion, journey time unreliability and the possibility of steep increases in cost are also present.

Because of the importance of long-distance international moves the industry is aware of missing links in transport infrastructure and the lack of standardisation between the cargo handling systems used by different countries. It is also concerned about the slow progress being made in telematics (for example the absence of in-cab electronic communications systems in older vehicles), the need for more specialist equipment (for example double deck or high cube trailers which would allow 32.5 ton vehicles to carry the same payload as a 38t vehicle does now) and the need for further improvements in logistics to reduce the amount of empty vehicle running.

However the industry is unique in that it also provides one of the main inputs into road transport, so it is more concerned about the effects of transport policy on its market than on its transport and logistics strategies.

5.5.3. Sea

The transport of finished vehicles by sea has always been an important, if specialist, area of shipping, although it has been dominated from the beginning by long-distance movements from Japan. There is now more interest in short-sea vehicle movements between Northern Europe and the Mediterranean/Black Sea, whilst companies like Wallenius, Ugland International Holdings and Grimaldi, the three leading European car carriers, are seeking to become more involved themselves in supply chain management. All now offer an intermodal distribution service, in some cases including value added services such as de-waxing and pre-delivery inspection. Wallenius and Grimaldi are developing greenfield storage sites close to key North European ports, whilst Ugland has recently bought the US car terminal operator Autoport Group.

In respect of components which normally travel in containers, OOCL, the Hong Kong based shipping line now operates a twice weekly block train service from Antwerp to Graz (Austria) on behalf of Chrysler, and other global container lines are also offering multi-modal distribution services to their large automotive clients.

5.5.4. Air

The air freighting of components is uncommon within Europe, although it is still significant in the US where distances are longer and there are operators offering dedicated air cargo networks.

5.5.5. Conclusions About Transport Needs

Although there is a general feeling within the automotive sector that more investment is needed in transport infrastructure, there is no widely-held view that the money should be spent exclusively (or even largely) on road. There is general interest in the development of improved rail services and multi-modal transport, although it is tinged with practical scepticism about the ability of the railways in their present form to deliver an acceptable quality of service.

There is also recognition that better use has to be made of existing infrastructure, through the harmonisation of regulations, standardisation of equipment, and more effective use of IT.

This is an encouraging position in view of the strong vested interests of motor manufacturers.

CONCLUSIONS AND RECOMMENDATIONS

6. CONCLUSIONS AND RECOMMENDATIONS

This chapter compares and contrasts the three sectors studied in detail – retail, pharmaceuticals and the automotive industry - drawing conclusions from them and asking whether these conclusions can be applied to other sectors. It looks specifically at the transport issues raised by the sector studies, and makes recommendations about how the EU and/or national/local governments could create a transport environment which is more in line with the needs of modern logistics practices.

6.1. Common Features

The main points of similarity between the three sectors are:

- **increasing concentration of the industry amongst a small number of large players.** In retailing this has occurred partly because of logistics, which is increasing the price competitiveness and product range of large supermarket chains. In pharmaceuticals it has been mainly the result of merger and acquisition activity amongst both manufacturers and wholesalers. Although this is creating new opportunities for improvements in logistics, these have not yet been fully exploited because of different national regulations and the need for multiple distribution centres located close to consumers. In the automotive sector there are serious over-capacity problems, as well as large economies of scale and slow market growth, leading to the expectation that the number of manufacturers and component suppliers will continue to fall. Dealership networks are also likely to be rationalised as inventory reductions and vehicle customisation make it more attractive to centralise stocks at a few large showrooms;

- **internationalisation**, with more cross-border moves within Europe and increased amounts of foreign direct investment from Asia and the United States. Although non-European firms have embraced the concept of the Single European Market, and usually serve it from a small number of centralised locations, there is still a tendency amongst European firms to treat Europe as a series of loosely linked national markets.

  In retailing most cross-border moves have been short distance, and have exploited cultural similarities between the countries of origin and destination (for example French investment has gone primarily to Spain and Portugal, whereas German investment has been focussed on Austria, the Netherlands and Denmark). In pharmaceuticals the large wholesalers each have a presence in several countries, but are not yet operating as truly pan-European companies. And in the automotive sector, perhaps the most international of all, there is still a strong consumer preference for domestically manufactured vehicles, whilst manufacturers try to restrict trade in vehicles which are priced according to the conditions found in each national market;

- **a high degree of regulation**, which is distorting industrial markets and increasing the demand for transport. Although there has been a large amount of deregulation in transport, progress in other sectors has been patchy. Retailing has made the fastest progress in logistics, partly because it is a highly competitive sector, almost completely deregulated apart from planning controls over new development. Pharmaceuticals has made the least progress, as discussions about rationalisation have been hindered by professional insistence on frequent deliveries, leaving artificially high prices to absorb the costs of inefficient distribution systems;

- **more information about customers** and greater responsiveness to customer needs, leading to a move towards market segmentation. Retailing has again led the way, with electronic point of sales (EPOS) data, and the use of "club cards" to collect information about individual customers' purchasing habits. Pharmaceuticals has not moved very far in this direction, perhaps because of the confidentiality of medical records, although the co-existence of prescribed and over-the-counter drugs is beginning to break-up the market into several distinctive groups of customers. The automotive sector, in contrast, is using postponement technology to allow the customer to specify the product in detail prior to manufacturing, and is also offering a wider range of after-sales support "packages" to meet individual customers' needs ;

- **fewer, more stable supply chains** as firms reduce the number of partners but enter into longer-term relationships. However some supply chains are becoming longer and more complex as companies trade with more distant suppliers, and more activities are outsourced to intermediaries. Retail supply lines are becoming longer as companies sell more exotic products, and take advantage of low wage rates when sourcing labour intensive products such as toys and electronics. Consolidators (often shipping line subsidiaries) pick and sort multi-product containers for individual stores in either the country of origin or the European port of entry. Pharmaceuticals supply chains have changed more slowly, although patent production has resulted in the establishment of a global marketplace for the active ingredients of new drugs. Automotive manufacturers, in contrast, are now outsourcing much of their pre-assembly work (modules) to Tier 1 integrators, and are tending to work with the same Tier 1 components suppliers world-wide, even if this means substantial international flows of materials when the supplier does not follow them into new markets;

- **smaller, more frequent deliveries,** and a more varied delivery pattern according to product shelf life. Retailers now work to very pre-booked short delivery windows, but are still facing ramp congestion for unloading due to the large number of deliveries made throughout the day. Cross docking to consolidate loads for each store in a single vehicle is becoming more popular, but retailers are also sharing vans with their competitors for multi-drop deliveries. In the pharmaceuticals industry, which has traditionally had a very high delivery frequency, there may be fewer deliveries to pharmacies as wholesalers merge and the larger pharmacies begin to hold stocks of commonly used drugs, but direct deliveries to large customers such as hospitals and drug store chains, and even to individuals ordering via the Internet, will almost certainly grow. In the automotive industry customised production and measures to reduce on-site inventories have led to an almost continuous flow of sequenced parts to many sections of the assembly, although simpler components are still delivered in batches, particularly to volume car manufacturers. Delivery of the individual car to the individual customer is also beginning to displace batch delivery of cars to showrooms for stock;

- **uncertainty about the future of E-commerce** and how to respond. E-commerce is growing rapidly, but is still handicapped by its low profitability and (in some companies) lack of proper logistics support. In retailing there seems likely to be a convergence between E-commerce and traditional forms of retailing, as E-traders set up display showrooms to allow customers to inspect their goods and stores offer home delivery services based on electronic ordering, using telephone and television ordering, as well as the Internet. In the pharmaceuticals sector E-commerce is extremely suitable for business-business transactions between wholesalers and pharmacies, but represents little more than the further automation of processes which already exist. Some E-commerce between wholesalers and individuals will undoubtedly develop, particularly for drugs that are not available in all countries or are variably priced, but the packaging of the product with a service (medical advice) will probably limit its spread. Its impact on the automotive industry

is likely to be large. EDI has not been very successful in integrating supply chains because it is complicated, and requires expensive software and trained staff. The user-friendly open systems available on the Internet will speed up the use of electronic data exchange, particularly for the smaller components manufacturers and dealers, and could lead to large improvements in logistics planning;

- **a surprising level of backwardness** in respect of logistics, in view of the large scope for cost savings. In retailing there is a polarisation between the large supermarkets and specialist chains such as Toys R Us, which operate very sophisticated logistics systems, and small independent retailers who still rely on personal contacts with known suppliers for ordering goods by telephone as and when needed. In the large pharmaceuticals companies, senior management skills have been focussed on research and development and bringing new products to market, to the neglect of product distribution. This is now beginning to change in response to government pressure to reduce costs, but the industry still has a surprisingly long way to go to match the systems used by leading retailers. The automotive manufacturers, in contrast, use sophisticated systems to control the assembly line and the supply chain links which lead immediately to and from it, but have not so far been very successful in integrating the logistics of second and third tier suppliers, or in persuading their dealers to restructure themselves more cost effectively.

So although the three sectors have some common features, these are never present to the same degree, and have often occurred for different reasons related to the structure of the individual industry. We were also surprised, during the workshops, at the amount of variation found between companies in the same industry in their approach towards logistics and their willingness to invest in new systems.

6.2. Inter-Sectoral Contrasts

The main points of contrast between the three sectors were in terms of:
- the extent of supply chain reform;
- location of responsibility for supply chain management;
- mobility and location trends;
- use of IT; and
- preferred mode of transport.

Supply chain reconfiguration – from supply-led ("push") to demand-led ("pull") – is now largely complete amongst supermarkets and large retail chains, and is well under way in the automotive industry but has barely started in pharmaceuticals. The supply chain for consumer goods which are purchased directly from large stores is dominated by the retailer, whereas the automotive supply chain is managed (increasingly) by the manufacturer, and the pharmaceuticals supply chain by the wholesaler.

Retailing is a fairly mobile activity. In recent years there has been a drift towards out-of-town sites that allow the construction of larger premises more easily accessible by car, although this is now being curtailed by planning controls in countries such as the Netherlands, UK and Denmark.

The pharmaceuticals industry has been locationally very stable – the large manufacturers of active ingredients have remained close to their historical points of origin, clustered around centres of excellence for research and development, or (for companies entering Europe from overseas) sought out attractive living environments offering good tax breaks. The smaller manufacturers serving mainly national markets have favoured the outskirts of large cities, whilst wholesalers and pharmacies remain tied to consumers.

The automotive industry has shown a different locational behaviour pattern at different points in the supply chain. Manufacturers are globally mobile, but rather conservative about site selection in countries where they are already established, preferring the modernisation of existing premises to the development of new greenfield sites. Some suppliers are moving closer to manufacturers, particularly where the manufacturer or local authority has taken steps to develop supplier parks nearby, but others are relying on more advanced logistics to enable them to meet increasingly stringent delivery standards. And dealership patterns are changing slowly as small family businesses become more specialised or close down, allowing sales to become gradually more concentrated at fewer, larger sites on the outskirts of towns.

There are now some very sophisticated IT applications available for retailing, which analyse as well as record data and allow large retailers to manage both their customers and their suppliers very efficiently. The pharmaceuticals sector makes use of large databases for recording and tracking orders, but does not make such effective use of this information for business planning purposes. And the automotive industry is a major customer for IT applications at the centre of the supply chain, although the small businesses found at both ends make relatively little use of IT.

Retailers and pharmaceuticals companies make very little use of rail transport, citing as the cause the need for a high service frequency, ability to handle small consignments, and guaranteed door-to-door delivery times.

Automotive manufacturers are more variable in their choice of transport. They already use both road and rail, and are prepared to make further use of rail if offered the right price/quality of service. But although most assembly lines are rail connected, this does not extend to suppliers and dealers, so guaranteeing multi-modal door-to-door delivery times becomes one of the most serious obstacles to the use of rail.

6.3. Applicability of Conclusions

The three sectors studied in the workshops have led to some general conclusions about logistics, which are broadly in line with the results of some of the large, multi-sectoral surveys that have been carried out in recent years. On the other hand each sector has some unique characteristics affecting its logistics and transport requirements, making them sufficiently different to raise a wide range of strategic issues. Considerable care is therefore needed when making generalisations based on the three sector studies alone.

It is not the purpose of this study to develop a typology of European industry that could be used for classifying and benchmarking the performance of individual sectors in respect of logistics. However it has become apparent during the course of the study that industry structures have various characteristics which affect logistics performance. These include:

- size distribution of production units (large or small companies);
- geographical distribution of customers and suppliers (length of supply chain);
- nature of customers (individual consumers, other production units, or intermediaries);
- volume of transactions taking place in the supply chain ;
- extent of vertical integration;
- degree of competitiveness/monopoly;
- speed of technological change;
- importance of new entrants in moving the industry forward;

- geographical availability of inputs (widespread or localised);
- product differentiation;
- capital intensity of the manufacturing process;
- value added by the manufacturing process;
- weight gain/loss during manufacturing;
- value:volume:weight ratio of the product;
- packaging of products with services;
- need for human contacts to reassure customers.

We believe that these criteria can only be applied at the individual company/product level, and not to manufacturing sectors as a whole (chemicals, electronic etc). Nevertheless they could be used as part of an initial screening process to identify companies whose logistics and transport arrangements are ripe for change, for example the companies which are most likely to be attracted back to rail by specific types of service improvement.

6.4. Conclusions

6.4.1. Location

The importance of transport and logistics on location decisions depends on the location of activities within the supply chain, and on whether the location decisions are taken at global, national, regional or local level. In general location has a far greater impact on transport and logistics than they have on location.

Today's location pattern has been strongly influenced by past logistics systems. Current logistics practices – which are giving most industries more locational freedom - will have a significant effect on future location patterns. But the forces of inertia mean that this will happen relatively slowly in most sectors, whilst choice of location in some parts of Europe will be increasingly constrained by traffic congestion, more restrictive driving regulations, and – in future – higher charges for the use of road transport infrastructure.

When considering the relationship between location, logistics and transport, it is useful to draw a distinction between primary and secondary activities. Primary activities can be very loosely defined as the manufacture, distribution and sale of final products, the items which form part of everyday life and which usually have a strong brand image/consumer recognition. Secondary activities, on the other hand, comprise the manufacture of capital and intermediate goods, services and products associated with maintenance and life extension, and miscellaneous inputs into the production and sales processes themselves

Primary Activities

Transport and logistics have relatively little effect on the global location of primary activities. This is determined primarily by markets, labour conditions, financial incentives, and the social or cultural preferences of senior management. Transport and logistics influence regional and local location decisions where site accessibility is a significant factor, but they usually represent "threshold " conditions – minimum requirements which must be complied with – rather than "determining" factors which must be optimised in some way.

There are two main trends in primary activity within Europe where there is a definable relationship between location, logistics and transport:

- the southwards drift of manufacturing and service activities towards the Mediterranean; and
- the concentration of inward investment within a small "core" area of North West Europe (the Benelux countries, Northern France and Germany, and South East England)

The drift of primary activities towards Southern Europe has taken place in spite of, rather than because of, transport and logistics considerations, fuelled by low cost, flexible labour and growing markets. EU investment, designed to reduce regional inequalities in Europe and speed the move towards monetary union, has also played a role.

But Southern Europe is separated from northern Europe by four large logistics barriers - the Alps, the former republic of Yugoslavia, France and Germany. Restrictions on road transport in the Alps are forcing goods to use more expensive inter-modal transport or travel longer distances through France. Political turmoil in the Balkans has further increased the industrial isolation of Greece. France is seen as a barrier to north-south freight movements because of restrictions on driving hours, and the unreliability of its rail freight services, whilst in Germany the principal barrier is high rail track charges. As markets in Southern Europe mature, and domestic growth slows down, these barriers will become an increasing obstacle to European integration and economic convergence.

Within Northern Europe the Benelux countries are often the preferred location for inward investment, as well as for activities which require a single European site. This is partly a result of their good transport and communications links, but also reflects their welcoming business environment (flexible, multi-lingual labour, absence of regulations, willingness of the public sector to negotiate, incentives for large companies to locate there). The UK and Ireland are also favoured locations for linguistic, legal and tax reasons, particularly for US and Japanese companies.

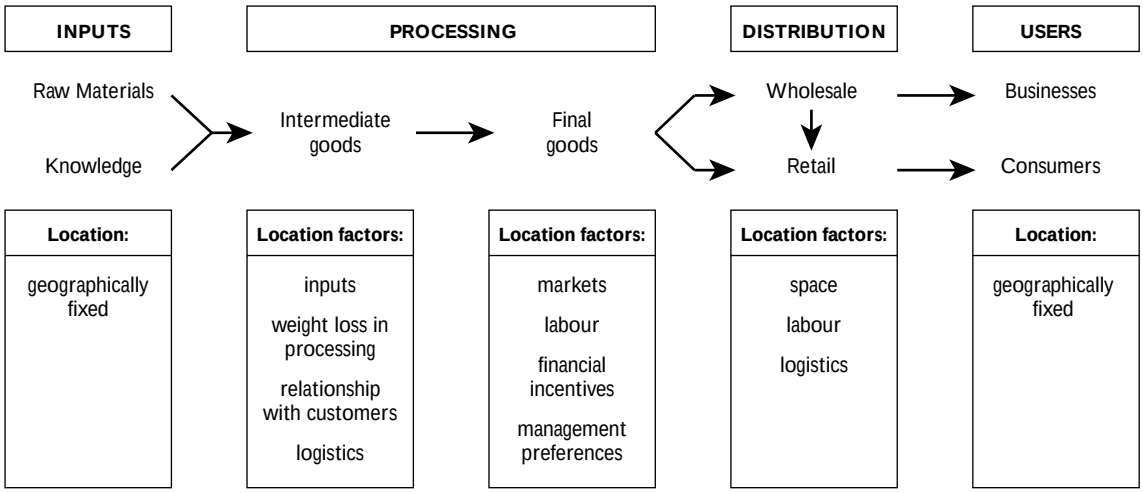
Non-European companies entering the European market for the first time are more likely than their European competitors to choose greenfield sites with good pan-European transport connections. This is because they see Europe as a single market that can be served from a single site, whereas most European firms still regard Europe as a series of loosely linked national markets to be served from multiple sites. Foreign firms also have the advantage of starting with a clean sheet of paper, and do not have to take into account the high levels of investment already committed to existing plants, sunk costs which would have to be written off in the event of a major relocation.

In addition, large foreign investors often bring with them their own suppliers, who are prepared to locate nearby, and have sophisticated logistics systems capable of managing supply chains across several different markets. They are more likely to consult governments about their location decisions (possibly because of higher expectations about the availability of grants), and have fewer personal preferences or historic commitments to particular locations.

Secondary Activities

Transport and logistics play a more important role in the location of secondary industries - "upstream" and "downstream" activities such as components manufacture, wholesaling and distribution, and industries in the service sector.

Figure 6.1. Factors Influencing Location Decisions at Different Points in the Supply Chain



The growth in outsourcing has increased the number of intermediaries in the supply chain, so that the value added (and employment potential) of secondary activities is increasing relative to that of primary activities. This is uncoupling functions that were previously carried out at the same place, and assigning them to smaller companies with a greater degree of locational freedom.

Simultaneously logistics improvements are allowing corporate economies of scale (for example purchasing discounts) to be separated from plant economies of scale (such as local fixed costs) to create a more diverse pattern of manufacturing and distribution based on smaller units serving overlapping markets which meet different customer needs. This is being reinforced by greater market segmentation as manufacturers seek to differentiate between separate niche markets.

Nevertheless Governments and local authorities generally focus on primary activities rather than secondary activities. This is partly because the structure of secondary activities –and the identities of the main players – are much less well known, but also illustrates the higher degree of confidence which the public authorities have in large companies, and the public relations benefits attracting famous names.

Secondary activities are frequently unable to locate as close to primary activities as they would like because of:

- land use planning controls;
- local political opposition to new industry, particularly in areas of low unemployment whose residents are anxious to protect the quality of their environment;
- economies of scale, which make it more cost effective to have a single plant serving multiple clients rather than several smaller plants dedicated to the needs of individual clients;
- high relocation costs, particularly when existing staff have to be paid off;
- unwillingness to become dependent on a single large client at a time when inter-firm relationships are changing rapidly;
- Government reluctance (central and local) to let established companies move to more cost effective or transport efficient locations outside of there own area.

For industry as a whole the separation of primary and secondary activities probably increases direct costs by no more than 0.5%. However the figure will be higher for products which have a high volume:value ratio or are handled by a large number of intermediaries.

Although the separation of primary and secondary industries significantly increases transport costs this has not been a big issue in location decisions because direct transport costs are fairly small, and have been falling as a proportion of total cost due to:

- improvements in transport infrastructure and vehicle design;
- transport deregulation;
- increases in other cost items (IT, marketing, R&D)

In addition, the external costs imposed on third parties (congestion, pollution, noise etc) have virtually no effect on location decisions because they are not recovered from the organisations giving rise to them.

There are already some companies who would find it economic (in commercial terms) to break up their operations into smaller units located closer to customers, but are unable to do this because of the difficulty of finding suitable sites. There are also other firms which it would be economic to relocate in social cost benefit terms, even though present land and transport pricing policies do not encourage them to take this decision themselves.

Many industrialists would like – through their location and transport policies - to make a larger contribution to the achievement of social and environmental objectives, but are being prevented from doing so by consideration of cost and quality of service to their customers. More progress would be made in encouraging them to adopt economically efficient location patterns if planning regulations were to be based on common standards which took into account the wider transport implications of their decisions. Regulations are becoming an increasingly important part of the local "package" offered to industrialists when they make location decisions, but are difficult to standardise because of competition between local authorities for employment and economic growth - regulations are often relaxed to attract industry away from other areas, for example.

If social and environmental considerations are to play a more important role in industrial location decisions, as many people believe they should, then national governments will have to act quickly to develop guidelines for local authority planning regulations, and a framework which will allow local authorities to co-operate in the enforcement of these regulations. This is particularly important in relation to mobile investments which are able to move across national boundaries.

At the same time planning regulations must take into account industrialists' logistics requirements. Many local authorities are unaware of the logistics implications of their planning decisions, and the technical content of the regulations governing industrial location is often very weak.

It is impossible to identify directly companies whose relocation would have economic benefits in terms of a reduction in transport demand and other external costs, as the complexity of supply chain economics means there are many other factors to be taken into account. However the public authorities have two duties:

- to increase awareness of transport costs amongst all parties (including local politicians and residents);
- to facilitate relocation decisions when suitable circumstances arise, usually at local level on a case-by-case basis.

Local authorities should take a flexible and pro-active approach to industrial location issues, assisting moves in which the benefits of reduced transport demand outweigh other direct and indirect costs.

There are two ways in which this can be done:
- by removing obstacles to relocation; and
- by actively promoting the clustering of related activities (an approach which has already been successfully adopted in Italy, in the automotive industry in Austria, and, to a lesser extent, in Scandinavia).

The removal of obstacles to relocation is often difficult because:
- the locations chosen by firms wishing to relocate are often unsuitable from a public interest perspective (noise nuisance to local residents, traffic congestion, accident black spots etc). Better ways need to be found of balancing the tension/conflict between commercial and social priorities, for example by requiring local plans to take into account strategic as well as local considerations, and providing compensation in cases where there is a clear trade-off between local costs and national benefits;
- national governments do not understand the locational requirements of industry very well. There is a need for more dialogue about future transport and land use requirements, to explore the implications of policy tools such as regional development grants, road pricing, and new infrastructure;
- Local governments do not want to let old industry go, even when it is becoming obsolete, because of the employment implications, disturbance to the status quo and fear of the unknown;
- industrialists are not aware of the full range of options which are on offer, and frequently take sub-optimal decisions on the basis of very limited information.

In general we believe that the role of government should be to create an "enabling environment", in which firms choose their own location but have to pay the full social costs of their decisions. Many existing industrial location policies have the opposite effect, encouraging firms to move to areas with high social costs which government continues to subsidise in the interests of regional balance, social welfare or political stability. This happens because many industrial location policies address the symptoms of industrial change rather than the underlying causes, focus on local rather than structural problems, and are concerned with individual decisions rather than creating the right framework for decision-making.

6.4.2. Logistics

The most important recent trends in logistics are towards:
- more varied delivery patterns related to product shelf life, product customisation, more differentiated retailing strategies, and improved short-term forecasting methods;
- shorter order cycles;
- smaller, more frequent, more reliable deliveries;
- greater use of IT;
- closer relationships with fewer suppliers;
- outsourcing of logistics to third party logistics managers (otherwise known as 3PLs or TPLMs), which allows companies to share distribution facilities;
- more use of recycling, which has resulted in additional backhaul cargoes.

There is still considerable uncertainty about the future of E-commerce, and the impact that this will have on logistics.

More varied delivery patterns are likely to result in a mixture of different warehousing and stock-holding strategies. Some standardised, low cost products with fairly long shelf lives will continue to be delivered in large batches, whilst customised or fast-moving items will require local buffer stocks to be held close to the point of use or sale, so that a carefully synchronised flow of products can be maintained, overcoming the supply problems caused by road congestion.

With the trend towards smaller, more frequent deliveries, freight transport could be expected to increase faster than the volume of goods sold. In fact this has not happened: land transport of freight (ton-km) has increased at an average rate of only 2.7% pa since 1970, which is not much faster than GDP growth. However there has been a very significant shift in traffic from rail to road, and also an increase in vehicle movements associated with higher volume:weight ratios and the growth in short distance movements by delivery vans in urban areas, which has increased public awareness of the growth of freight.

The overall growth in freight transport has been less than might be expected because of steps taken by industry to keep transport costs under control. These include:

- development of sophisticated software to optimise vehicle routeing, removing many of the inefficiencies associated with past journey patterns;
- use of cross-docking to increase vehicle load factors and reduce the need for inefficient multi-drop journeys;
- use of smaller vehicles designed for urban driving conditions in the final stage of distribution;
- trip spreading throughout the day, which reduces the proportion of goods vehicles movements taking place during the peak hours for passenger journeys;
- more vehicle sharing as TPLMs consolidate the flows of different clients. Even competitors now share transport, which is perceived as reducing costs without affecting market share;
- improvements in vehicle design to use the space within the vehicle more effectively (twin decks, pallet racking, high cube box frames etc).

The next stage is likely to be increased use of sea and air transport for longer distance moves within Europe – sea transport because of regulatory changes intended to promote environmentally friendly forms of transport, and air transport because of the amount of freight capacity (belly space) generated by the growth in passenger travel since deregulation, and the desire of the airlines to maximise aircraft utilisation at night.

The need for fast, frequent deliveries of small consignments has been one of the factors behind the explosive growth of express parcels carriers. This seems likely to continue, fuelled by the growth in E-commerce, and will have three main effects:

- an increase in vehicle mileage which far outstrips the growth in ton-miles travelled;
- an improvement in transport efficiency through the use of shared delivery services for small, irregular flows of goods;
- a reduction in the importance of location as transport costs and quality of service become more uniform throughout Europe.

The increase in vehicle miles will be a particular problem in urban areas, not only because of the high level of traffic congestion which already exists in many towns, but also because of the disruption to traffic flows caused by frequent stops for loading and unloading. Urban freight will become a more important political issue in future, and is one of the areas to which DG TREN should be paying more attention, even though it is primarily a Member State responsibility.

There are at least three models for the management of urban freight flows that may have wider applicability in other parts of Europe[7]:

- the German model : voluntary co-operation between carriers to establish freight interchanges on the edges of urban areas, and share local distribution vehicles designed for urban driving conditions;
- the Dutch model : restriction of entry into urban areas to goods vehicles operated by companies holding urban distribution licenses. The award of licenses can be made conditional on type and quality of vehicle, the scheduling of collection and delivery work, and the facilities offered for cargo consolidation;
- the Monaco model: a municipal goods distribution service operated on behalf of the local authority by a single private contractor.

Approaches such as these have not been widely discussed outside their country of origin. Most urban freight plans still concentrate on restrictive measures such as lorry bans, vehicle weight limits and unloading regulations rather than working with the private sector to develop a more pro-active approach to the organisation of freight flows.

Information technology is an important tool for the streamlining of materials flows, but most cargo tracking systems are proprietary systems intended for use within a single organisation, often resulting in serious communications problems between successive participants in an inter-modal transport chain. It is difficult in Europe to create the "virtual extended enterprise" in which all of the companies in a supply chain are linked by telematics, because of:

- lack of a common conceptual framework;
- difficulty of reaching agreement on information accessibility and confidentiality (smaller players may move to competing supply chains, taking commercially sensitive information with them);
- patchy knowledge of IT on the part of smaller participants;
- absence of international standardisation in message design; and
- insufficient awareness of the costs and benefits of integrated supply chains, and arrangements for sharing the net benefits fairly amongst participants.

Some of these problems are now being overcome by the "open systems" approach offered by the Internet, which provides a more user-friendly platform at substantially lower cost. Other problems will be overcome with time, as the next generation of workers will have a much higher level of IT skills than the present one. So further major expansion in the use of IT appears almost certain, increasing the scope for improved logistics in small and medium sized enterprises.

The move towards longer-term customer-supplier relationships will regularise freight movements, encourage investment in more efficient vehicles and rolling stock and make it easier to consolidate individual flows. It also allows logistics considerations to be incorporated into product design and marketing strategies.

In addition, the outsourcing of logistics to third party suppliers brings in professional management techniques and promotes the sharing of facilities, both of which increase transport efficiency. But the growth in out-sourcing appears to be slowing down, because of fears about loss of control over the supply chain, the need for manufacturers to keep in regular direct contact with customers and suppliers, and the high fees charged by high quality logistics managers. Supply chain management does not have to be outsourced to be efficient, but there must be a single company somewhere in the supply chain which has the authority, information and incentive to take overall responsibility. This does not have to be a manufacturer - large retailers, shipping lines, freight forwarders, and components suppliers as well as TPLMs are amongst the many types of agent who believe they can fulfil this role.

Source: (7) L. Datablanc *Le Transport de Marchandises en Ville* 1998

However there still are many supply chains – particularly those involving small and medium enterprises (SMEs) - which have no-one in charge, and are inefficiently organised as a result. There is a need for a mixed programme of research/consultation/advice to increase these companies' awareness of the opportunities for cost savings, design fairly simply supply chain improvements which would be of immediate value to them, and promote the use of best practice.

Because logistics has such an enormous effect on transport demand, there is also a need for much better monitoring of what is actually happening. At present, most of the information comes from surveys of large manufacturing companies or third party logistics managers, and is not necessarily in the form most suitable for transport planning:

- it pays very little attention to small and medium sized enterprises (SMEs);
- it lacks any sort of spatial dimension;
- it is concerned primarily with logistics processes, and pays little attention to the size and direction of the resulting product flows;
- performance benchmarking is concerned with potential future benefits rather than the cost savings achieved to date. For reasons of commercial confidentiality few of the surveys describe or quantify past achievements in very much detail, making it difficult to extrapolate the results of past changes into the future, or to gross up the results from a small sample of companies to assess the speed of change for the European economy as a whole.

As a result, it is difficult for firms which are just beginning to reform their logistics to form a clear idea of the potential benefits, and even more difficult for planners and policy makers to assess the implications of future changes in logistics.

6.4.3. Transport

The demand for freight transport will continue to grow, particularly in terms of vehicle-km. Factors supporting a growth rate higher than GDP growth include E-commerce, easier access to price information and more leisure time which will encourage consumers to shop over longer distances (perhaps internationally for some goods like cars), and higher values of time leading to a "must have it now" culture. The strong market position of the express parcels carriers, which is based on frequency as well as reliability of service, and hub-and-spoke distribution systems which reduce transport costs at the expense of longer distances travelled, may also keep freight transport growth high.

Factors which may slow down the growth in freight transport include the trend towards expenditure on services rather than products, higher value:volume ratios for many products, greater use of IT and co-operation between shippers to rationalise goods flows, and the suppression of demand caused by road congestion or demand management policies for transport.

So whilst the growth in ton-km may be fairly modest, at 1.5-2.5% pa, the growth in vehicle-km may actually be slightly faster than the growth in GDP.
Changes in modal split will be conditional on changes in transport policy. Industry's strong preference for road transport has been a recurrent theme of this report, and is caused in most cases by the lack of a viable alternative (rail, inland waterways, sea or air). Higher road user charges (vehicle and fuel taxes, vignettes and tolls) will have very little effect on modal split unless they are combined with measures to make other modes of transport more acceptable.

Concern about congestion, and the environmental effects of continued growth in road transport, has resulted in an aspiration to move more freight by rail. However there is a large gap between

the transport service characteristics required by industry and the quality of service provided by non-road modes of transport. Industry's requirements are for:

- ability to handle small consignments : less than trainload and in many cases less than wagonload;
- frequent point-to-point services at scheduled times;
- guaranteed delivery times;
- conveniently located and easily accessible intermodal terminals, and/or door-door delivery by intermodal transport;
- specialist wagons designed to meet the needs of individual cargo flows;
- automatic cargo tracking and monitoring;
- a faster response to queries and problems; and
- competitive prices.

European railways are perceived to fall far short of meeting these needs, and there is no feeling within industry that the gap is closing. Industry representatives attending the three sector workshops offered several explanations of why they believed the railways were failing to meet their needs:

- national railways pay too much attention to costs and not enough to quality of service;
- European railways are congested, with key bottlenecks restricting flows over much wider areas, so they do not have sufficient train paths available at the right time and place to accommodate more freight;
- priority is usually given to passenger services;
- it has been difficult to develop an entrepreneurial culture within large public sector organisations;
- railways have not sought to expand the range of services they provide to customers, for example door-to-door collection and delivery of the goods, consolidation and groupage services, short-term warehousing, IT-based order processing and Just-In-Time delivery;
- high charges for the use of railway infrastructure make it difficult for the railways to compete with road;
- most long-distance routes (for which rail has a natural competitive advantage) crossfrontiers, which represent obstacles to guaranteed high quality services.

There are clearly many freight flows for which rail will never be viable. But there are some viable flows which are missed because the search for additional traffic is insufficiently targeted or, indeed, is never begun at all. This is partly because there are some entrenched ideas about the economics of rail transport that are no longer valid.

The first of these is that rail is not viable at distances of less than 300 km. Experience in the car industry has shown that regular high volume flows using dedicated facilities and equipment can be viable at much shorter distances (around 100 km) particularly for heavy or bulky items, whilst the EC's own statistics show the average distance travelled by rail freight is 245km.

A second myth is that the barriers imposed by national frontiers are insuperable. Experience with the Freight Freeways, and with alliances between European railways for short-haul cross-border traffic (for example between the Netherlands and Germany) has shown that these barriers can be overcome, but only with strong leadership and the development of completely new organisational structures.

And the third myth is that scheduled train services for less than trainload traffic are uneconomic. This has not been properly tested yet but early results from EWS (UK), which is using a "package" approach involving several inter-related innovations targeted at specific types of customer, have been encouraging and should be pursued.

We support the decision by the Council of Ministers in December 1999 to establish a Trans-European Rail Freight Network, as this will provide easier access to key parts of the rail network for companies which are prepared to offer new types of rail service and can spot the commercial opportunities which will be opened up by services more in line with shippers' needs.

Inland waterways have restricted catchment areas (mainly in Germany, France and the Benelux countries) and point-to-point distances are often longer than for road or rail because of the need to follow natural features. The extra distance is exacerbated by slow travel speeds, although the service provided is usually cheaper than by road and reasonably reliable. The organisational structure has not produced the consolidation services needed to generate full barge-loads of cargo other than bulks or containers, whilst there are not enough efficient, low-cost interchange facilities to serve industries located away from the waterways.

Coastal shipping suffers from many of the same problems as inland waterways, but on a larger scale. For many cargo flows between Northern and Southern Europe coastal shipping would involve an excessive diversion distance, whilst there are relatively few routes with sufficient traffic to justify daily services by ships carrying payloads of 3,000+ tons. Coastal shipping is also affected by high port charges, slow turn-round times, poor interchange facilities (particularly sea-rail) and more stringent documentation requirements than other modes of transport, but these are minor problems compared with the need to consolidate sufficient volumes of traffic. The rapid growth in long distance intra-European trade is making short-sea shipping more viable, and it is also growing rapidly where it performs a bridging role (the cross Channel and Baltic ferries, or the Ireland-Continent routes) or where there is strong organisational support for hub-and-spoke distribution (for example the container feeder services operated by deep-sea container lines). When the potential traffic is dispersed, viable short sea shipping services become much more difficult to organise, and carry a high commercial risk during the start-up period.

Air transport is well suited in many respects to modern developments in logistics, particularly as airport congestion at the main hubs increases services to regional airports. Belly space in passenger aircraft comes virtually "free" in resource cost terms, services are fast and frequent and the organisational structure is well equipped to handle and track small consignments. Yet political attitudes towards the growth of air cargo are ambivalent, in part because of the noise and pollution associated with any extra aircraft movements, and the image of air freight as "high cost". More serious thought needs to be given to the role of air transport in European logistics, not least because it will affect the ability of many European manufacturers to participate competitively in global supply chains.

Road transport is likely to remain the most favoured mode of transport, but congestion costs will eventually have a significant effect on the delivered price of goods, affecting European competitiveness in global markets.
There are varying views about the seriousness of present road congestion levels:

- one view (held by some economists) is that congestion costs are over-estimated because they compare actual journey times with "free flow" journey times, rather than longer journey times associated with optimal levels of investment in the road network. However most industrialists – and members of the general public – appear to be seeking a standard of performance from the road network which is higher than the economic optimum, which raises important methodological questions about how congestion costs should actually be measured;

- there are significant regional variations in congestion costs within Europe, with the UK and the Benelux countries most seriously affected. Congestion reflects not only the lack of space in these countries resulting from high population densities but also significant under-investment in transport infrastructure over the last decade, particularly in the UK. It can therefore be argued that congestion – although a serious problem – can be eased by a combination of better management and more investment;
- however congestion costs are always underestimated – sometimes to a large extent - because official statistics do not take into account the "unseen" costs of the remedial measures used to maintain supply chain reliability – more dense depot networks, longer scheduled journey times, investment in reserve vehicles. In a world in which service reliability has become more important than cost, the measurement of road congestion costs should include the cost of avoiding potential delays as well as any costs incurred as a result of actual delays.

Congestion can be eased (to a small extent) by making road transport more efficient. But there is a major conflict between the steps which industry would like to see taken – authorisation of larger vehicles, relaxation of restrictions on driving hours, construction of more motorways, limits on the growth of car traffic in towns – and the changes being sought by politicians, who are sensitive to the arguments put forward by environmentalists, car drivers and local residents for limiting the growth of road freight.

Public support for additional road investments will only be forthcoming if it can be shown that traffic management techniques are already squeezing as much capacity out of the existing network as they can. Appropriate action will also be required to reduce public concerns about the poor safety record of road transport, and its failure to comply with environmental protection measures.

The EU has been active in promoting improvements in vehicle design and road network management, which make road transport more efficient AND reduce its adverse environmental consequences. The three main issues still outstanding are:

- the design of vehicles (and rail wagons) to handle standard European pallets;
- the development of efficient pricing policies for transport infrastructure;
- the development of a regulatory regime which can handle the growing internationalism of road transport.

Lack of standardisation of pallets - there are two main sizes (1200mm x 800mm and 1200mm x 1000mm) - adds to the inefficiency of European logistics. In addition, neither of these pallet sizes makes maximum use of ISO maritime containers, acting as a disincentive for the use of short-sea LoLo shipping. Whilst efforts to standardise pallet sizes continues, progress is constrained by the large amounts of sunk investment already committed to vehicles and warehouse equipment designed to handle existing pallet sizes. In addition, there appears to be little agreement about whether equipment design should be driven by customer needs or European standards, and whether European standards should be reconciled with US domestic container sizes to ensure global inter-operability.

Road pricing has already attracted a great deal of attention, but there is no doubt that a common approach within Europe will be extremely difficult to achieve. In this situation it is usually best to start off from a point on which there is general agreement, so the best chance of success will come from considering the pricing of road and rail infrastructure together, in the context of measures to promote the growth of intermodal transport within Europe.

The deregulation of road transport has achieved important efficiency gains, but the growth of outsourcing and sub-contracting has obscured responsibility for vehicle and driver standards. A cargo may be controlled by a logistics provider in one country, using a transport sub-contractor based in a second country whose vehicles are registered in a third country and whose drivers come from a fourth country (the use of low wage drivers from Eastern Europe, which encourages the double manning of vehicles, is likely to become much more common in future). In this situation, the enforcement of regulations and the identification of persistent offenders, becomes extremely difficult. A review of the legal liability regime relating to road transport may therefore be appropriate to take into account these emerging trends, including the establishment of links between the databases on operators which are now being set up by the regulatory authorities in several European countries.

Intermodalism combines the flexibility of road transport for short-distance collection and delivery work with the lower costs and environmental acceptability of other modes for the trunk-haul section of the journey. Cargo consolidation is often required at the interchange point to create services which are frequent enough to attract cargo yet sufficiently well used to be financially viable.

A critical issue for intermodalism is to reduce the distance at which it becomes competitive with door-to-door road transport. This can be done by:

- making rail infrastructure charges for the long-haul section of the journey consistent with road infrastructure charges, preferably with an allowance for any net saving in external costs;
- achieving higher utilisation rates for railway rolling stock through better wagon tracking and fleet management, acceptance of empty running to bring wagons back into circulation faster, disposal of surplus or obsolete wagons, the purchase or leasing of specialist rolling stock dedicated to the needs of key customers (and perhaps financed or guaranteed by them);
- ensuring that there is an adequate number of terminals, located so that they are easily accessible by all modes of transport and equipped with suitable and efficient load transfer equipment;
- making terminals more intelligent through the use of automatic vehicle identification (AVI), weight in motion equipment, electronic data interchange, and automatic transmission of cargo details and storage instructions to yard equipment;
- introducing longer collection and delivery hours at intermodal interchanges (or secure, unmanned collection and delivery points) - at present 50% of all intermodal exchanges are squeezed into a two hour time window in the early evening;
- reducing collection and delivery costs by pre-planning and rationalisation of road vehicle scheduling. This will only be possible for terminals with a minimum critical mass of traffic, and may preclude the use of terminals by large numbers of independent haulage firms.

In addition, the various organisations involved in intermodal transport will have to make more progress towards co-ordinated marketing, agreed service standards, revenue sharing, common documentation or a code sharing system which links related documents, and long-term partnerships or alliances.

The present institutional arrangements for intermodal transport are far from satisfactory. ICF (containers) and UIRR combined transport companies (swap bodies and trailers) exercise a high level of monopoly for intermodal movements in all of the long distance transport corridors, and both are heavily influenced by the culture of European railways. The initial burst of technical innovation, which was warmly welcomed, has not been followed by equivalent progress in commercial innovation, and there has been a rather conservative, risk-averse attitude towards new investment. As a result, the use of combined transport has grown only slowly, in spite of its potential advantages.

European competition policy may need adjusting to encourage a higher degree of vertical integration in the provision of door-to-door transport services. For many years it has been assumed that modes of transport as well as transport companies should compete against each other. Public policy has focussed on the use of competition to reduce prices/improve service quality, disregarding the ability of vertical integration to achieve the same results through co-ordination and economies of scope.

Another issue which will become more important in future is discriminatory pricing. The combination of lean supply chains and guaranteed deliveries has pushed the responsibility for handling demand peaks from the manufacturer to the transport service provider, who must maintain expensive surplus capacity to meet this need. Following the example of the airlines, freight transport companies will make more use of variable or discriminatory pricing as a means of managing their peaking problems. This has been discouraged on equity grounds for services involving the use of public assets (for example rail transport) but should be regarded more positively as a means of improving asset utilisation, except in cases where it has no economic justification.

6.5. Recommendations

6.5.1. Location

Recommendation 1 : Investment Incentives
The European Commission should promote the harmonisation of national and regional investment incentives to reduce distortions in competition between different regions for new investment and ensure that manufacturing and service industries locate in the areas which are most advantageous in terms of long-term socio-economic costs (defined to include costs such as the provision of transport infrastructure and environmental protection which are largely external to the industry).

The European Commission should also seek to ensure that transport and logistics considerations are taken into account in the design and location of economic development projects receiving direct EU assistance, for example through the Structural Funds.

Recommendation 2 : Removal of Barriers to International Logistics and Trade
The European Commission should continue to work towards the removal of logistics barriers which affect international trade, such as high rail track charges or restrictions on weekend driving, to reduce the locational disadvantages of peripheral areas and increase the cohesiveness of the Single European Market.

Recommendation 3 : Better Planning Guidelines
National governments should develop guidelines for local authority planning regulations which take into account the social and environmental impact of industrial location decisions, including their implications for long-distance as well as local transport. There is a clear need for stronger linkages between transport and land use planning, and a need to develop evaluation methodologies for land use plans which take into account their overall economic efficiency and sustainability.

Recommendation 4 : Industrial Clusters
The European Commission should – in association with national governments - sponsor pilot projects aimed at the promotion of industrial clustering, where this can be shown to reduce transport needs or make a significant contribution to the success of urban freight plans.

6.5.2. Logistics

Recommendation 5 : Assistance to Small and Medium Enterprises

Improvements in supply chain management bring benefits to both their sponsors (cost savings) and the wider community (lower prices for goods and slower growth in goods vehicle movements). Because many small and medium sized companies (SMEs) are unaware of these benefits, the European Commission should encourage national governments to make some assistance available to encourage SMEs to move faster in adopting modern logistics techniques. This could take the form of:

- direct financial assistance to individual SMEs for a professional diagnostic review of their logistics systems. This would be fairly short – with external paid assistance restricted to a maximum of (say) 20 man-days – and would perhaps be restricted to SMEs trading internationally;
- education, training and publicity programmes;
- support for a small number of demonstration projects.

Recommendation 6: Urban Freight Plans

Many local authorities still need technical assistance for the development of urban freight plans which will reduce distribution costs within urban areas, improve the reliability of distribution schedules, and minimise the environmental impact of freight movements. Some EC-sponsored research projects have already begun, but a "Communications Plan" is needed to disseminate best practice, perhaps involving study visits and the exchange of experience between local politicians and industrialists.

Urban transport planning has traditionally been dominated by the management of passenger flows, and most public authorities' knowledge of freight requirements is sparse. Few planners working in the public sector have any basic skills in logistics, which makes it difficult for them to evaluate alternative solutions to freight transport problems. To redress this imbalance the development and testing of new techniques for the evaluation of freight strategies should be given strong support within the EC's transport research programme.

The TEN-T programme for freight terminals, which already covers multi-modal platforms, should be extended to cover road-road transfer points on the outskirts of large cities, even though this could result in a large increase in the number of terminals eligible for EU funding.

Recommendation 7: E-Commerce

There is an urgent need for more research into the logistics and transport requirements of E-commerce, covering issues such as the the additional growth in transport demand which it will generate, the location and ownership of collection and delivery hubs, the role of Post Offices and express parcels carriers, the scope for using intermodal transport, and the impact on city centres and out-of-town shopping areas.

Because E-commerce is moving so quickly, and will have a very large (if uncertain) impact, its research needs cannot be handled through traditional research contracts. We recommend that the European Commission should set up a special monitoring unit with high level reporting lines, to produce fast and effective policy responses to a rapidly changing situation.

6.5.3. Transport

The most important single issue in freight transport is how to achieve a better balance between road and other modes of transport, taking into account differences in cost, quality of service, safety and environmental impact, and the need to build additional infrastructure.

An appropriate modal split will depend on:
- the availability of cargo which can be consolidated into flows suitable for intermodal transport;
- the scope for improvement in the quality of service offered on European railways;
- the pricing policies adopted for road and rail infrastructure, which in most countries will remain in the public domain or under fairly strict regulatory control;
- the capacity available for freight on existing road and rail networks; and
- other public policy measures designed to support the growth of intermodalism, including the harmonisation and updating of regulations relating to carrier liability.

Our recommendations address each of these points in turn.

General Recommendations

Recommendation 8: Survey of Shipper Requirements
In order to improve the planning of the European transport system it is important to know more about shippers' requirements, particularly for shippers who have a genuine choice between different routes and modes.

There is a reasonable amount of freight traffic which could use non-road transport for at least a part of its journey, but it is widely dispersed and very little is known about its service requirements or responsiveness to different service offerings (price/frequency/transit time/reliability). It needs to be identified at the level of the individual company, plant or materials flow – the ranking of potential markets by industrial sector does not go far enough – and in depth interviews should be used to as certain the circumstances in which specific cargoes would be transferred from road transport to other modes.

Whilst it is unrealistic to do this for all companies which could switch modes (except as part of the carriers' normal marketing efforts) an EC-sponsored study to identify the 500 largest European freight flows which could be transferred from road to other modes, and the conditions which would allow this to occur, would add a lot to our general understanding of the potential for intermodal transport.

The results of the survey could then be compared with an analysis of spare capacity in the network for each mode of transport, leading to the identification of realistic and socially beneficial opportunities for modal transfers.

Recommendation 9: Monitoring Transport Performance
One of the most important conclusions of this study is that it is quality of service, rather than price, which underlies many transport decisions. Financial incentives for the use of rail or changes to road taxation and user charges to provide a "level playing field" will have very little effect unless the quality of alternative modes can be improved. We therefore recommend that the European Commission becomes more closely involved in the monitoring of transport service quality – by developing new performance indicators and persuading Member States to use them in ways which will improve the consistency of national transport statistics - in order to keep up the pressure for continuous performance improvements.

The quality of transport services can be defined in terms of specific criteria such as:

- frequency, minimum consignment size, door-to-door collection and delivery times, security and reliability;
- the use of vehicles and rolling stock which satisfy the technical requirements of the cargo flows they are intended to handle;
- response times to customer queries and changes in shipping instructions;
- provision of information about cargo status and the use of cargo tracking systems;
- guaranteed service standards, for example for cargo arrival times;
- willingness to accept liability, and offer compensation, when things go wrong;
- a commercial and flexible approach to the negotiation of price and quality of service;
- willingness to provide freight consolidation services, or work closely with other companies in this area;
- resolution of problems relating to the movement of goods across national frontiers

The improvements in these areas required to attract a substantial increase in rail freight are large, and will almost certainly involve a culture change within national railways, leadership from outside of the railway industry, or the creation of new rail freight service providers. Achieving this magnitude of change lies outside of DG TREN's direct responsibility, yet it can create substantial pressure for change by introducing a Europe-wide system for benchmarking performance in terms which are demand-led rather than supply-led.

Performance indicators of this type will need to be interpreted with considerable care, to take into account differences in the geography and demographic characteristics of each country. Nevertheless, the explanation of inter-country differences in performance would in itself be a valuable exercise, which would help to identify best practice and areas which require significant improvement.

Resources should therefore be assigned to developing new types of transport performance indicators that reflect shipper requirements more closely. Initially performance benchmarking – over time and between countries – should be confined to the railways, but with provision to extend it to other modes of transport once experience has been gained. Once objective performance indicators are available, the Council of Ministers should agree with the European railways' managements a series of targets for performance improvement, particularly in relation to international traffic.

Recommendation 10: Infrastructure Pricing Policies

The incorrect pricing of transport has been one of the causes of sub-optimal industrial location patterns. Supply chains will only be shortened if transport prices become more closely related to transport costs, and an appropriate modal split will only be achieved if road and rail infrastructure are priced on a comparable basis.

However the pricing of road and rail transport is moving in opposite directions, as rail freight pricing becomes more market-based and road infrastructure pricing (tolls, vignettes and motoring-related taxes) becomes more oriented towards full cost recovery.
Within the past three years a great deal of useful work has been done (separately) on road and rail infrastructure pricing. This should now be integrated to provide a common approach to infrastructure pricing which ensures that consumers pay the full marginal costs of using each mode, that the most efficient use is made of existing infrastructure, and that the correct pricing signals are given about the need for new investment. Although it will be very difficult to find a formula which establishes fair competition between modes whilst satisfying other policy objectives, this does not mean that the attempt should not be made. The study of infrastructure capacity constraints (Recommendation 11) would provide a unified policy framework for a study, and may help to resolve the methodological disputes that have affected previous pricing studies.

Recommendation 11: Capacity Constraints in Transport Infrastructure
There are serious capacity constraints affecting road and rail infrastructure, especially in Northern Europe. Failure to secure sufficient, suitably timed train paths has been one of the main reasons why rail freight services are so poor and unreliable, whilst road congestion is significantly increasing logistics costs. There are five possible solutions to this dilemma:

- develop transport management techniques which will allow more capacity to be squeezed out of the existing networks;
- transfer some train paths from passengers to freight;
- move cars off the roads to make space for goods vehicles, by suppressing passenger travel demand or transferring it to rail;
- invest to increase the capacity of road or rail infrastructure (or both);
- price transport so as to reduce passenger or freight demand, by road or rail, where this can be done without adverse consequences on economic growth.

The European Commission, through its transport research programme, should take the lead in developing and testing an economic evaluation methodology which can determine the most appropriate balance between these strategies. This should consider:

- the comparative costs and benefits of alternative transport service patterns (including externalities);
- the financial, institutional and regulatory changes which would allow better use to be made of existing transport infrastructure (for example lower prices for services prepared to accept longer, less heavily utilised routes, reservation of road space for specific types of vehicles, and new types of transport service);
- the costs and benefits of removing key bottlenecks within each network;
- the political acceptability of the mechanisms which would be required to channel transport demand into the most economically desirable service patterns; and
- the impact of the proposed changes on economic growth, particularly at regional level.

Recommendation 12: Institutional Changes

EU support for intermodalism has so far concentrated on the technical and physical aspects. But for intermodalism to be really successful there is a need for complementary action to create the legal/organisational framework which will allow new types of service provider to emerge.

It is already clear that intermodalism will require:

- more reliable, improved services by non-road modes of transport;
- accessible, low cost interchange facilities;
- high quality support services for logistics, including consolidation, documentation, cargo tracking and consignment re-routing when circumstances change or things go wrong;
- consistency of regulation throughout and between the various transport networks.

However the organisational structures required implementing these changes are much less obvious. Some experimentation may be required in pilot schemes involving new types of transport service and new types of service provider, and EC support may be necessary to share the financial risks associated with the start-up costs of such schemes.

There is also a need to ensure that the present legal framework does not impede the growth of large, vertically integrated logistics providers (for example the Deutsche Bundespost group), whilst providing for them to be properly regulated. The Energy and Transport Directorate should have a watching brief over organisations, and should be prepared to act swiftly with the Competition Directorate if there is any abuse of market power.

Finally, the European Commission should encourage national governments to allocate capital expenditure intermodally, on a corridor or "problem" basis, rather than by mode.

Recommendation 13 : Clarification of Carrier Liabilities

The management of transport services is becoming more complex as different parts of the operation are outsourced, and inputs are brought together from all over Europe or even – in some cases – from outside of Europe. It is quite common for road haulage in one country to be provided by a company registered in another member state, using vehicles or sub-contractors registered in third countries, and drivers of yet another nationality. Legal liability for accidents or non-compliance with national regulations or standards can become very blurred and difficult to enforce, and provides no incentives for better behaviour in future. The situation becomes even more confused when the journey involves more than one mode of transport.

The European Commission should sponsor a study of carrier liabilities throughout Europe, with the objective of clarifying and harmonising legal procedures, improving communications between the regulatory authorities in different member states, and raising minimum acceptable quality standard for vehicles, drivers, and the organisations managing freight transport.

Regional Priorities

The recommendations listed above are most urgently required in the congested areas of North West Europe (West Germany, the Benelux countries, SE England and the Ile de France). In the more peripheral areas transit rights through other countries to key European markets and the under-development of local transport services are more important issues than achieving a more balanced modal split.

Recommendation 14: Transit Corridors

Much of Europe now has a "7 day " economy, whose efficient working is hindered by weekend and night-time driving restrictions in certain transit countries. The European Commission should therefore take the lead in negotiating the waiving of these restrictions in multimodal transit corridors to Southern and Eastern Europe and Scandinavia, without necessarily requiring any change in national transport policies in the surrounding territory. Each Member State can grant its own derogations or waivers from these restrictions (although in some cases these powers have been delegated to regional authorities) and may be prepared to do so in return for similar concessions from other Member States, or financial assistance from the EU for multi-modal investment projects which help to overcome the problems the driving restrictions were originally intended to address.

Recommendation 15: Extension of Structural Funds Assistance

The development of logistics and transport services in Western Europe has been patchy. Financial support from the EU Structural Funds and the Cohesion Fund has brought about large improvements in transport infrastructure, but these now need to be matched by service improvements. Although the problems of funding investments other than fixed assets are well known, the use of EU funds for the "soft" investments in transport services – cargo consolidation facilities, cargo tracking, communications, training - should therefore be investigated. It would be useful for DG TREN to list the criteria which could be used by the Regional Development Directorate to identify the types of transport service improvements which might be funded on an experimental basis.

ANNEXES

Annexe A. Glossary of Terms

Active ingredient: the chemical within a pharmaceutical product that produces the desired medical response in consumers.

Benchmarking: comparison of the physical and financial performance of one undertaking with that of others producing similar goods and services, in particular the undertaking regarded as "best of class" AND/OR comparison of the actual performance of an undertaking with precisely defined targets.

Carrier: a company accepting responsibility for the transport of goods for all or part of the door-to-door journey.

Combined transport: the movement of goods on more than one mode of transport under a single transport contract.

Common transport policy: a statement of policy published by the European Union in 1992 and updated in 1998 as The Common Transport Policy. Sustainable Mobility: Perspectives for the Future (COM (1998) 716 Final/2). This emphasises the free movement of people and goods, the development of integrated, sustainable transport systems, the use of transport to reduce regional disparities, improvements in safety, better working conditions in transport, and the improvement of links to countries outside of the EU.

Cross-border moves: the establishment of a manufacturing or sales outlet in one country by a company registered in another country.

Cross-docking: the transfer of goods between vehicles without intermediate storage.

Dealerships: companies which sell manufactured products AND a range of associated services.

Discount stores: self-service grocery stores that sell a limited range of products at below-normal prices

Distribution: the process of moving goods from the manufacturer to the final consumer.

Foreign direct investment: the purchase of fixed assets or shares by a company registered in another country.

Freight forwarder: a company which arranges goods transport on behalf of other companies.

Goal: an ideal situation, stage or quality to which activities are directed, but which cannot necessarily be fully achieved.

Hypermarket: a supermarket with a floor area of over 2,500m2 (in Sweden 1,500m2).

Interchange: the location at which goods are transferred between vehicles or modes of transport.

Intermediate goods: goods which require further processing before sale to the consumer.

Inter-modal: the use of more than one mode of transport during a single door-to-door journey.

Logistics: management of flows of materials, information and money in a way which allows raw materials to be transformed into finished products.

Multi-modal: the use of more than one mode of transport during a single door-to-door journey.

Output: the gross value of goods and services, at market prices.

Out-of-town shopping centre: groups of large shops on the outskirts of towns, with shared access and car parking arrangements.

Over-the-counter (OTC) drugs: drugs which can be purchased without a doctor's prescription.

Pharmacy: an establishment that employs professionally qualified staff licensed to sell all types of drug.

Primary activities: the manufacture and sale of consumer products.

Regional distribution centre (RDC): large warehouses providing short-medium term storage and associated logistics services for goods which will move directly into the shops without any further storage.

Retailing: the sale of goods to individual consumers.

Secondary activities: the manufacture of capital and intermediate goods, inputs into the production, distribution and sale of consumer goods, and activities associated with post sales maintenance and servicing.

Shopping mall: a group of shops at one location, built by a single company but occupied by many retailers offering different types of product.

Short-sea shipping: the movement of goods by sea between ports in Western Europe.

Small and medium enterprises (SMEs): companies with fewer than 250 employees.

Supermarket: a self-service store with a floor area of over 500m2, selling food and drink and other household items.

Sustainability: a situation in which the use of renewable resources does not exceed their rate of regeneration, the use of non-renewable resources does not exceed the rate of development of sustainable alternatives, and the emission of pollutants does not exceed the capacity of the environment to absorb them.

Third party logistics manager/provider/supplier (3PLs or TPMLs): a company which manages on behalf of others the flow of materials, information and money associated with the manufacturing and distribution of goods.

Tier 1 suppliers: companies which supply intermediate goods directly to manufacturers of finished products.

Tier 2 and 3 suppliers: companies which supply intermediate goods to other manufacturers of intermediate goods.

Train path: the right to use specified railway infrastructure between two locations at a specified point in time.

Transport infrastructure: the immobile fixed assets involved in the production of transport services.

Transport policy: the process of defining measures within the transport sector to achieve goals within any sector of society.

Transport services: the movement of passengers or goods from one location to another.

Transport system: the combination of infrastructure, vehicles and services required to move people or goods from one location to another.

Value added: the difference between the sale price of a good or service (net of tax) and the price paid for purchased inputs other than labour and capital.

Western Europe: member states of the European Union plus Norway and Switzerland.

Wholesaling: the sale of goods by companies other than the manufacturer to companies intending to sell the goods to consumers without any further processing.

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