

**FINDING THE OPTIMUM PURCHASING STRATEGY FOR
FULL / PART LOAD SHIPMENTS IN LOGISTICS**

**M.Sc. Thesis by
Seher BARAN**

**Department : Industrial Engineering
Programme: Industrial Engineering**

JUNE 2007

**FINDING THE OPTIMUM PURCHASING STRATEGY FOR
FULL / PART LOAD SHIPMENTS IN LOGISTICS**

**M.Sc. Thesis by
Seher BARAN
(507031127)**

**Date of submission : 7 May 2007
Date of defence examination: 10 June 2007**

**Supervisor (Chairman): Assoc. Prof. Dr. Tufan Vehbi KOÇ
Members of the Examining Committee: Prof. Dr. Füsün ÜLENGİN
Prof. Dr. Nahit SERASLAN**

JUNE 2007

ACKNOWLEDGEMENTS

First and foremost thanks are due to my supervisors, Assoc. Prof. Dr. Tufan Vehbi Koç and Assoc. Prof. Dr. Mehmet Tanyaş, for their valuable guidance and encouragement throughout this project. I also would like to thank to Michael Martin for giving me opportunity to implement my study in Gefco UK.

Special thanks go to Emre İleritürk, without his advices this thesis would not be what it is today. I also thank to Serçin Şahin, Halisem Baran, Suzie Haydon and Anthony Ross for helping me with their supports.

Finally, I would like to thank to my family for their patience and support. I also appreciate all of my friends for their friendship.

JUNE, 2007

Seher BARAN

TABLE OF CONTENTS

ABBREVIATIONS	v
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF SYMBOLS	viii
ÖZET	ix
SUMMARY	x
1. INTRODUCTION	1
2. LITERATURE REVIEW	3
2.1. Supply Chain Management	3
2.2. Logistics	8
2.3. The Evaluation of Logistics	10
2.4. Logistics Activities	13
2.5. International Logistics	15
2.5.1. Difficulties of international logistics	18
2.5.2. Strategies of multinational companies in logistics	18
2.5.3. Evolution of logistics concepts in Europe	20
2.5.4. International trade	23
2.6. Distribution Channel	24
2.7. Centralisation	26
3. PURCHASING MANAGEMENT AND AHP	32
3.1. Purchasing and Supply Chain	33
3.2. Purchasing Strategy	34
3.2.1. Purchasing synergy-managing corporate purchasing strategy	38
3.3. Global Sourcing	40
3.4. Outsourcing	44
3.4.1. Make or buy decision	44
3.4.1.1. No formal method for evaluating the decision	45
3.4.1.2. Analysis of costs	45
3.4.1.3. Neglecting the core	45
3.4.2. A strategic model for make or buy decision	46
3.4.2.1. Stage 1 – defining the core activities of the business	46
3.4.2.2. Stage 2 – profiling the appropriate value chain links	48
3.4.2.3. Stage 3 – total cost analysis	49
3.4.2.3.1. Scenario 1	50

3.4.2.3.2. Scenario 2	50
3.4.2.4. Stage 4-analysis of potential suppliers for partnership	51
3.5. Analytic Hierarchy Process (AHP)	52
4. IMPLEMENTATION	58
4.1. Who is Gefco?	58
4.2. Gefco UK	60
4.2.1. Automotive division	60
4.2.1.1. PVNO (preparation of new and used vehicles)	61
4.2.1.2. Logistics arm of the automotive	61
4.2.1.3. Gefco transport	62
4.2.2. Supply division	63
4.2.2.1. Gefco's air and sea freight network (RMA)	63
4.2.2.2. Supply chain integration (ILI)	64
4.2.2.3. Handling solutions activity	64
4.2.3. Network division	65
4.2.3.1. Gefco groupage network	67
4.2.3.2. Full / part load network	68
4.3. Defining the Optimal Degree of Centralisation for Gefco	69
4.3.1. An analytical model for the global sourcing organization	70
4.3.2. Ideal types for the global sourcing organisation	72
4.4. Make or Buy Decision in Gefco	74
4.4.1. Description of the business between Gefco UK and Danone Waters UK	76
4.4.2. Implementation of model	77
4.5. Supplier Selection and Evaluation by Using AHP	86
5. CONCLUSION AND FUTURE RESEARCH	93
6. REFERENCES	95
APPENDIX A: DANONE WATERS UK'S CUSTOMER'S DATA IN 2006	100
APPENDIX B: THE TOTAL VOLUME FORECAST FOR 2007 FROM NEDC	105
APPENDIX C: CALCULATION OF TOTAL COST FOR GEFCO AND SUPPLIER FROM ZEEBRUGGE	108
APPENDIX D: CALCULATION OF TOTAL COST FOR GEFCO AND SUPPLIER FROM SANTES	113
RESUME	117

ABBREVIATIONS

AHP	: Analytic Hierarchy Process
DWUK	: Danone Water United Kingdom
EDI	: Electronic Data Interchange
EU	: European Union
FTL	: Full Truck Load
ILI	: Supply Chain Integration in Gefco
INES	: Information Network System
IT	: Information Technology
JIT	: Just In Time
LIS	: Logistics Information Systems
MNC	: Multinational Company
NAFTA	: The North American Free Trade Agreement
NDC	: National Distribution Centre
NEDC	: Northern European Delivery to Customer
PLC	: Programmable Logic Controller
PSA	: Peugeot Citroen Company
PVNO	: Preparation of New and Used Vehicles in Gefco
RDC	: Regional Distribution Center
RDVM	: Logistics Arm of Automotive Division in Gefco
SCM	: Supply chain Management
SEM	: Single European Market
SILS	: Supply Chain in Line Sequence
UK	: United Kingdom
US	: United States
WTO	: World Trade Organization
WWII	: World War II
3PL	: Third-Party Logistics

LIST OF TABLES	Page No
Table3.1	Comparing of decentralised and centralised purchasing 43
Table3.2	Pairwise comparison scale used in AHP 55
Table3.3	Relationship between consistency and compatibility for a different number of elements 56
Table3.4	Random Index -R.I 56
Table 4.1	Key figures in 2006 For Gefco..... 58
Table 4.2	Gefco Network Depots in the UK..... 66
Table 4.3	Total cost per trip and vehicle utilisation for Zeebrugge..... 80
Table 4.4	Total cost of one trip between the destination and tariff for Zeebrugge..... 81
Table 4.5	Total cost and tariff for subcontractor and differences for Zeebrugge..... 82
Table 4.6	Total cost per trip and vehicle utilisation for Santes..... 83
Table 4.7	Total cost of one trip between the destination and tariff for Santes..... 84
Table 4.8	Total cost and tariff for subcontractor and differences for Santes..... 85
Table 4.9	Pairwise comparison matrix with respect to the goal..... 88
Table 4.10	Priority values of Criteria..... 88
Table 4.11	Pairwise comparison matrix with respect to the cost criterion 89
Table 4.12	Pairwise comparison matrix with respect to the flexibility criterion..... 89
Table 4.13	Pairwise comparison matrix with respect to the reliability criterion..... 89
Table 4.14	Pairwise comparison matrix with respect to the technical capacity criterion..... 90
Table 4.15	Pairwise comparison matrix with respect to the information system criterion..... 90
Table 4.16	Pairwise comparison matrix with respect to the customer satisfaction criterion..... 91
Table 4.17	Supplier-criteria matrices' results..... 91
Table 4.18	Inconsistency ratios for supplier-criteria matrices..... 91
Table 4.19	Priority values of suppliers..... 92

LIST OF FIGURES	Page no
Figure 2.1 : Basic supply chain management model	3
Figure 2.2 : Activities and firms in a supply chain.....	4
Figure 2.3 : Strategic vision of supply chain management	7
Figure 2.4 : The role of logistics	9
Figure 2.5 : The evolution of logistics	11
Figure 2.6 : Interdependent logistics activities	14
Figure 2.7 : Changing Strategies of MNCs	19
Figure 2.8 : Governance structure of supply chains	20
Figure 2.9 : Evolution of import related logistics concepts	22
Figure 2.10 : Emergence of distribution related logistics concepts related to managerial focus	23
Figure 2.11 : The change from a decentralised to a centralised distribution structure	27
Figure 2.12 : The links between Centralisation, In-house / outsourcing and the SEM	31
Figure 3.1 : Strategic development of purchasing	35
Figure 3.2 : Generalised decision matrix	37
Figure 3.3 : Global sourcing as a strategic purchasing program	42
Figure 3.4 : A conceptual framework for evaluating the make or buy decision.....	47
Figure 3.5 : Hierarchy Model	54
Figure 4.1 : Change in turnover	59
Figure 4.2 : Breakdown of Turnover	60
Figure 4.3 : Depots in the UK.....	67
Figure 4.4 : Coventry depot's system for national and international shipments.....	68
Figure 4.5 : Research Procedure	70
Figure 4.6 : Analytical model for the global sourcing organisation	72
Figure 4.7 : Positioning in the global sourcing-organisation model for Gefco.....	73
Figure 4.8 : DWUK's warehouses changes from 2006 to 2007.....	75
Figure 4.9 : Zones in the UK.....	77
Figure 4.10 : Distribution flow from Danone's DCs to the UK.....	78
Figure 4.11 : Full Truck Load Volume per annum by Postcode in the UK.	79
Figure 4.12 : Hierarchy model for choosing best supplier.....	87

LIST OF SYMBOLS

A	: Comparison Matrix
CI	: Consistency Index
CR	: Consistency Ratio
n	: Number of Elements
RI	: Random Index
w	: Weight of Matrix
$\lambda_{\max}$	: Average of the Consistency Vectors

LOJİSTİKTE TAM VE PARÇA YÜKLEMELER İÇİN OPTİMUM SATINALMA STRATEJİSİNİN BELİRLENMESİ

ÖZET

Lojistik, materyallerin tedarikçiler ve müşterileri arasındaki akışı sırasında taşınması ve depolanmasından sorumlu fonksiyondur. Tedarik Zinciri Yönetimi değişik sektörlerdeki firmalara maliyetleri düşürürken müşteri hizmetlerini arttıran çeşitli öneriler sunmaktadır. Tedarik Zinciri Yönetiminin dünya standartlarını yakalaması için önemli olan faaliyetlerinden biri de satınalmadır. Tedarik Zinciri Yönetiminin en önemli amacı üretimin güvenilirliğini ve dağıtımını doğru çeşitlilikte, doğru miktarda, doğru zamanda ve doğru yerde sağlamaktır. Bu amaca ulaşmak için satınalma stratejisi, merkezileşme ve tedarikçi seçimi gibi konularda stratejik kararlar alınmalıdır.

1990'lı yıllarda birçok üretici ve servis sağlayıcı tedarikçileri ile işbirliği arayışlarına girerek satınalma ve tedarik yönetimi fonksiyonlarını eski yöntemlerden yeni bir fenomenin ayrılmaz bir parçası olan tedarik zinciri yönetimine yükselttiler. Tedarik zinciri yönetiminin, endüstrideki alıcıların satınalma ve tedarik fonksiyonlarına odaklanmasıyla tedarik zinciri yönetimi, satınalma ve tedarik açısından sınıflandırıldı. Buna karşılık birçok satıcı rekabetçi avantaj sağlayabilmek için kendi fiziksel dağıtım ve lojistik fonksiyonlarını, tedarik zinciri yönetiminin ulaşım ve lojistik perspektifiyle bütünleştirdiler.

Bu çalışmada Avrupa'daki en büyük Lojistik firmalarından biri analiz edilmiş ve AHP prosedürü kullanılarak tedarikçi seçimi problemi ele alınmıştır. Bu çalışmanın sonuçları, uluslararası nakliyelerde dışardan kaynak temin etmenin daha avantajlı olacağını göstermiştir. Buna karşın, lojistik faaliyetlerde etkin kaynak kullanımıyla ülke içinde yatırım yapmanın daha kârlı olduğu görülmüştür. Bu çalışma, yöneticilere; satınalma yönetiminde ve dışardan tedarik etme veya yatırım yapma kararlarının alınması süreçlerinde yol göstermektedir.

FINDING THE OPTIMUM PURCHASING STRATEGY FOR FULL / PART LOAD SHIPMENTS IN LOGISTICS

SUMMARY

Logistics is the function that is responsible the transport and storage of materials on theirs journey between suppliers and customers. Supply Chain Management (SCM) offers some business solutions to companies in various sectors by increasing customer service while minimizing cost. One of the key activities of SCM to achieve world class performance is purchasing. The most important objective of SCM is to ensure production and delivery of products at the right diversity, with the right amounts, at the right time and to the right locations. In order to achieve this aim, some strategic decisions have to be made such as purchasing strategy, centralization and choosing suppliers. During the 1990s, many manufacturers and service providers sought to collaborate with their suppliers and upgrade their purchasing and supply management functions from a clerical role to an integral part of a new phenomenon known as supply chain management. Since this aspect of supply chain management primarily focuses on the purchasing and supply management functions of industrial buyers, it has been classified as the purchasing and supply perspective of supply chain management. Correspondingly, many wholesalers and retailers have also integrated their physical distribution and logistics functions into the transportation and logistics perspective of supply chain management to enhance competitive advantage. In this study, one of the biggest logistics company in Europe has been analyzed and supplier selection problem is considered with the help of Analytic Hierarchy Process (AHP). The results of this study indicate that outsourcing the international shipments is more advantageous than investing. Besides that, investing for logistic activities could be more profitable due to efficient utilization in domestic market. The findings of this study guide the managers in their decision-making process of purchasing management and make or buy decision.

1. INTRODUCTION

Logistics is about managing and controlling the activities along the chain of supply, with the objective of creating sustainable competitive advantage in an international arena. Most organisations are involved in receiving products, handling them and despatching them to customers. Improved performance in the retail sector worldwide (increased range, lower prices, faster time to market) is mainly due to increased logistics competencies. It is no longer enough to 'push' products through the supply channel. Customer 'pull' strategies to meet the expectations of ever more demanding customers, through customised products and services, quick response deliveries and state-of-the-art information systems, means that international logistics must be seen as a key enabler of business strategy.

With an understanding of world-class supply chain management beyond the core competency of most EU retailers and manufacturers, there is an increasing reliance on outsourced logistics. The purpose is to eliminate geographical boundaries and to create a commonality of systems.

Looking at the occupier segment of the distribution property market, third-party distribution and logistics operators as well as manufacturing and trading companies will be the main drivers of demand for distribution properties in Europe. Retailers also account for a large part of the demand for warehouses. Internet retailing has created an increasing need for distribution space as online orders have been growing rapidly. In the 1990s larger storage units were required, with a preference towards centralized distribution operations serving not only regional but also national and international markets.

Centralised distribution has been one of the essential changes in retail and manufacturing sector. It does away with national stockholding operations and instead serves the whole region from just one or two major distribution centres or warehouses.

Purchasing is a critical link to adding value in the supply chain because it has both internal and external customers and acts cross-organizationally as manager of external suppliers. Purchasing operates within an organization, managing the supply of materials and services for other functional areas including operations, engineering, and finance. More recently, purchasing role has begun to play a more strategic role as organizations implement supply chain management concepts.

Analytic Hierarchy Process is utilised for developing a framework for analyzing the values of the performance measures in order to understand the reasons for the performance level. Supplier selection problem in Supply Chain Management is considered with the help of Analytic Hierarchy Process (AHP). Because, the problem is based on making comparisons and AHP technique has been applied extensively for this type of problems.

Gefco, which is one the biggest logistics company in Europe, decided to change their purchasing strategy for full / part load consignments through to centralisation in December 2006. In this study we analysed the performance of changing strategy and tried to find the optimum policy to answer the decision of make or buy. Moreover we analysed the suppliers and evaluate them according to their performances.

This study is organized as follows: In Section 2, the literature in logistics is reviewed and centralisation is explained. The following section provides details of purchasing strategy and management, also Analytic Hierarchy Process (AHP) is described in this section. In Section 4, related studies are implemented in Gefco. The last section gives the conclusion and recommendations for further studies.

2. LITERATURE REVIEW

2.1. Supply Chain Management

Alvarado and Kotzab (2001) define that Supply Chain Management (SCM) is the integration of business processes among channel members with the goal of better performance for the entire channel system. SCM is the integration of business processes from end-user through original suppliers that provides products, services, and information that add value for customers. SCM is a special form of strategic partnership between retailers and suppliers, with positive effects on the overall performance of the channel.

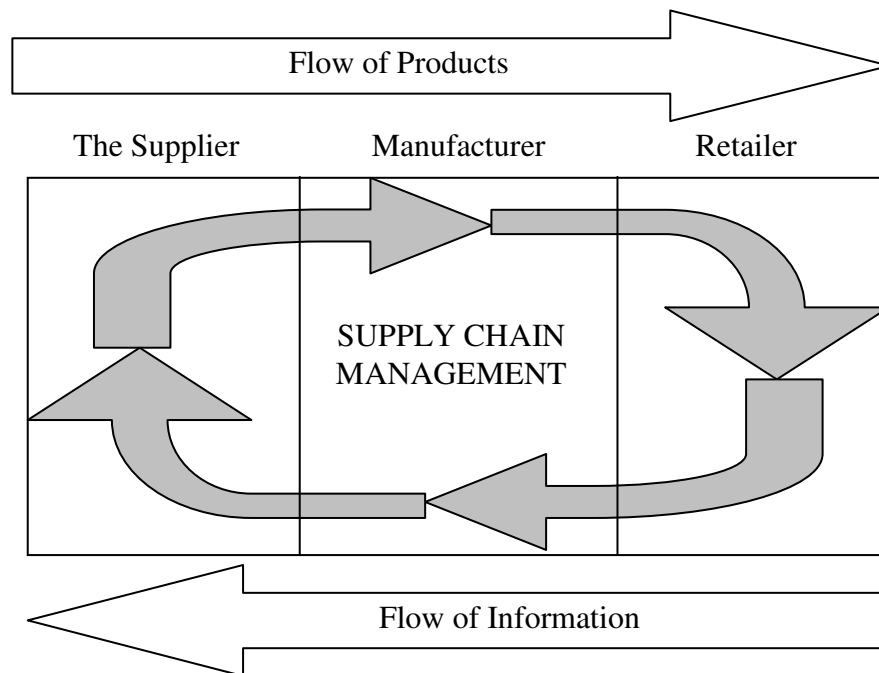


Figure 2.1: Basic Supply Chain Management Model (Alvarado and Kotzab, 2001)

Wang et al (2004) describe the key element of SCM is activity integration. SCM model in Figure 2.1 suggest the orchestration of activities at the inter-organizational level as well as the departmental level. Instead of focusing on the management of interfirm

inventory and transportation capacities, SCM aims to integrate the activities of an entire set of organizations from procurement of material and product components to deliver completed products to the final customer. These activities refer to marketing-dominated areas such as new product development, customer relationship management and/or customer service management. Consequently, SCM leads to improvements in channel performance among all channel members and not solely within the focal firm.

Logistics serves as an integrating function in supply chain management. Because of the long distances and lead times involved with global sourcing and distribution, top quality logistics systems development and management are essential to minimize costs and maximize customer service in global supply chains. Most modern logistics and supply chain thought also includes the development of "partnerships" with long-time suppliers or customers. International logistics helps to integrate different parties in the various logistics channels throughout the world. (Long, 2004)

Figure 2.2 shows the activities and firms involve in such a value chain as portrayed by New and Payne (1995). It begins with the extraction of raw materials or minerals from the earth, through the manufacturers, wholesalers, retailers, and the final users. Where appropriate, supply chain management also encompasses recycling or re-use of the products or materials.

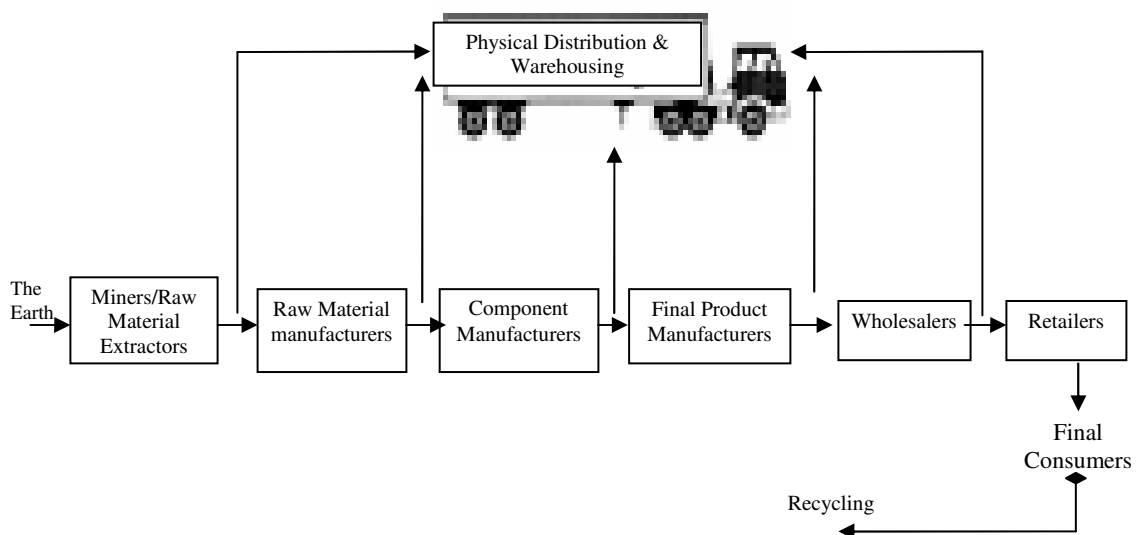


Figure 2.2: Activities and Firms in a Supply Chain (New And Payne, 1995)

Supply chain management appears to treat all organizations within the value chain as a unified 'virtual business, entity. According to Tan (2001), it includes activities such as planning, product design and development, sourcing, manufacturing, fabrication, assembly, transportation, warehousing, distribution, and post delivery customer support. In a truly integrated supply chain, the final consumers pull the inventory through the value chain instead of the manufacturer pushing the items to the end users.

Trebilcock (2006) explains building the real-time supply chain. Figuring out how to manufacture, warehouse and distribute products on a global basis cheaper than the others is the competitive challenge facing almost every business today. Two opposing forces complicate that challenge: On the one hand, anyone who wants to remain competitive is looking to source some portion of their goods from a low-cost provider. That means the supply chain is longer than ever and probably includes more participants than in the past. A manufacturer may be; producing in its own plants or using contract manufacturers around the globe; distributing from its own warehouses as well as using third-party logistics (3PL) providers; using its own trucks or multiple carriers along with many modes of transportation. On the other hand, all of those handoffs, not to mention all of that distance, suggest a need for longer lead times. But that's a luxury no one can afford. That's because today's customer wants more options and better service. The customer is driving the move to real time. That affects the retailer who relays that demand signal up the supply chain to distributors and manufacturers.

The process flow from the origin of raw materials all the way through production to delivery to the final customer across geographies can be managed by real-time information. Real-time information enables that complex supply chain to work. The term real time is visibility. Managing all of that complexity requires the deployment of the real-time systems across a supply chain network. The goal of these systems is to remove the huge latencies that have been built up in the supply chain. The only way to shrink them is to give better visibility to the trading partners. Getting visibility through real-time information is the goal both across the enterprise as well as inside a factory. Having visibility into the orders coming into the manufacturing plant, or it might mean taking it all the way down to the PLC (programmable logic controller) level at the floor

and knowing what is the next sequence in an operation. Real-time information shared across applications and across trading partners enables new processes that allow a company to be more responsive, like cross docking, merge-in-transit and dynamic rerouting of deliveries (Trebilcock, 2006).

There is one other new twist: As supply chains compete against supply chains, the cost of not performing has never been higher. Penalty costs are charged according to delays in delivery time to a major retailer. It is possible to shut down a plant as a failure to deliver on time.

Over the last 15 years the European Union's goods transport sector has been growing. The creation of a single market and the introduction of the euro have intensified competition in the distribution market, driving the demand for service providers with extensive knowledge and access to the major distribution regions of the world. This has created a demanding and complex supply chain with a noticeable impact on the logistics industry.

According to Tan (2001) the evolution of supply chain management continued into the 1990s as organizations further extended best practice in managing corporate resources to include strategic suppliers and the logistics function in the value chain. Supplier efficiency was broadened to include more sophisticated reconciliation of cost and quality considerations. Instead of duplicating non-value-adding activities, such as receiving inspection, manufacturers trusted suppliers' quality control by purchasing only from a handful of qualified or certified suppliers. More recently, many manufacturers and retailers have embraced the concept of supply chain management to improve efficiency across the value chain. Manufacturers now commonly exploit supplier strengths and technology in support of new product development, and retailers seamlessly integrate their physical distribution function with transportation partners to achieve direct store delivery or cross docking without the need for receiving inspection. A key facilitating mechanism in the evolution of supply chain management is a customer-focus corporate vision, which drives change throughout a firm's internal and external linkages. Figure 2.3 illustrates the strategic vision of supply chain management.

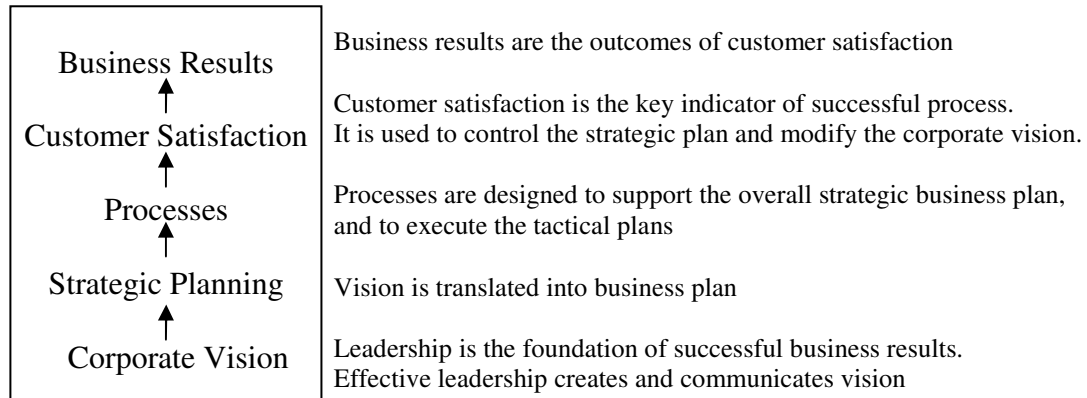


Figure 2.3: Strategic Vision of Supply Chain Management (Tan, 2001)

Companies are developing global supply chains to reduce the overall "net landed cost" of their product while improving customer service. The new supply chains are designed to enable each "node" within a network to perform needed services at the location that optimises competitive advantage, allowing the purchase and delivery of products globally at the lowest possible costs (Barbalho et al., 1998). The advantages and obstacles of global supply chain are listed below.

Advantages of Global Supply Chains

- Reduced total costs
- Inventory reduction
- Improved fulfilment cycle time
- Reduce cycle time
- Increased forecast accuracy
- Productivity increase
- Improved capacity
- Expand international connections

- Increase intellectual assets
- Delivery improvement

Potential Global Supply Chain Obstacles

- Inefficient transportation and distribution systems
- Market instability
- Language Barriers
- Customs
- Political turmoil
- Trade imbalances
- Export surges and recessions

Supply chain management differs from logistics management in the sense that supply chain management starts with customer requirements and focuses on the alignment of all activities needed in the supply chain to create competitive advantage for serving these customers. Logistics management focuses on the alignment of the activities needed to process and transform materials and goods to meet given supply chain requirements. Thus defined logistics management is a specific part of supply chain management and is strongly influenced by changes in supply chain strategies. (Lugt and Langen, 2005)

2.2. Logistics

A widespread idea prevails that logistics is 'movement of goods'. That is a narrow concept. Logistics is much more and much wider than mere physical handling of goods. Logistics is the one important function in business today. No marketing, manufacturing or project execution can succeed without logistics support. For companies, 10 per cent to 35 per cent of gross sales are logistics cost, depending on business, geography and weight/value ratio.

Logistics is comparatively a new term, but not the operation. Logistics has existed since the beginning of civilization. Raw material and finished products had always to be moved, though on a small scale. Things began changing with the advance in transportation. Another factor has come into play recently. Since the early 1990's, the business scene has changed. The globalisation, the free market and the competition has required that the customer gets the right material, at the right time, at the right point, in the right condition and at the lowest cost (Wanke and Zinn, 2004).

According to Council of Supply Chain Management logistics is defined as the process of planning, implementing, and controlling the efficient, effective flow and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements. This definition includes inbound, outbound, internal, and external movements, and return of materials for environmental purposes.

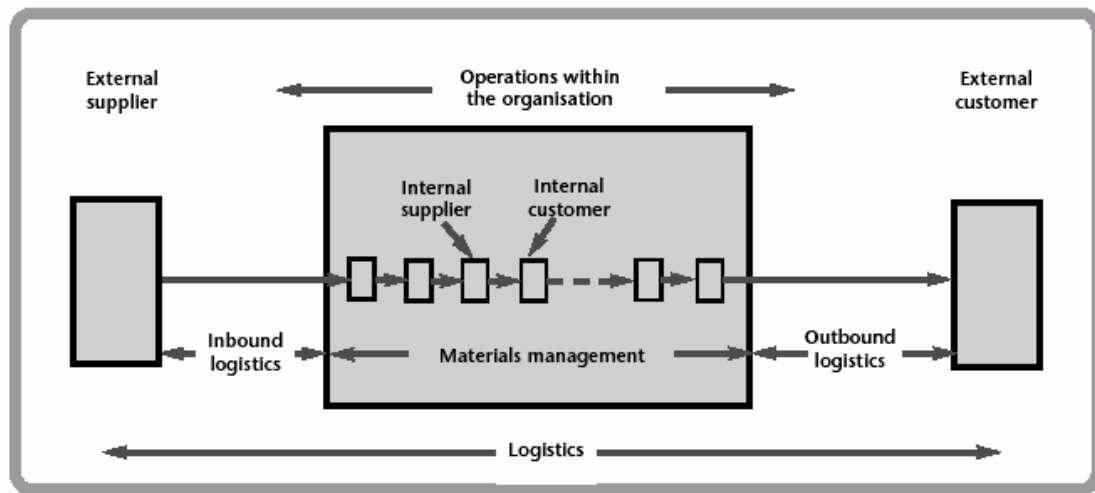


Figure 2.4: The Role of Logistics (Waters, 2003)

Logistics is the function responsible for the flow of materials from suppliers into an organisation, through operations within the organisation, and then out to customers. The operations are usually divided into a number of related parts (Waters, 2003). Logistics also moves materials through the different parts of an organisation, collecting from internal suppliers and delivering to internal customers as shown in Figure 2.4. Moving materials into the organisation from suppliers is called inbound or inward

logistics; moving materials out to customers is outbound or outward logistics; moving materials within the organisation is materials management.

Population began moving from rural to urban areas and to business centres. No longer did people live near production centres, nor did production take place near residence centres. The geographical distance between the production point and consumption point increased and international logistics gained importance.

According to Bonet and Paché (2005) logistics management is based on elementary operations (transport, storage, etc.) the overall optimization of which relies on a continuous effort of collaboration between manufacturers and large retailers; without any collaboration, there is a great risk of inefficient interfaces occurring.

2.3. The Evalution of Logistics

Paralleling advances in management theory and information systems, logistics has evolved in scope and influence in the private sector since the mid to late 1940s. In the 1950s and '60s, the military was the only organization using the term logistics. There was no true concept of logistics in private industry at that time. Instead, departmental silos including material handling, warehousing, machining, accounting, marketing, and so on, were the norm (Frazelle, 2002).

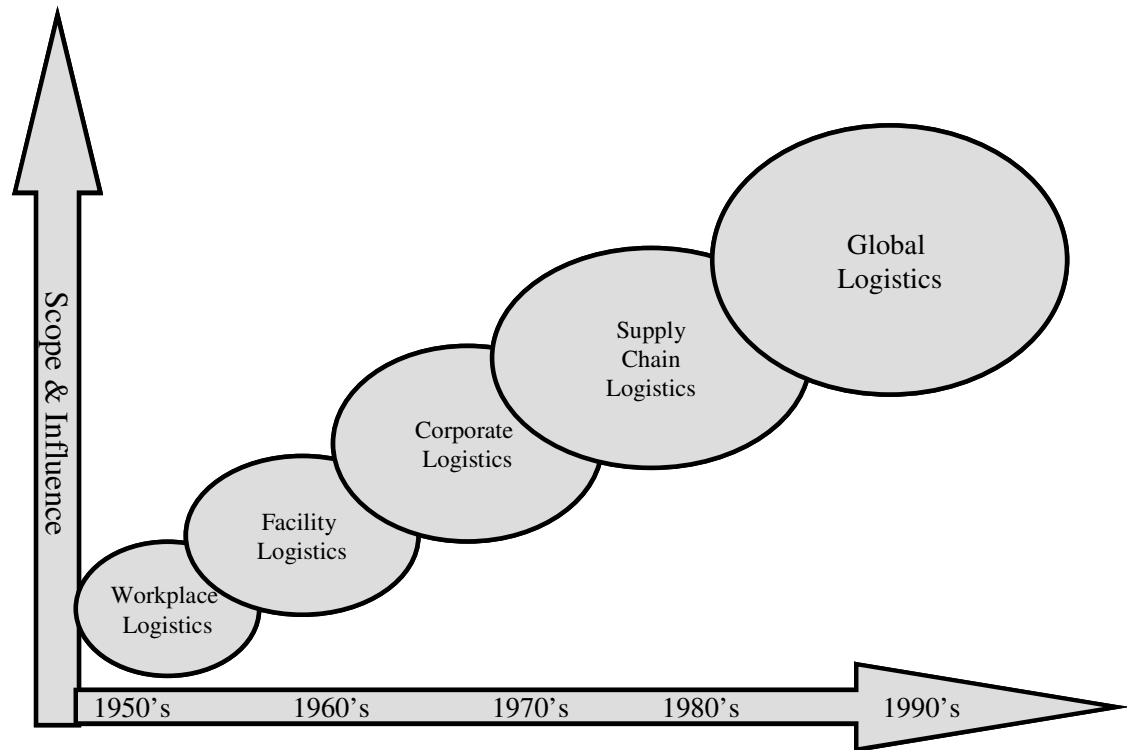


Figure 2.5: The Evolution of Logistics (Frazelle, 2002)

The five phases of logistics development—workplace logistics, facility logistics, corporate logistics, supply chain logistics, and global logistics—are plotted in time in Figure 2.5.

Workplace Logistics: Workplace logistics is the flow of material at a single workstation. The objective of workplace logistics is to streamline the movements of an individual working at a machine or along an assembly line. The principles and theory of workplace logistics were developed by the founders of industrial engineering working in WWII and post-WWII factory operations. A popular name today for workplace logistics is ergonomics.

Facility Logistics: Facility logistics is the flow of material between workstations within the four walls of a facility (that is, interworkstation and intrafacility). The facility could be a factory, terminal, warehouse, or distribution centre. Facility logistics has been more commonly referred to as material handling. The roots of facility logistics and material handling are in the mass production and assembly lines that distinguished

the 1950s and 1960s. In those times and even into the late 1970s, many organizations maintained material-handling departments. Today, the term material handling has fallen out of favour because of its association with non-value added activities.

In the 1960s, material handling, warehousing, and traffic were grouped together to become known as physical distribution; procurement, marketing, and customer service were grouped together to become known as business logistics.

Corporate Logistics: Corporate logistics is the flow of material and information between the facilities and processes of a corporation (interworkstation, inter-facility, and intra-corporate). For a manufacturer, logistics activities occur between its factories and warehouses; for a wholesaler, between its distribution centers; and for a retailer, between its distribution centres and retail stores. Corporate logistics is sometimes associated with the phrase physical distribution that was popular in the 1970s.

Supply Chain Logistics: Supply chain logistics is the flow of material, information, and money between corporations (interworkstation, interfacility, intercorporate, and intrachain).

There is a lot of confusion surrounding the terms logistics and supply chain management. The supply chain is the network of facilities (warehouses, factories, terminals, ports, stores, and homes), vehicles (trucks, trains, planes, and ocean vessels), and logistics information systems (LIS) connected by an enterprise's supplier's suppliers and its customer's customers. Logistics is what happens in the supply chain. Logistics activities (customer response, inventory management, supply, transportation, and warehousing) connect and activate the objects in the supply chain. To borrow a sports analogy, logistics is the game played in the supply chain arena.

Global Logistics: Global logistics is the flow of material, information, and money between countries. Global logistics connects our suppliers' suppliers with our customers' customers internationally. Global logistics flows have increased dramatically during the last several years due to globalization in the world economy, expanding use of trading blocs, and global access to Web sites for buying and selling merchandise. Global logistics is much more complex than domestic logistics, due to the

multiplicity of handoffs, players, languages, documents, currencies, time zones, and cultures that are inherent to international business.

2.4. Logistics Activities

Logistics is comprised of five interdependent activities: customer response, inventory planning and management, supply, transportation, and warehousing (Frazelle, 2002). Each activity and its objective are described briefly in Figure 2.6.

Customer Response: Customer response links logistics externally to the customer base and internally to sales and marketing. Customer response is optimized when the customer service policy yielding the lowest cost of lost sales, inventory carrying, and distribution is identified and executed.

Inventory Planning and Management: The objective of inventory planning and management is to determine and maintain the lowest inventory levels possible that will meet the customer service policy requirements stipulated in the customer service policy.

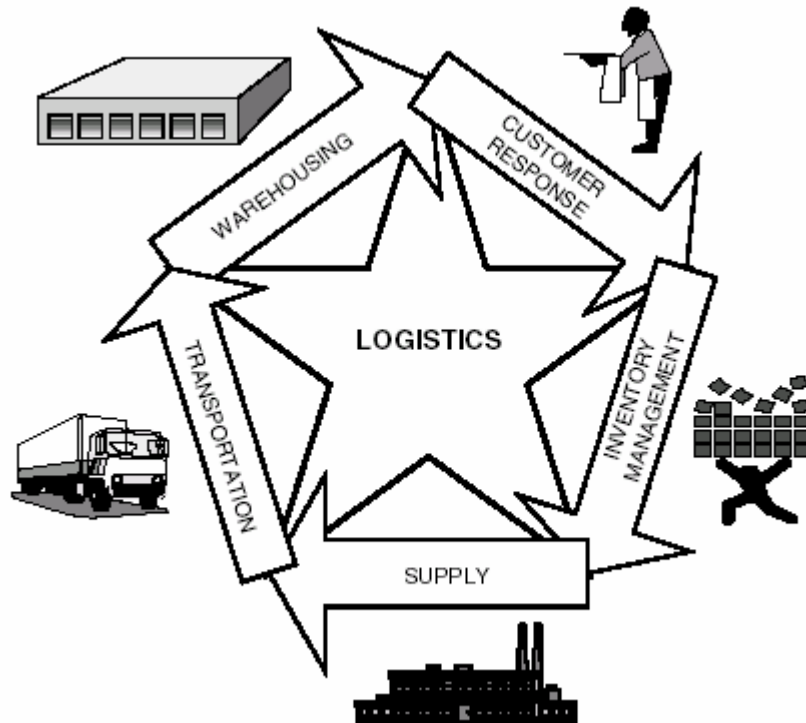


Figure 2.6: Interdependent Logistics Activities (Frazelle, 2002)

Supply: Supply is the process of building inventory (through manufacturing and/or procurement) to the targets established in inventory planning. The objective of supply management is to minimize the total acquisition cost while meeting the availability, response time, and quality requirements stipulated in the customer service policy and the inventory master plan.

Transportation: Transportation physically links the sources of supply chosen in sourcing with the customers we have decided to serve chosen as a part of the customer service policy. We reserve transportation for the fourth spot in the logistics activity list because the deliver-to points and response time requirements determined in the customer service policy and the pick-up points determined in the supply plan must be in place before a transportation scheme can be developed.

The objective of transportation is to link all pick-up and deliver-to points within the response time requirements of the customer service policy and the limitations of the transportation infrastructure at the lowest possible cost.

Warehousing: Good planning in the other four activities may eliminate the need for warehousing or may suggest the warehousing activity be outsourced. In addition, a good warehouse plan incorporates the needs of all the other logistics activities. Good or bad, the warehouse ultimately portrays the efficiency or inefficiency of the entire supply chain.

The objective of warehousing is to minimize the cost of labor, space, and equipment in the warehouse while meeting the cycle time and shipping accuracy requirements of the customer service policy and the storage capacity requirements of the inventory play.

2.5. International Logistics

International means that it will deal with transactions involving individuals or firms in more than one nation. International logistics systems are the complex web of carriers, forwarders, bankers, information and communication companies, traders, and so on that facilitate international transactions, trades, and movements of goods and services. Global supply chain management refers to the complex integration of processes necessary to manage materials from their point of origin through manufacturing and shipment to the final consumer. (Long, 2004)

As the new century begins, the world truly” is a global village. Improvements in telecommunications, systems technology, and logistics will allow for the purchase of any product, anywhere, anytime-at the lowest landed cost.

The world of logistics is changing rapidly. Barriers to world trade have been reduced or eliminated. For example, starting with the European Economic Community, which transformed the way products were manufactured and distributed in Europe.

More than 60 percent of all EU trade remains within EU countries. Sixty percent of all EU exports are sent to Germany, France, Italy, and the UK. Germany, France, and the Netherlands account for half of all international road freight-a sector that has grown by 40 percent since 1990. In that same period, rail use has increased by 17 percent and inland waterways by 12 percent. Ocean ports and airports are similarly growing. Northern European seaports such as Rotterdam, Hamburg, and Antwerp move nearly one-third of all the EU's ocean-bound containers. On the air side, Heathrow, de Gaulle,

Frankfurt, and Schiphol represent 60 percent of the freight tonnage transported in the EU. Now demand for distribution warehouses around these ports is strong and pushing up land prices and rental values. Many operators are looking toward less-expensive locations with good accessibility, such as Liege Airport in Belgium and Lille in France, rather than locations in Germany and the Netherlands. Supported by strong regional economic growth over the last live years, the Mediterranean ports of Marseille, Barcelona, and Genova are gaining in importance. And freight transport at Stansted Airport and Manchester International in England and Malpensa in Milan, Italy, increased by more than 100 percent between 1995 and 1999, creating new possible distribution hubs. (Anonymous, 2003)

The opening of world trade also has allowed manufacturers to rationalize their productive capacity for greater efficiency. Focused global or regional manufacturing now is common in Europe and North America. Manufacturers are expanding their presence in the Asian market to satisfy growing demand and to take advantage of lower labour costs per production unit.

Long (2004) explains that many factors influence the flow of goods and people between nations. Political situations are also important. Trade between the U.S. and Iraq has been limited to humanitarian relief supplies since the Persian Gulf War of 1990 because the U.S. currently embargoes trade with the Iraqi political regime now in power in Baghdad. It is seen that rapidly evolving consumer economies in Russia and China, and these will have many impacts on trade and travel volumes and patterns. Friendly nations negotiate treaties to increase the flow of commerce between them. On the other hand, wars, boycotts, and terrorism have a dampening effect. Technological improvements also influence international logistics. The Internet has provided access to a host of facilitating tools for managing global supply chains. Managers today are able to control information about inventory in transit in the same ways that managers once controlled actual inventory stocks. Global logistics systems have become quite predictable and reliable due to this enhanced information flow, and thus have become more manageable and precise.

In every region of the world, certain countries act as "regional hubs," which are countries that have developed large distribution infrastructures and are located relatively short distances from the key consumption centres of the region. For example, in Europe, The Netherlands serve as the key distribution point for many multinational companies. Turkey and Finland are trying to establish themselves as regional hubs to support Eastern Europe. In Asia, Singapore is a strong hub for the Southeast Asian region. Regional hubs, in a global logistics scenario, provide several significant benefits that are listed below.

- The regional hub can be the site for completing the final configuration of the product in a low tax and labour cost environment. Product can be shipped in its "generic" form and customized to the final target market as needed.
- Product configuration centres also are being created to maintain "generic" inventory that is configured based on actual customer orders. This already has delivered benefits to the electronic and computer industries.
- The creation of "generic" products will allow major manufacturing sites to operate more efficiently, with fewer changeovers and improved productivity. (Barbalho et al., 1998)

O'Sullivan (1997) explains that logistics is playing an important role in the increasing Europeanization of business. It is helping companies to integrate their operations in different countries with more common processes and to rationalize their manufacturing and distribution infrastructure to make more effective use of business resources. Linked with this is an increasing influence of logistics in many parts of business and an increased Europeanization of logistics management. The most important factor influencing developments in European logistics is the demand of customers for improved levels of customer service.

The increasing integration of Europe as an economic community provides multinational businesses with major opportunities. In spite of cultural and infrastructure barriers and difficulties associated with the development of common systems, significant benefits are available both in reduced costs and in enhanced service. It is important that

companies set up appropriate logistics management structures and implement European logistics strategies so that these benefits can be realized. (O'Sullivan, 1997)

2.5.1. Difficulties of International Logistics

International logistics is more difficult to manage than domestic logistics because the assumptions made by managers may not be as reliable, situations are generally less stable, the geography is much broader, and monitoring logistics processes is more complex. Business practices and standards differ from nation to nation.

Cultural differences also play major roles in selling and establishing ongoing relationships. Insisting too much on legalisms may be offensive to a foreign businessman and cause the deal to collapse.

International logistics is clearly more challenging and costly than domestic logistics. Significant cost differences exist for the increased inventory needed due to the length of international transportation times. The tradeoffs between inventory cost and transportation cost become magnified in international logistics, rendering some domestic solutions to those tradeoffs irrelevant to global movement of goods. A second category of increased cost is the complex documentation that is generally required in international trade but is nearly absent in domestic trade (Long, 2004).

The world truly is getting smaller and the marketplace is getting bigger. Global logistics can bridge the gap between service and efficiency, but it is not easy. By learning from others, and with an understanding of future trends in communication, marketing strategies, sourcing options, and technology advances, a true global logistics strategy can be implemented successfully. Companies that have taken this approach have reduced overall supply-chain costs by as much as 15 percent to 20 percent. (Barbalho et al., 1998)

2.5.2. Strategies of Multinational Companies in Logistics

The strategies of many multinational companies (MNCs) have changed from focused on market development to a focus on logistics efficiency and costs, to a focus on both market development as logistics efficiency and costs. Figure 2.7 shows the creation of competitive advantage.

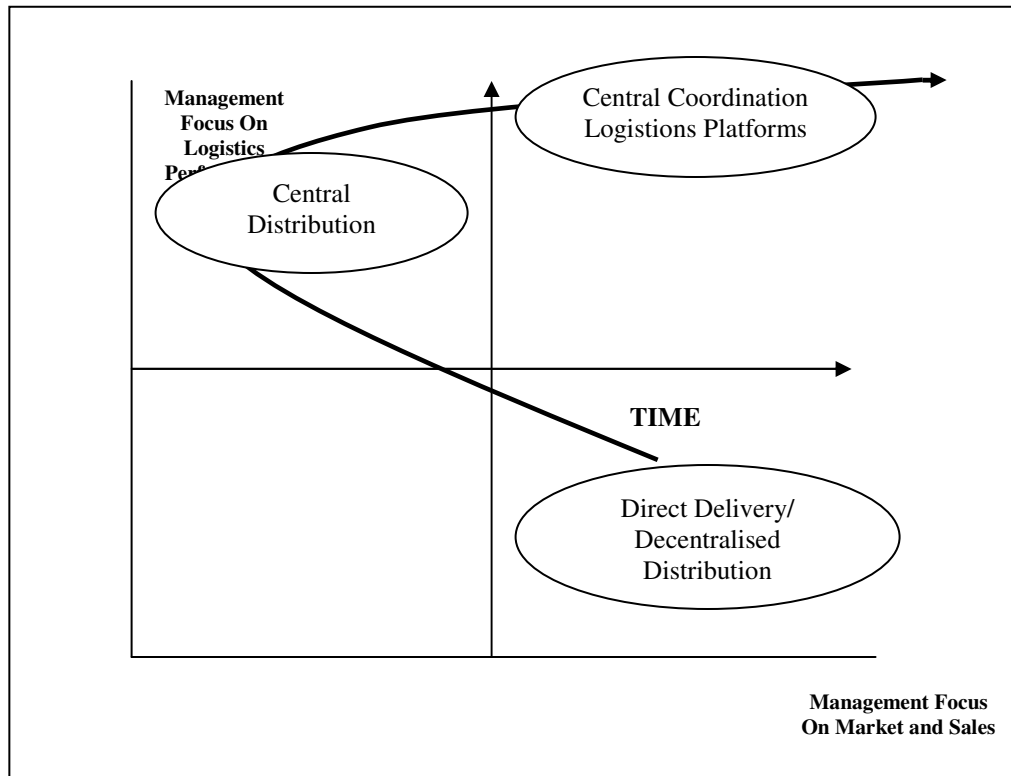


Figure 2.7: Changing Strategies of MNCs (Lugt and Langen, 2005)

Globalisation strategies of firms can be explained by two motives: the market expansion motive and the factor-input motive. The market expansion motive focuses on increasing ‘foreign sales’. The primary objective of the factor-input strategy is the enhancement of a firm’s competitive position in its home market by shifting the production activities to various regions in the world, based on cost advantages. In reality, multinational firms combine both strategies. The truly global corporation integrates both strategies to improve its competitive position in world markets (Lugt and Langen, 2005).

The integration of production and logistics and outsourcing strategies results in a clearer distinction between firms. A limited number of firms establish themselves as ‘brands’ with product development and customer service as core competencies, firms with effective control of logistic and production chains as core competency (logistics service providers) and companies with as core competencies the efficient operation of activities that form part of the logistics and production chains (e.g. plant management and transport companies). This division of firms is closely related to the distinction

between integrators, first tier and second tier suppliers. Figure 2.8 illustrates the structure that governs this division of firms in supply chains.

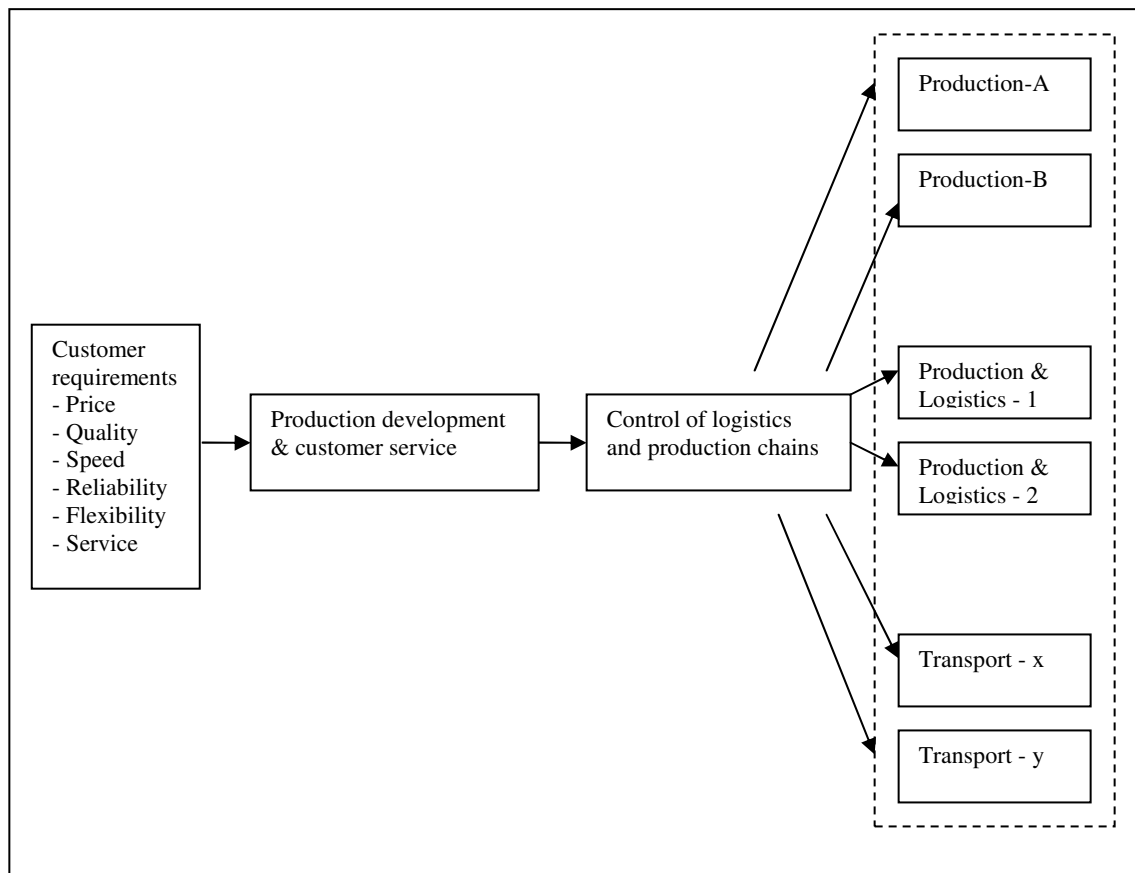


Figure 2.8: Governance Structure of Supply Chains (Lugt and Langen, 2005)

Supply chain networks frequently emerge with close coordination between different firms engaged in production, logistics and transport. For logistics service providers the changes in supply chain design imply that their role changes. Some of the logistics service provider succeeds in attracting more sophisticated value added activities, while others lack the required scale and capabilities. As a result, concentration and internationalisation characterise the logistics industry.

2.5.3. Evolution of Logistics Concepts in Europe

The developments in supply chains have led to an evolution of logistics concepts of Multi National Companies' servicing the European continent. Concerning the distribution related logistics concepts in Europe over the last two decades an evolution

of concepts can be seen. Multinational manufacturing companies that have extended their markets to Europe and that are faced with changing customer requirements have gone through an evolution of logistics concepts for their European distribution.

There are three different concepts that have evolved in Europe. Figure 2.9 illustrates the three base concepts. These three concepts can be explained as below.

In the first stages of internationalisation products are delivered directly to different markets in Europe. This concept is characterised by national distribution centres or national importers with storage locations, because in this stage, different countries in Europe were (considered as) different markets, with different consumer preferences, standards and regulatory requirements. In this concept, transport is also decentralised: the various markets are served independently by air or sea.

Secondly, with the emerging focus on logistics efficiency, and ongoing European integration Central European Distribution concepts emerged. These concepts are characterised by a single physical central storage and distribution location where value added activities can take place. European distribution centre serves all European markets. Delivery takes place directly from the central distribution centre or via regional cross-docking centres. Intercontinental transport is centralized to the European distribution centre, mostly by sea.

Finally, the combined focus on logistics efficiency and market expansion is driven by customer requirements. The core of supply chain strategies of most MNCs - leads to central coordination, but not necessarily central distribution, and in some cases to the development of logistics platforms. A logistics platform originates from a firms' internal cooperation between marketing development and logistics development and combines the operational management and control of logistics activities with design, development and renewal activities of the logistics system. Logistics platforms both have an operational and strategic function. Logistics platforms emerge in a situation where the business environment is dynamic and flexibility of supply chains and production facilities is required. Concepts like postponed manufacturing, vendor managed inventory systems, combined with transport concepts like direct delivery, cross-docking, and merge in transit are applied in a network of various logistics

facilities with multinational or regional service areas, steered and controlled from one (virtual) location and supported by sophisticated information systems. (Lugt and Langen, 2005)

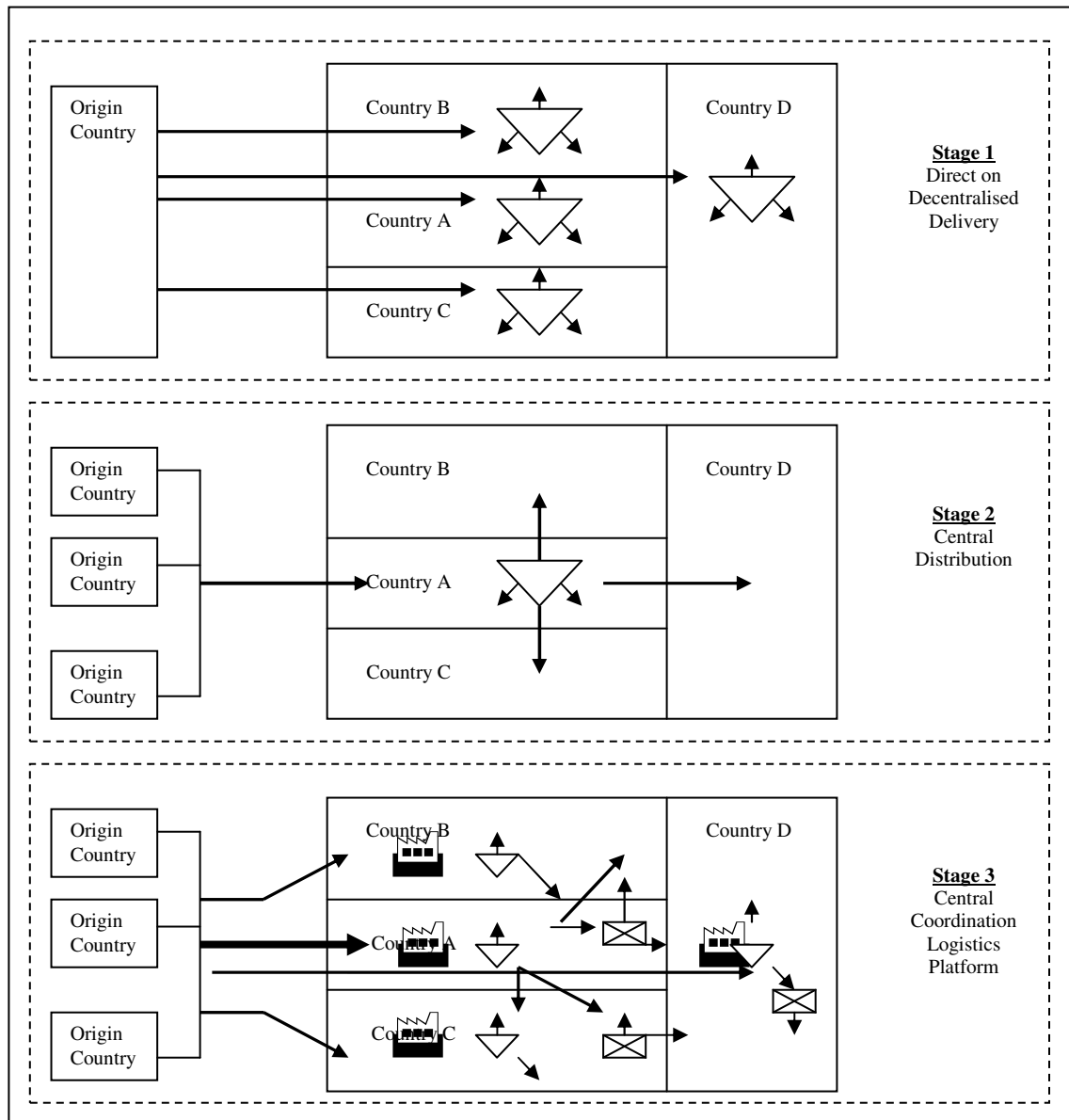


Figure 2.9: Evolution of Import Related Logistics Concepts (Lugt and Langen, 2005)

Figure 2.10 further illustrates the evolution of logistics strategies: first firms focus on market expansion, then on logistics efficiency and finally on both aspects.

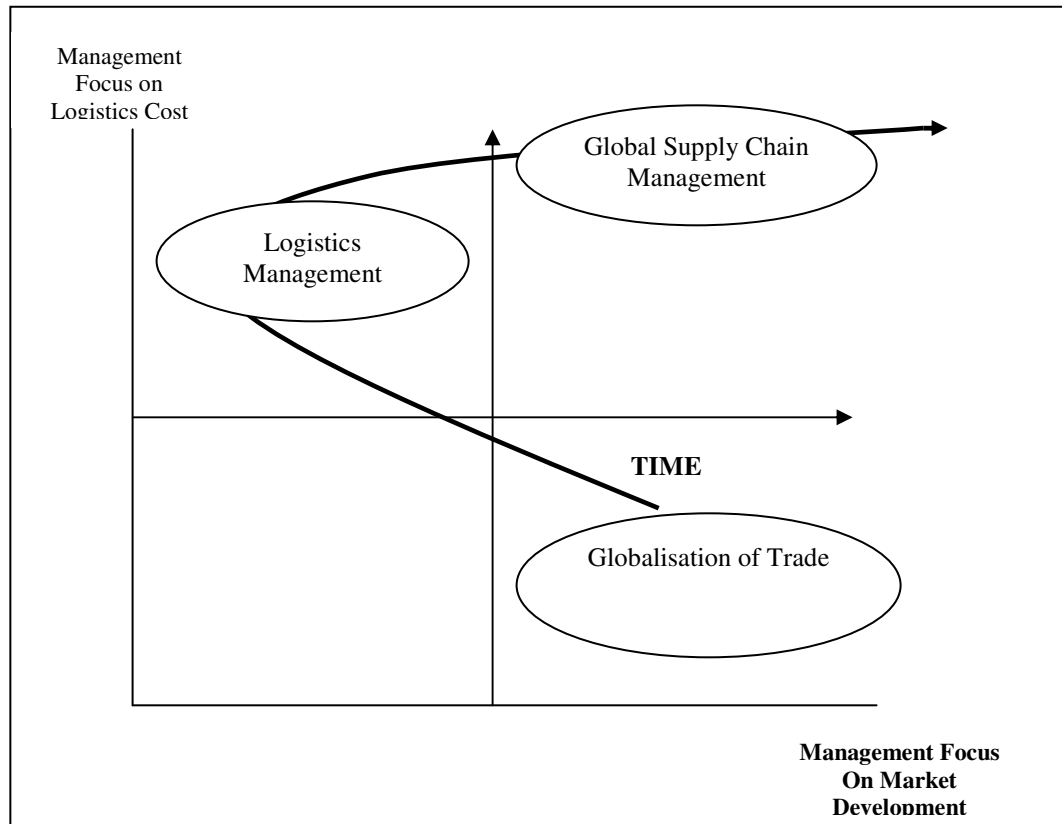


Figure 2.10: Emergence of Distribution Related Logistics Concepts Related to Managerial Focus (Lugt and Langen, 2005)

Some firms have adopted appropriate strategies due to both on the product characteristics and positions in markets.

2.5.4. International Trade

International trade is the exchange of goods and services across international boundaries or territories. In most countries, it represents a significant share of Gross Domestic Product. While international trade has been present throughout much of history, its economic, social, and political importance has been on the rise in recent centuries. Industrialization, advanced transportation, globalisation, multinational corporations and outsourcing are all having a major impact.

In global trade, everything takes longer and involves more people. Operating in the international marketplace has become a risky business. Every error or discrepancy in

paperwork slows down the system and adds cost. Financial and physical supply chains also operate on different timetables, adding complexity. (Bartels, 2006)

Economic conditions and relative economic strengths also influence trade patterns. Changes in relative values of two nations' currencies influence amounts and directions of trade and tourism between them. Also, they influence the carrier's cost of doing business since the firm's revenues and costs are in several fluctuating currencies. Shifting currency values add an element of uncertainty to all international transactions. Also fuel represents a major cost item for road transporters, sea and air carriers. In times of high fuel prices; road transporters, sea and air carriers often add a fuel surcharge to their freight rates, and these impacts shippers as an added cost of moving along the supply chain. (Long, 2004)

Political and economic developments in recent years are dramatically changing the commercial trading environment. The creation of the Single European Market, the formation of NAFTA and other trade-blocks, the collapse of the communist regimes of eastern Europe and the freeing of international trade through World Trade Organisation (WTO), coupled with improved facilities for international communications, transportation and logistics offer wider scope than ever before for globalisation of business. According to Smith (1999), these increased opportunities bring with them the higher competition in both domestic and international markets. This same internationalisation of trade is also promoting cross-border mergers and acquisitions and the establishment of foreign operating subsidiaries, in many companies, for the first time. These developments are in turn leading companies towards the procurement of materials and components from foreign sources to improve their own competitive performance.

2.6. Distribution Channels

Channels are networks and have been used to explain the functioning of marketing arrangements. The transaction channel handles contracting and trading, while the distribution channel deals with the physical movement of product. The channels are separated from each other, that is, a firm may locate sales offices in a different set of

cities from where it locates distribution warehouses. However, the two channels are linked to the extent that sales or payments "trigger" release of goods to the buyer. There are three channels relating the transaction channel, which handles the buying, selling and collection of payment; the distribution channel, through which the good moves physically; and the documentation/communications channel. (Long, 2004)

Distribution centres are popular as occupiers benefit from the shared services and dedicated environment they provide. The availability of state-of-the-art facilities in combination with good stocking and inventory management practices make it possible for many companies to shorten their order-to-delivery cycles. (Anonymous, 2003)

Many companies have gained, and continue to gain, competitive advantage from the implementation of powerful, information technology-driven logistics solutions to their distribution systems.

From a logistics standpoint, the need to channel goods through a wholesaler has been manufacturer-driven. Manufacturers started making concerted efforts to raise their minimum truck orders and to estimate an annual total purchase volume minimum for their customer base. This has continued with the rising cost of fuel, insurance and tolls as well as government regulations on truck drivers.

Manufacturers, who continue to increase minimum order size and look for cost-effective ways to deliver product, are the main reason for the blurring of the traditional distribution channel and the redistribution channel. Since distributors usually cannot meet these order minimums and be competitive at the same time, they are left with few options to satisfy customer needs. However, the nature of this industry's products are forcing many manufacturers' hand because they are producing "high cube items with low value" compared to the health care industry, for example, which is afforded the opportunity to ship a lot of goods through small means.

Logistics become more and more expensive; the wholesale distributor in this industry is becoming more important. Additionally, manufacturers are realizing and concentrating more on investing in improving products and offering their goods at competitive prices - and wholesalers are satisfying this yearning. Today's wholesale channel now

represents approximately 20 percent of the overall cost of goods, pre-margin mark-up to the end-user (DiPaolo, 2006).

In distribution channels, warehouses are intermediate storage points between the manufacturer and retailers. Lu (2004) defines distribution centre as a warehouse of finished goods; also applied to the facility from which wholesale and retail orders may be filled; a materials warehouse would also be a distribution centre for buyers of its stock. It provides a number of service attributes to shippers, such as storage, cargo tracking, inland transport service, customs clearance service, consolidation, packaging, labelling, assembly, and documentation services. Some of these attributes can be expected to be more important than others to customers, and not all customers will attach the same importance to any particular attribute. To develop a distribution centre service responsive to customer needs, it is necessary to determine the individual importance of service attributes.

2.7. Centralisation

The simple definition of centralisation is concentrating at a single location. Within the logistics arena this is applicable to warehousing, inventory, distribution and/or manufacturing operations. Centralisation put the focus on products rather than on geography. The move to centralised distribution has been one of the biggest changes in retail (and some extent manufacturing) sector logistics in recent years. It does away with national stockholding operations and instead serves the whole region from just one or two major distribution hubs or warehouse facilities. Figure 2.11 illustrates the change of distribution structures. Before the move to centralise, most products were delivered by manufacturers or wholesalers from local distribution centres to nearby depots and stores.

Now manufacturers are made to regional distribution centres (RDCs) run by contractors or retailers, who then control final distribution through to the stores. RDCs developed during the 1980s and have played a large part in changing UK distribution patterns. The establishment of these centralised networks has involved heavy investment by both retailers and service contractors. (Bence, 1995)

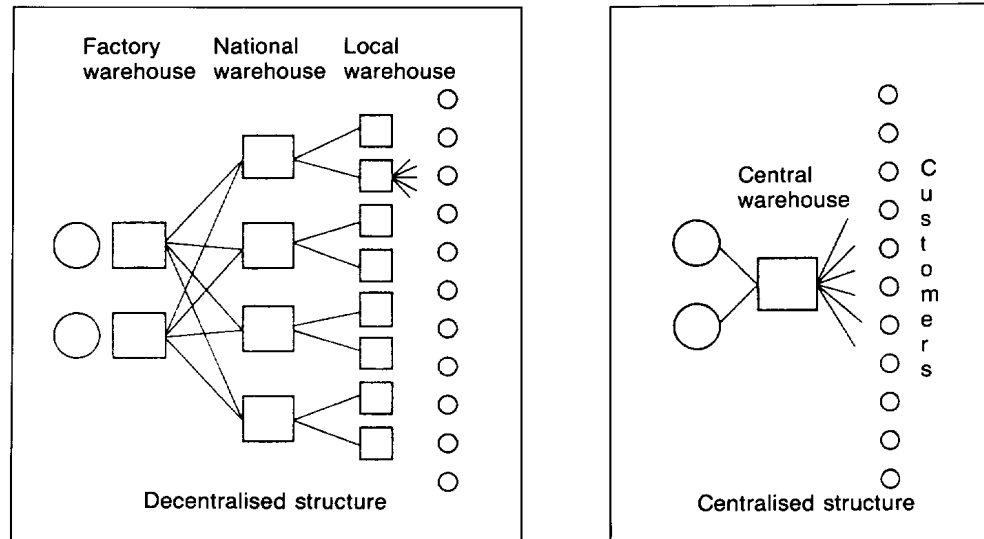


Figure 2.11: The Change From a Decentralised to a Centralised Distribution Structure
(Bence, 1995)

Centralisation has several obvious benefits. Companies can command better pricing, they can achieve further cost savings by outsourcing non-core activities, such as storage and distribution of diagnostic kits to their logistics partners and they can achieve a better quality service by the centralisation of shipment booking and tracking via the dedicated service centre of the chosen partner. (Jie and Skinner, 2005)

Centralisation provides a host of operational, financial and marketing advantages and can transform the 'culture' of a retail business, the based on the demand in-store. Growth has been assisted by the development of retail superstores, composite (multi-temperature) warehouses and vehicles, and IT. Other benefits of centralisation include:

- Economics of scale (warehousing etc.)
- Increased handling efficiency,
- Lower stockholding in-store, giving extra selling space,
- Replenishment on a daily demand basis – faster stock turn,
- Lower inventory levels – transferring the problem of holding inventory back to the manufacturers, and

- Precise scheduling. Tighter delivery times were demanded by supermarkets. If a supplier missed a time slot to an RDC, delivery was refused and the supplier was expected to pay a penalty for the profit lost by the company as a result.

However, there are disadvantages; goods are stored further away from individual local markets leading to increased transport costs; problems over who controls the central warehouse system; decisions at every stage including in-house or outsource, should the warehouse be nearer to the production plant or the main markets; vulnerability to local transport problems or regulations.

There is a distinction to be made between centralising distribution operations, from which both large and small companies can benefit, and the larger rationalisation of a company's manufacturing and/or production operations, where it appears that a company must be above a certain size before the benefits of economies of scale will be felt.

Many firms are looking for increased flexibility and cost savings in production or in distribution, but very few firms are tackling both aspects at the same time. Lower unit production cost tend to be upper most in relocation decisions and the research showed the considerable savings in cost and time could be found on the supply side of many companies' logistics activities. It is essential that a holistic view of supply chain is taken and that all three parties to it (suppliers, producers and distribution) should be considered before centralisation takes place. The trend towards centralised distribution systems has led to the accelerated use of third party contractors.

Companies today need their distribution systems to maintain service levels but at a lower cost. So whilst some are returning to in-house or shared usage activity, other companies are mixing their distribution portfolio – running some in-house, both as an insurance policy and a benchmark against which to compare their contractors' performance.

The concept of third-party distribution has proved very successful in the UK but that does not guarantee successful export. It is less common outside the UK and some companies operating both in the domestic and European markets have had to develop

dual supply chain systems – one built on high levels of dedicated contract distribution, based on the UK model and another on more locally adapted shared-user systems.

The main choice facing business today is how to minimise their overall supply chain cost. The least cost option of a particular link may not be the best option – and as a result it is increasingly important for companies to understand and evaluate reasons and motives for re-assessing their distribution operations. Many are now choosing not to abdicate total responsibility for supply chain management to a third party, preferring to maintain an element of control.

To meet increasing demand and customers changing needs from the creation of the 1993 Single European Market (SEM), many contractors decided to expand geographically and broaden their range of services along with their customers.

Centralised, composite and contract distribution, has been developed to a high degree within the UK, enabling greater cost efficiencies and reduced lead times to be achieved by the customer. Road transport remains strongly regulated and large companies are traditionally reluctant to sub-contract distribution.

From a marketing perspective the SEM is expected to provide expanded opportunities for both European and non-European firms to greatly extend their cross border activities. Companies wishing to take advantage of the opportunities on offer would have to dramatically alter their basic operating strategies. Major distribution groups, if they are taking to advantage of the SEM, need to be able to create a network through which goods can be moved around the continent as effectively as they can within national borders. Some manufacturers are now producing from a limited number of fixed points and will consolidate their European operations in order to gain greater efficiencies of scale. Savings must be set against rising transport cost due to greater distances to bring goods to markets.

Success in domestic market will not necessarily ensure success in Europe; competition will come from both other national and international companies, as well as independent operators from low wage countries already used to operating in a more regulated environment. Integrating the different Euro-cultures, distribution methods and infrastructure has proved more difficult than many operators bargained for. There are

major differences between the UK and mainland Europe's logistics industries and it is very important to consider these when faced with strategic choices for the development of a pan-European structure. Some differences are mentioned in the following.

- Differences in countries basic infrastructure and economies.
- Structural differences between UK and European retailers and manufacturers.
- Lower land costs in Europe means stock can be held cheaply at the point of sale.
- Owner-drivers may transfer goods for several retailers – there is a predominance of autonomous self-employed drivers unlike the UK systems of employee drivers.
- Regulation problems.
- Fragmented nature of the logistics industry.
- Cultural and language difficulties.

While some manufacturers have set up pan-European production and distribution facilities, retailers have been more cautious. Developing retail operations into Europe means extending communication lines and the structure and management of the whole supply chain becomes crucial. Different companies adopt different strategies for entry into Europe. Some companies have initially entered European marketplace by following an established customer. Other companies have also adopted this strategy and increasingly leading operators are building a presence in Continental Europe based on links with specific customers rather than setting up service networks and looking to win new business contracts. Some companies have purchased others, which already had national networks.

Centralisation, in-house/outsourcing and the SEM are all very important factors within the logistics inventory and as such play essential roles in both its development and for its operators. The implications of change in any one of these areas are enormous and have a knockdown effect both throughout the industry and individual supply chains. Figure 2.12 illustrates links between the three areas.

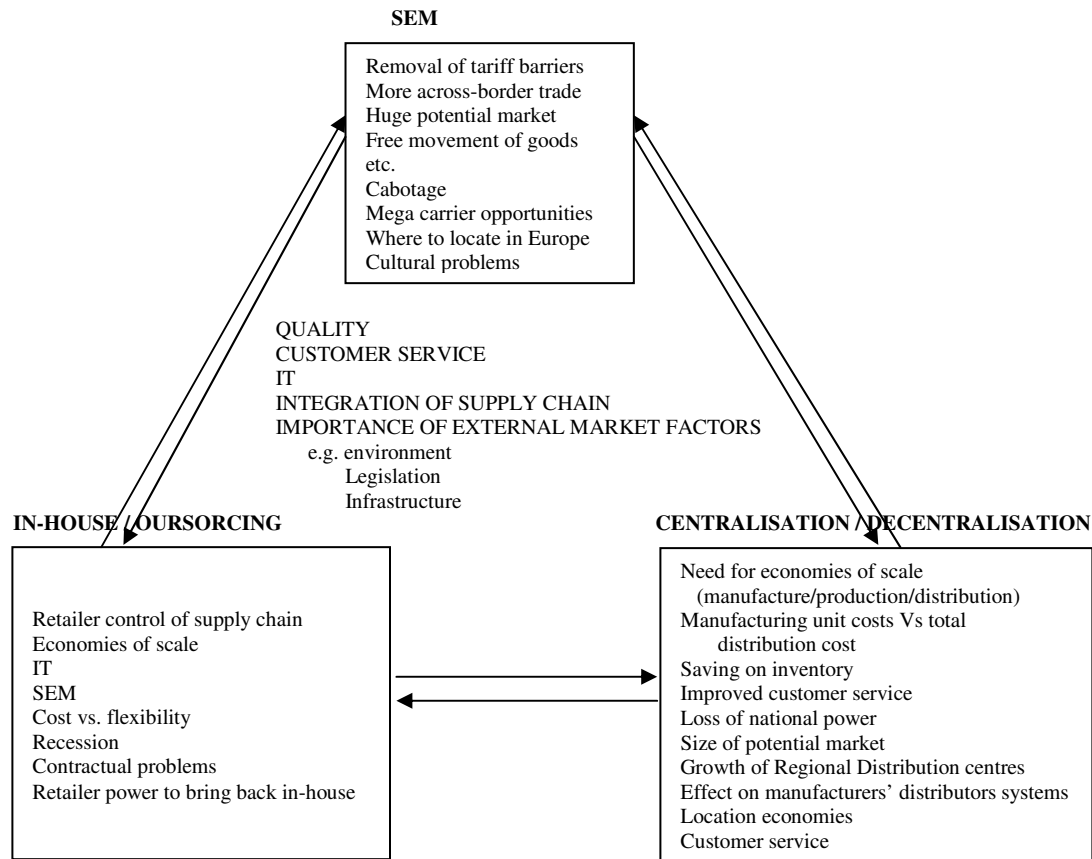


Figure 2.12: The Links Between Centralisation, In-House / Outsourcing and the SEM (Bence, 1995)

In our study we will explain how Gefco moved from decentralised to centralised structure in the UK. Our aim is to evaluate the performance of the centralised network structure. Around the UK, Gefco has six main warehouses, which are located in Manchester, Glasgow, Dartford, Sheffield, Gloucester and Coventry. Every warehouse used to be managed separately until December 2006. The company has decided to implement centralised strategy. Therefore Coventry has chosen as a hub. All goods, which will be transported to other countries, are collected in Coventry and distributed from Coventry.

3. PURCHASING MANAGEMENT AND AHP

The purchasing function was generally regarded as being a service to production, and managers paid limited attention to issues concerned with purchasing. The intense global competition in the 1980s forced world-class organizations to offer low cost, high quality and reliable products with greater design flexibility. Manufacturers utilized just-in-time (JIT) and other management initiatives to improve manufacturing efficiency and cycle times. In the fast-paced just-in-time manufacturing environment with little inventory to cushion production or scheduling problems, manufacturers began to realize the potential benefit and importance of strategic and cooperative buyer-supplier relationship (Farmer, 1997).

The supply side is of increasing strategic importance in most companies today. According to Dubois and Gadde (2006) this change reflects a new awareness of the benefits to be gained from better utilising resources from beyond the boundaries of firms short-term focus on efficiency in the individual transaction needs to be replaced with longer-term-oriented relational exchanges based on close buyer - seller relationships. The benefits of these constellations are obtained partly from better use of individual suppliers, partly from network effects derived out of the combined efforts of a number of suppliers.

The purchasing function has become increasingly important among business processes in the last decades. The purchasing function can also be effectively connected to a company's environmental policy and can play a strategic role in nudging a company towards a more environmentally friendly strategy. In fact, environmental factors concerns usually stem from traditional sourcing roles, namely, purchasing managers and quality assurance staff. A more precise estimation of the real cost of a specific item should guide purchase decisions more wisely. In contrast, a narrow perspective of the costs involved may sometimes give the wrong impression of a new component being cheaper than a recovered one; the same may happen with raw materials. Intangible

benefits will be a spin-off of a better market image and market differentiation. (Fernandez and Kekale, 2005)

3.1. Purchasing and Supply Chain

During the 1990s, many manufacturers and service providers sought to collaborate with their suppliers and upgrade their purchasing and supply management functions from a clerical role to an integral part of a new phenomenon known as supply chain management. Tan (2001) emphasizes that since this aspect of supply chain management primarily focuses on the purchasing and supply management functions of industrial buyers, it has been classified as the purchasing and supply perspective of supply chain management. Correspondingly, many wholesalers and retailers have also integrated their physical distribution and logistics functions into the transportation and logistics perspective of supply chain management to enhance competitive advantage. Over the last 10 years, these two traditional supporting functions of corporate strategy evolved along separate paths and eventually merged into a holistic and strategic approach to operations, materials and logistics management, commonly referred to as supply chain management (SCM).

Farley (1997) describes that; supply chain management focuses on how firms utilize their suppliers' processes, technology, and capability to enhance competitive advantage, and the coordination of the manufacturing, logistics, and materials management functions within an organization. When all strategic organizations in the value chain integrate and act as a single unified entity, performance is enhanced throughout the system of suppliers.

Supply chain management is synonymous with supplier base integration that evolves from the traditional purchasing and supply management functions. It emphasizes that purchasing and materials management represents a basic strategic business process, rather than a narrow specialized supporting function to overall business strategy. It is a management philosophy that extends traditional internal activities by embracing an inter-enterprise scope, bringing trading partners together with the common goal of optimisation and efficiency (Harwick, 1997). All strategic partners must recognize that

the purchasing function is the crucial link between the sources of supply and the organization itself, with support coming from overlapping activities to enhance manufacturability for both the customer and supplier. The involvement of purchasing in concurrent engineering is essential for selecting components that assure the requisite quality is designed into the product and to aid in collapsing design-to-production cycle time.

The impact of the purchasing and supply perspective of supply chain management on contemporary business practices is the factors cited in the literature as being elements of effective supply chain management (for example, customer relations and purchasing practices) positively affect corporate performance. In general, supply chain management seeks improved performance through elimination of waste and better use of internal and external supplier capabilities and technology to create a seamlessly coordinated supply chain (Tan, 2001).

3.2. Purchasing Strategy

Smith (1999) indicates that; traditionally, most organizations make the majority of their purchases from domestic markets and bought from abroad only out of need arising due to the lack of local availability, or having significant purchase price advantages. Now international or global purchasing is viewed as a strategic weapon in the quest for improved performance and profitability through greater availability, enhanced technology and price advantage.

Doing business across borders has become both easier to undertake, and at the same time, necessary to maintain a competitive position. The increasing economic competitiveness, which companies experience, demands that they find new ways of creating commercial strengths and advantage and, as a result, purchasing is being perceived as a strategic function of business (Monczka et al., 1993). Oliver et al. (1994) point that; procurement and effective management of the supply chain are in fact the key activities to achieve world-class performance. Figure 3.1 illustrates a part of this process of redefining procurement as a significant strategic function is the globalisation

of purchasing, so as to make effective use of the opportunities created by the very internationalisation of business which initiated the process.

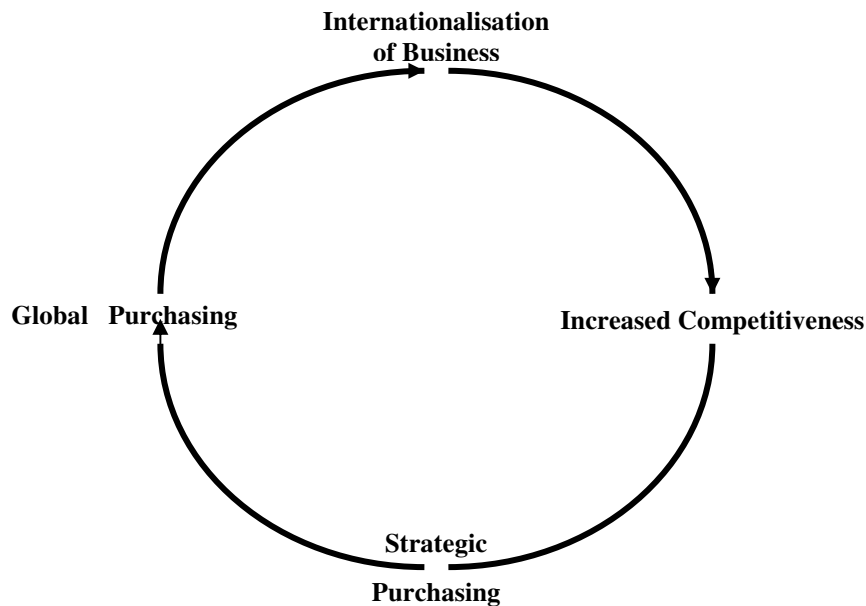


Figure 3.1: Strategic Development of Purchasing (Smith, 1999)

Smith (1999) describes the development of traditional local sourcing policies in two directions. First direction shows that companies move to international sourcing to satisfy operational needs of lowering costs, improving quality or seeking wider availability. Secondly, the development of strategic purchasing to increase technological know-how, stimulate product innovation or enhance management of the supply chain. Smith (1999) defines the ultimate objective of global sourcing as the coming together of these two trends but only identifies a limited number of very large corporations who are progressing towards this goal.

The advantages and disadvantages of international purchasing have been investigated by Scully and Fawcett (1994). They show that sourcing items internationally can secure advantages as following.

- Availability of specific items,
- Higher levels of product quality,
- Use of advanced product and process technology,

- Item price.

Buying directly from international suppliers may offer additional benefits as below.

- Wider range of potential items and vendors,
- Further price improvement,
- Direct access to new technologies,
- Influence over quality,
- Improved delivery service,
- Meeting terms of off-set agreements,
- Introducing greater competitiveness to domestic markets,
- Gaining a knowledge of foreign markets,
- Exploiting tax and currency opportunities.

Global procurement can hence secure advantages in terms of availability, quality, delivery, technology and price for certain items. There can nevertheless be the problems dealing with remote suppliers. Communications with foreign vendors can be impaired by language, cultural differences, time zone differences and the use of different systems of measurement, leading to delays and misunderstandings. Buying from abroad may also involve increased freight costs, import duty and possibly customs delays. The need to pay in foreign currencies introduces both the uncertainty of not knowing what a future cost may be and also the risk of fluctuating costs; steps can be taken to minimise against these after using stable currencies and by hedging and risk sharing, but such actions themselves can incur additional costs (Smith, 1999).

Some of these difficulties are avoided by buying from within a trade-block but many remain and are only avoided by restricting the domain of procurement to the national market. Procurement of foreign sourced items through national distributors and dealers can maintain item availability and choice, but at the cost of using a third party, and the risks incurred in distancing communication with the original supplier. Limiting the scope of procurement to the immediately local market restricts item availability and

choice even more but offers additional benefits in terms of close collaboration and ease of communication with suppliers (Scully and Fawcett, 1994).

According to Smith (1999), market competitiveness is reducing vulnerability and increasingly buyers attach greater importance to vendor selection. It is clear that globalising purchasing offers both advantages and disadvantages. Selecting those items for which buying internationally offers the maximum benefit, whilst restricting to local or national supply those which are likely to manifest the greatest obstacles, offers a strategy for maximising the advantages of the global market at the lowest risk.

Gelderman and Semejin (2006) support that global purchasing strategy of a company is reflected by its degree of standardisation and centralisation of purchasing.

Smith (1999) considers the various factors applying to the proposed item to be purchased; a plot may be made on a decision matrix as illustrated in Figure 3.2, which provides an indication as to where the item may be bought from. Taking the origin of the decision matrix to be the origin (0,0), the lower left quadrant (A) between the origin and (-10, -10) indicates the items that are best sourced and bought locally.

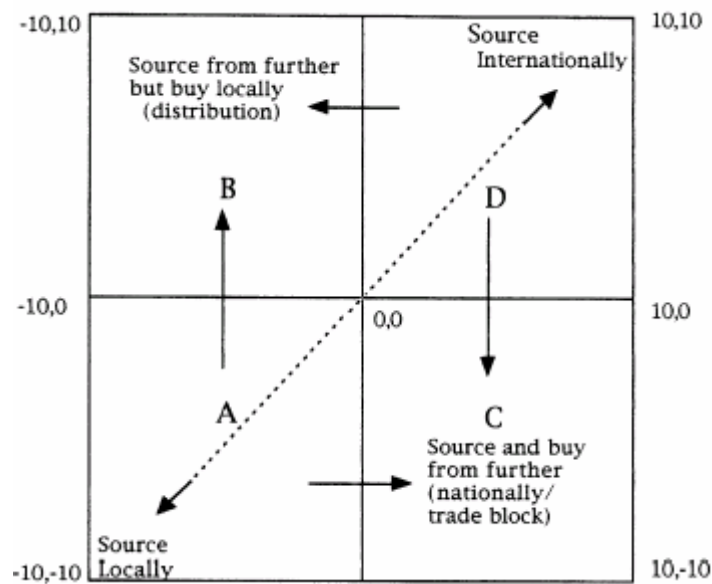


Figure 3.2: Generalised Decision Matrix (Smith, 1999)

The upper right quadrant (D) between the origin and (10,10) indicates items for which full international sourcing and buying may be appropriate and beneficial. Items falling

above the diagonal (quadrant B) may progressively benefit from more distant sourcing whilst retaining some measure of local buying through the use of distributors, whilst those falling below the diagonal may progressively benefit from both sourcing and buying from national and intra-trade block locations.

3.2.1. Purchasing Synergy - Managing Corporate Purchasing Strategy

The scope and importance of purchasing increases and the companies increasingly recognise the necessity of co-ordination of their overall purchasing efforts. Driven by the competitive pressures and the importance of purchasing, especially in the Retail, Automotive, Computer, and Electronics sectors companies have implemented strategies and structures aimed at capturing purchasing synergies (Rozemeijer, 2000). Capturing synergies is a way of getting extra performance, or creating extra value, from an existing situation. Purchasing synergies can yield significant benefits and even play a vital role in some companies' corporate strategies.

In business usage, synergy refers to 'the ability of two or more units to generate greater value working together than each of them could by working apart'. Often this is illustrated with the equation as $1+1=3$. The most business synergies take one of six forms as following (Goold and Campbell, 1998).

Pooled negotiation power (buying together): By combining their purchases, different units can gain greater leverage over suppliers, reducing the cost or even improving the quality of the goods/services they buy.

Sharing intangible resources (knowledge and information): Firstly, business units (BU) can improve their results by pooling their insights into a particular process (e.g. formulating purchasing strategies, applying state-of-the-art purchasing tools and techniques, developing purchasing skills and competencies, gaining access to world-class suppliers), function, or geographic area. Value can be created simply by exposing one set of people to another. The emphasis that many companies place on leveraging core competencies and sharing best practices reflects the importance attributed to sharing knowledge. Secondly, business units can improve their position by exchanging and sharing information about product specifications, company wide contracts, product prices, suppliers, purchasing procedures, and supply market developments.

Shared tangible resources: Units can gain economies of scale and avoid duplicated effort by pooling (corporate) purchasing specialists, purchasing information and communication systems, a corporate management group (overhead), and/or office space and other facilities.

Vertical integration: Co-ordinating the flow of products or services from one unit to another can reduce inventory, speed product development, or increase capacity utilisation. By integrating and co-ordinating the total chain from suppliers to customers (supply chain management) significant synergies can be captured.

Co-ordinated strategies: Aligning the strategies of two or more business units can be an important source of synergy, but difficult to achieve. Striking the right balance between corporate intervention and business unit autonomy is not easy.

Combined business creation: It can be facilitated by combining know-how from different units in a new unit, or by establishing internal joint ventures.

Purchasing synergy can be defined as the value that is added when two or more business units or purchasing departments join their forces and/or share resources, information, and/or knowledge in the area of purchasing.

Rozemeijer (2000) summarises four driving factors that motivate companies to establish stronger purchasing and move away from complete decentralisation of purchasing.

- Coping with supply shortages and assuring long-term availability,
- Responding effectively to a changing business context
- Seeking improved profit performance through reduced costs of supply, and
- Responding to a need for increased professional development in purchasing, and for more efficient use of scarce human resources in its several functions and business units.

Faes and Matthijssens (1998) indicate the top five perceived benefits of a co-ordinated purchasing approach. First is better internal exchange of information, second is improved market negotiation strategy, third is significant cost savings, next is more

impact on monopolistic supply markets, and the last one is improved insight in market and cost structures.

Guidelines for the implementation of an effective co-ordinated purchasing approach were defined by Faes and Matthijssens (1998). Firstly, intra-company co-ordination is built up step-by-step (incrementally) and not by a revolution. Secondly, confidence building performance measures are needed to motivate the people involved. Thirdly, build trust by keeping one's word to suppliers and internal customers. Finally, clear communication lines are needed between the people involved.

3.3. Global Sourcing

Organisations have realised that a world-class global supply base is required in order to meet world-class competition. It is generally agreed that 'how to source globally' has become a critical strategic decision for companies competing on a global basis (Gelderman and Semejin, 2006).

Successful supply chain management necessitates an effective sourcing strategy to combat uncertainties in both supply and demand. Burke et al. (2006) indicate that single sourcing is a dominant strategy only when supplier capacities are large relative to the product demand and when the firm does not obtain diversification benefits. In other cases, multiple sourcing is an optimal sourcing strategy.

Procurement activities in large part support a firm's inbound logistics and are vital to value creation. Moreover, the long-term implications of poor supply management are far reaching, ultimately impacting both firm performance and market value. A manufacturer's operations strategy and financial livelihood rely on its chosen supplier pool and thus, decisions with regard to suppliers are fundamental to successful supply chain management.

According to Burke et al. (2006), firm's sourcing strategy is characterized by three key decisions. These decisions are criteria for establishing a supplier base, criteria for selecting suppliers (a subset of the base) who will receive an order from the firm and the quantity of goods to order from each supplier selected. Scoring models are typically used to evaluate suppliers for inclusion in the base. In general, this approach ranks each

supplier in terms of objectives and then based on a relative weighting of each of the objectives, a total score for each potential supplier is derived.

Single-sourcing strategies strive for partnerships between buyers and suppliers to foster cooperation and achieve shared benefits. The tighter coordination between buyer and suppliers required for successful just-in-time (JIT) inventory initiatives encourage supplier alliances to streamline the supply network and tend to shift supply relations toward single sourcing. Managing more than one source is obviously more cumbersome than dealing with a single source. However, web-based SCM applications enable closer management of diverse suppliers, streamline supply chain processes and drive down procurement costs (Burke et al., 2006).

Firms that prefer single-sourcing for its ease of management can embrace multiple-sourcing via information technology-based SCM applications as a more viable strategy to capture risk-pooling benefits. In addition, firms can utilize these Internet procurement tools for “pricing out” the total costs associated with sourcing from a particular supplier, thus creating a comprehensive cost measure, which includes other supplier performance criteria (Teich et al., 2004).

Single-sourcing dependency may also expose the buying firm to a greater risk of supply interruption. Operationally, multiple-sourcing provides greater assurance of timely delivery, and greater upside volume flexibility due to the diversification of the firm’s total requirements. Another shortcoming of single sourcing is that it exposes the buying firm to hold-up risk. Strategically, supplier power over the buyer is weakened when the firm splits its total requirements among multiple sources. Hence, multiple sourcing hedges the risks of creating a monopolistic (sole source) supply base and supplier forward integration (Burke et al., 2006).

To benefit from the advantages of internationalisation procurement must define global sourcing as a strategic alternative. International purchasing has to be developed into global sourcing by using a strategic focus. Using a strategic focus means realizing competitive advantage. In fact, globalisation refers to two aspects (Arnold, 1999). These aspects are mentioned in the following.

- Operating in international marketplaces. In this aspect globalisation means systematically extending procurement policy towards sources in foreign markets at least worldwide.
- Strategic orientation. In this aspect globalisation means an overall orientation of purchasing activities in order to secure the profit base of a firm.

Figure 3.3 combines these two dimensions and creates four sectors of purchasing activities. Besides traditional procurement and a just operative-oriented ‘going international’ there is the field of strategic supply management and the field of global sourcing which integrates high degrees in both aspects of globalisation. To perform its functions successfully and efficiently and to realize competitive advantages, global sourcing structure has to follow global sourcing strategy.

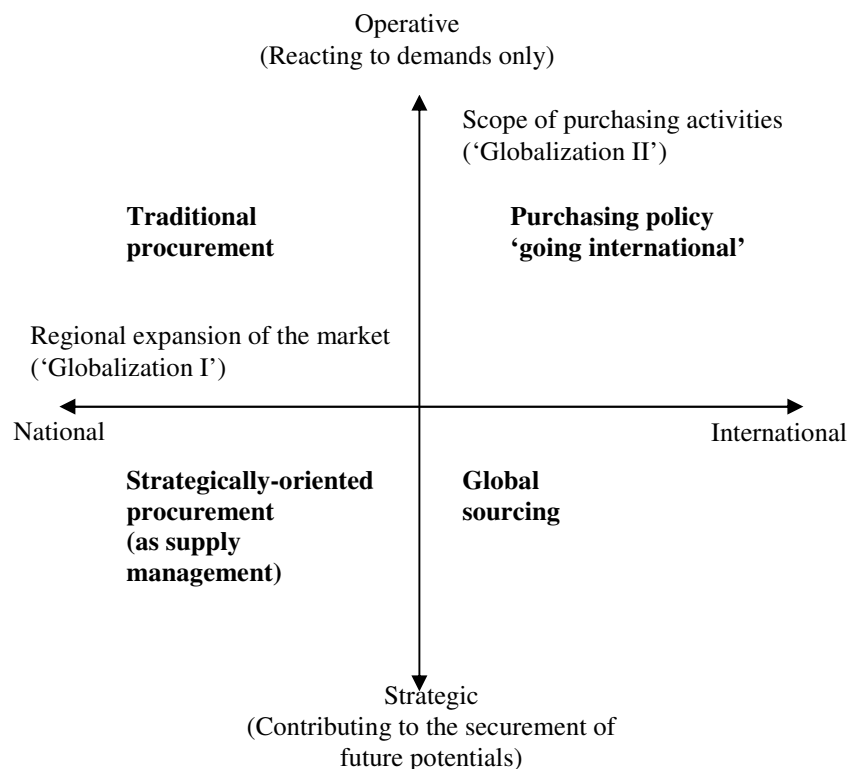


Figure 3.3: Global Sourcing as a Strategic Purchasing Program (Arnold, 1999)

Arnold (1999) explains that organizational problems are dominated by the question of the degree of centralisation. In terms of global sourcing, (de-) centralisation is the

variation of purchasing elements (departments, procurement processes, responsibilities) within the global sourcing system. In general: if there is no accumulation of these elements, the degree of centralisation is low. Table 3.1 compares decentralised and centralised purchasing.

Coordination mechanism is an important issue in designing a contract for a decentralized supply chain. If the decentralized decisions result in channel profit that is equal to those achieved under a centralized supply chain. The decentralized system provides less capacity than the integrated system (Li and Hua, 2006).

With regard to global sourcing, decentralization is a chance and a risk as well. It is a risk because the purchasing departments of business units might be too small to purchase globally and in an efficient way. Strategic orientation of all procurement activities may be neglected. On the other hand, decentralization is a chance because it makes it easier to cross borders and to establish business units with procurement functions in foreign countries (Arnold, 1999).

Table 3.1: Comparing of Decentralised and Centralised Purchasing (Arnold, 1999)

Arguments in favour of decentralization	Arguments in favour of centralization
1. Local management responsible for all costs including purchasing might become frustrated if they lose control over such an important cost item. 2. Close cooperation between local buyers and users. Good fit with local requirements. 3. Choice of local suppliers: - better and faster service; - shorter delivery times; - sometimes better terms; - goodwill to local community 4. Local buyers more motivated.	1. Stronger negotiating position versus suppliers, hence better prices and terms. 2. Construction of a group purchasing and procurement strategy. Uniformly leads to economies of scale. 3. Acquisition of better, more profound knowledge of the market. Establishment of a global supply view. 4. Efficient use of available purchasing skills. 5. Less administrative work and reduction of purchasing organization expenses.

A study, which is about defining the optimal degree of centralisation for Gefco, will be implemented in the following part (part 5.3).

3.4. Outsourcing

It is obvious that many organizations are making the decision to outsource. In today's global marketplace outsourcing has made itself accessible to many organizations on a national and international level.

Outsourcing entered the business world in the 1980s and often refers to the delegation of non-core operations from internal production to an external entity specializing in the management of that operation. Outsourcing represents an organizational practice that involves the transfer of an organizational function to a third party (Norwood et al., 2006). The decision to outsource is often made in the interest of lowering firm costs, redirecting or conserving energy directed at the competencies of a particular business, or to make more efficient use of worldwide labour, capital, technology and resources.

Through outsourcing, companies today have the ability to develop competitive strategies that will leverage their financial positions in the ever competitive global marketplace.

3.4.1. Make or Buy Decision

Many companies have been attempting to develop partnership relationship with their suppliers as they seek to reduce the risk associated with outsourcing (Humphreys et al., 2002). In recent years, many companies have been moving significantly away from making towards buying. However, research has revealed that make or buy decisions are rarely taken within a thoroughly strategic perspective. It has been shown that many firms adopt a short-term perspective and are motivated primarily by the search for short-term cost reductions (Humphreys et al., 2000).

Yoon and Naadimuthu (1994) explain that within organisations the make or buy decision is being given more consideration because of its strategic implications. The make or buy decision can often be a major determinant of profitability making a significant contribution to the financial health of the company.

Traditionally, buying by organisations had been done largely on the basis of obtaining the best price, taking into account a few other factors such as quality and delivery (Humphreys et al., 2000). However, in many cases a significant number of factors such

as delivery reliability, technical capability, cost capability and the financial stability of the supplier were not taken into consideration (Dooley, 1995).

Few companies have taken a strategic view of make or buy decisions, with many companies deciding to buy rather than make for short-term reasons of cost reduction and capacity (Ford et al., 1993). In addition, some organisations may find themselves with an initial position, which has been inherited from the past. Their position in the supply chain is already established and the extent of vertical and horizontal integration already mapped out. However, this is likely to have occurred owing to a series of short-term decisions with no consideration for the long-term strategic direction of the organisation. An outline of three key problems encountered by companies in their efforts to formulate an effective make or buy decision is presented below (Humphreys et al., 2000).

3.4.1.1. No formal Method for Evaluating the Decision

Many companies have no firm basis for evaluating the make or buy decision. Many firms make sourcing decisions primarily on the basis of overhead costs. The choice of which components to outsource is made by ascertaining what will save most on overhead costs, rather than on what makes the most long-run business sense.

3.4.1.2. Analysis of Costs

In many instances, companies base their sourcing decisions on cost issues alone. This is the classical way of looking at the make or buy. It involves attempting to measure all the important costs associated with the two alternatives; make or buy. The alternative, which yields the lowest total cost, is chosen.

3.4.1.3. Neglecting the Core

Sourcing decisions can have an impact on flexibility, customer service and the core competences of the organisation. Companies, who measure competitiveness in terms of price, only are inviting the erosion of their core competences. Humphreys et al. (2000) define core competence as the combination of individual technologies and production skills, which underlie a company's myriad product lines.

It is crucial to make categorisation in order to match the purchasing strategy with the relevant purchased item. Without categorisation, when companies are making sourcing decisions they may find themselves over-investing in non-critical components and disregarding the core activities of their business.

The make or buy decision is highly complex and one of the most difficult tasks faced by organisations. It requires substantial judgement to assess the wide range of trade-offs present, to recognise all the alternatives available and to make a decision that balances both the short and the long-term needs of an organisation. In addition, as organisational requirements and markets condition change, a decision that may have been appropriate in the past may have to be resolved in a totally different manner in the future (Humphreys et al., 2002).

3.4.2. A Strategic Model for Make or Buy Decision

Humphreys et al. (2002) state that the decision to outsource is fundamental to an organisation's strategy and business model. Companies must be clear about why they are outsourcing, what is core and non-core. The model is intended primarily for use with strategic items focusing on a collaborative relationship with a selected supplier. The stages involved in this make or buy model are illustrated in the decision tree in Figure 3.4.

3.4.2.1. Stage 1 – Defining the Core Activities of the Business

This stage is involved with identifying the core and non-core activities of the organisation. It is important to define what is meant by a core activity. A core activity is central to the company successfully serving the needs of potential customers in each market. The activity is perceived by the customers as adding value and therefore being a major determinant of competitive advantage.

Distinguishing between core activities and non-core activities is a complex task, and care must be taken to ensure the long-term strategic considerations and true benefits are assessed. This process of identifying the core activities should be carried out by top management along with inputs from teams at lower levels in the organisation. Each team should encompass a broad section of members-functionally, divisionally and

hierarchically. The team has to identify the major determinants of competitive advantage in the markets, the industries, or the strategic groups in which the organisation competes or might wish to compete. Focusing attention on customer needs and competitive advantage will involve applying their distinctive capabilities to meet these needs (Humphreys, 2000).

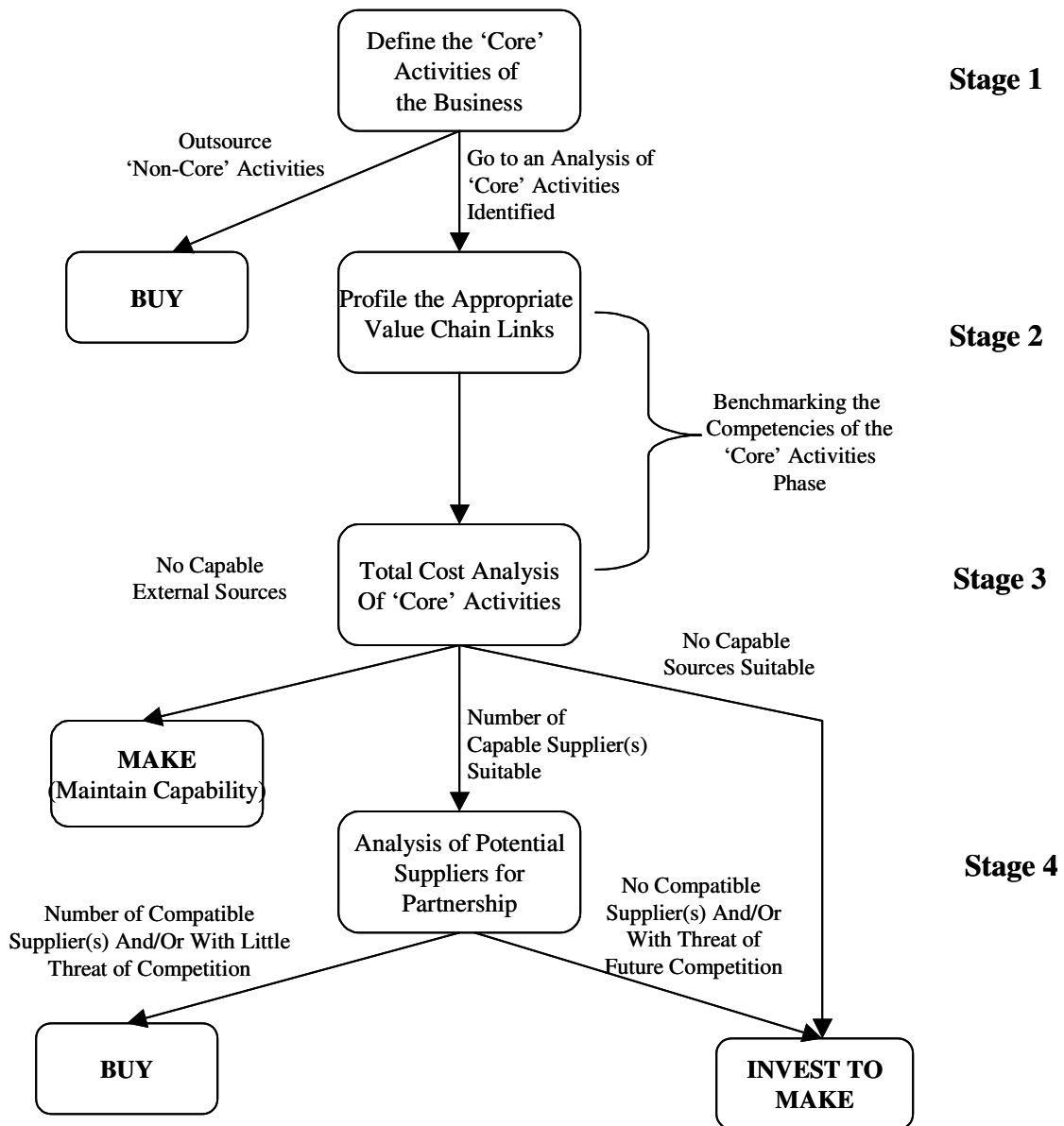


Figure 3.4: A Conceptual Framework for Evaluating the Make or Buy Decision (Humphreys Et Al., 2000)

Once all the core and non-core activities have been identified, the next section is concerned with analysing the competences of the company in these core activities in relation to potential external sources. This involves a two-stage analysis, which is told below.

1. Profiling the appropriate value chain links – each selected core activity must be benchmarked against the capabilities of all potential external providers of that activity.
2. Total cost analysis – attempts to identify and measure the costs associated with either retaining the activity in-house or outsourcing the activity.

In effect, these two stages identify the difference between the sourcing company and potential external providers of the core activities. It allows companies to focus on whether it will be detrimental to their competitive position to outsource activities both in the short and long term. The benefits of carrying out this analysis are mentioned in the following (Alexander and Young, 1996).

- The company can focus resources on the activities where it can achieve pre-eminence and provide unique customer perceived value.
- Activities for which the company has neither a critical strategic need nor special capabilities should be outsourced.

3.4.2.2. Stage 2 – Profiling the Appropriate Value Chain Links

A key strategic issue in the make or buy decision is whether a company can achieve a sustainable competitive advantage by performing a core activity internally on an ongoing basis. Clearly, if the company can perform the activity uniquely well, then this activity should continue to be made in-house. However, many companies assume that because they have always performed them internally, then it should remain that way. In many cases, closer analysis may reveal a significant difference between their capabilities and those of the world-best suppliers.

Companies considering outsourcing must rigorously evaluate their company's capabilities in relation to their suppliers and competitors. This analysis involves a structured benchmarking approach to assessing the company's competences in the range of core activities identified by top management in relation to the potential suppliers' and

competitors' capacity to provide these activities. In effect, each company is in competition with all potential suppliers of each activity in its value chain. In the context of the make or buy decision, knowing the capabilities of your competitors can be as important as knowing their relative market shares. Each point in the value chain relevant to providing the activity is assessed. Therefore, each selected core activity must be benchmarked against all potential external providers of that activity. The basic nature of strategic analysis may move from an industry analysis to a horizontal analysis of capabilities across all potential providers of the activity regardless of which industry the provider might be in. These activities may be a function of the workforce skills (Humphreys, 2000).

3.4.2.3. Stage 3 – Total Cost Analysis

This stage involves measuring all the actual and potential costs involved in sourcing the activity – internally or externally. It encompasses all costs associated with the acquisition of the activity throughout the entire supply chain and not just the purchase price. It considers costs right from idea conception, as in collaborating with a supplier in the design phase of the component, through to any costs associated with the component once the completed product is being used by the final customer. This stage is therefore concerned with identifying all the activities and costs associated with the make or buy decision. There are two types of costs that are identified at this stage below.

1. Cost estimation of making internally.
2. Cost estimation(s) associated with potential supplier(s) identified from the previous stages.

The data requirements for this stage are quite formidable. The management team must break down the company's functional cost accounting data into the costs of performing specific activities. The appropriate degree of disaggregation depends on the economics of the activities and how valuable it is to develop cross-company comparisons for narrowly defined activities as opposed to broadly defined activities.

There will be a certain amount of overlap in the analysis carried out in Stages 2 and 3. Both stages are concerned with benchmarking activities – but different aspects of the activities. The primary aim of Stages 2 and 3 is to understand current best practices in performing the core activities of the company, to understand how costs are actually achieved, and use this information to take appropriate action if a disparity is revealed between internal performance and that of potential external providers of the activity.

When the company has completed benchmarking the competences of the “core” activities, it will be faced with either of the following two scenarios.

3.4.2.3.1. Scenario 1

The company is more competent than any other potential external sources. With this situation, the company has two possible options:

1. Make. Clearly, the strategy, which should be pursued here, is to continue to keep this activity in-house. This is shown in Stage 4 in Fig.3.4. If the company is currently outsourcing the activity, then it may wish to repatriate it within the company. It is also important to maintain any current advantage by further developing the competency in order to minimise the risk of competitors benefiting from it as well. Ideally, a company wants to have competitive advantage in as many of its core activities as possible.

2. Strategic outsource. In a manufacturing context, it is possible to gain competitive advantage by outsourcing the assembly or integration of the parts, which comprise the core activity. Competitive advantage can be achieved in the activity of specifying and integrating external services and other purchases, rather than in assembly and production of the goods themselves.

If the company wishes to consider outsourcing a core activity, then it should proceed to Stage 4 – analysis of potential suppliers for partnership.

3.4.2.3.2. Scenario 2

There are external sources that are more competent than internally. With this situation, the company has two options.

1. Invest to make. This option entails investing the necessary resources to bridge the disparity between the company and the more competent external providers of the activity. This option may be desirable in a case where the technologies involved in the activity are in the embryonic stage and therefore may provide considerable scope for future growth. However, if the company's capabilities lag considerably behind the capabilities of external providers, then it may be difficult to justify a substantial investment of resources in order to match or advance on external capabilities.

2. Strategic outsource. The company may wish to consider outsourcing a core activity that it may have no competitive advantage. In this case, it should proceed to Stage 4 – analysis of potential suppliers for partnership.

3.4.2.4. Stage 4 – Analysis of Potential Suppliers for Partnership

A number of issues have to be addressed before outsourcing a core activity. These issues concern the maintenance of knowledge, which enables the technology of the activity to be exploited, even when it is being provided by another partner. It is important that the company controls the new product development and design process – the activities which will drive future growth. The company may establish a partnership relationship with a supplier in order to exploit their capabilities. This involves an intensive collaborative working relationship with the prospective partner (Humphreys, 2000).

When a company is considering forging a close collaborative relationship with a supplier for a strategic item, the supplier assessment process is crucial. A strategic partnership between a buying and supplying firm is defined as a mutual, ongoing relationship involving a commitment over an extended time period, and a sharing of information and the risks and rewards of the relationship. Effective partnership relations require a clear understanding of expectations, open communication and information exchange, mutual trust and a common direction for the future. Owing to the long-term nature of the relationship, careful analysis of the supplier's organisation has to be given. Profiles of suppliers' organisations will include 'soft factors' which are difficult to quantify. Qualitative factors concentrate not only on immediate concerns but also on long-term ramifications associated with a potential relationship with a given

supplier. The purpose here is to recognise that different factors, usually less quantifiable in nature, may be more important when a firm is seeking a supplier partnership as those which typically are included in current supplier selection models.

From this analysis of potential suppliers, the company will filter out any potential suppliers, which are unsuitable. If it is found that there are no suppliers suitable with which to initiate a partnership relationship, then the company may pursue an investment strategy. However, if the company has found a suitable partner, then it should form a partnership while leveraging its own capabilities by focusing resources on high value-added activities.

Another study, which is about a strategic model for the formulation of an effective make or buy decision, will be implemented in the following part (part 5.4).

3.5. Analytic Hierarchy Process (AHP)

The Analytic Hierarchy Process (AHP), first developed in 1980 by Thomas L. Saaty, is a general theory of measurement. AHP has been widely used in the decision making process by academics and practitioners (Kengpol, 2004). AHP is a systematic procedure for representing the elements of any problem in the form of a hierarchy. The AHP supports executive decisions, applies knowledge, intuition and experience, derives priorities and ranks alternatives (Korpela and Lehmusvaara 1999). AHP is a problem-solving framework and a systematic procedure for representing the elements of any problem (Saaty, 1982). AHP is a theory of measurement for dealing with quantifiable and intangible criteria that has been applied to numerous areas, such as decision theory and conflict resolution (Vargas, 1990).

Saaty (1982) states that that AHP is based on the following three principles; decomposition, comparative judgements, and the synthesis of priorities. AHP starts by decomposing a complex, multicriteria problem into a hierarchy where each level consists of a few manageable elements that are then decomposed into another set of elements. The second step is to use a measurement methodology to establish priorities among the elements within each level of the hierarchy. The third step in using AHP is to synthesise the priorities of the elements to establish the overall priorities for the

decision alternatives. AHP differs from conventional decision analysis methodologies by not requiring decision makers to make numerical guesses as subjective judgements are easily included in the process and the judgements can be made entirely in a verbal mode (Korpela et al., 2002).

While constructing a hierarchy, priorities should be determined for the elements in every level of the hierarchy. The prioritisation is based upon a set of axioms which are described below (Kengpol, 2004).

- **Axiom 1:** Reciprocal condition: This axiom comes from the intuitive idea that, if alternative or criteria A is n times preferred to B, then B is $1/n$ times preferred to A.
- **Axiom 2:** Homogeneity: This axiom suggests that comparisons are meaningful if the elements are comparable. In other words, it cannot be compared automobiles with oranges.
- **Axiom 3:** Dependence: This axiom allows comparisons amongst a set of elements with respect to another element at a higher level. In other words, comparisons at the lower level depend upon the element at the higher level.
- **Axiom 4:** Expectations: The axiom simply suggests that any change in the structure of the hierarchy will require new evaluations or preferences for the new hierarchy. Then the elements of the hierarchy are compared with respect to the elements in the higher level. Figure 3.5 illustrates the hierarchy model.

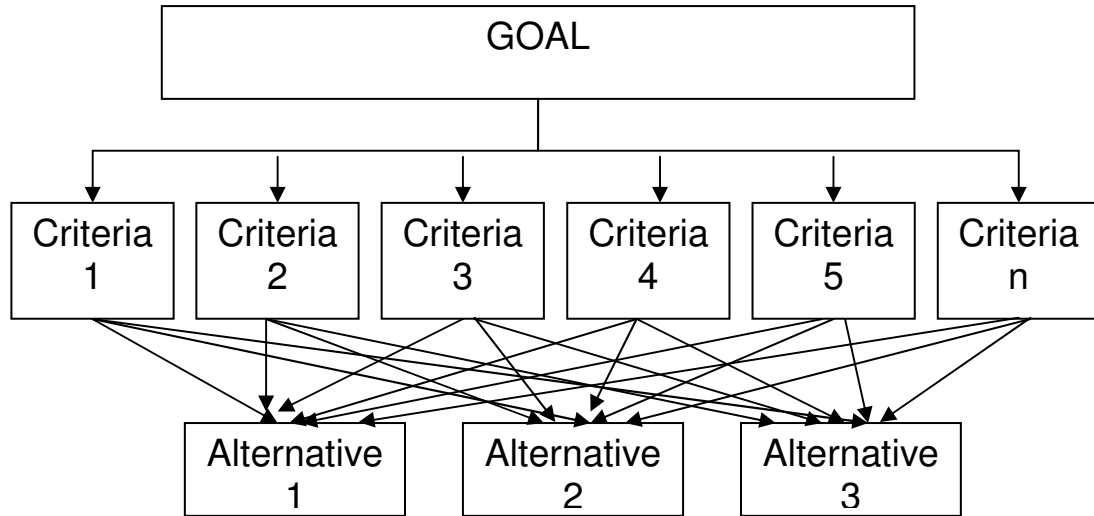


Figure 3.5: Hierarchy Model (Paksoy and Gules, 2006)

Dyer and Forman (1992) describe the advantages of AHP in a group setting as follows.

- Both tangibles and intangibles, individual values and shared values can be included in an AHP-based group decision process,
- The discussion in a group can be focused on objectives rather than on alternatives,
- The discussion can be structured so that every factor relevant to the decision is considered in turn, and
- In a structured analysis, the discussion continues until all relevant information from each individual member in the group has been considered and a consensus choice of the decision alternative is achieved.

AHP captures priorities from paired comparison judgments of the elements of the decision with respect to each of their parent criteria. Paired comparison judgments can be arranged in a matrix. Priorities are derived from the matrix as its principal eigenvector, which defines a ratio scale. Thus, the eigenvector is an intrinsic concept of a correct prioritization process. It also allows for the measurement of inconsistency in judgment (Topcu, 2004).

Using Saaty's pairwise comparison scale as it is given in table 3.2, it can be determined the relative weights of the set of objectives in respect to each other and express them in a pairwise comparison matrix (Paksoy and Gules, 2006).

Table 3.2: Pairwise Comparison Scale Used in AHP (Saaty, 2001)

Importance/ Preference Level	Verbal Definition	Explanation
1	Equal importance of both elements	Two elements contribute equally
3	Moderate importance of one element over another	Decision Maker (DM) favours one element over another
5	Strong importance of one element over another	DM favours one element strongly
7	Very strong importance of one element over another	An element is very strongly dominant
9	Extreme importance of one element over another	An element is extremely dominant
2, 4, 6, 8	Intermediate values	Used to compromise between two judgements

After deciding pairwise comparison matrix, this matrix must be normalised. For normalisation, every value is divided by sum of the every column in matrix. Average of the every column is calculated and weights are derived. Then comparison matrix is checked whether it is consistent with weights, if not these weights cannot be used.

$$A.w = \lambda_{\max} * w \quad (3.1)$$

Where A represents comparison matrix and w is for weight. From this equation $\lambda_{\max}$ is calculated and consistency index (CI) is derived by using $\lambda_{\max}$.

$$CI = \frac{\lambda_{\max} - n}{n - 1} \quad (3.2)$$

Saaty (1982) simulated random pairwise comparisons for different size matrices, calculated the consistency indices, and arrived at an average consistency index for random judgments for each size matrix. Table 3.3 gives information on compatibility and consistency for different size judgment matrices and Table 3.4 shows random index depend on number of elements.

Table 3.3: Relationship Between Consistency and Compatibility for a Different Number of Elements (Saaty, 2001)

Dimension of Matrix	3	4	5	6	7	8	9	10
C.R. = C.I. / R.I.	0.05	0.08	0.10	0.10	0.10	0.10	0.10	0.10

Table 3.4: Random Index -R.I (Saaty, 2001)

Number of elements	1	2	3	4	5	6	7	8
R.I.	0	0	0.58	0.90	1.12	1.24	1.32	1.41

Consistency Ratio ($CR = CI/RI$) is the ratio of the consistency index to the average consistency index for random comparisons for a matrix of the same size. Inconsistency ratio of about 10% or less is usually accepted.

Influencing Factors of Supplier Development

Facing increasingly competitive challenges, many organizations view supplier performance as an important contributor to their competitive advantage. They work closely with suppliers and expect to improve performance and capabilities by engaging supplier development programs.

Wen-li et al. (2003) identify seven factors, which are relevant to supplier development activities.

Long-term strategic goal: Supplier development efforts should focus on developing supplier future capabilities in technology and product development rather than focusing only on current quality and cost. The clarity of long-term strategic goals would be the key to the success of supplier development program.

Effective communication: Open and frequent communication between buying firm personnel and their suppliers was identified as a key approach in motivating suppliers. Early involvement and open channels of communication increase both parties' understanding and encourage problem solving between both parties.

Partnership strategy: Krause and Ellram(1997) indicate that the majority of buying firms involved in supplier development perceive their suppliers as partners. Adopting a partnership strategy means that a buying firm pursues a long-term relationship with suppliers and they would like to show their commitment. Without buyer's commitment, the suppliers may be unwilling to make changes in its operation to accommodate the desires of that buyer.

Top management support: Purchasing management needs the encouragement and support from top management to expend their resources within a supplier's operation.

Supplier evaluation: Supplier evaluation results can provide valuable information about general areas of weakness where performance improvements are required.

Direct supplier development: In order to pursue excellence and develop best practices, the suppliers need the encouragement or expertise of their buyers. Direct supplier development activities include providing support personnel, capital, equipment, technology, or direct involvement with suppliers in identifying and eliminating non-value or duplicate costs, processes and time (Monczka et al., 1993). These assistances from the buyers can accelerate supplier capability improvement greatly.

Perception on supplier's strategic objective: Supplier development requires a mutual recognition by the buyer and supplier of the need for continuous performance improvement. Supplier development would not work if the supplier does not have a compatible strategic objective with that of customer (Wen-li et al., 2003).

4. IMPLEMENTATION

4.1. Who is Gefco?

Gefco, or “les Groupages Express de Franche Comté”, was founded at the end of 1949 by Société des Automobiles Peugeot. The objective was twofold:

- To ensure reliability of supply for Sochaux, which was the only Peugeot Automobiles assembly plant at that time.
- To reduce transport costs, as Sochaux's more remote position was a disadvantage for Peugeot compared to competitors in the Paris region.

Gefco is one of the top ten transport and logistics groups in Europe with a worldwide network. The company has 420 locations/depots worldwide and Europe's third biggest integrated network.

Around ten employees performed the first runs between La Garenne and Sochaux in January 1950. Today, GEFECO has more than 10,000 employees worldwide and manages more than 60,000 shipments daily, using all modes of transport (air, sea, rail and road).

Table 4.1: Key Figures in 2006 for Gefco

Key Figures	2006
Turnover (EURO million)	3,245
Operating Margin	151
% Turnover	4.7%
World Network	80 countries
Workforce	9,897

GEFCO also brings its 50,000 customers specialist know-how in customs and tax representation. The group is continuously in quest of new innovative, efficient and profitable solutions.

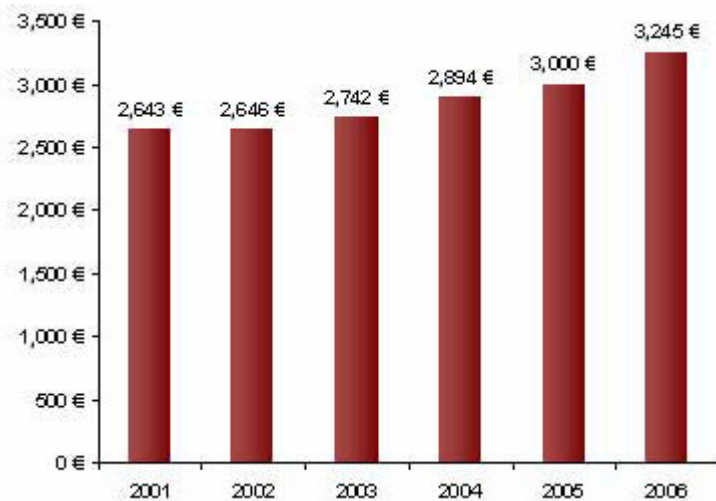


Figure 4.1: Change in Turnover (in Euro Million)

In 2006, GEFCO reported turnover of more than EUR 3,245 million. GEFCO has become a logistics integrator specialising in industry and providing global expertise.

- Automotive: Preparation and Distribution of vehicles
- Network: Europe's first Integrated Network for groupage and full/part-load road transport
- Supply: Logistics of industrial flows

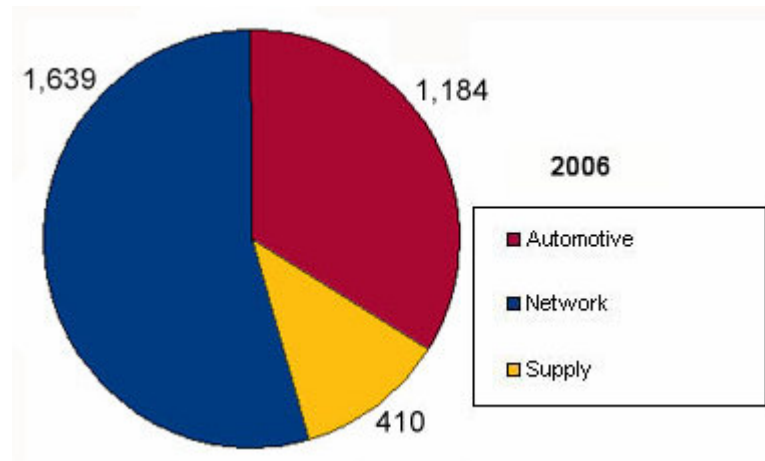


Figure 4.2: Breakdown of Turnover (in Euro Million)

4.2. Gefco UK

Gefco UK was formed in 1981. Since then Gefco has grown from strength to strength. Currently with 16 different locations across the UK, the company covers three main areas. These areas are automotive, network and supply.

4.2.1. Automotive Division

Gefco is a key partner for car manufacturers, rental firms and distributors of new and used vehicles. Seeking continuously to develop new high-performance, innovative and competitive solutions, the company bring their customers the benefits of a global logistics service, together with a vast European network of distribution centres, storage centres and workshops.

Gefco Automotive also has expertise in flow monitoring, customs and tax representation, together with a growing network in Europe and South America. Through IT system and they are able to draw up transport processes, trace vehicles, manage operations in storage areas / workshops and finally perform administrative management: invoicing and performance charts. Some facts and figures in automotive division are mentioned below.

- 1,184 million Euro turnover in 2006

- 57 years of experience in vehicle transport and the improvement of transport processes
- More than 2,000 people dedicated to automotive activity
- A base of 4,345 dedicated rail cars
- A fleet of 1,900 trucks
- 80 distribution centres across Europe
- 40 preparation centres across Europe

4.2.1.1. PVNO (Preparation of New and Used Vehicles)

Gefco UK has been operating technical centres for over nine years. These are currently located in three sites. These sites are Sheerness (83 Acres, 16,300 v yard capacity, PDI Building: 553 m², Body shop 1473m²), Corby (111 Acres, 14,250 v yard capacity, PDI Building: 2,235 m², Body shop 1,500 m²) and Sandtoft (60 Acres, 9,300 v yard capacity, PDI Building: 1,600 m², Body shop 1,400 m²), which are handled in excess of 100,000 jobs per year.

Gefco's facilities cover over 6,300 m² of workshop space with areas such as body shops, pre delivery inspection workshops, vehicle refurbishment areas and mechanical repair workshops at each location.

Gefco's services include the preparation of new vehicles prior to dealer dispatch, vehicle body repair at the point of import and used vehicle refurbishment on behalf of a major rental companies. Gefco also manages a fleet demonstration program on behalf of a major vehicle manufacturer.

4.2.1.2. Logistics Arm of the Automotive

The logistics arm of the automotive division is called RDVM. Operating from four sites nationwide, RDVM covers all aspects of vehicle handling, quality and storage (for up to 37,000 vehicles). Gefco also provides national distribution to 650 Peugeot and Citroen dealers located throughout the United Kingdom.

RDVM annually delivers 262,000 vehicles to these dealers within a 24 or 48 hour period. The vehicles are received into the UK by road, rail or sea and are then handled by the RDVM depots. Approximately 253,000 vehicles are delivered to one of Gefco's four locations. As a result of strict quality demands and peaks in demand caused by two new vehicle registrations each year, as many as 250 transports are managed daily by the RDVM team.

Gefco has its own transport fleet comprising 28 transporters providing vehicle movements and delivery service to the PSA (Peugeot) group and third party clients. This increases to over 50 transporters during peak periods. The division has been in operation since 1997 and has had a significant and tangible impact on to the automotive division as a result of its flexibility and customer focused approach.

4.2.1.3. Gefco Transport

Whilst Gefco covers a variety of operations within the UK, Gefco's main customer is PSA Peugeot Citroen. As well as continuing to build Gefco's relationship with PSA Gefco is also looking towards the possibility of working with other third party businesses in order to increase the efficiency of Gefco's current operation.

Many employees may be familiar with Gefco company car activities, and this is one area where Gefco transport has sole duty of delivery. In the following year Gefco will complete delivery of over 6,000 vehicles to Eblock, with the peak of this operation mirroring the national new car registration dates in March and September. During these months the volume will rise to 9,000 vehicles.

Another main activity for the PSA group is to deliver vehicles for the majority of the new model release events. Prior to these events Gefco transport will load trial any new model for the verification and rectification of any potential problems with these vehicles. These events are hugely time sensitive and all delivery schedules must be met by Gefco.

The PSA group also requires Gefco to undertake select deliveries, for the transfer of vehicles from dealers or return to stock of vehicles. For Peugeot Gefco currently cover

all used vehicle movements from Pinley Gardens, Coventry, to dealers or auction sites within the UK.

Gefco's plans for the future are to continue extend the existing fleet with the view to expanding current workloads and taking on further third party activities to secure future work.

4.2.2. Supply Division

Gefco has many years of expertise and experience in all aspects of the supply chain. This know-how has been built up primarily from the Group's active involvement in the design and implementation of processes to provide supplies to automotive plants and to distribute their products. Some facts and figures in supply division are mentioned below.

- 410 million Euro turnover in 2006
- 40 logistics centres (700 000 m²)
- 20 collection and washing centres, of which eight of washing stations are owned
- 140 air and sea freight platforms
- 300 international destinations
- 80 countries served

The Supply activity comprises three key functions: supply chain integration (ILI), Overseas (air and sea freight network) and the "Handling Solutions" activity.

4.2.2.1. Gefco's Air and Sea Freight Network (RMA)

Gefco overseas is the international air and sea freight division of the supply activity. In addition to Gefco's international support of PSA Gefco also has worldwide offices/hubs facilitating the international logistics requirements of Gefco's diverse client base.

By setting up international hubs, Gefco overseas solution and its partners are able to bring customers a wide range of logistics services anywhere in the world. Gefco is able to account for 85% of global trade with Gefco's allied partners in the Far East, North and South America and South East Asia.

Through a series of agreements signed in 2005, GEFECO is expanding its air and sea freight network. It now covers 300 international destinations in 80 countries.

4.2.2.2. Supply Chain Integration (ILI)

Logistics solutions (ILI) is the branch of Gefco which deals with warehousing operations i.e. storage, picking, segregation, sequencing, SILS (supply in line sequence) and deliveries to just in time principles. Because of the nature of the business, staff skills are varied and specialist. Concentration and accuracy allied with customer liaison are prerequisites in an environment where a flexible response is required to ensure continuous problem free third party operations.

Logistic solutions do not solely rely on automotive customers. Whilst customers such as Peugeot, Jaguar, Aston Martin, Nissan, Land Rover and Honda are amongst Gefco's range portfolio, there are many other large non-automotive suppliers who use Gefco's services, giving Gefco a wider customer base. It is because of this growth that the previous two sites in Coventry have merged and moved to a prestigious, purpose built 21,000 m² warehouse, again in Coventry, to facilitate the increase in Gefco's operations. This new centre is the largest of its kind to be built by Gefco UK and has been designed for Gefco's specific needs by Gefco personnel.

By developing specialist consulting and supply chain services, Gefco aims to develop global supply chain management expertise. For this purpose, Gefco operates 40 dedicated platforms for all inbound and outbound logistic operations.

4.2.2.3. Handling Solutions Activity

Gefco is building its experience on the know-how acquired in the management of reusable packaging over a period of more than ten years. It has acquired considerable expertise in meeting the specific needs of car manufacturers and components suppliers in the automotive industry that is a highly demanding sector of activity. This expertise is also available to all other customers in industry and distribution.

Gefco provides handling all freight requirements globally for its clients with their Skystream and Ocean stream activities.

4.2.3. Network Division

Gefco Network is Europe's first integrated groupage and full/part-load road transport network and the biggest private integrated network. It is based on a frequent, consistent and reliable quality of services, real time tracking of deliveries. Gefco Network offers global logistics solutions necessary for international businesses to succeed and provide competitive edge. The turnover in 2006 is EURO 1,639 million.

The network division manages road freight collections and deliveries across the UK and Europe. Shipments can range from a few kilos to full loads across the many network subsidiaries. Network has a dual focus managing only the supply of parts to Peugeot Citroen factories across Europe and dealerships across the UK, but also working with third party customers in the automotive sector as well as other industries.

Network is structured around scheduled line hauls between the main import/export hubs across the group. Each line haul has a specified departure/arrival schedule with integration and delivery being based on a fixed transport plan for each country.

The focus in recent years has been on developing Gefco's key account strategy, which has the main logistics provider for large groups across different countries. These accounts require far more management of the entire logistics chain and have given the staff at Gefco a broader responsibility when dealing with the accounts.

Across Gefco network there are standard operating procedures, which allow Gefco to ensure that any of the processes are followed to the same standard across the various subsidiaries. This can pertain to information flows, timescales or invoicing specifics. Similarly the new information technology system, INES is being rolled out across the group and will provide consistency across Europe with one unique database and a fully integrated track and trace system.

In the UK there are six network depots, which cover the whole of the United Kingdom and Ireland. Long-term partnerships have been developed in the geographical areas, which cannot be directly serviced from each UK site.

Most depots are involved in the distribution of parts to the Peugeot Citroen dealerships. Deliveries are either integrated into daytime vehicles or done as VOR (overnight)

deliveries. These have formed the footprint of the network through which third party freight is delivered. In Table 4.2 shows name and capacity for every depot and Figure 4.3 illustrates the related locations of each depot in the following.

Table 4.2: Gefco Network Depots in the UK

1.1.1.1.1 Depot Name	Warehouse surface (m²)	Transit Platform (m²)	Quantity of Groupage Shipment (per month)	Quantity of Affretement Shipment (per month)
COVENTRY (Import / Export Hub)	2,000	3,000	9,300	1,100
DARTFORD (Import / Export Hub)		3,000	7,000	340
GLASGOW		1,000	3,300	125
GLOUCESTER		2,000	6,300	386
MANCHESTER	2,000	3,000	5,700	160
SHEFFIELD		2,000	5,700	330

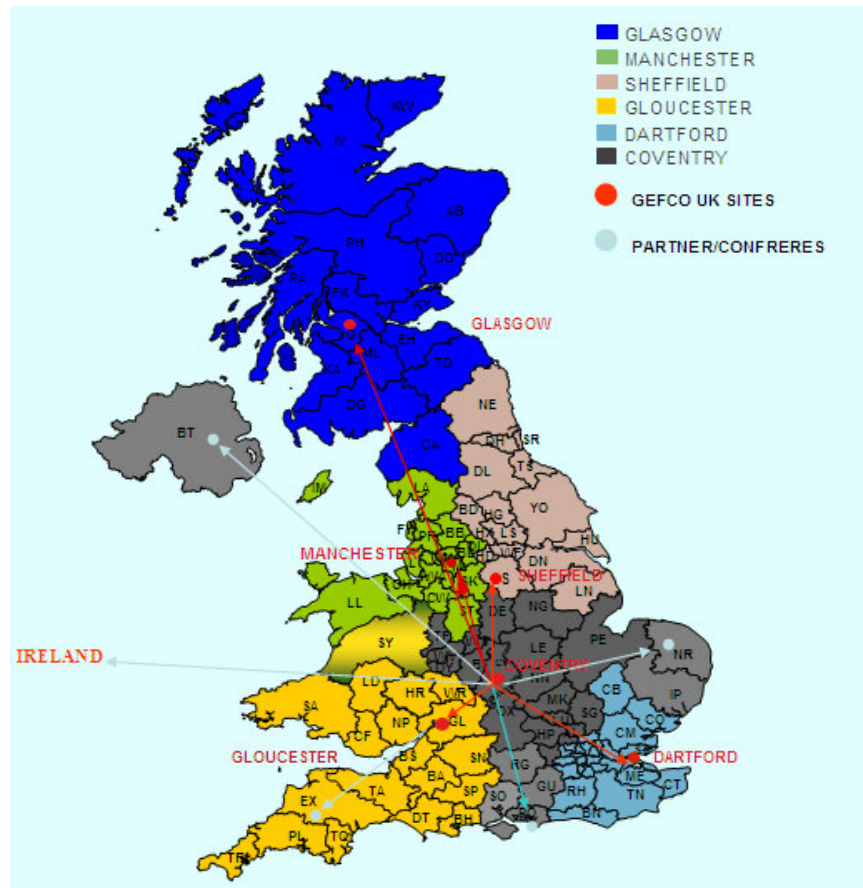


Figure 4.3: Depots in the UK

Geico Network is divided into two areas. These are Groupage and Full / Part Load Network.

4.2.3.1. Geico Groupage Network

Every shipment under 3 tonnes is called as a groupage activity. The Geico European Groupage Network operates across 19 subsidiaries. The Network is structured around a fixed European Transport Plan showing trunk departures and arrivals at each site. Freight is fed via the regional hubs onto a line haul/trunk for export.

France, Germany, Benelux, Italy, Spain remain its core markets for UK Exports however the Eastern European traffic is expanding especially with the opening of new subsidiaries in Hungary, Czech Republic, Slovakia.

In 2006, the groupage activity handled 60,000 packages daily through its network of locations.

4.2.3.2. Full / Part Load Network

Anything over 3 tonnes will usually be transported as an ‘Affretement’ job which means it is delivered by a direct vehicle rather than cross-docking at a Gefco depot. Gefco utilise regular haulers for this activity across Europe. A recent initiative has been looking for cost savings on regular traffic and utilising Slovakian and Portuguese drivers.

Gefco describes any consignment between 3 tonnes-15 tonnes as Part Load and over 15 tonnes as Full Load.

When Gefco moved to centralisation in Coventry, Coventry has become a main hub. Before that every depot used to work and be managed separately, but now there are deliveries every night from every depot to Coventry depot. For national shipment Coventry has six different bays for every depot. According to region, trailers unload their goods to related bay. The following day in the early morning these goods deliver to their addresses. The same system has applied for international shipments, Coventry depot has bays for every country as well, but shipment’s frequency changes depend on country. For example there are 6 deliveries for France in a day but for Turkey it is just once a week. Coventry depot’s system is illustrated in Figure 4.4.

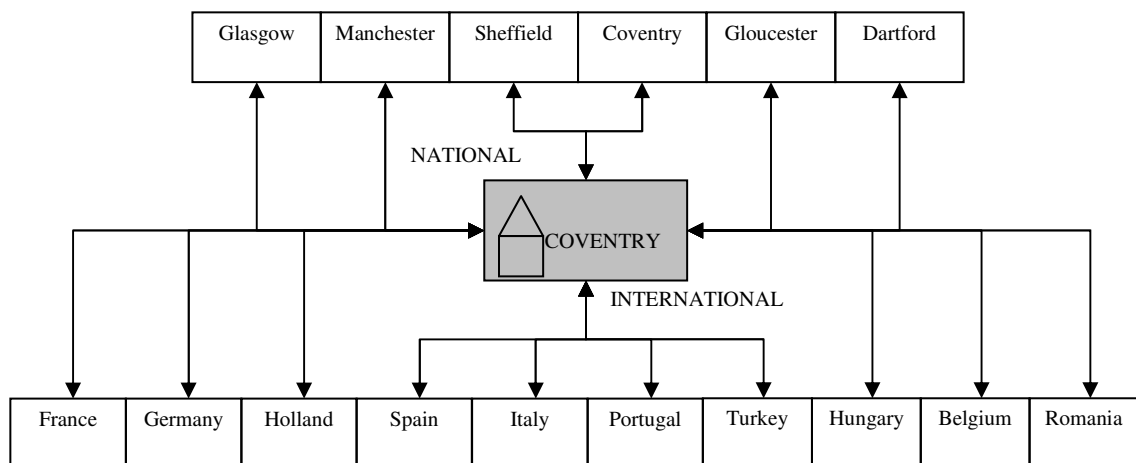


Figure 4.4: Coventry Depot's System for National and International Shipments

4.3. Defining the Optimal Degree of Centralisation for Gefco

The aim of our study is to find out the optimal degree of centralisation for the company Gefco. To create a conceptual model, the general organization perspective of the whole company has to be transferred to the global sourcing organization. Doing this help us to answer some important questions. First question is how to organize global sourcing itself and the second question is how to set the degree of centralisation in a global sourcing organization with respect to (a) the intra-structure-fit towards the general organization, (b) the intra-strategy-fit between global sourcing and general internationalisation strategy, and (c) the overall structure-strategy-fit.

Figure 4.5 illustrates the methodology that combines analytical and empirical research. First, Gefco is analysed depending on degree of internationalisation and degree of centralization both in general and purchasing. Then three basic types of global sourcing organization are identified and Gefco characterized in this organization.

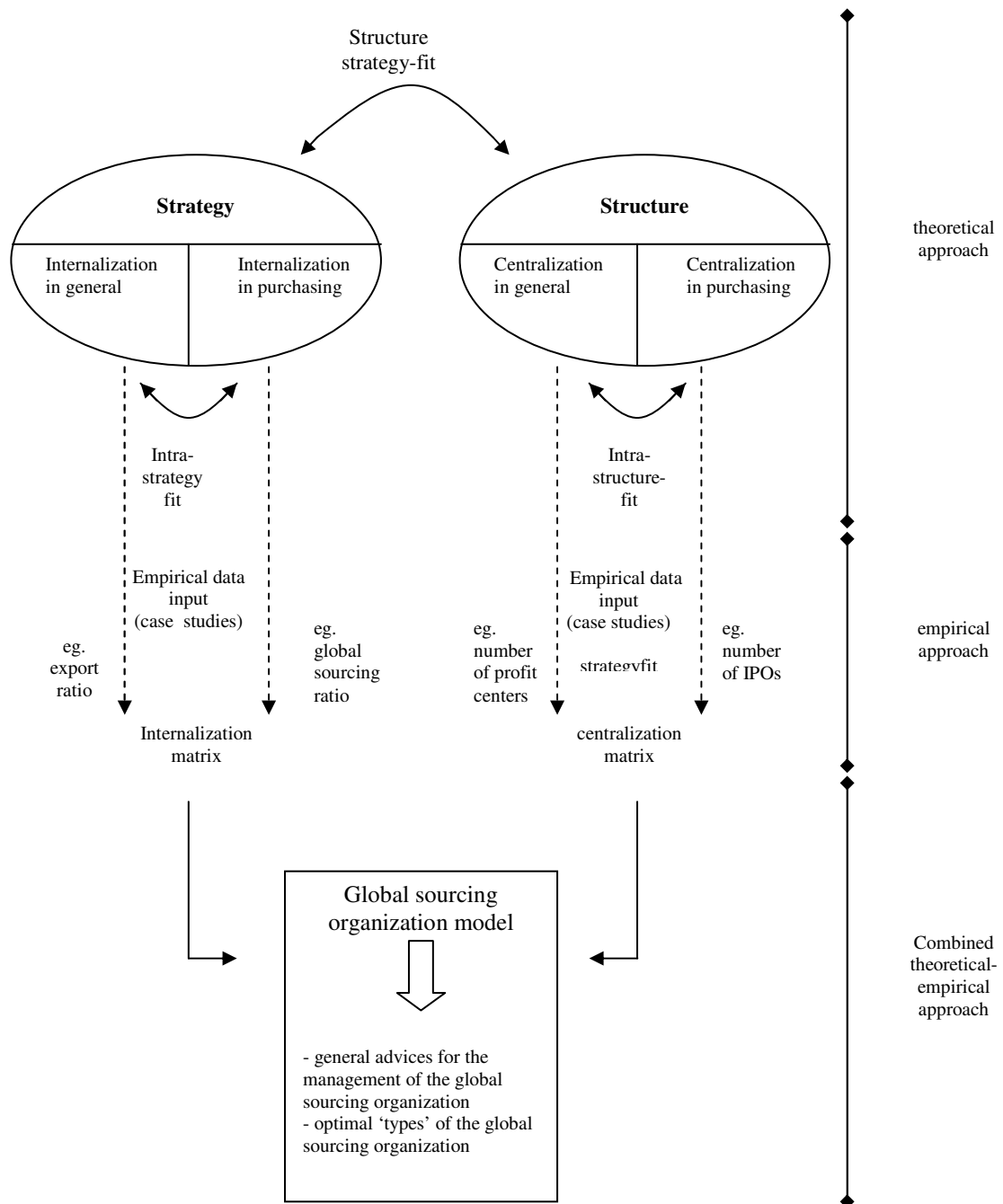


Figure 4.5: Research Procedure (Arnold, 1999)

4.3.1. An Analytical Model for the Global Sourcing Organization

Internationalisation is described by two dimensions. First dimension is the general internationalisation and second is the internationalisation of procurement. Furthermore, whole company and purchasing function are examined concerning their degree of

centralisation. As a result, four types of organization can be identified each in the internationalisation and in the centralisation matrix.

The 'global player' has international activities in all fields including purchasing (type A in Fig. 4.6), whereas the 'domestic player' (type D in Fig. 4.6) is not internationally orientated in any value chain activity. A mixture of a generally international company with a low global sourcing ratio is called 'global sourcing deficit' (type C in Fig. 4.6). The 'global sourcing focus' type B combines low interest in general international activities with a high global sourcing ratio ('on the way').

The centralisation matrix combines the degree of centralisation in the general organization with the degree of centralisation in the purchasing organization. In the 'hierarchical structure' (type 1 in Fig. 4.6) these two degrees are high; in the 'atomised structure' (type 4 in Fig. 4.6) both degrees are low. A highly decentralized company with a centralized purchasing function is called 'hierarchical purchasing structure' (type 2 in Fig. 4.6), whereas the 'atomised purchasing structure' (type 3 in Fig. 4.6) combines a centralized general organization with a decentralized supply management.

Internationalisation of Gefco and internationalisation of its procurement are very high. Therefore according to this model Gefco acts as 'global player'. Gefco has a worldwide network and operates in more than 80 countries. Every depot in the UK had acted completely independent and every unit used to have its own procurement services. But Gefco moved to centralisation in December 2006 and changed its structure. Now between 80 and 90% of the purchasing volume are handled by the central purchasing department in Coventry.

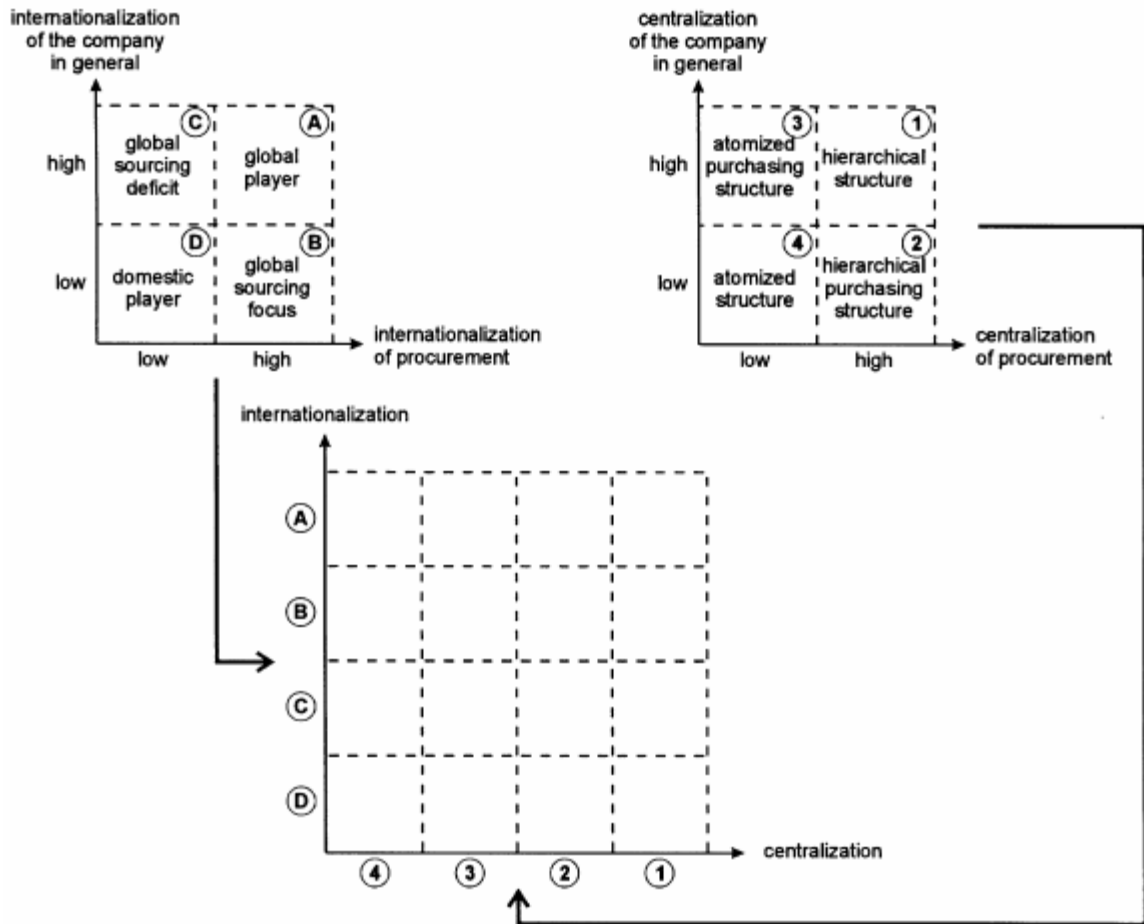


Figure 4.6: Analytical Model for the Global Sourcing Organisation (Arnold, 1999)

4.3.2. Ideal Types for the Global Sourcing Organisation

The global sourcing organization model refers to concrete recommendations about the optimal structure for the global sourcing strategy. The three organization models for global sourcing give suggestions for different types of organizations to meet the structure-strategy-fit, the intra-strategy-fit and the intra-structure-fit. By combining an analytical approach with empirical verification there is solid evidence for three different types' central purchasing model, coordination model and outsourcing model. Figure 4.7 illustrates three ideal types for the global sourcing organisation.

Gefco decided to change its organisation structure and moved to centralisation as illustrated in Figure 4.7. Hence Gefco's position in the global sourcing organisation model moved from 'outsourcing model' to 'coordination model'.

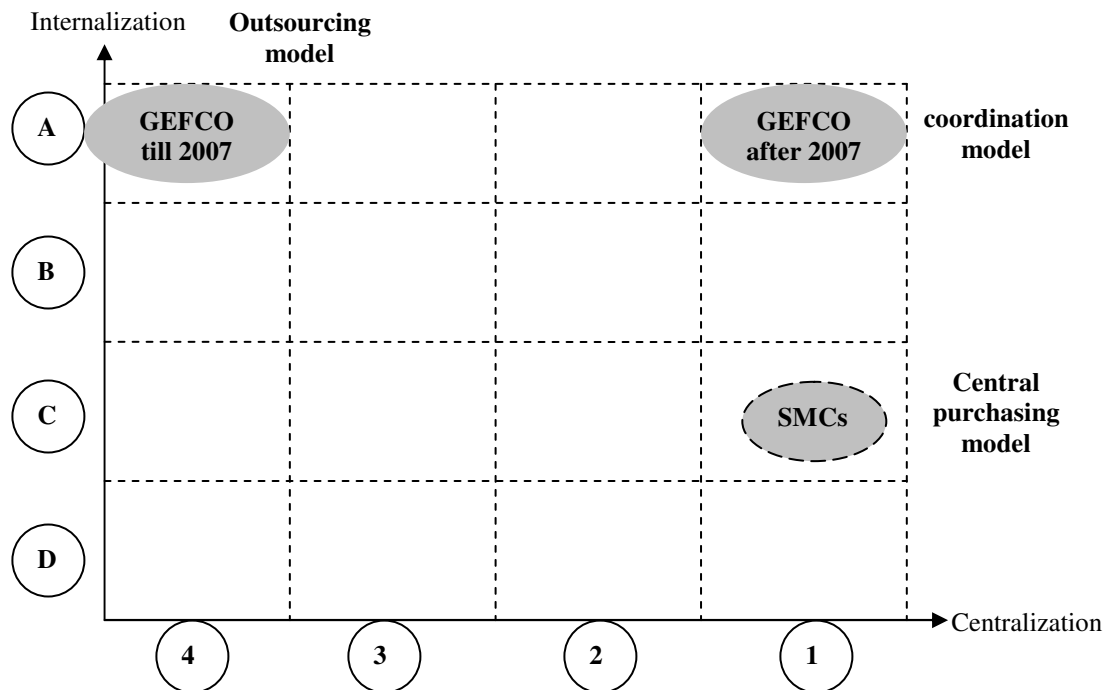


Figure 4.7: Positioning in the Global Sourcing-Organisation Model for Gefco

The central purchasing model is useful for organizations with generally low international/global sourcing activities and a high degree of centralisation. Because of the low global sourcing ratio, a regionally decentralized purchasing structure does not make sense. This is why a central purchasing function within the company is responsible for global sourcing to realize economies of scale. In addition there is a high intra-structure-fit towards the generally centralized structure. A strong central purchasing department exists in all cases of this model. Centralised purchasing helps to realize economies of scale by bundling demand and economies of scope by establishing a central purchasing process. Centralisation refers not necessarily to all procurement functions but at least to a centralized supplier management and contract handling.

The coordination model makes use of economies of scale. Instead of a strong hierarchy another steering system is used. This efficient model for centralisation refers to the idea

of cooperation among the regions/ business units. The coordination model is appropriate for centralised internationally active companies. It combines the advantages of independent regional business units with best market know how and the advantages of demand bundling in purchasing. It creates high commitment to coordinated purchasing in all regions.

The outsourcing model makes sense in a highly decentralised but very internationally oriented company. Its main idea is to enable the autonomous and decentralized business units and their purchasing functions to source globally. Therefore, a kind of outsourcing of their procurement function for international duties is established. Outsourcing in this case means to give a purchasing mandate for a specific foreign supply market to the business unit located there or to establish an international trading organization which acts separately in its market fields. The position of the global sourcing organization depends heavily on their ability to 'sell' global sourcing activities to the independent business units. Without their commitment, global sourcing could never be outsourced successfully.

The approach of this study was to create concrete recommendations how to organise global sourcing. From an individual company's perspective, it is often not easy to find a structure that fits perfectly with international purchasing activities. Companies try to find their individual position by analysing the four dimensions of the internationalisation matrix and of the centralisation matrix. This leads them to a final position within or next to the three ideal structure models (coordination model, outsourcing model, central purchasing model).

4.4. Make or Buy Decision in Gefco

In our implementation, we decided to analyse one of the Gefco's biggest customer's flow. Danone Waters UK (DWUK) is the value and volume market leader in bottled water. DWUK supplies to consumers throughout the UK, via grocery and food service channels.

DWUK has growth 15-20% yearly during the last 5 years. DWUK's famous brands are; Evian, Volvic, Touch of Fruit, Shape, Badoit and Green Valley. 90% of products are

imported from France (Evian and Volvic mainly). There is flow of 525.000 pallets per year.

Deliveries from France/Belgium to UK customers are called Northern European Delivery to Customer (NEDC) routes. The 2006 data shows that only 252 customer delivery points were via NEDC, and of these 147 received 1 delivery per month or less as shown in Appendix A. This is explained by the fact that all NEDC volume is full truck loads (FTL's) and a large proportion of DWUK's customers order less than full truck loads of anything from one case upwards.

Danone Waters UK currently has six warehouses in its network; Neasden, Knowsley and Coventry in the UK, Lille and Outreau in France, and Zeebrugge in Belgium.

In 2007, DWUK is undergoing a major change in this warehousing. In the UK, DWUK is closing Neasden and Knowsley's regional distribution centres (RDC's), and opening one large national distribution centre (NDC) in Coventry. In Europe, DWUK is moving from its warehouse in Lille to a larger warehouse in Santes, and closing Outreau during second quarter of 2007. Zeebrugge warehouse remains one of our RDC's. Figure 4.8 illustrates changing of warehouses in the UK and Northern Europe.

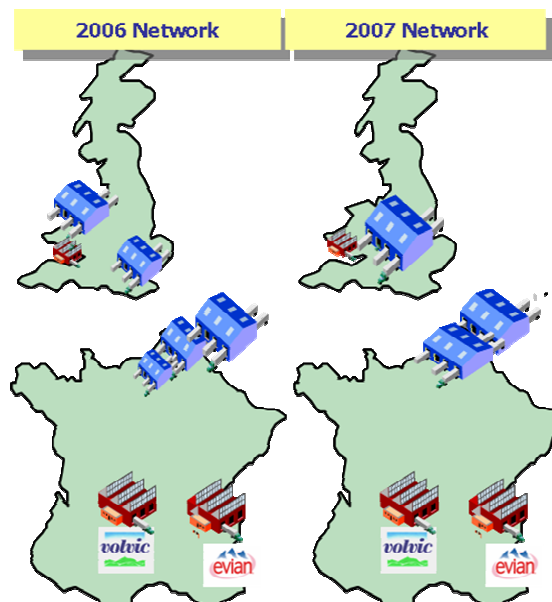


Figure 4.8: DWUK's Warehouses Changes From 2006 to 2007

The total volume forecast for 2007 from NEDC warehouses is 280,000 pallets. This equates to 12,000 trucks per year in total from Zeebrugge and Lille/Santes as shown in Appendix B.

The lead time for orders is split as follows.

- 38% Day 1 for Day 3
- 61% Day 1 for Day 4 or more
- 1% rush orders (majority in peak season)
- 12 % weekend deliveries

4.4.1. Description of the Business Between Gefco UK and Danone Waters UK

DWUK receives orders from their customers via EDI, telephone and fax. EDI orders are received 24 hours per day, 7 days per week, and 364 days per year. Orders are sent via EDI throughout the day, with the last batch of orders sent at 16:00 off peak and as late as 18:00 in peak season. The haulier must have planners available to process these orders from 08:00 to 20:00 in peak season. Operations are conducted 364 days per year and include all bank holidays.

DWUK delivers 99.4% of its despatches in plastic bottles. Only 0.5% are made in glass, and the remainder are in cans. Bottled water is a heavy product and has an average pallet weight of 1,000kgs. Danone Waters UK requires haulers to operate with equipment which allows at least a 26 tonne payload and floor space for 26 pallets of 1200mm x 1000mm each.

The trailer presented for loading must be fit for purpose. As bottled water absorbs its surrounding environmental factors, the trailer must not have any odour. The trailer must not have been previously used for odorous products such as chemical, radioactive products, fuels, paints, varnishes, cleaning products, disinfectants, perfumes, herbicides or pesticides, leather products, rubber products, smelly food products, or products degraded by micro-organisms. Danone Waters' product cannot be loaded with any of these product types as part of a multi-drop load. All trailers must be clean, dry and weatherproof. There must be no holes in the vehicle, or internal protruding objects that

could result in damage of product or loading equipment. Trailers with air suspension are required.

Haulers must be insured for a minimum of €25,000 recovery per delivery in order to carry DWUK product. This insurance must cover loss and damage.

4.4.2. Implementation of Model

Make or buy decision will be made due to strategic model which explained in part four. In this study, we analyzed flow from Zeebrugge (Belgium) and Santes (Lille) to many delivery points in the England. All products for UK's customers are delivered from Zeebrugge and Santes. Gefco provides direct shipments from Danone's warehouses to consumption point. UK is divided four zones and these zones are shown in figure 4.9. In this study we analyzed deliveries to Zone1 and Zone2.

Gefco as a logistics company provides logistics solution to its customers. Therefore in the first stage of model, we can define 'core' activity as full and part load consignment.

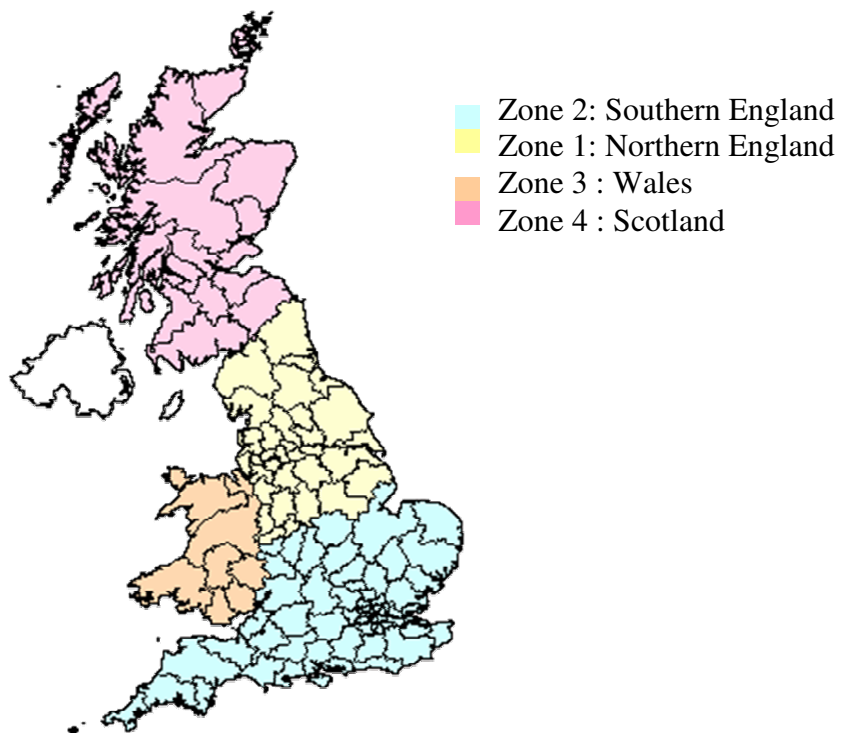


Figure 4.9: Zones in the UK

In this study, we tried to fix as many as cost items for core activity. Gefco loads the pallets and bring them to port. This procedure is called shunting and we can define this activity as non-core activity for Gefco. Every activity, which is managed out of UK, is difficult to compete with European companies. Therefore Gefco prefers to outsource shunting. When the pallets are delivered to port they are loaded to ferry towards Dartford, where there is a big port. There are 252 delivery points in the UK for Danone but Gefco determined 96 delivery points which some of them are centre for other delivery points. Figure 4.10 is map of the Northern Europe and Southern England and shows distribution flow for Danone's distribution centres to England. Volume of full truck load per year to the UK by postcode is shown in Figure 4.11, on the red areas there are the highest volume of flow.

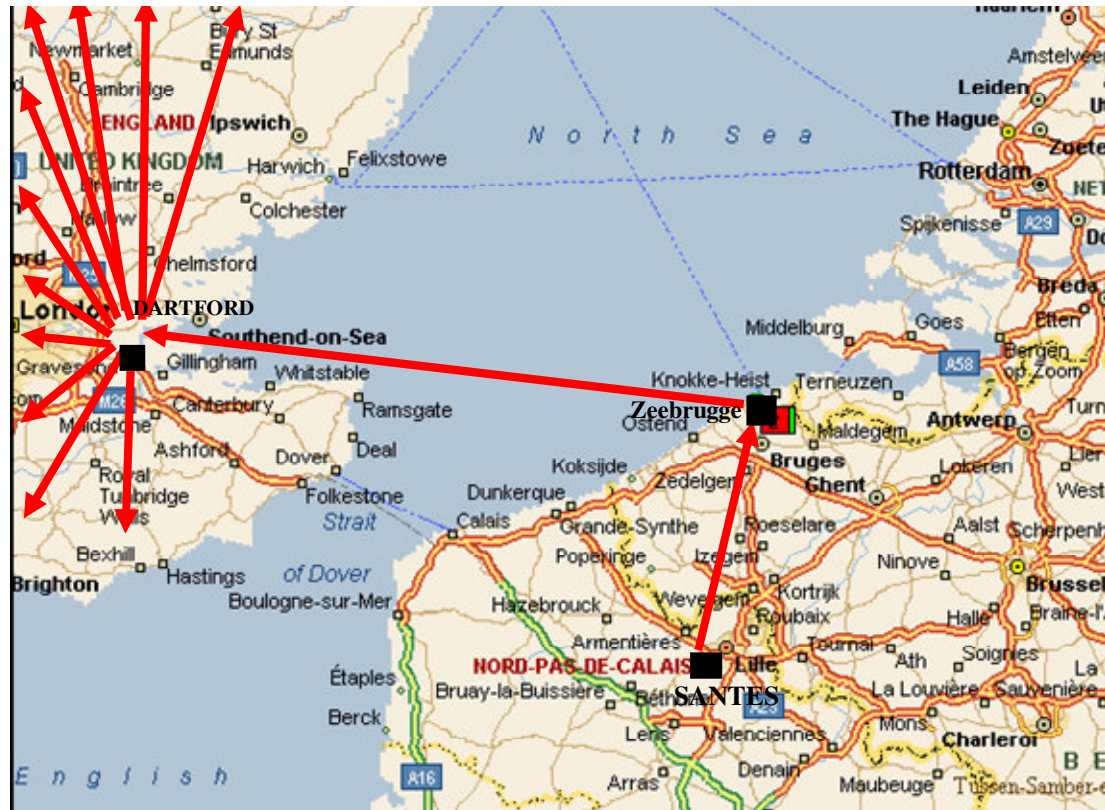


Figure 4.10: Distribution Flow From Danone's Dcs to the UK

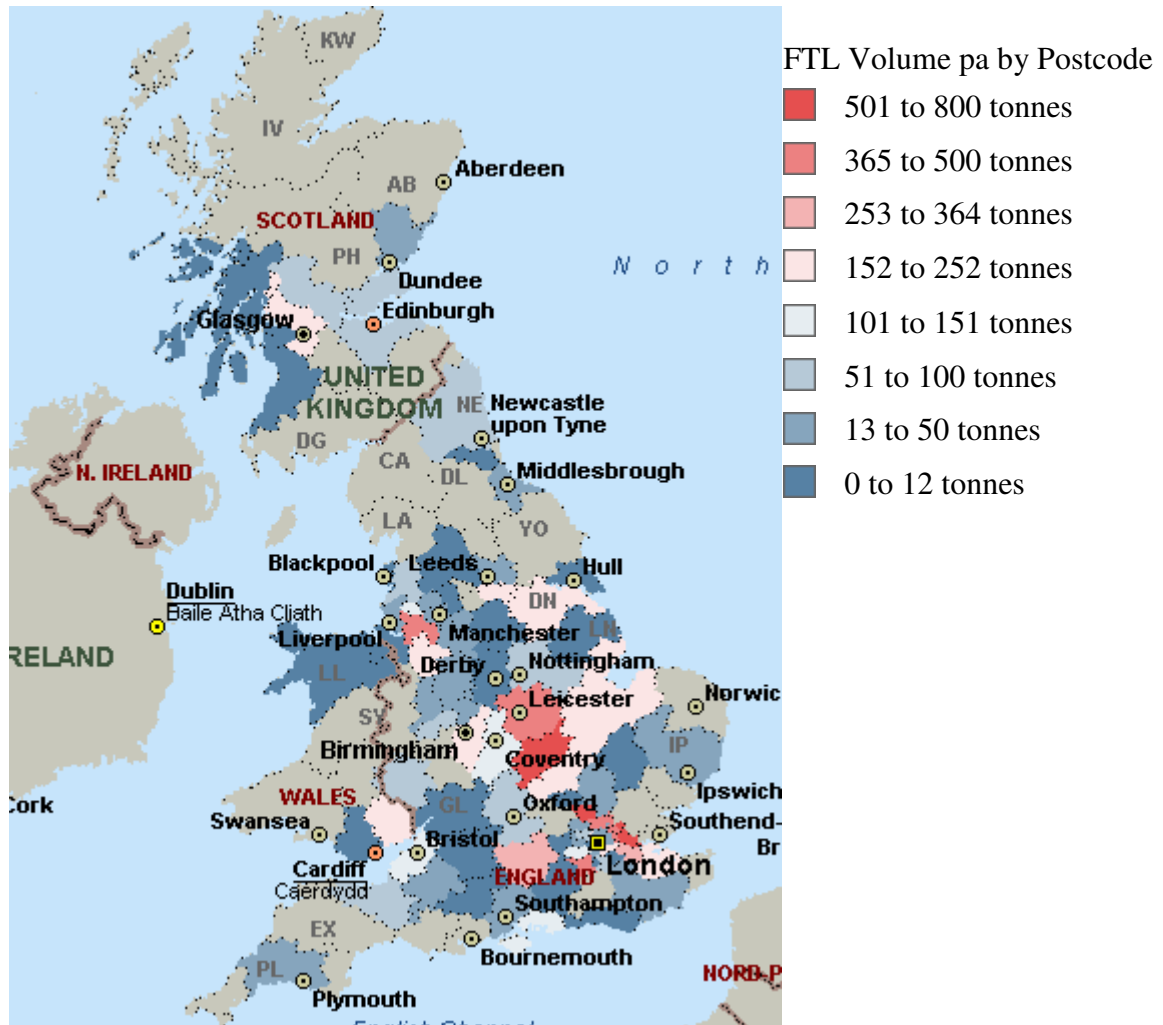


Figure 4.11: Full Truck Load Volume per Annum by Postcode in the UK

During the cost analysis stage, we wanted to fix costs. The system is generally to lease trailer and tractor unit instead of buying and also this is one of Gefco's policies. Gefco asked many companies for trailers and tractor units hiring. All quotations were collected and the best offer was chosen for cost analysis. In this analysis shunting, ferry between Europe and the UK, trailer hire, tractor unit, drivers and insurance were thought as fixed cost. Transport planner's cost was variable cost. We calculated daily cost per trip for Zeebrugge as it is shown Table 4.3.

Table 4.3: Total Cost Per Trip And Vehicle Utilisation For Zeebrugge

	Items	Daily Cost	Explanation
Fixed	Shunting	£ 43.8	Shunting in Zeebrugge - 8 Loads per day- Daily shunting hire is £350 per day
Fixed	Ferry	£ 350.0	£175 one way
Fixed	Trailer Hire	£ 14.0	£70 per week
Fixed	Tractor Unit	£ 66.0	£330 per week
Fixed	Drivers	£ 155.0	£39,000 per year, working 252 days
Fixed	Insurance	£ 19.8	Assuming 10 vehicles day
	Total Fixed	£ 648.6	
	Vehicle Utilisation	546.65	60 per cent
Variable	Transport Planner	£ 58.455	Per year
		£12.06	Per trip
Total Cost per Trip		£ 660.65	
Vehicle Utilisation		£ 558.72	

We added cost of fuel according to mileage between Zeebrugge and areas in the UK. In table 4.4 shows calculation of total cost per trip and tariff that is Gefco's sales price. 8% margin added up to total cost per trip and tariff is calculated. Only few of destinations are shown in the table as an example. This study has been done for 96 areas and table of calculation for all areas are given in Appendix C.

Table 4.4: Total Cost of One Trip Between the Destination and Tariff for Zeebrugge

Cost per mile: 0.38 (Based on 75.43p per litre AND 9 MPG)							Margin 8%	
Origin	DA	60% day vehicle utilisation	Mileage 1 way	Return mileage	Fuel Cost	Fixed cost per trip	Total Cost per trip	Tariff
1	BB		251.09	502.18	191.31	660.65	851.96	926.05
1	CA		331.88	663.77	252.87	660.65	913.52	992.96
1	DH		290.24	580.48	221.14	660.65	881.80	958.47
1	DL		273.46	546.92	208.36	660.65	869.01	944.58
1	ST		181.48	362.96	138.27	660.65	798.93	868.40
1	TF		172.16	344.31	131.17	660.65	791.82	860.68
1	TS		272.84	545.68	207.88	660.65	868.54	944.06
1	WA		215.66	431.32	164.32	660.65	824.97	896.71
1	WF		208.83	417.65	159.11	660.65	819.76	891.05
1	WN		228.09	456.18	173.79	660.65	834.44	907.00
1	WS		149.78	299.56	114.12	660.65	774.78	842.15
1	WV		154.75	309.51	117.91	660.65	778.57	846.27
1	YO		232.44	464.89	177.10	660.65	837.76	910.61
2	AL	X	44.75	89.50	34.09	558.72	592.81	644.36
2	B		142.32	284.65	108.44	660.65	769.09	835.97
2	BA		142.95	285.89	108.91	660.65	769.57	836.49
2	BH		131.14	262.27	99.92	660.65	760.57	826.71
2	BN	X	59.04	118.09	44.99	558.72	603.70	656.20
2	BR	X	10.57	21.13	8.05	558.72	566.77	616.05
2	CB		62.77	125.54	47.83	660.65	708.48	770.09
2	CM		27.97	55.94	21.31	660.65	681.96	741.27
2	CO		52.21	104.41	39.78	660.65	700.43	761.34
2	CR	X	68.99	137.97	52.56	558.72	611.28	664.44
2	CT		42.26	84.52	32.20	660.65	692.86	753.10
2	CV		120.57	241.14	91.87	660.65	752.52	817.96
2	DA	X	20.00	40.00	15.24	558.72	573.96	623.87
2	DY		153.51	307.02	116.96	660.65	777.62	845.24
2	E	X	14.29	28.59	10.89	558.72	569.61	619.14
2	EC		17.40	34.80	13.26	660.65	673.91	732.52
2	EN	X	32.32	64.64	24.62	558.72	583.34	634.07
2	EX		228.71	457.43	174.26	660.65	834.92	907.52
2	GU		50.34	100.68	38.36	660.65	699.01	759.79

After finding costs for Gefco, we calculated cost in case of Gefco uses subcontractors.

BJ Myers is one of transport company and was asked for quotation. According to this

new tariff was prepared and differences between Gefco's tariff and subcontractor's tariff were shown in table 4.5.

Table 4.5: Total Cost And Tariff For Subcontractor And Differences For Zeebrugge

Cost per mile - BJ Myers: 1.2				Margin: 8%		
Tractor Unit / Trailer / Driver costs removed from Fixed Cost per trip						
Origin	DA (Dartford)	Fixed cost per trip	Fuel Cost	Total Cost per trip	Tariff	Difference
1	BB	432.24	618.68	1,050.92	1,142.30	216.26
1	CA	432.24	817.76	1,250.00	1,358.70	365.74
1	DH	432.24	715.16	1,147.40	1,247.17	288.70
1	DL	432.24	673.81	1,106.05	1,202.23	257.65
1	ST	432.24	447.16	879.40	955.87	87.48
1	TF	432.24	424.19	856.43	930.91	70.23
1	TS	432.24	672.28	1,104.52	1,200.56	256.50
1	WA	432.24	531.39	963.63	1,047.42	150.72
1	WF	432.24	514.55	946.79	1,029.11	138.07
1	WN	432.24	562.02	994.26	1,080.72	173.71
1	WS	432.24	369.06	801.30	870.98	28.83
1	WV	432.24	381.32	813.56	884.30	38.03
1	YO	432.24	572.74	1,004.98	1,092.37	181.76
2	AL	432.24	110.26	542.50	589.67	-54.69
2	B	432.24	350.69	782.93	851.01	15.04
2	BA	432.24	352.22	784.46	852.67	16.19
2	BH	432.24	323.12	755.36	821.05	-5.66
2	BN	432.24	145.48	577.72	627.96	-28.24
2	BR	432.24	26.03	458.27	498.12	-117.93
2	CB	432.24	154.67	586.91	637.95	-132.14
2	CM	432.24	68.91	501.15	544.73	-196.53
2	CO	432.24	128.64	560.88	609.65	-151.69
2	CR	432.24	169.98	602.22	654.59	-9.84
2	CT	432.24	104.13	536.37	583.02	-170.09
2	CV	432.24	297.09	729.33	792.75	-25.21
2	DA	432.24	49.28	481.52	523.39	-100.47
2	DY	432.24	378.25	810.49	880.97	35.73
2	E	432.24	35.22	467.46	508.11	-111.03
2	EC	432.24	42.88	475.12	516.43	-216.08
2	EN	432.24	79.63	511.87	556.38	-77.68
2	EX	432.24	563.55	995.79	1,082.38	174.86
2	GU	432.24	124.04	556.28	604.65	-155.14

When we analysed these two tables and it has seen that to invest or make decision much more profitable for Gefco in some destination, on the other hand there are other destinations that must be worked by subcontractors. 48 destinations cost cheaper to Gefco than subcontractors, but other 48 destinations are cheaper with subcontractors. In this study from Zeebrugge to UK, Gefco can have 50% advantages.

Same study has been done for Santes. The difference of cost is due to shunting. Table 4.6 gives total cost per trip from Santes.

Table 4.6: Total Cost per Trip and Vehicle Utilisation for Santes

	Items	Daily Cost	Explanation
Fixed	Shunting	£ 116.7	Shunting in Zeebrugge - 3 Loads per day- Daily shunting hire is £350
Fixed	Ferry	£ 350.0	£175 one way
Fixed	Trailer Hire	£ 14.0	£70 per week
Fixed	Tractor Unit	£ 66.0	£330 per week
Fixed	Drivers	£ 155.0	£39,000 per year, working 252 days
Fixed	Insurance	£ 19.8	Assuming 10 vehicles day
	Total Fixed	£ 721.5	
	Vehicle Utilisation	619.57	60 per cent
Variable	Transport Planner	£ 58,455	Per year
		£12.06	Per trip
Total Cost per Trip		£ 733.57	
Vehicle Utilisation		£ 631.63	

In table 4.7 shows calculation of total cost per trip and tariff that is Gefco's sales price from Santes. 8% margin added up to total cost per trip and tariff is calculated. Only few of destinations are shown in the table as an example. This study has been done for 96 areas and table of calculation for all areas are given at Appendix D.

Table 4.7: Total Cost of One Trip Between the Destination and Tariff for Santes

Cost per mile : 0,38 Based on 75.43p per litre AND 9 MPG							Margin 8%	
Origin	DA	60% day vehicle utilisation	Mileage 1 way	Return mileage	Fuel Cost	Fixed cost per trip	Total Cost per trip	Tariff
1	BB		251.09	502.18	191.31	733.57	924.88	1,005.30
1	DE		153.51	307.02	116.96	733.57	850.53	924.49
1	DH		290.24	580.48	221.14	733.57	954.71	1,037.73
1	LN		149.16	298.32	113.65	733.57	847.22	920.89
1	NG		151.65	303.29	115.54	733.57	849.11	922.95
1	TF		172.16	344.31	131.17	733.57	864.74	939.94
1	TS		272.84	545.68	207.88	733.57	941.45	1,023.32
1	WN		228.09	456.18	173.79	733.57	907.36	986.26
1	WS		149.78	299.56	114.12	733.57	847.69	921.41
1	WV		154.75	309.51	117.91	733.57	851.48	925.52
1	YO		232.44	464.89	177.10	733.57	910.67	989.86
2	EN	x	32.32	64.64	24.62	631.63	656.26	713.32
2	EX		228.71	457.43	174.26	733.57	907.83	986.77
2	PE		97.58	195.15	74.35	733.57	807.92	878.17
2	PL		268.49	536.98	204.57	733.57	938.14	1,019.72
2	PO		94.47	188.94	71.98	733.57	805.55	875.60
2	RG		71.47	142.95	54.46	733.57	788.03	856.55
2	RH	x	28.59	57.18	21.78	631.63	653.42	710.24
2	RM	x	126.79	253.57	96.60	631.63	728.24	791.56
2	SE	x	16.16	32.32	12.31	631.63	643.95	699.94

When we calculate cost with subcontractors we realised that there are much more minus in Santes that means it costs lower from Santes rather than Zeebrugge. End of the calculation results show that only 35% of shipment is more profitable if Gefco's decision is 'make'. These results are shown in Appendix D.

Table 4.8: Total Cost and Tariff for Subcontractor and Differences for Santes

Cost per mile - BJ Myers: 1.2					Margin	8%
Tractor Unit / Trailer / Driver costs removed from Fixed Cost per trip						
Origin	DA	Fixed cost per trip	Fuel Cost	Total Cost per trip	Tariff	Difference
1	BB	432.24	618.7	1,050.9	1,142.3	137.0
1	DE	432.24	378.3	810.5	881.0	- 43.5
1	DH	432.24	715.2	1,147.4	1,247.2	209.4
1	LN	432.24	367.5	799.8	869.3	- 51.6
1	NG	432.24	373.7	805.9	876.0	- 47.0
1	TF	432.24	424.2	856.4	930.9	- 9.0
1	TS	432.24	672.3	1,104.5	1,200.6	177.2
1	WN	432.24	562.0	994.3	1,080.7	94.5
1	WS	432.24	369.1	801.3	871.0	- 50.4
1	WV	432.24	381.3	813.6	884.3	- 41.2
1	YO	432.24	572.7	1,005.0	1,092.4	102.5
2	EN	432.24	79.6	511.9	556.4	- 156.9
2	EX	432.24	563.6	995.8	1,082.4	95.6
2	PE	432.24	240.4	672.7	731.2	- 147.0
2	PL	432.24	661.6	1,093.8	1,188.9	169.2
2	PO	432.24	232.8	665.0	722.8	- 152.8
2	RG	432.24	176.1	608.3	661.2	- 195.3
2	RH	432.24	70.4	502.7	546.4	- 163.8
2	RM	432.24	312.4	744.6	809.4	17.8
2	SE	432.24	39.8	472.1	513.1	- 186.8

As a result of this study, we can say it is better for Gefco to outsource activities for long distances. It is same for international shipments as well. Gefco UK should make some investments in the UK, therefore this investment, which includes trucks, trailers, drivers and warehouses, can be used many times in the UK and for short distances in Europe. If Gefco decides to invest, all items must be used as much as possible. That is all about planning and managing. On the other hand there is no meaning to invest for a shipment for example from Casablanca to Coventry. Investment decision should be made according to destination and frequency of shipments.

4.5. Supplier Selection and Evaluation by Using AHP

Gefco works with many suppliers in many countries and provides logistics solution for its customers from five different suppliers which work on route from Northern Europe to UK. The company's purpose is reducing the number of suppliers by eliminating some of them in order to increase efficiency in the supply chain.

In this study we used AHP model which is explained in Section 3 and followed Paksoy and Gules's (2006) method. Gefco proposes six criteria during the elimination of the suppliers. These are; cost, flexibility, reliability, technical capacity, information systems and customer satisfaction.

- **Cost:** Cost is a major factor in determining the supplier. The quality of the service should be the same, the supplier that offered the lower price will have a stronger likeliness of getting chosen by the company.
- **Flexibility:** Flexibility refers to the ability to respond to changing requirements or circumstances. The logistics network probably will be more complex, involving alliances with third-party logistics providers, and will certainly have to be more flexible than the traditional network. It is essential in logistics to respond to potential internal or external changes affecting its value delivery, in a timely and cost-effective manner. The logistics function must be very flexible in order to respond quickly to any special logistics requirement coming from the customer.
- **Reliability:** Reliability between the company and its suppliers is one of the significant measure performances. It is like reliability of customer service in terms of timeliness or delivered quantities.
- **Technical Capacity:** This performance refers to size of suppliers. Technical capacity includes amount of customers' trucks and trailers, their distribution centers and the conditions of these trailers or distribution centers. In this study Gefco generally works middle size suppliers.
- **Information Systems:** Rapid developments in information technology have many implications for the organisation and management of logistics. Information technology has transcended the borders of the individual firm. Management

control and decision making throughout the supply chain has therefore become an important focus of attention for management. Information systems are needed which can support that control and decision making. Moreover it is important for Gefco to work with suppliers which have tracing systems and data flow due to control the systems and inform the customers where the goods or trailers are.

- **Customer Satisfaction:** This performance measure is based on customer interviews and gives a subjective view on the performance level. The basic service level to the customers must always be achieved because failing might risk the relations with the customers and result to lost business.

The decision structure, which captures the explained criteria above, about the supplier selection problem of Gefco, is given in the Figure 4.12 below.

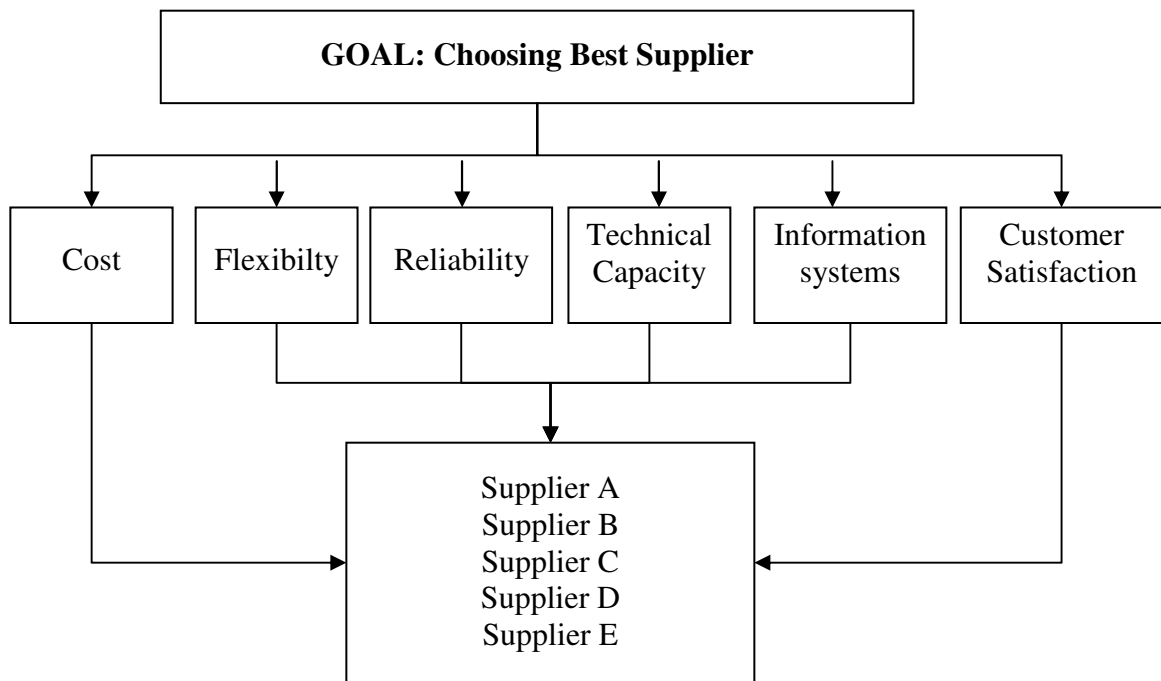


Figure 4.12: Hierarchy Model for Choosing Best Supplier

The matrix of pairwise comparisons of the criteria given by Gefco in the study is shown in Table 4.9. The judgements are entered using the Pairwise Comparison Scale (Table 3.2), first verbally as indicated in the scale and then by associating the corresponding number.

Table 4.9: Pairwise Comparison Matrix with Respect to the Goal

GOAL	Cost	Flexibility	Reliability	Technical Capacity	Information System	Customer Satisfaction
Cost	1.00	3.00	2.00	2.00	3.00	3.00
Flexibility	0.33	1.00	0.50	3.00	4.00	4.00
Reliability	0.50	2.00	1.00	3.00	4.00	3.00
Technical Capacity	0.50	0.33	0.33	1.00	2.00	0.50
Information System	0.33	0.25	0.25	0.50	1.00	2.00
Customer Satisfaction	0.33	0.25	0.33	2.00	0.50	1.00

Using pairwise comparison matrix, as displayed in the Table 4.9 above, Inconsistency Index is found as 9.44% in Excel. Decision maker's evaluation is consistent because of $0.09 < 0.10$. The weight values or the priorities derived from the judgements are shown in the following Table 4.10.

Table 4.10: Priority Values of Criteria

Cost	Flexibility	Reliability	Technical Capacity	Information System	Customer Satisfaction
0.305	0.201	0.241	0.092	0.077	0.084

We now move to the pairwise comparisons of the alternatives / suppliers, comparing them pairwise with respect to how much more important one is than the other with respect to the criterion which is showed with shaded cell on the North West corner on the top of the Tables 4.11-16. Thus, there are six 5x5 matrices of judgements since there are six criteria and five suppliers to be pairwise compared for each criterion (Tables 4.11-4.16).

Cost is one of the most important criteria for Gefco and given prices turned into ratio to evaluate suppliers. This is shown in Table 4.11.

Table 4.11: Pairwise Comparison Matrix with Respect to the Cost Criterion

COST	Supplier A	Supplier B	Supplier C	Supplier D	Supplier E
Supplier A	1	2	1	0.5	4
Supplier B	0.5	1	2	1	5
Supplier C	1	0.5	1	0.25	3
Supplier D	2	1	4	1	3
Supplier E	0.25	0.2	0.33	0.33	1

The question asked to Gefco is ‘Of the two suppliers being compared, which is considered better with respect to performance criterion?’ The answer is presented in Table 4.12.

Table 4.12: Pairwise Comparison Matrix with Respect to the Flexibility Criterion

FLEXIBILITY	Supplier A	Supplier B	Supplier C	Supplier D	Supplier E
Supplier A	1	3	2	4	5
Supplier B	0.33	1	0.33	0.5	2
Supplier C	0.5	3	1	2	3
Supplier D	0.25	2	0.5	1	4
Supplier E	0.2	0.5	0.33	0.25	1

Gefco’s judgement which shows the relative ‘importance’ of the suppliers with respect to the reliability criterion is given below in Table 4.13.

Table 4.13: Pairwise Comparison Matrix with Respect to the Reliability Criterion

RELIABILITY	Supplier A	Supplier B	Supplier C	Supplier D	Supplier E
Supplier A	1	0.2	1	2	0.5
Supplier B	5	1	3	4	3
Supplier C	1	0.33	1	1	0.5
Supplier D	0.5	0.25	1	1	2
Supplier E	2	0.33	2	0.5	1

Table 4.14 reflects the Gefco's judgement about the relative 'importance' of the suppliers with respect to the technical capacity of suppliers.

Table 4.14: Pairwise Comparison Matrix with Respect to the Technical Capacity

Criterion

TECHNICAL CAPACITY	Supplier A	Supplier B	Supplier C	Supplier D	Supplier E
Supplier A	1	4	2	2	3
Supplier B	0.25	1	2	0.33	2
Supplier C	0.5	0.5	1	0.5	1
Supplier D	0.5	3	2	1	3
Supplier E	0.33	0.5	1	0.33	1

Table 4.15 reflects the Gefco's judgement about the relative 'importance' of the suppliers with respect to the information system criterion.

Table 4.15: Pairwise Comparison Matrix with Respect to the Information System

Criterion

INFORMATION SYSTEM	Supplier A	Supplier B	Supplier C	Supplier D	Supplier E
Supplier A	1	0.5	0.33	3	5
Supplier B	2	1	0.5	2	3
Supplier C	3	2	1	3	4
Supplier D	0.33	0.5	0.33	1	0.5
Supplier E	0.2	0.33	0.25	2	1

Gefco's judgement which shows the relative 'importance' of the suppliers with respect to the customer satisfaction criterion is given below in Table 4.16. This importance is decided after interviewing with customers.

Table 4.16: Pairwise Comparison Matrix with Respect to the Customer Satisfaction Criterion

CUSTOMER SATISFACTION	Supplier A	Supplier B	Supplier C	Supplier D	Supplier E
Supplier A	1	3	0.5	2	3
Supplier B	0.33	1	0.5	0.33	2
Supplier C	2	2	1	0.5	4
Supplier D	0.5	3	2	1	3
Supplier E	0.33	0.5	0.25	0.33	1

The priorities derived from the company judgement about criteria are evaluated by Analytic Hierarchy Process (AHP). The relative importance of suppliers with respect to each criterion is laid out in a matrix below in Table 4.17 inconsistency ratios of the judgements are given in Table 4.18. All values for inconsistency ratio is under 0,10 , therefore decision maker's judgements are consistent.

Table 4.17: Supplier-Criteria Matrices' Results

Firm/Criteria	Cost	Flexibility	Reliability	Technical Capacity	Information System	Customer Satisfaction
Supplier A	0.234	0.417	0.126	0.372	0.210	0.277
Supplier B	0.239	0.106	0.455	0.147	0.229	0.107
Supplier C	0.141	0.247	0.115	0.119	0.381	0.271
Supplier D	0.325	0.167	0.140	0.264	0.086	0.276
Supplier E	0.061	0.064	0.164	0.098	0.093	0.070

Table 4.18: Inconsistency Ratios for Supplier-Criteria Matrices

Firm/Criteria	Cost	Flexibility	Reliability	Technical Capacity	Information System	Customer Satisfaction
Inconsistency Ratio	0.08	0.04	0.09	0.05	0.09	0.08

Following AHP procedure is to calculate the priority values for the suppliers which are done by multiplying priority values of each criteria and every relative importance of suppliers with respect to each criterion, then taking the total. For example for Supplier A, its priority value is calculated as Supplier A = $0.234 * 0.305 + 0.417 * 0.201 + 0.126$

* 0.241 + 0.372 * 0.092 + 0.210 * 0.077 + 0.277 * 0.084 = 0.259. Similar calculation has done for other suppliers and the results in Table 4.19.

Table 4.19: Priority Values of Suppliers

Suppliers	Priority Values
Supplier A	0.259
Supplier B	0.244
Supplier C	0.184
Supplier D	0.221
Supplier E	0.093

As the result of implementation of AHP method, Supplier A has the best performance among the five suppliers firms. Then Supplier B, Supplier D, Supplier C and Supplier E follow Supplier A.

5. CONCLUSION AND FUTURE RESEARCH

Logistics is essential for every organization. Without logistics, no materials move, no operations can be done, no products are delivered, and no customers are served. Logistics is the function that is responsible for the flow of materials into, through and out of an organization. Materials move through a series of related activities and organizations between initial suppliers and final customers. Logistics consists of a series of related activities. These range from procurement at the beginning of operations, through to physical distribution at the end. An overall aim for logistics is to achieve high customer satisfaction or perceived product value. This must be achieved with acceptable costs.

Successful supply chain management necessitates an effective sourcing strategy to combat uncertainties in both supply and demand. The development and evolution of supply chain management owes much to the purchasing and supply management, and transportation and logistics literature. Genuinely integrated supply chain management requires a massive commitment by all members of the value chain. For example, the buyer may have to overhaul its purchasing process and integrate a supplier's engineering teams and product designers directly into its own decision-making process. Since the cost of changing a partner can be huge, the purchasing firm can become a captive of its suppliers. Poor supplier performance is not the only risk; the purchaser needs to worry about the possibility of a supplier passing trade secrets to competitors or with its new found abilities, venturing out on its own. Trusting suppliers may be good business sense, but for many firms hostility may still be more profitable, even in the long run.

In this study, logistics, supply chain management and purchasing issues have been considered in different views. After introducing literature about these subjects, implementation has been done in one of the biggest logistics company, Gefco, in Europe. Gefco has just moved to centralization and efficiency of purchasing has slightly

increased, but for further research this efficiency will be measured and analyzed whether it is an advantage for Gefco.

Outsourcing has a strategic importance in purchasing management. To decide which is more profitable; investing to business or outsource with suppliers is one of the most essential decisions for companies. This strategy has analyzed in Gefco and it is concluded that outsourcing is an inevitable for long destinations. Gefco covers 300 international destinations in 80 countries covering all aspects of international goods transport across Europe, North Africa, or the Far East. As Gefco UK's point of view, investing to business or make decision is only reasonable in the UK if these investments are used efficient.

In further studies similar research should be done to make decision of make or buy for other destinations. If the decision is to outsource business with the suppliers, supplier selection and evaluation is crucial. AHP helps to evaluate suppliers' performance to decide on best suppliers by comparing. Although Gefco works with many suppliers, it does not have any performance evaluation for its suppliers, which have been worked for along time. This study was one of the first projects to analyze suppliers in Gefco and the company has realized what criteria are important and necessary to satisfy customers. Logistics has an increasing importance day by day and competition is very severe. It is impossible to invest to business in every country but Gefco, as a one of the biggest logistics company in Europe, should take this as an advantage and find optimum routes and solutions for its customers.

6. REFERENCES

- Alexander, M., and Young, D., 1996. Strategic Out-Sourcing, *Long Range Planning*, 29(1), 115-119.
- Alvarado, U.Y. and H. Kotzab, 2001. Supply Chain Management, The Integration of Logistics in Marketing, *Elsevier Science*, **30**, 183-198.
- Anderson, S., 2000. Distribution Logistics in Big Cities, *ISTP 4th International Conference on Transport*, Lizbon, Portugal, July.
- Anonymous, Nov 2003. The Changing Face of European Logistics, *Logistics Management, Highland Ranch*, **42(11)**, 69-73.
- Arnold, U., 1999. Organization of Global Sourcing: Ways Towards an Optimal Degree of Centralisation, *European Journal of Purchasing and Supply Management*, **5**, 167 – 174.
- Barbalho, M. , Scott Dunn and Vince Colabello, Feb 1998. The Globalisation of Logistics, *Manufacturing Systems, Wheaton*, **16(2)**, 132-141.
- Bartels, N., Mar 2006. 21st Century Logistics, *Manufacturing Business Technology, Highlands Ranch*, **24(3)**, 30.
- Bence, V., 1995. The Changing Marketplace for Distribution: An Operator's Perspective, *European Management Journal*, **13(2)**, 18-229.
- Bonet, D. and Paché, P., 2005. A New Approach for Understanding Hindrances to Collaborative Practices in the Logistics Channel, *International Journal of Retail and Distribution Management*, **33(8/9)**, 583-596.
- Burke, G.J., Janice E. Carillo and Asoo J. Vakharia, 2006. Single Versus Multiple Supplier Sourcing Strategies, *Elsevier Science*, **10**, 7-23.
- Chiang, W.K and Monahan, G.E., 2005. Managing Inventories in a Two-Echelon Dual-Channel Supply Chain, *European Journal of Operational Research*, **162**, 325-341.
- DiPaolo, R., Mar 2006. Wholesale Channel: More Than The Minimum, *Maintenance Supplies, Melville*, **51(2)**, 26-27.
- Dong, Y. and Xu, K., 2002. A Supply Chain Model of Vendor Managed Inventory, *Transportation Research Part E*, **38**, 75-95.

- Dooley, K.**, 1995. Purchasing and Supply – An Opportunity for OR, *OR Insight*, **8(3)**, 21-25.
- Dubois, A. and Lars-Erik Gadde**, 2000. Supply Strategy and Network Effects-Purchasing Behaviour in the Construction Industry, *European Journal of Purchasing and Supply Management*, **6**, 207-215.
- Dyer, R.F. and Forman, E.H.**, 1992. Group Decision Support with the Analytic Hierarchy Process, *Decision Support Systems*, **8(2)**, 99-124.
- Enslow, B.**, Jan 2006. Best Practices in Global Trade Management Stress Speed and Flexibility, *World Trade*, **19(1)**, 36-40.
- Faes, W. and Matthijssens, P.**, 1998. Managing Purchasing Coordination: How to Build an Effective Intra-company Relationship, *Proceedings of the 7th IPSERA Conference*, London, UK, p. 204-215.
- Farley, G.A.**, 1997. Discovering Supply Chain Management: A Roundtable Discussion, *APICS - The Performance Advantage*, **7(1)**, 38 -39.
- Farmer,D.**, 1997. Purchasing Myopia, *European Journal of Purchasing and Supply Management*, **3(1)**, 1-8.
- Fernandez, K. and Tauno Kekale**, 2005. The Influence of Modularity and Industry Clockspeed on Reverse Logistics Strategy: Implication for the Purchasing Function, *Journal of Purchasing and Supply Management*, **11**, 193-205.
- Field, A.M.**, Jul 2006. On-demand in Demand, *Journal of Commerce*, New York, 28-30.
- Ford, D., Cotton, B., Farmer, D., Gross, A. and Wilkinson, I.**, 1993. Make-or-Buy Decisions and Their Implications, *Industrial Marketing Management*, **22**, 207-214.
- Frazelle, E.**, 2002. Supply chain Strategy, McGraw-Hill, New York.
- Gelderman, C.J. and Janjaap Semejin**, 2006. Managing the Global Supply Base Through Purchasing Portfolio Management, *Journal of Purchasing and Supply Management*, **12**, 209-217.
- Gonzalez-Benito, J.**, 2007. A Theory of Purchasing's Contribution to Business Performance, *Journal of Operations Management*, **9(2)**, 7-12.
- Goold, M. and Campbell A.**, Sept-Oct 1998. Desperately Seeking Synergy, *Harvard Business Review*, 131-143.

- Harwick, T.**, 1997. Optimal Decision-making for the Supply Chain. *APICS - The Performance Advantage*, **7 (1)**, 42-44.
- Humphreys, P.K., Lo, V.H.Y. and McIvor, R.T.**, 2000. A Decision Support Framework for Strategic Purchasing, *Journal of Materials Processing Technology*, **107**, 353-362.
- Humphreys, P., McIvor, R. and Huang, G.**, 2002. An Expert System For Evaluating the Make or Buy Decision, *Computers and Industrial Engineering*, **42**, 567-585.
- Jie, N. S. and Rosalynd Skinner**, 2005. Managing Clinical Trial Logistics in Asia, Business Briefing, Pharma Outsourcing.
- Kengpol, A.**, 2004. The Design of a Decision Support System to Evaluate the Investment in New Distribution Centre Using The Analytic Hierarchy Process (AHP), Capital Investment Model and Transportation Model, *International Journal of Production Economics*, **90**, 59-70.
- Korpela, J. and Lehmusvaara, A.**, 1999. A Customer Oriented Approach to Warehouse Network Evaluation and Design, *International Journal of Production Economics*, **59**, 135-146.
- Korpela, J., Nousiainen, J., Kylaheiko, A., Tuominen, M.**, 2002. An Analytic Hierarchy Process –Based Approach for More Effective Performance Measurement, *Institute of Production Economics*, 135-148.
- Krause, D.R. and Ellram, L.M.**, 1997. Critical Elements of Supplier Development, *European Journal of Purchasing and Supply Management*, **3**, 21–31.
- Li, S. and Zhongsheng Hua**, 2006. A Note on Channel Performance Under Consignment Contract With Revenue Sharing, *European Journal of Operational Research*, **11**, 3-7.
- Long, D.**, 2004. International Logistics: Global Supply Chain, Springer, Germany.
- Lu, C.**, 2004. An Evaluation of Logistics Services' Requirements of International Distribution Centers in Taiwan, *Transportation Journal*, **43(4)**, 53-66.
- Lugt, L. M. and Peter W. de Langen**, 2005. The Changing Role of Ports as Locations for Logistics Activities, *Journal of International Logistics and Trade*, **3(2)**, 59-72.
- Monczka, R.M., Trent, R.J. and Callahan, T.J.**, 1993. Supply Base Strategies to Maximise Supplier Performance, *International Journal of Physical Distribution and Inventory Management*, **23(4)**, 42-54.

- New, S.J., Payne, P.**, 1995. Research Frameworks in Logistics: Three Models, Seven Dinners and a Survey, *International Journal of Physical Distribution and Logistics Management*, **25(10)**, 60-77.
- Norina, L.V., Bailey, W.C.**, 2001. Quantitive approach to Supply Chain Relationships, *11th Annual Food and Agribusiness Symposium*, Sydney, Australia.
- Norwood, J., Carson, C., Deese, M., Johnson, N.J., Reeder, F. S., Rolph, J.E. and Schwab, S.**, Jan 2006. Off-Shoring: An Elusive Phenomenon, *A Report of the Panel of the National Academy Of Public Administration For the U.S. Congress and the Bureau of Economic Analysis*, p.5-11.
- Oliver, N., Jones, D., Roberts, P. and Taylor, B.**, 1994. Worldwide Competitiveness Study: The Second Lean Enterprise Report. Andersen Consulting, London, UK.
- O'Sullivan, D.**, 1997. Logistics in Europe - The Vision and The Reality, *Logistics Information Management. Bradford*, **10(1)**, 14-19.
- Page, P.**, Oct 2006. A Logistics Tail, *Traffic World, Newark*, p. 1.
- Paksoy, T., Gules, H.K.**, 2006. Analytic Hierarchy Process for Supplier Selection Problem in Supply Chain Management: Case Study of A Textile Manufacturer Firm, *Sigma*, **4**, 100-110.
- Paun, M. S.**, Jan-Feb 2006. Intermodal Distribution Comes of Age in Europe, *Army Logistician*, **38(1)**, 12-14 .
- Rozemeijer, F.**, 2000. How To Manage Corporate Purchasing Synergy In A Decentralised Company? Towards Design Rules For Managing and Organising Purchasing Synergy In Decentralised Companies, *European Journal of Purchasing and Supply Management*, **6**, 5-12.
- Rutter, M.**, 2006. 5 Steps To Trade Compliance, *Logistics Management Highland Ranch*, **45(11)**, 43.
- Saaty, T.L.**, 1982. Decision Making for Leaders, *Lifetime Learning Publications*, USA.
- Saaty, T. L.**, 2001. Decision Making with Dependence and Feedback: The Analytic Network Process, RWS Publications, Pittsburgh, PA, USA.
- Sarmah, S.P., Acharya, D. and Goyal, S.K.**, 2006. Buyer Vendor Coordination Models in Supply Chain Management, *European Journal of Operational Research*, **175**, 1-15.

- Scully, J.I. and Fawcett, S.E.**, 1994. International Procurement Strategies: Challenges and Opportunities for Small Businesses, *Production and Inventory Management*, **35**(2), 39-46.
- Sharma, A. and Mehrotra A.**, 2007. Choosing an Optimal Channel Mix in Multichannel Environments, *Industrial Marketing Management*, **36**, 21-28.
- Smith, J. M.**, 1999. Item Selection for Global Purchasing, *European Journal of Purchasing and Supply Management*, **5**, 117-127.
- Stanley, L.L. and Wisner, J.D.**, 2002. The Determinants of Service Quality: Issues for Purchasing, *European Journal of Purchasing and Supply Management*, **8**, 97-109.
- Tagaras, G.**, 1997. Pooling in Multi-Location Periodic Inventory Distribution Systems, *Omega, International Journal of Management Science*, **27**, 39-59.
- Tan, K. C.**, 2001. A Framework of Supply Chain Management Literature, *European Journal of Purchasing and Supply Management*, **7**, 39-48.
- Teich, J., Wallenius, H., Wallenius, J. and Koppius, O.**, 2004. Emerging Multiple Issue e-auctions, *European Journal of Operational Research*, **159**, 1–16.
- Tirschwell, P.**, Apr 2004. The Logistics Evolution., *Journal of Commerce*, New York, p. 6.
- Trebilcock, B.**, Sep 2006. Building the Real-time Supply Chain, *Modern Materials Handling, Warehousing Management Edition*, Boston, **61**(9), 20-23.
- Topcu, I.**, 2004. Lecture Notes, Istanbul Technical University, Istanbul.
- Vargas, L.G.**, 1990. An Overview of the Analytic Hierarchy Process and Its Applications, *European Journal of Operational Research*, **48**, 2-8.
- Wang, W., Fung, R.Y.K. and Chai, Y.**, 2004. Approach of Just-in-Time Distribution Requirements Planning for supply Chain Management, *International Journal of Production Economics*, **91**, 101-107.
- Wanke, P.F. and Zinn, W.**, 2004. Strategic Logistics Decision Making, *International Journal of Physical Distribution and Logistics Management*, **34**(6), 466-478.
- Waters, D.**, 2003. Logistics: An Introduction the Supply Chain Management, Palgrave Macmillan, New York.

Wen-li, L., Humphreys, P., Chan, L.Y. and Kumaraswamy, M., 2003. Predicting Purchasing Performance: The Role of Supplier Development Programs, *Journal of Material Processing Technology*, **138**, 243-249.

Yoon, K.P. and Naadimuthu, G., 1994. A Make-or-Buy Decision Analysis Involving Imprecise Data, *International Journal of Operations and Production Management*, **14(2)**, 62-69.

<http://www.cscmp.org/Website/AboutCSCMP/Definitions/Definitions.asp>

<http://www.logistics.co.uk/dbpdf/overviewofmanufacturinglogistics41.pdf>

<http://www.projectsmonitor.com/detailnews.asp?newsid=6968>

APPENDIX A: DANONE WATERS UK'S CUSTOMERS' DATA IN 2006

	No. of Customers	% Customers	Notes
Total Customer Delivery Points	252		
Customers receiving 1 or less delivery per month	147	58%	Low volume customers
Customers receiving 10+ deliveries per month	21	8%	High volume customers

Customer Name	Customer Postcode	Number of Orders	Notes
TESCO STORES LTD - PURFLEET DC	RM	557	
TESCO STORES LTD - WELHAM GREEN	AL	442	
TESCO STORES LTD - WEYBRIDGE	KT	380	
J SAINSBURY PLC - PINDAR ROAD	EN	358	
WAITROSE LTD - BRACKNELL	RG	300	
BP Oil UK Ltd (Express Shopping)	LE	281	
NISA - TODAY'S - SCUNTHORPE (105)	DN	233	
WAITROSE LTD - BRINKLOW	MK	219	
TESCO STORES LTD - CRICK	NN	212	
SOMERFIELD STORES LTD - HUNTINGDON	PE	194	
TESCO STORES LTD - MAGOR	NP	186	
BOOKER BELMONT RDC4 HATFIELD 654	AL	173	
PALMER & HARVEY MCLANE - MEDWAY	ME	165	
WM MORRISON - SWAN VALLEY	NN	148	
PALMER & HARVEY MCLANE - COVENTRY	CV	144	
MILLENIUM CASH & CARRY - KENT	DA	137	
MILLENIUM CASH & CARRY - BARKING	IG	137	
PALMER & HARVEY MCLANE - HAYDOCK	WA	127	
ASDA STORES LTD - DARTFORD RDC	DA	125	
MILLENIUM CASH & CARRY LTD	IG	124	
PALMER & HARVEY MCLANE - FAREHAM	PO	121	
ASDA STORES LTD - WAKEFIELD CDC	WF	113	
W H SMITH - HOLFORD DEPOT	B	109	
J SAINSBURY PLC - CHARLTON	SE	108	
ASDA STORES LTD - WIGAN RDC	WN	103	
BOOKER BELMONT RDC2 HAYDOCK 652	WA	102	
WM MORRISON - NORTHANTS (953)	NN	99	
A F BLAKEMORE & SON LTD (SPAR)	WV	94	
PALMER & HARVEY MCLANE - DUNFERMLIN	KY	93	
ASDA STORES LTD - GRANGEMOUTH RDC	FK	90	
TESCO STORES LTD - MIDDLEWICH	CW	90	
SOMERFIELD STORES LTD - LEA GREEN	WA	89	
J W FILSHILL LTD	G	88	
OCADO LTD - DEPOT	AL	88	
WM MORRISON - NORTHWICH	CW	88	
MILLENIUM CASH & CARRY - WEST THURR	RM	86	
ASDA - LUTTERWORTH ADC (7446)	LE	85	
ASDA STORES LTD - DIDCOT RDC 7443	OX	83	

J SAINSBURY PLC - FELTHAM	TW	74	
SOMERFIELD STORES LTD - BRIDGEWATER	TA	74	
WM MORRISON - WAKEFIELD	WF	74	
BUDGENS STORES LTD - WELLINGBOROUGH	NN	73	
J SAINSBURY - CONTINGENCY DEPOT 12	AL	70	
JAMES HALL & CO (SPAR)	PR	69	
ASDA STORES LTD - WASHINGTON (7449)	NE	67	
PALMER & HARVEY MCLANE - BRISTOL	BS	63	
WAITROSE LTD - BARDON	LE	62	
DHAMECHA FOODS LTD	HA	60	
BESTWAY - 004 ABBEY ROAD	NW	57	
SOMERFIELD STORES LTD - ROSS ON WYE	HR	57	
DHAMECHA FOODS - CROYDON	CR	54	
J SAINSBURY PLC - BASINGSTOKE	RG	49	
J SAINSBURY PLC - ST HELENS	WA	47	
WM MORRISON - BATHGATE (827)	EH	47	
BESTWAY - 005 EDGEWARE ROAD	NW	46	
SOMERFIELD STORES LTD - E KILBRIDE	G	46	
C W S LTD - THURROCK	RM	44	
BESTWAY - 012 LEWISHAM	SE	42	
J SAINSBURY PLC - EMERSONS GREEN	BS	42	
PALMER & HARVEY MCLANE - BRANDON	IP	42	
WESTONE WHOLESALE LTD - DONNINGTON	TF	41	
ASDA STORES LTD - CHEPSTOW ADC	NP	40	
J SAINSBURY PLC - WALTHAM	EN	39	
UNITED CO-OPERATIVE - TALKE	ST	37	
WM MORRISONS - STOCKTON 991	TS	37	
BESTWAY - 009 TOTTENHAM	N	35	
DHAMECHA CASH & CARRY - BARKING	IG	35	
MILLENIUM CASH & CARRY - GASCOIGNE	IG	34	
W & H YOUNG LTD	LS	32	
ONE STOP LTD - WALSALL	WS	30	
J.SAINSBURY PLC - HAMS HALL	B	29	
J SAINSBURY PLC - BUNTINGFORD	SG	28	
TURNER & WRIGHTS LTD	BL	28	
BESTWAY - 001 ACTON	NW	26	
BESTWAY - 010 CROYDON	CR	26	
C W S LTD - CUMBERNAULD RDC	G	26	
BESTWAY - HACKNEY	E	25	
BOOTS THE CHEMISTS - BEESTON D42	NG	24	
J SAINSBURY PLC - NORTHFLEET	DA	24	
ONE STOP STORES LTD - NURSING	SO	24	
CHETAN WHOLESALERS	IG	23	
SOMERFIELD STORES LTD - WELLINGBORO	NN	23	
THE BEER SELLER LTD - PARK ROYAL	NW	23	
BOOKER BELMONT RDC1 LIVINGSTON 651	EH	22	
BOOTS THE CHEMISTS - GREENWICH	SE	22	
BRAKE LOGISTICS - YATE	BS	22	
CJ LANG & SON LTD (SPAR)	DD	22	
BESTWAY NORTHERN - 014 MANCHESTER	M	21	
EAST END FOODS (SMETHWICK)	B	21	
MIDLAND CO-OP - LEICESTER	LE	21	
ODDBINS LTD	SW	21	
FRIENDLY DRINKS (TWICKENHAM) LTD	TW	20	

A C WARD & SON LTD - WEST THURROCK	RM	19	
APPLEBY WESTWARD (SPAR) - SALTASH	PL	18	
BESTWAY - 002 SOUTHALL	UB	18	
LONDIS (HOLDINGS) LTD - ERITH	DA	18	
T & A SYMONDS LTD	BA	18	
BESTWAY - 031 BARKING	IG	17	
BRAKE LOGISTICS - GRANTHAM	NG	17	
RIPPLEGLEN LTD	B	17	
DAIRY CREST LTD - SUNBURY	TW	16	
3663 - BATTERSEA	SW	15	
BESTWAY NORTHERN - 015 LIVERPOOL	L	14	
CAPPER & CO LTD (SPAR) - HASTINGS	TN	13	
TRS INTERNATIONAL FOODS - LEYTON	E	13	
BESTWAY - 020 NORTHAMPTON	NN	12	1 or less delivery per month
C W S LTD - CHELSTON RDC	TA	12	1 or less delivery per month
LONDIS (HOLDINGS) LTD - ELMSALL	WF	12	1 or less delivery per month
RIGHT PRICE (W/SALE) - PARK ROYAL	NW	12	1 or less delivery per month
SOUTHERN CO-OP LTD - FAREHAM RDC	PO	12	1 or less delivery per month
ANDERSONS (WHOLESALE) LTD	SK	11	1 or less delivery per month
BESTWAY NORTHERN - 016 BIRMINGHAM	B	11	1 or less delivery per month
BESTWAY NORTHERN - 021 BOLTON	BL	11	1 or less delivery per month
C W S LTD - NOTTINGHAM RDC	NG	11	1 or less delivery per month
CAPPER & CO LTD (SPAR)	CF	11	1 or less delivery per month
PALMER & HARVEY - BRISTOL (SUMMER)	BS	11	1 or less delivery per month
COSTCO - WATFORD	WD	10	1 or less delivery per month
FRED STEELE (HANDSWORTH) LTD	B	10	1 or less delivery per month
MATTHEW CLARK WHOLESALE LTD - PARK	NW	10	1 or less delivery per month
BUDGENS STORES LTD - SYWELL	NN	9	1 or less delivery per month
C W S LTD - BIRTLEY RDC	DH	9	1 or less delivery per month
GLENCREST LTD	G	9	1 or less delivery per month
JACKSONS STORES LTD	HU	9	1 or less delivery per month
PALMER & HARVEY MCLANE - MURRAY	NE	9	1 or less delivery per month
BLUE HEATH DIRECT LTD - BOC	B	8	1 or less delivery per month
BOOKER CASH & CARRY 353 WIMBLEDON	SW	8	1 or less delivery per month
HOTHI CASH & CARRY LTD	NW	8	1 or less delivery per month
TRADETEAM LTD (FQR) - BLACKBURN	BB	8	1 or less delivery per month
AG PARFETT & SONS LTD - AINTREE	L	7	1 or less delivery per month
BESTWAY - 003 CLAREMONT	E	7	1 or less delivery per month
BUDGENS - WELLINBOROUGH (DEPOT 6)	NN	7	1 or less delivery per month
GEMINI WHOLESALE	SG	7	1 or less delivery per month
IAIN HILL LTD	KA	7	1 or less delivery per month
J SAINSBURY PLC - MIDDLETON	M	7	1 or less delivery per month
PREMIER WHOLESALE UK LTD	HA	7	1 or less delivery per month
TRS CASH & CARRY LTD	UB	7	1 or less delivery per month
UNITED WHOLESALE (SCOTLAND)-RENFREW	PA	7	1 or less delivery per month
AG PARFETT & SONS LTD - STOCKPORT	SK	6	1 or less delivery per month
BESTWAY - 011 LUTON	LU	6	1 or less delivery per month
BRAKE BROS FOODSERVICE - PARK ROYAL	NW	6	1 or less delivery per month
J SAINSBURY PLC - EAST KILBRIDE	G	6	1 or less delivery per month
PREMIER WHOLESALE UK LTD - LONDON	N	6	1 or less delivery per month
TESCO STORES LTD - DUNDEE	DD	6	1 or less delivery per month
TRADETEAM LTD (FQR) - GLOUCESTER	GL	6	1 or less delivery per month
UNITED WHOLESALE GROCERS LTD	G	6	1 or less delivery per month
BOOKER CASH & CARRY 558 NINE ELMS	SW	5	1 or less delivery per month

C W S LTD - SWANLEY RDC	BR	5	1 or less delivery per month
COSTCO - R C WARREN PACKERS	WD	5	1 or less delivery per month
DHAMECHA SALAMIS - ENFIELD	EN	5	1 or less delivery per month
ELBROOK (CASH & CARRY) LTD	CR	5	1 or less delivery per month
KWIK SAVE STORES - SHERBURN	LS	5	1 or less delivery per month
SHER BROTHERS (CASH & CARRIES) LTD	G	5	1 or less delivery per month
SPLENDOR SNACKS	WD	5	1 or less delivery per month
TURNING POINT INTERNATIONAL LTD	IG	5	1 or less delivery per month
ALFA (WHOLESALE) LTD	G	4	1 or less delivery per month
ASDA STORES LTD - LUTTERWORTH RDC	LE	4	1 or less delivery per month
BARGAIN BOOZE LTD - THOROUGHGOODS	ST	4	1 or less delivery per month
BESTWAY NORTHERN - 025 STOCKPORT	SK	4	1 or less delivery per month
BRAKES LOGISTICS - FARNBOROUGH	GU	4	1 or less delivery per month
C T M WHOLESALE LTD	LL	4	1 or less delivery per month
LONDIS (HOLDINGS) LTD - ANDOVER	SP	4	1 or less delivery per month
TRADETEAM LTD (FQR) - DUNSTABLE	LU	4	1 or less delivery per month
ARCTIC SEAL (UK) LTD	AL	3	1 or less delivery per month
ASDA STORES LTD - WASHINGTON RDC	NE	3	1 or less delivery per month
B M V DISTRIBUTORS	NW	3	1 or less delivery per month
BESTWAY NORTHERN - 008 LEICESTER	LE	3	1 or less delivery per month
BESTWAY NORTHERN - 013 LEEDS	LS	3	1 or less delivery per month
BESTWAY NORTHERN - 029 OLDBURY	B	3	1 or less delivery per month
BOOKER CASH & CARRY LEICESTER (85)	LE	3	1 or less delivery per month
C W S LTD - BARNSELY RDC	S	3	1 or less delivery per month
COSTCO - THURROCK	RM	3	1 or less delivery per month
DHAMECHA CASH & CARRY - WATFORD	WD	3	1 or less delivery per month
HOLLAND & BARRETT - CENTRUM	DE	3	1 or less delivery per month
IMPERIAL CASH & CARRY LTD	N	3	1 or less delivery per month
J SAINSBURY PLC - MALTBY (09)	S	3	1 or less delivery per month
MASRUS SUPPLIES LTD	N	3	1 or less delivery per month
MR R WHEEL	CR	3	1 or less delivery per month
MR Y UMERJI & MR Y PATEL	BB	3	1 or less delivery per month
RAYBURN TRADING LTD	M	3	1 or less delivery per month
TREE OF LIFE	ST	3	1 or less delivery per month
TREE OF LIFE - LYMEDALE	ST	3	1 or less delivery per month
A F BLAKEMORE (C&C) - SALTLEY	B	2	1 or less delivery per month
A F BLAKEMORE (C&C) - WALSALL	WS	2	1 or less delivery per month
BAKO NORTH WESTERN LTD	PR	2	1 or less delivery per month
BOOKER CASH & CARRY 306 DAGENHAM	RM	2	1 or less delivery per month
BOOKER CASH & CARRY 369 ARDWICK GRN	M	2	1 or less delivery per month
BOOKER CASH & CARRY 561 ST PANCRAS	NW	2	1 or less delivery per month
BOOTS THE CHEMIST - DARTFORD	DA	2	1 or less delivery per month
ENTERPRISE	ST	2	1 or less delivery per month
FIVE STAR SOFT DRINKS - GREENAWAY	N	2	1 or less delivery per month
GANDHI WINE SUPPLIERS LIMITED	IG	2	1 or less delivery per month
HUSKY CORPORATE LTD - MANCHESTER	M	2	1 or less delivery per month
J H JAFFE & CO LTD - PORTSMOUTH	PO	2	1 or less delivery per month
LONDIS (HOLDINGS) LTD - NEWARK	NG	2	1 or less delivery per month
M & L LOGISTICS	B	2	1 or less delivery per month
PALMER & HARVEY (SUMMER) - KENT	ME	2	1 or less delivery per month
PALMER & HARVEY MCLANE - PLYMOUTH	PL	2	1 or less delivery per month
R & I JONES LTD	LL	2	1 or less delivery per month
SELECTA - SUTTON COLDFIELD	B	2	1 or less delivery per month
SOMERFIELD STORES LTD - RAINHAM	RM	2	1 or less delivery per month

T J MORRIS LTD	L	2	1 or less delivery per month
THAMES CASH & CARRY LTD	RG	2	1 or less delivery per month
WESTONE (ICELAND - DEESIDE)	CH	2	1 or less delivery per month
WESTONE (ICELAND - LIVINGSTONE)	EH	2	1 or less delivery per month
WESTONE WHOLESALE LTD	TF	2	1 or less delivery per month
WILKINSON HARDWARE - MAGOR	NP	2	1 or less delivery per month
WILKINSON HARDWARE - WORKSOP	S	2	1 or less delivery per month
A F BLAKEMORE (C&C) - WOLVERHAMPTON	WV	1	1 or less delivery per month
ADAMSONS DRINKS LTD	KY	1	1 or less delivery per month
APCO LTD	G	1	1 or less delivery per month
B A CASH & CARRY (CARDIFF) LTD	CF	1	1 or less delivery per month
BELLEVUE CASH & CARRY	EH	1	1 or less delivery per month
BELLS STORES LTD - DEPOT	TS	1	1 or less delivery per month
BENJYS GROUP - BOW - DO NOT USE	E	1	1 or less delivery per month
BESTWAY - 006 ROMFORD	RM	1	1 or less delivery per month
BESTWAY - 007 BRISTOL	BS	1	1 or less delivery per month
BOOKER CASH & CARRY 307 BRIGHTON	BN	1	1 or less delivery per month
BOOKER CASH & CARRY 395 TOTTENHAM	N	1	1 or less delivery per month
BOOTS THE CHEMISTS - BASINGSTOKE	RG	1	1 or less delivery per month
BOOTS THE CHEMISTS - SHERWOOD PARK	NG	1	1 or less delivery per month
BRAKE BROS FOODSERVICE - EGHAM	TW	1	1 or less delivery per month
BRAKE BROS FOODSERVICE - RUNCORN	WA	1	1 or less delivery per month
BRAKES LOGISTICS - ROCHDALE	OL	1	1 or less delivery per month
CHARLES DOLMAN - SAMPLES	E	1	1 or less delivery per month
COSTCO - MANCHESTER	M	1	1 or less delivery per month
DAIRY CREST LTD - WIMBLEDON	SW	1	1 or less delivery per month
DAVID SANDS LTD	KY	1	1 or less delivery per month
EAST END FOODS (BIRMINGHAM)	B	1	1 or less delivery per month
FROZEN VALUE LTD	S	1	1 or less delivery per month
GAP CONVENIENCE DISTRIBUTION	FY	1	1 or less delivery per month
GENEVIEVE FAY - SAMPLES	W	1	1 or less delivery per month
GLOBAL WHOLESALE SUPPLIES LTD	SL	1	1 or less delivery per month
H FORD & SONS LTD	WA	1	1 or less delivery per month
HEALTH STORES (WHOLESALE) LTD	NG	1	1 or less delivery per month
HOLLAND & BARRETT RETAIL LTD	DE	1	1 or less delivery per month
HUSKY CORPORATE LTD.	LE	1	1 or less delivery per month
HUSKY CORPORATE SERVICES LTD	LE	1	1 or less delivery per month
JUICE SOFT DRINKS	G	1	1 or less delivery per month
LINCOLN CO-OP - DEPOT	LN	1	1 or less delivery per month
LUCY VARAH - SAMPLES	W	1	1 or less delivery per month
MR SUNDEEP MAINI	B	1	1 or less delivery per month
PALMER & HARVEY MCLANE - THOMAS	PL	1	1 or less delivery per month
PLYMOUTH & S DEVON FOOD DIST CNTR	PL	1	1 or less delivery per month
RAYBURN TRADING - BURY	BL	1	1 or less delivery per month
SPICERS LTD	CB	1	1 or less delivery per month
SUPERDRUG - HACKBRIDGE	SM	1	1 or less delivery per month
TRS INTERNATIONAL FOODS LTD	UB	1	1 or less delivery per month
UNITED CO-OPERATIVE - BRADFORD	BD	1	1 or less delivery per month
UNITED POLMADIE LTD	G	1	1 or less delivery per month
UNITED WHOLESALE (SCOTLAND) LTD	G	1	1 or less delivery per month
WESTONE (ICELAND - SWINDON)	SN	1	1 or less delivery per month
WM MORRISON - COVENTRY (947)	CV	1	1 or less delivery per month
		9,299	

APPENDIX B: THE TOTAL VOLUME FORECAST FOR 2007 FROM NEDC

Pallets	No of Week	Zeebrugge	Outreau	Santes
April	Week 14	2679,55	881,1	2082,81
April	Week 15	2947,1	881,1	2288,99
April	Week 16	3066,2	881,1	2395,27
April	Week 17	3003,1	881,1	2341,19
May	Week 18	2644,47	963	1889,62
May	Week 19	2712,74	975,6	1942,57
May	Week 20	2779,68	975,6	1997,2
May	Week 21	3073,12	1005,3	2214,47
June	Week 22	3315,45	1080,9	2396,38
June	Week 23	3481,67	1183,5	2507,14
June	Week 24	3465,85	1183,5	2485,37
June	Week 25	3654,9	1183,5	2620,8
June	Week 26	3728,53	1147,5	2684,55
July	Week 27	3693,36	0	4400,19
July	Week 28	3523,68	0	4251,72
July	Week 29	3429,6	0	4169,4
July	Week 30	3296,16	0	4052,64
August	Week 31	2739,12	0	3429,38
August	Week 32	2590,56	0	3244,29
August	Week 33	2451,12	0	3122,28
August	Week 34	2358	0	3040,8
September	Week 35	2966,4	0	3017,7
September	Week 36	2731,2	0	2744,25
September	Week 37	2722,56	0	2738,04
September	Week 38	2496	0	2575,2
September	Week 39	2522,24	0	2594,06

October	Week 40	2187,2	0	2256,95
October	Week 41	2181,76	0	2253,04
October	Week 42	2211,2	0	2274,2
October	Week 43	2268,48	0	2315,37
November	Week 44	2212,16	0	2317,19
November	Week 45	2132,16	0	2292,09
November	Week 46	2088,96	0	2261,04
November	Week 47	2062,08	0	2241,72
December	Week 48	2059,52	0	2274,98
December	Week 49	2191,36	0	2459,74
December	Week 50	2204,16	0	2468,94
December	Week 51	2172,48	0	2446,17
December	Week 52	2133,76	0	2418,34

APPENDIX C: CALCULATION OF TOTAL COST FOR GEFCO AND SUPPLIER FROM ZEEBRUGGE

Cost per mile : 0,38									Margin : 8%					ANALYSE		
Based on 75.43p per litre AND 9 MPG																
Origin	DA	60% day vehicle utilisation	Mileage 1 way	Return mileage	Fuel Cost	Fixed cost per trip	Total Cost per trip	Tariff	Fixed cost per trip	Fuel Cost	Total Cost per trip	Tariff	Difference	Best Price	Company Name	
1	BB		251,09	502,18	191,31	660,65	851,96	926,05	432,24	618,7	1.050,9	1.142,3	216,26	926,05	GEFCO	1
1	BD		227,47	454,94	173,31	660,65	833,97	906,49	432,24	560,5	992,7	1.079,1	172,56	906,49	GEFCO	1
1	BL		233,69	467,37	178,05	660,65	838,70	911,64	432,24	575,8	1.008,0	1.095,7	184,06	911,64	GEFCO	1
1	CA		331,88	663,77	252,87	660,65	913,52	992,96	432,24	817,8	1.250,0	1.358,7	365,74	992,96	GEFCO	1
1	CW		192,04	384,09	146,32	660,65	806,98	877,15	432,24	473,2	905,4	984,2	107,02	877,15	GEFCO	1
1	DE		153,51	307,02	116,96	660,65	777,62	845,24	432,24	378,3	810,5	881,0	35,73	845,24	GEFCO	1
1	DH		290,24	580,48	221,14	660,65	881,80	958,47	432,24	715,2	1.147,4	1.247,2	288,70	958,47	GEFCO	1
1	DL		273,46	546,92	208,36	660,65	869,01	944,58	432,24	673,8	1.106,0	1.202,2	257,65	944,58	GEFCO	1
1	DN		193,91	387,82	147,74	660,65	808,40	878,69	432,24	477,8	910,0	989,2	110,47	878,69	GEFCO	1
1	FY		263,52	527,04	200,78	660,65	861,43	936,34	432,24	649,3	1.081,5	1.175,6	239,25	936,34	GEFCO	1
1	HD		214,42	428,84	163,37	660,65	824,02	895,68	432,24	528,3	960,6	1.044,1	148,42	895,68	GEFCO	1
1	HG		233,69	467,37	178,05	660,65	838,70	911,64	432,24	575,8	1.008,0	1.095,7	184,06	911,64	GEFCO	1
1	HU		198,26	396,52	151,06	660,65	811,71	882,30	432,24	488,5	920,8	1.000,8	118,52	882,30	GEFCO	1
1	HX		221,26	442,51	168,58	660,65	829,23	901,34	432,24	545,2	977,4	1.062,4	161,07	901,34	GEFCO	1
1	L		235,55	471,10	179,47	660,65	840,12	913,18	432,24	580,4	1.012,6	1.100,7	187,51	913,18	GEFCO	1

1	LA		266,00	532,01	202,67	660,65	863,33	938,40	432,24	655,4	1.087,7	1.182,3	243,85	938,40	GEFCO	1
1	LN		149,16	298,32	113,65	660,65	774,30	841,63	432,24	367,5	799,8	869,3	27,68	841,63	GEFCO	1
1	LS		218,77	437,54	166,68	660,65	827,34	899,28	432,24	539,0	971,3	1.055,7	156,47	899,28	GEFCO	1
1	M		223,74	447,48	170,47	660,65	831,13	903,40	432,24	551,3	983,5	1.069,1	165,66	903,40	GEFCO	1
1	NE		305,78	611,56	232,98	660,65	893,63	971,34	432,24	753,4	1.185,7	1.288,8	317,44	971,34	GEFCO	1
1	NG		151,65	303,29	115,54	660,65	776,20	843,69	432,24	373,7	805,9	876,0	32,28	843,69	GEFCO	1
1	OL		226,23	452,45	172,37	660,65	833,02	905,46	432,24	557,4	989,7	1.075,7	170,26	905,46	GEFCO	1
1	PR		244,87	489,75	186,57	660,65	847,23	920,90	432,24	603,4	1.035,6	1.125,7	204,76	920,90	GEFCO	1
1	S		187,07	374,15	142,53	660,65	803,19	873,03	432,24	460,9	893,2	970,9	97,82	873,03	GEFCO	1
1	SK		208,20	416,41	158,63	660,65	819,29	890,53	432,24	513,0	945,3	1.027,5	136,92	890,53	GEFCO	1
1	SR		300,81	601,62	229,19	660,65	889,85	967,22	432,24	741,2	1.173,4	1.275,5	308,24	967,22	GEFCO	1
1	ST		181,48	362,96	138,27	660,65	798,93	868,40	432,24	447,2	879,4	955,9	87,48	868,40	GEFCO	1
1	TF		172,16	344,31	131,17	660,65	791,82	860,68	432,24	424,2	856,4	930,9	70,23	860,68	GEFCO	1
1	TS		272,84	545,68	207,88	660,65	868,54	944,06	432,24	672,3	1.104,5	1.200,6	256,50	944,06	GEFCO	1
1	WA		215,66	431,32	164,32	660,65	824,97	896,71	432,24	531,4	963,6	1.047,4	150,72	896,71	GEFCO	1
1	WF		208,83	417,65	159,11	660,65	819,76	891,05	432,24	514,5	946,8	1.029,1	138,07	891,05	GEFCO	1
1	WN		228,09	456,18	173,79	660,65	834,44	907,00	432,24	562,0	994,3	1.080,7	173,71	907,00	GEFCO	1
1	WS		149,78	299,56	114,12	660,65	774,78	842,15	432,24	369,1	801,3	871,0	28,83	842,15	GEFCO	1
1	WV		154,75	309,51	117,91	660,65	778,57	846,27	432,24	381,3	813,6	884,3	38,03	846,27	GEFCO	1
1	YO		232,44	464,89	177,10	660,65	837,76	910,61	432,24	572,7	1.005,0	1.092,4	181,76	910,61	GEFCO	1
2	AL	x	44,75	89,50	34,09	558,72	592,81	644,36	432,24	110,3	542,5	589,7	-54,69	589,67	Subcontractor	
2	B		142,32	284,65	108,44	660,65	769,09	835,97	432,24	350,7	782,9	851,0	15,04	835,97	GEFCO	1

2	BA		142,95	285,89	108,91	660,65	769,57	836,49	432,24	352,2	784,5	852,7	16,19	836,49	GEFCO	1
2	BH		131,14	262,27	99,92	660,65	760,57	826,71	432,24	323,1	755,4	821,0	-5,66	821,05	Subcontractor	
2	BN	x	59,04	118,09	44,99	558,72	603,70	656,20	432,24	145,5	577,7	628,0	-28,24	627,96	Subcontractor	
2	BR	x	10,57	21,13	8,05	558,72	566,77	616,05	432,24	26,0	458,3	498,1	-117,93	498,12	Subcontractor	
2	BS		149,78	299,56	114,12	660,65	774,78	842,15	432,24	369,1	801,3	871,0	28,83	842,15	GEFCO	1
2	CB		62,77	125,54	47,83	660,65	708,48	770,09	432,24	154,7	586,9	637,9	-132,14	637,95	Subcontractor	
2	CM		27,97	55,94	21,31	660,65	681,96	741,27	432,24	68,9	501,2	544,7	-196,53	544,73	Subcontractor	
2	CO		52,21	104,41	39,78	660,65	700,43	761,34	432,24	128,6	560,9	609,6	-151,69	609,65	Subcontractor	
2	CR	x	68,99	137,97	52,56	558,72	611,28	664,44	432,24	170,0	602,2	654,6	-9,84	654,59	Subcontractor	
2	CT		42,26	84,52	32,20	660,65	692,86	753,10	432,24	104,1	536,4	583,0	-170,09	583,02	Subcontractor	
2	CV		120,57	241,14	91,87	660,65	752,52	817,96	432,24	297,1	729,3	792,7	-25,21	792,75	Subcontractor	
2	DA	x	20,00	40,00	15,24	558,72	573,96	623,87	432,24	49,3	481,5	523,4	-100,47	523,39	Subcontractor	
2	DT		153,51	307,02	116,96	660,65	777,62	845,24	432,24	378,3	810,5	881,0	35,73	845,24	GEFCO	1
2	DY		153,51	307,02	116,96	660,65	777,62	845,24	432,24	378,3	810,5	881,0	35,73	845,24	GEFCO	1
2	E	x	14,29	28,59	10,89	558,72	569,61	619,14	432,24	35,2	467,5	508,1	-111,03	508,11	Subcontractor	
2	EC		17,40	34,80	13,26	660,65	673,91	732,52	432,24	42,9	475,1	516,4	-216,08	516,43	Subcontractor	
2	EN	x	32,32	64,64	24,62	558,72	583,34	634,07	432,24	79,6	511,9	556,4	-77,68	556,38	Subcontractor	
2	EX		228,71	457,43	174,26	660,65	834,92	907,52	432,24	563,6	995,8	1,082,4	174,86	907,52	GEFCO	1
2	GL		144,19	288,38	109,86	660,65	770,52	837,52	432,24	355,3	787,5	856,0	18,49	837,52	GEFCO	1
2	GU		50,34	100,68	38,36	660,65	699,01	759,79	432,24	124,0	556,3	604,7	-155,14	604,65	Subcontractor	
2	HA	x	26,10	52,21	19,89	558,72	578,61	628,92	432,24	64,3	496,6	539,7	-89,18	539,74	Subcontractor	
2	HP		49,72	99,44	37,88	660,65	698,54	759,28	432,24	122,5	554,8	603,0	-156,29	602,99	Subcontractor	

2	IG	x	18,02	36,05	13,73	558,72	572,45	622,23	432,24	44,4	476,7	518,1	-104,13	518,10	Subcontractor	
2	IP		68,99	137,97	52,56	660,65	713,22	775,24	432,24	170,0	602,2	654,6	-120,65	654,59	Subcontractor	
2	KT	x	49,10	98,20	37,41	558,72	596,13	647,96	432,24	121,0	553,2	601,3	-46,64	601,33	Subcontractor	
2	LE		125,54	251,09	95,65	660,65	756,31	822,08	432,24	309,3	741,6	806,1	-16,01	806,07	Subcontractor	
2	LU	x	57,18	114,36	43,57	558,72	602,28	654,66	432,24	140,9	573,1	623,0	-31,69	622,96	Subcontractor	
2	ME	x	18,02	36,05	13,73	558,72	572,45	622,23	432,24	44,4	476,7	518,1	-104,13	518,10	Subcontractor	
2	MK		76,44	152,89	58,24	660,65	718,90	781,41	432,24	188,4	620,6	674,6	-106,85	674,57	Subcontractor	
2	N		18,65	37,29	14,21	660,65	674,86	733,54	432,24	45,9	478,2	519,8	-213,78	519,76	Subcontractor	
2	NN		90,74	181,48	69,14	660,65	729,79	793,25	432,24	223,6	655,8	712,9	-80,40	712,85	Subcontractor	
2	NR		116,84	233,69	89,02	660,65	749,68	814,87	432,24	287,9	720,1	782,8	-32,11	782,76	Subcontractor	
2	NW	x	19,27	38,53	14,68	558,72	573,40	623,26	432,24	47,5	479,7	521,4	-101,83	521,43	Subcontractor	
2	OX		96,95	193,91	73,87	660,65	734,53	798,40	432,24	238,9	671,1	729,5	-68,90	729,50	Subcontractor	
2	PE		97,58	195,15	74,35	660,65	735,00	798,91	432,24	240,4	672,7	731,2	-67,75	731,16	Subcontractor	
2	PL		268,49	536,98	204,57	660,65	865,22	940,46	432,24	661,6	1.093,8	1.188,9	248,45	940,46	GEFCO	1
2	PO		94,47	188,94	71,98	660,65	732,63	796,34	432,24	232,8	665,0	722,8	-73,50	722,84	Subcontractor	
2	RG		71,47	142,95	54,46	660,65	715,11	777,30	432,24	176,1	608,3	661,2	-116,05	661,25	Subcontractor	
2	RH	x	28,59	57,18	21,78	558,72	580,50	630,98	432,24	70,4	502,7	546,4	-84,58	546,40	Subcontractor	
2	RM	x	126,79	253,57	96,60	558,72	655,32	712,30	432,24	312,4	744,6	809,4	97,09	712,30	GEFCO	1
2	SE	x	16,16	32,32	12,31	558,72	571,03	620,69	432,24	39,8	472,1	513,1	-107,58	513,10	Subcontractor	
2	SG	x	54,69	109,38	41,67	558,72	600,39	652,60	432,24	134,8	567,0	616,3	-36,29	616,31	Subcontractor	
2	SL		64,01	128,03	48,77	660,65	709,43	771,12	432,24	157,7	590,0	641,3	-129,84	641,27	Subcontractor	
2	SM	x	32,32	64,64	24,62	558,72	583,34	634,07	432,24	79,6	511,9	556,4	-77,68	556,38	Subcontractor	

2	SN		111,25	222,50	84,76	660,65	745,42	810,24	432,24	274,1	706,4	767,8	-42,46	767,78	Subcontractor	
2	SO		105,66	211,31	80,50	660,65	741,16	805,60	432,24	260,3	692,6	752,8	-52,80	752,80	Subcontractor	
2	SP		111,25	222,50	84,76	660,65	745,42	810,24	432,24	274,1	706,4	767,8	-42,46	767,78	Subcontractor	
2	SS		28,59	57,18	21,78	660,65	682,44	741,78	432,24	70,4	502,7	546,4	-195,38	546,40	Subcontractor	
2	SW	x	19,27	38,53	14,68	558,72	573,40	623,26	432,24	47,5	479,7	521,4	-101,83	521,43	Subcontractor	
2	TA		196,40	392,79	149,64	660,65	810,29	880,75	432,24	483,9	916,2	995,8	115,07	880,75	GEFCO	1
2	TN	x	23,62	47,23	17,99	558,72	576,71	626,86	432,24	58,2	490,4	533,1	-93,78	533,08	Subcontractor	
2	TQ		244,87	489,75	186,57	660,65	847,23	920,90	432,24	603,4	1.035,6	1.125,7	204,76	920,90	GEFCO	1
2	TR		314,48	628,96	239,61	660,65	900,26	978,55	432,24	774,9	1.207,1	1.312,1	333,54	978,55	GEFCO	1
2	TW	x	26,10	52,21	19,89	558,72	578,61	628,92	432,24	64,3	496,6	539,7	-89,18	539,74	Subcontractor	
2	UB	x	29,21	58,42	22,26	558,72	580,97	631,49	432,24	72,0	504,2	548,1	-83,43	548,06	Subcontractor	
2	W	x	23,62	47,23	17,99	558,72	576,71	626,86	432,24	58,2	490,4	533,1	-93,78	533,08	Subcontractor	
2	WC		18,65	37,29	14,21	660,65	674,86	733,54	432,24	45,9	478,2	519,8	-213,78	519,76	Subcontractor	
2	WD		49,72	99,44	37,88	660,65	698,54	759,28	432,24	122,5	554,8	603,0	-156,29	602,99	Subcontractor	
2	WR		167,18	334,37	127,38	660,65	788,04	856,56	432,24	411,9	844,2	917,6	61,03	856,56	GEFCO	1
															Total GEFCO	48
															Total Subcontractor	48
															GEFCO	50,0%
															SUBCONTRACTOR	50,0%

APPENDIX D: CALCULATION OF TOTAL COST FOR GEFCO AND SUPPLIER FROM SANTES

Cost per mile : 0,38						Margin : 8%		
Based on 75.43p per litre AND 9 MPG								
Origin	DA	60% day vehicle utilisation	Mileage 1 way	Return mileage	Fuel Cost	Fixed cost per trip	Total Cost per trip	Tariff
1	BB		251,09	502,18	191,31	733,57	924,88	1,005,30
1	BD		227,47	454,94	173,31	733,57	906,89	985,75
1	BL		233,69	467,37	178,05	733,57	911,62	990,89
1	CA		331,88	663,77	252,87	733,57	986,44	1,072,22
1	CW		192,04	384,09	146,32	733,57	879,89	956,41
1	DE		153,51	307,02	116,96	733,57	850,53	924,49
1	DH		290,24	580,48	221,14	733,57	954,71	1,037,73
1	DL		273,46	546,92	208,36	733,57	941,93	1,023,83
1	DN		193,91	387,82	147,74	733,57	881,31	957,95
1	FY		263,52	527,04	200,78	733,57	934,35	1,015,60
1	HD		214,42	428,84	163,37	733,57	896,94	974,94
1	HG		233,69	467,37	178,05	733,57	911,62	990,89
1	HU		198,26	396,52	151,06	733,57	884,63	961,55
1	HX		221,26	442,51	168,58	733,57	902,15	980,60
1	L		235,55	471,10	179,47	733,57	913,04	992,44

Cost per mile - BJ Myers : 1,2			Margin : 8%	
Tractor Unit/Trailer/Driver costs removed from Fixed Cost per trip				
Fixed cost per trip	Fuel Cost	Total Cost per trip	Tariff	Difference
432,24	618,7	1.050,9	1.142,3	137,00
432,24	560,5	992,7	1.079,1	93,31
432,24	575,8	1.008,0	1.095,7	104,80
432,24	817,8	1.250,0	1.358,7	286,48
432,24	473,2	905,4	984,2	27,77
432,24	378,3	810,5	881,0	-43,52
432,24	715,2	1.147,4	1.247,2	209,44
432,24	673,8	1.106,0	1.202,2	178,39
432,24	477,8	910,0	989,2	31,21
432,24	649,3	1.081,5	1.175,6	160,00
432,24	528,3	960,6	1.044,1	69,16
432,24	575,8	1.008,0	1.095,7	104,80
432,24	488,5	920,8	1.000,8	39,26
432,24	545,2	977,4	1.062,4	81,81
432,24	580,4	1.012,6	1.100,7	108,25

ANALYSE		
Best Price	Company Name	
1.005,30	GEFCO	1
985,75	GEFCO	1
990,89	GEFCO	1
1.072,22	GEFCO	1
956,41	GEFCO	1
880,97	Subcontractor	
1.037,73	GEFCO	1
1.023,83	GEFCO	1
957,95	GEFCO	1
1.015,60	GEFCO	1
974,94	GEFCO	1
990,89	GEFCO	1
961,55	GEFCO	1
980,60	GEFCO	1
992,44	GEFCO	1

1	LA		266,00	532,01	202,67	733,57	936,24	1.017,66	432,24	655,4	1.087,7	1.182,3	164,60	1.017,66	GEFCO	1
1	LN		149,16	298,32	113,65	733,57	847,22	920,89	432,24	367,5	799,8	869,3	-51,57	869,32	Subcontractor	
1	LS		218,77	437,54	166,68	733,57	900,26	978,54	432,24	539,0	971,3	1.055,7	77,21	978,54	GEFCO	1
1	M		223,74	447,48	170,47	733,57	904,04	982,66	432,24	551,3	983,5	1.069,1	86,41	982,66	GEFCO	1
1	NE		305,78	611,56	232,98	733,57	966,55	1.050,60	432,24	753,4	1.185,7	1.288,8	238,19	1.050,60	GEFCO	1
1	NG		151,65	303,29	115,54	733,57	849,11	922,95	432,24	373,7	805,9	876,0	-46,97	875,98	Subcontractor	
1	OL		226,23	452,45	172,37	733,57	905,94	984,72	432,24	557,4	989,7	1.075,7	91,01	984,72	GEFCO	1
1	PR		244,87	489,75	186,57	733,57	920,14	1.000,16	432,24	603,4	1.035,6	1.125,7	125,50	1.000,16	GEFCO	1
1	S		187,07	374,15	142,53	733,57	876,11	952,29	432,24	460,9	893,2	970,9	18,57	952,29	GEFCO	1
1	SK		208,20	416,41	158,63	733,57	892,21	969,79	432,24	513,0	945,3	1.027,5	57,66	969,79	GEFCO	1
1	SR		300,81	601,62	229,19	733,57	962,76	1.046,48	432,24	741,2	1.173,4	1.275,5	228,99	1.046,48	GEFCO	1
1	ST		181,48	362,96	138,27	733,57	871,84	947,66	432,24	447,2	879,4	955,9	8,22	947,66	GEFCO	1
1	TF		172,16	344,31	131,17	733,57	864,74	939,94	432,24	424,2	856,4	930,9	-9,03	930,91	Subcontractor	
1	TS		272,84	545,68	207,88	733,57	941,45	1.023,32	432,24	672,3	1.104,5	1.200,6	177,24	1.023,32	GEFCO	1
1	WA		215,66	431,32	164,32	733,57	897,89	975,97	432,24	531,4	963,6	1.047,4	71,46	975,97	GEFCO	1
1	WF		208,83	417,65	159,11	733,57	892,68	970,30	432,24	514,5	946,8	1.029,1	58,81	970,30	GEFCO	1
1	WN		228,09	456,18	173,79	733,57	907,36	986,26	432,24	562,0	994,3	1.080,7	94,46	986,26	GEFCO	1
1	WS		149,78	299,56	114,12	733,57	847,69	921,41	432,24	369,1	801,3	871,0	-50,42	870,98	Subcontractor	
1	WV		154,75	309,51	117,91	733,57	851,48	925,52	432,24	381,3	813,6	884,3	-41,22	884,30	Subcontractor	
1	YO		232,44	464,89	177,10	733,57	910,67	989,86	432,24	572,7	1.005,0	1.092,4	102,50	989,86	GEFCO	1
2	AL	x	44,75	89,50	34,09	631,63	665,73	723,62	432,24	110,3	542,5	589,7	-133,95	589,67	Subcontractor	
2	B		142,32	284,65	108,44	733,57	842,01	915,23	432,24	350,7	782,9	851,0	-64,22	851,01	Subcontractor	

2	BA		142,95	285,89	108,91	733,57	842,48	915,74	432,24	352,2	784,5	852,7	-63,07	852,67	Subcontractor	
2	BH		131,14	262,27	99,92	733,57	833,49	905,96	432,24	323,1	755,4	821,0	-84,92	821,05	Subcontractor	
2	BN	x	59,04	118,09	44,99	631,63	676,62	735,46	432,24	145,5	577,7	628,0	-107,50	627,96	Subcontractor	
2	BR	x	10,57	21,13	8,05	631,63	639,69	695,31	432,24	26,0	458,3	498,1	-197,19	498,12	Subcontractor	
2	BS		149,78	299,56	114,12	733,57	847,69	921,41	432,24	369,1	801,3	871,0	-50,42	870,98	Subcontractor	
2	CB		62,77	125,54	47,83	733,57	781,40	849,35	432,24	154,7	586,9	637,9	-211,40	637,95	Subcontractor	
2	CM		27,97	55,94	21,31	733,57	754,88	820,52	432,24	68,9	501,2	544,7	-275,79	544,73	Subcontractor	
2	CO		52,21	104,41	39,78	733,57	773,35	840,60	432,24	128,6	560,9	609,6	-230,95	609,65	Subcontractor	
2	CR	x	68,99	137,97	52,56	631,63	684,20	743,69	432,24	170,0	602,2	654,6	-89,10	654,59	Subcontractor	
2	CT		42,26	84,52	32,20	733,57	765,77	832,36	432,24	104,1	536,4	583,0	-249,35	583,02	Subcontractor	
2	CV		120,57	241,14	91,87	733,57	825,44	897,21	432,24	297,1	729,3	792,7	-104,47	792,75	Subcontractor	
2	DA	x	20,00	40,00	15,24	631,63	646,87	703,12	432,24	49,3	481,5	523,4	-179,73	523,39	Subcontractor	
2	DT		153,51	307,02	116,96	733,57	850,53	924,49	432,24	378,3	810,5	881,0	-43,52	880,97	Subcontractor	
2	DY		153,51	307,02	116,96	733,57	850,53	924,49	432,24	378,3	810,5	881,0	-43,52	880,97	Subcontractor	
2	E	x	14,29	28,59	10,89	631,63	642,53	698,40	432,24	35,2	467,5	508,1	-190,29	508,11	Subcontractor	
2	EC		17,40	34,80	13,26	733,57	746,83	811,77	432,24	42,9	475,1	516,4	-295,34	516,43	Subcontractor	
2	EN	x	32,32	64,64	24,62	631,63	656,26	713,32	432,24	79,6	511,9	556,4	-156,94	556,38	Subcontractor	
2	EX		228,71	457,43	174,26	733,57	907,83	986,77	432,24	563,6	995,8	1,082,4	95,61	986,77	GEFCO	1
2	GL		144,19	288,38	109,86	733,57	843,43	916,77	432,24	355,3	787,5	856,0	-60,77	856,00	Subcontractor	
2	GU		50,34	100,68	38,36	733,57	771,93	839,05	432,24	124,0	556,3	604,7	-234,40	604,65	Subcontractor	
2	HA	x	26,10	52,21	19,89	631,63	651,52	708,18	432,24	64,3	496,6	539,7	-168,44	539,74	Subcontractor	
2	HP		49,72	99,44	37,88	733,57	771,45	838,54	432,24	122,5	554,8	603,0	-235,55	602,99	Subcontractor	

2	IG	x	18,02	36,05	13,73	631,63	645,37	701,49	432,24	44,4	476,7	518,1	-183,39	518,10	Subcontractor	
2	IP		68,99	137,97	52,56	733,57	786,13	854,49	432,24	170,0	602,2	654,6	-199,90	654,59	Subcontractor	
2	KT	x	49,10	98,20	37,41	631,63	669,04	727,22	432,24	121,0	553,2	601,3	-125,90	601,33	Subcontractor	
2	LE		125,54	251,09	95,65	733,57	829,23	901,33	432,24	309,3	741,6	806,1	-95,27	806,07	Subcontractor	
2	LU	x	57,18	114,36	43,57	631,63	675,20	733,91	432,24	140,9	573,1	623,0	-110,95	622,96	Subcontractor	
2	ME	x	18,02	36,05	13,73	631,63	645,37	701,49	432,24	44,4	476,7	518,1	-183,39	518,10	Subcontractor	
2	MK		76,44	152,89	58,24	733,57	791,82	860,67	432,24	188,4	620,6	674,6	-186,10	674,57	Subcontractor	
2	N		18,65	37,29	14,21	733,57	747,78	812,80	432,24	45,9	478,2	519,8	-293,04	519,76	Subcontractor	
2	NN		90,74	181,48	69,14	733,57	802,71	872,51	432,24	223,6	655,8	712,9	-159,66	712,85	Subcontractor	
2	NR		116,84	233,69	89,02	733,57	822,60	894,13	432,24	287,9	720,1	782,8	-111,36	782,76	Subcontractor	
2	NW	x	19,27	38,53	14,68	631,63	646,31	702,52	432,24	47,5	479,7	521,4	-181,09	521,43	Subcontractor	
2	OX		96,95	193,91	73,87	733,57	807,44	877,66	432,24	238,9	671,1	729,5	-148,16	729,50	Subcontractor	
2	PE		97,58	195,15	74,35	733,57	807,92	878,17	432,24	240,4	672,7	731,2	-147,01	731,16	Subcontractor	
2	PL		268,49	536,98	204,57	733,57	938,14	1.019,72	432,24	661,6	1.093,8	1.188,9	169,20	1.019,72	GEFCO	1
2	PO		94,47	188,94	71,98	733,57	805,55	875,60	432,24	232,8	665,0	722,8	-152,76	722,84	Subcontractor	
2	RG		71,47	142,95	54,46	733,57	788,03	856,55	432,24	176,1	608,3	661,2	-195,30	661,25	Subcontractor	
2	RH	x	28,59	57,18	21,78	631,63	653,42	710,24	432,24	70,4	502,7	546,4	-163,84	546,40	Subcontractor	
2	RM	x	126,79	253,57	96,60	631,63	728,24	791,56	432,24	312,4	744,6	809,4	17,83	791,56	GEFCO	1
2	SE	x	16,16	32,32	12,31	631,63	643,95	699,94	432,24	39,8	472,1	513,1	-186,84	513,10	Subcontractor	
2	SG	x	54,69	109,38	41,67	631,63	673,31	731,85	432,24	134,8	567,0	616,3	-115,55	616,31	Subcontractor	
2	SL		64,01	128,03	48,77	733,57	782,35	850,38	432,24	157,7	590,0	641,3	-209,10	641,27	Subcontractor	
2	SM	x	32,32	64,64	24,62	631,63	656,26	713,32	432,24	79,6	511,9	556,4	-156,94	556,38	Subcontractor	

2	SN		111,25	222,50	84,76	733,57	818,33	889,49	432,24	274,1	706,4	767,8	-121,71	767,78	Subcontractor		
2	SO		105,66	211,31	80,50	733,57	814,07	884,86	432,24	260,3	692,6	752,8	-132,06	752,80	Subcontractor		
2	SP		111,25	222,50	84,76	733,57	818,33	889,49	432,24	274,1	706,4	767,8	-121,71	767,78	Subcontractor		
2	SS		28,59	57,18	21,78	733,57	755,35	821,04	432,24	70,4	502,7	546,4	-274,64	546,40	Subcontractor		
2	SW	x	19,27	38,53	14,68	631,63	646,31	702,52	432,24	47,5	479,7	521,4	-181,09	521,43	Subcontractor		
2	TA		196,40	392,79	149,64	733,57	883,21	960,01	432,24	483,9	916,2	995,8	35,81	960,01	GEFCO	1	
2	TN	x	23,62	47,23	17,99	631,63	649,63	706,12	432,24	58,2	490,4	533,1	-173,04	533,08	Subcontractor		
2	TQ		244,87	489,75	186,57	733,57	920,14	1.000,16	432,24	603,4	1.035,6	1.125,7	125,50	1.000,16	GEFCO	1	
2	TR		314,48	628,96	239,61	733,57	973,18	1.057,81	432,24	774,9	1.207,1	1.312,1	254,28	1.057,81	GEFCO	1	
2	TW	x	26,10	52,21	19,89	631,63	651,52	708,18	432,24	64,3	496,6	539,7	-168,44	539,74	Subcontractor		
2	UB	x	29,21	58,42	22,26	631,63	653,89	710,75	432,24	72,0	504,2	548,1	-162,69	548,06	Subcontractor		
2	W	x	23,62	47,23	17,99	631,63	649,63	706,12	432,24	58,2	490,4	533,1	-173,04	533,08	Subcontractor		
2	WC		18,65	37,29	14,21	733,57	747,78	812,80	432,24	45,9	478,2	519,8	-293,04	519,76	Subcontractor		
2	WD		49,72	99,44	37,88	733,57	771,45	838,54	432,24	122,5	554,8	603,0	-235,55	602,99	Subcontractor		
2	WR		167,18	334,37	127,38	733,57	860,95	935,82	432,24	411,9	844,2	917,6	-18,23	917,59	Subcontractor		
															Total GEFCO		35
															Total Subcontractor		61
															GEFCO		36,5%
															SUBCONTRACTOR		63,5%

RESUME

Date of Birth : 17 May 1979

Education

1993-1997 :Şişli Yunus Emre Lisesi
1998-2002 :Yildiz Technical University
Industrial Engineering (GPA: 3.50 / 4)
2003-2007 :Istanbul Technical University
Industrial Engineering (GPA: 3.14 / 4)

Work Experience

Jan 07-May 07 Gefco – London / UK (Intern)
Nov 04-Sep 05 Nursan Elektrik A.Ş. - Istanbul (Purchasing Engineer)
Nov 03-Sep 04 Pobusan Debriyaj San. - Istanbul (Planning and
Purchasing Enginner)
Apr 02-March 03 Beko Elektronik A.Ş. - Istanbul (Project Intern)

Certificates

International Trade, Import & Export – Cavendish College, London, 2005
Business Administration – Cavendish College, London, 2006
Mini MBA – Birbeck College, University of London, 2006
Public Speaking – Birbeck College, University of London, 2006
Academic English – Birbeck College, University of London, 2006
General English (Advanced Level) – King Street College, London, 2006

Interests

Cycling, swimming, walking, cooking, cinema, theatre, travelling, football and tennis.