PhD Thesis on the Topic

Management of Logistics Service Providers

- A Situational Approach -

submitted in September 2007 by

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To Christine

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Foreword by Mervyn Rowlinson

The process of outsourcing in logistics service provision is becoming increasingly important in global business activity. The quest to find best-fit solutions is integral to the hypothesis tested in this research programme. The constant need for firms to find optimum solutions in performance, in quality, in risk reduction and in cost competitiveness calls for attention to the nature of outsourcing activities. The case for the situational approach to logistics service providers is well defined here. The author has made good use of both his academic and industrial background.

This work makes significant contribution to our understanding of the critical areas of the outsourcing process. Furthermore, a systematic methodology is offered as an aid to implementing and assessing the value of the situational approach. The conceptual framework provided in chapter 3 serves as a comprehensive foundation for later analysis and together with the system model of logistics service provider management in chapter 4 a rigorous methodology is developed.

A particular strength of this work lies in the systematic construction of a bridge linking the conceptual world of logistics modelling and the empirical findings derived from the nine case studies analysed in chapter 6. It follows that a worthy PhD thesis has been achieved here, providing a welcome contribution to academic-industry interface.

London, January 2008 Mervyn Rowlinson

Foreword by Horst Wildemann

The elaboration and derivation of theoretically and empirically funded design recommendations for the management of organisations and their value chain is a fundamental challenge of practical managerial business studies. Starting point of the dissertation at hand is the fact that logistics is taking on an increasingly important function in the business models of companies. Furthermore, outsourcing of logistics functions is growing at an accelerated rate because organisations view outsourcing as an effective way to reduce costs, improve customer satisfaction, achieve strategic goals and secure efficiency improvements. Hence, the increasing importance of outstanding logistics is valid for the influences on the cost situation as well as on sales and image of a company. In addition, company-spanning value-added chains, due to high interdependencies and complex planning and design, pose high demands on the management of the participating companies. The management of logistics service providers can therefore be considered an integral part of corporate management. To adopt the position of a holistic, process-oriented perspective on the cooperation life cycle between shipper and logistics service provider, the necessity to formulate differentiated design recommendations dependent on the logistical situation and the integration of various solutions into a complete management model are considered to be a precondition for the successful management of logistics service providers.

The author succeeds in analysing and defining theoretically and empirically founded optimum management approaches of logistics service providers in different logistical situations alongside the complete life cycle of logistics cooperations between outsourcer/ shipper and logistics service provider. The work is characterised by an outstanding theoretical understanding while simultaneously resulting in high practical relevance. The dissertation bases on the author's independent thoughts and considerations that are elaborated from an extensive literature and empirical analysis. The analysis demonstrates the very high theoretical and practical problem understanding in an excellent formal design. The author demonstrates with this work that he is able to work academically and methodologically in a flawless manner. In addition, he demonstrates that he is capable of applying his practical expertise to his critical and structured ability to judge and generate new practically and academically relevant findings.

The work at hand centres on a dissertation which has been supervised in close and prosperous cooperation between Dr. Mervyn Rowlinson at London Guildhall University and me at the Technical University of Munich. The dissertation can be recommended to academics as well as practitioners who are involved in the challenge of designing optimised supply chain structures and cooperations with logistics service providers.

Munich, January 2008 Horst Wildemann

Preamble and Acknowledgements

Companies in various industries increasingly outsource non-core activities to specialist suppliers and service provider firms. This is especially true for logistics functions. Outsourcing of logistics functions is growing at an increased rate because organisations view outsourcing as a way to reduce costs, improve customer satisfaction, achieve strategic goals, reduce risks and provide further efficiency improvements. To meet these claims, there is a depth of skills required for excellence in the rapidly changing logistics and supply chain management environment. These skills relate to the direct capabilities of all involved partners, namely the shipper and the logistics service provider but also to the management of the involved logistics service providers as the central linking element between them.

The aim of the dissertation at hand is to identify and develop a managerial situational approach to the management of logistics service providers throughout a logistics cooperation life cycle. Areas of research include the management elements between the shipper and cooperating logistics service providers. The feasibility of a differentiated situational management approach dependent on internal and external variables, the logistical demand and the logistical supply situations, respectively is analysed and identified. As a result, design recommendations are demonstrated on the basis of norm strategies derived from a logistical demand/ logistical supply portfolio as well as characteristic taxonomy-dependent design variables in the analysed nine case studies are described. The main outcome is a situational approach towards logistics service provider management in diverse logistical demand and supply situations that allows the shipper to exploit the potentials in time, cost, quality and risk throughout a logistics cooperation life cycle.

I would like to thank the assistance and helpful guidance given by Dr. Mervyn Rowlinson from London Metropolitan University, Great Britain, who supported me all the way through from my Bachelor thesis to my PhD dissertation and beyond.

I would also like to thank for advice and support Univ.-Prof. Dr. Dr. h. c. Horst Wildemann from the Technical University of Munich, Germany, who supported and challenged me in my professional as well as in my academic life. Thanks are also due to my chief examiner Dr. Allan Woodburn from University of Westminster as well as my internal examiner Dr. John Lipczynski from London Metropolitan University. Both offered me the opportunity for an in-depth challenging discussion of my work.

The successful finishing of a work like this depends on several key supporters. I would like to thank Peter Epping and Paul Walker for offering me constant support and a warm welcome in London; Dr. Marc Arens, Dr. Gerhard Baumgärtner, Dr. Florian Bergener, Dr. Frank Denzler, Dr. Maik Steinmetz and Dr. Christoph Verbeek for their perpetual will to discuss this work; Dr. Simon Middleton for proof-reading it; Bernhard Boeck for his long-year support and in times capacity and will for suffering; Andreas Eisenbarth, Dr. Matthias M. Ick, Dr. Mansour Iskander and Michael Rudolf for constantly motivating me, each in a different manner; Dr. Hans-Jörg Dannemann for triggering this dissertation as well as for giving ongoing advice and support; my grandmother Waltraud and my parents Christel and Peter who have been supporting me at all times and made all this possible and last, but not all least, my sister Anne Kristina who offers me limitless support and love.

I am deeply indebted to my girlfriend Dr. Dr. Christine Dannemann without whose support, patience and encouragement I could never have completed this project. Hence, I dedicate this dissertation to her.

London/ Munich, January 2008 Sven-Erik Jacobsen

Content Overview

Table of Content

About the Author

Sven-Erik studied International Business at the University of Mannheim as well as at the University of Applied Sciences Aachen and the London Guildhall University London (Dual Degree Business Studies), majoring in International Business and Logistics, Production and Procurement Management. In 2001, he started to work as a Management Consultant at the Transfer Centrum GmbH & Co. KG Management Consulting (TCW) with Univ.-Prof. Dr. Dr. h. c. Horst Wildemann in Munich. In the course of his management consulting activities he conducted several logistics, supply chain management and procurement, as well as strategic management consulting projects, in the automotive, aircraft, printing technology, logistics services and logistics solutions and the telecommunication industry. In addition, he was responsible for the research project 'Decision upon and Design of the Vertical Range of Manufacture of Small and Medium Sized Companies (SMEs) in the Knife- and Tool-Industry'. Today, he works as Head of the Production, Supply Chain Management and Strategy Practice as well as acting Project Manager for the TCW Transfer-Centrum in Munich.

Abstract

Over the past decade, companies have seen a dramatic increase in the number of options available to them for structuring their supply chain. Still, they put forth restraints against the outsourcing of competition-relevant, comprehensive and complex tasks on logistics service providers. In particular, the possible dependencies on a logistics service provider or the difficult reversibility of a previously made outsourcing decision are unresolved issues. Numerous companies have indeed become more dependent on their suppliers for many activities. As a result, the strategic importance of purchasing logistics functions has become more important. In other words, the management approach and the resulting cooperation approach with the logistics service provider have become important influencing factors in a company's success.

This dissertation identifies and develops a managerial situational approach to the management of logistics service providers into intra- and inter-organisational processes and networks throughout a logistics cooperation life cycle. Areas of research are the management elements between the focal company (the shipper/ the outsourcer) and cooperating carriers, freight forwarders and third and fourth-party logistics providers. The feasibility of a differentiated situational approach is analysed and the possibility of a situational management approach dependent on internal and external variables, the logistical demand and the logistical supply situations, respectively is identified. The relevance of the organisational linkage is derived from developments and trends in supply chain management, network management, developments in the logistical demand as well as in the market of logistics services. The logistics service provider management elements are developed along the information- and decision phase, the agreement phase, the processing- and controlling phase as well as the adjustment phase. On the basis of case studies the practical relevance of the resulting procedure and design recommendations is challenged.

List of Figures

Glossary

3PL	Third-Party Logistics Provider
4PL	Fourth-Party Logistics Provider
APS	Advanced Planning and Scheduling
BGB	Bürgerliches Gesetzbuch – German Civil Code
BOT	Build-Operate-Transfer – Legal Production Organisation Form
BSC	Balanced Scorecard
CIP	Continuous Improvement Process
CLM	Council of Logistics Management
CRM	Customer Relationship Management
DSS	Decision Support Systems
Ed.	Editor
ERP	Enterprise Resource Planning
et al.	et alii (and others)
EUR	Euro
Fig.	Figure
GPS	Global Positioning System
ISM	Institute for Supply Management
ISO	International Organisation for Standardisation
IT	Information Technology
JIT	Just-in-Time
KPI	Key Performance Indicator

LLP	Lead Logistics Provider
M&A	Mergers & Acquisitions
NDA	Non-Disclosure Agreement
No.	Number - Issue
OEM	Original Equipment Manufacturer
PIMS	Profit Impact of Marketing Strategy
p.	Page
pp.	Pages
PoS	Point of Sales
Prof.	Professor
QA	Quality Assurance
QFD	Quality Function Deployment
R&D	Research and Development
RFID	Radio Frequency Identification
RFP	Request for Proposal
ROI	Return on Investment
SCEM	Supply Chain Event Management
SCM	Supply Chain Management
SME	Small and Medium Sized Enterprise
SRM	Supplier Relationship Management
TCA	Transaction Cost Analysis
TCO	Total Cost of Ownership
TQM	Total Quality Management
Vol.	Volume

VPN	Virtual Private Network
vs.	versus
XML	Extensible Mark-up Language

1 Introduction

The economic context of industry and trade is characterised by an increasing stress of competition. Rising customer expectations are manifested in the demand for increasing product quality, service levels, and price sensitivity. In addition, product life cycles get shorter and product individualisation is on the increase. This situation is intensified by a rising volatility of markets. An intensifying inter-organisational division of labour relieves the resulting pressure on cost and performance. This leads to a concentration on core competencies by the companies[1] involved in the value-added chain and to a reduction in the respective vertical range of manufacture (Wildemann, 2005a: p. 1).

Such development is also increasingly valid for the required logistics services. The relevance of logistics has been acknowledged since the 1980s. Academic literature agrees that logistics does not only influence the cost situation of organisations but also their competitive positioning. The question arises as to which the vertical range of logistics[2] is the optimum and in which constellation logistics services should be performed. Main players on the logistics market are the outsourcing company[3] and logistics service providers with various offers of logistical solutions. In recent years, a comprehensive market for external logistics services has evolved (Städtler-Schumann, Britsch, 1999) that further adds to the complexity. The question which logistics services should be outsourced is com-

[1] In the context of this work the terms 'company', 'organisation' and 'enterprise' are used synonymously.

[2] 'Vertical range of manufacture' defines the share of the value added that an organisation produces in-house. In literature there is no term defining the vertical range of manufacture in relation to the overall logistical performance. Therefore, for the purpose of this research the term vertical range of logistics is created. The vertical range of logistics is defined as the overall share of logistics services performed in-house in relation to the logistics services performed externally by logistics service providers.

[3] In the context of this work the terms 'outsourcing company', 'shipper', 'outsourcer', 'focal company' and 'buyer of logistics services' are used synonymously.

plemented by the question of who should produce the required logistics service and how this logistics service provider[4] should be managed.

In addition to the logistics market, the role and the contents of logistics have changed. Innovative concepts and new design approaches are developed to enable logistics to react efficiently, flexibly and to handle complex situations. Furthermore, strategic issues have increased in importance in recent years. Logistics has reached a firm position in the strategic configuration of the company. Since the foundation of logistics as a scientific discipline and since the acknowledgement of logistics as an independent and important working field in practise, the business context has changed. The general trend towards an intensifying and global cooperation provokes an adjustment of logistical processes and an uplift of specific problems. In this context, logistics is a strategic management instrument in companies and networks. Logistics influences company strategies, the intention of which is to gain sustainable competitive advantages and to secure the long-term survivability of a company in the market. To reach these goals, logistics links companies, suppliers and customers. In doing so, logistics is responsible for the holistic[5] planning, steering, and implementation as well as the control of all company-internal and -external flows of goods and information. In parallel, logistics is very seldom seen as a core competency of companies.

The above trends result in logistics structures that are based on expanding inter-organisational service interdependencies. As a basic rule, these intensified inter-organisational relations reduce the room for manoeuvre concerning the unrestricted flow of goods for the outsourcing companies. Therefore, it can be stated

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[4] In the following, the term 'logistics service provider' will be abbreviated by 'LSP'.

[5] 'Holistic' is a Greek term meaning 'all', 'entire' or 'total'. Holism is the idea that all the properties of a given system cannot be determined or explained by the sum of its component parts alone but that all of the individual parts have to be analysed as well. In the context of this work 'holistic' relates to the far-reaching definition of logistics used (see also chapter 3.2.1 and chapter 3.5.1).

that company-spanning value-added chains, due to their high interdependencies of the involved companies and their complex planning, design, (risk-) management and controlling[6], pose high demands on the management approach of the participating companies. Furthermore, it can be noted that the inevitable coordination intensity leads to a significant rise in the company-spanning coordination costs. This results in a necessity for improved planning, design, management, and control of the inter-organisational value-adding activities and the involved market players. In the present study focus lies on the inter-organisational cooperation[7] of the outsourcer in several industries with diverse types of LSPs (carriers[8]/ freight forwarders[9]/ third-party logistics providers (3PL[10])/ fourth-party logistics providers (4PL[11])). In addition, focus lies on the implications of varying logistical situa-

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6 In section 5.3.2 the use of the term 'controlling' in the present study is defined.

7 The management of logistics service providers always bases on some type of cooperation form. In this context, the term cooperation comprises each business connexion between an outsourcer and a logistics service provider, be it a one-time order or a long-term relationship. Hence, the terms 'logistics cooperation' and 'management of logistics service providers' is used synonymously in this work.

8 'Carriers' are logistics service providers that offer single logistics services for a large anonymous market. These single services can be basic logistics services or system components of a logistical concept. They own the physical transport means and offer their transport capacities, whereby their aim is a high utilisation of their assets (Weber *et al.*, 2002: p. 29).

9 'Freight forwarders' offer linked logistics services for which they arrange, own and/ or external resources. Freight forwarders take over the organisation of national, European-wide or global transport, including additional classical logistics services such as storing or handling. The main difference with carriers is the service portfolio that integrates several single services to a more integrated solution.

10 A 'third-party logistics provider' (3PL) is a firm that provides outsourced or 'third-party' logistics services to companies for part or sometimes all of their supply chain management function. Third-party logistics providers typically specialise in services that can be scaled and customised to customer's needs based on market conditions and the demands and delivery service requirements for their products and materials.

11 A 'fourth-party logistics provider' (4PL) is a term coined by consulting firm Accenture: "A 4PL is an integrator that assembles the resources, capabilities, and technology of its own organisation and other organisations to design, build and run comprehensive supply chain

tions on the choice and the definition of the optimum management of LSPs and therefore on the cooperation between shipper and LSP.

1.1 Initial Situation and Problem Formulation

The outsourcing of logistics services, respectively the required management of LSPs is academically situated in the thematic block of the optimisation of the vertical range of manufacture. This discussion about the 'make-or-buy' of value-adding steps gains in importance in times of increasing competition or in times, in which structural changes demand efficiency increases. Therefore, business science and practice has been dealing with this topic in cycles for several years. The term 'make-or-buy' and the discussion about the vertical range of manufacture traditionally focused on the alternative decision of in-house production or the external supply of material goods (see e.g. Männel, 1968, 1996; Männel, Dumke, 1973). Main decision criteria were the production costs. Current research in outsourcing widens the view and deals with the internal or external coordination of all company activities (see Picot, Maier, 1992: p. 15). Therefore, the external production of logistics services came into focus.

The new institutional economics and the industry economics were the first to provide descriptive models for the basic question concerning the institutional borderlines of a company and include more aspects than differences in the production costs of goods and services. From that, various concepts and methods for the analysis and the design of the management approach of LSPs developed. The today's spectrum and the quantity of literature concerning the analysis and definition of the vertical range of logistics alone underline the importance and the relevance in academic discussion.

solutions." 4PL is a refinement on the idea of 3PL. A 4PL uses one or more 3PLs to supply services to customers owning only computer systems and intellectual capital.

The practical relevance as well is beyond controversy. Parallel to the theoretical discussion, the practical focus developed from vertical range of manufacture related questions to questions related to the vertical range of service provision (see e.g. Albach, 1989: p. 10). From the practice-oriented discussion of new industry-economic approaches in the 1990s (Prahalad, Hamel, 1990) the core competency debate developed. This resulted in a business trend towards a concentration on core competencies and the outsourcing of 'border areas' (Gruhler, 1994: p. 161; Schneider, Baur, Hopfmann, 1994: p. 19). Outsourcing decisions were accelerated by the development of the information and technology industry. Alongside the production-related fields and obvious border areas such as catering and security this development reached, parallel to the development of sophisticated LSPs, the logistics area. Despite its important competitive function in companies, logistics is seldom considered a core competency and therefore it is often outsourced to LSPs. In some industries, LSPs manage 50 percent of the overall logistical costs and in most industries this percentage is increasing (Baumgarten, Thoms, 2002: pp. 2 and 15, Wildemann, 2007: p. 133). This results in an increased risk level and thereby increased importance of the management approach of LSPs in practice.

In addition to an increasing percentage of outsourced logistics functions and activities, the spectrum of logistical activities grows. Logistics as a function today takes over more tasks, moves larger flows of goods, and manages bigger amounts of information than ever. Innovative concepts and new design approaches enable logistics to react efficiently, flexibly and to handle complexity in relevant industry trends. Three main streams of trends concerning the demands on logistics confront today's industry (Wildemann, 2002a: p. 7) as demonstrated in Figure 1-1.

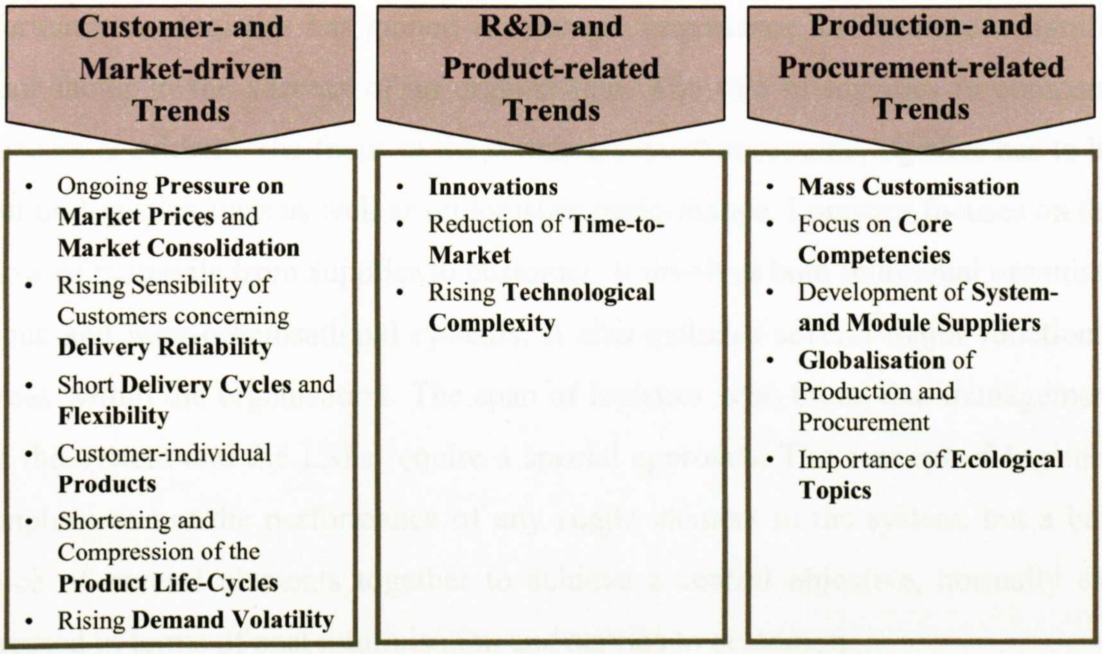

Figure 1-1: Logistics Trends

The interaction of these three trends increases the need for sophisticated logistical solutions and, in combination with the raising degree of outsourced shares of the logistics services, the need for holistic, efficient management approaches for LSPs. First, the market-driven trends enforce the demands on the management of LSPs concerning the reliability and the ability to cope with complexity. Second, R&D related trends influence the management of LSPs mainly in the field of an ongoing change in underlying processes. Third, production- and procurement related trends are mainly driven by globalisation. Globalisation is leading to sales, production and purchasing of products in new areas and hence the need for global logistics and thereby increasing demands on the management of LSPs from rising complexity. On one hand, this may have a big impact on the logistics costs, but, more importantly, this results in global coordination requirements on all actors in a supply chain[12] (see e.g. Bagchi, Virum, 1998: p. 192; Sheffi, 1990: p. 30).

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[12] In the context of this work 'supply chain' is defined as a "network of interacting organisations whose goal is to deliver a product or service to an end user by incorporating and coordinating the activities associated with the movement of goods, from raw materials to

Furthermore, logistics has gained in strategic importance and became a significant factor in the success of an organisation. The role of logistics in company success is evident. The focus in the measurement of successful logistics has to be put on logistics costs as well as on logistics performance. Logistics focuses on the flow of materials from supplier to customer. It involves both individual organisations and inter-organisational systems. It also includes several major functional areas within the organisation. The span of logistics is so broad that management of the system and the LSPs require a special approach. The concept of logistics emphasises not the performance of any single element in the system, but a balance of several elements together to achieve a central objective, normally expressed in terms of cost minimisation and service to customers.

All this makes the probability of problems arising in the supply chain highly likely. The logistics trends raise the complexity and practical importance of the management of logistics. Concomitantly, the increasing level of outsourced logistics leads to the enhanced importance of the management approach of LSPs. It is obvious, that the business context concerning the logistical demand and the logistical supply is not the same for every outsourcing company. Hence, the management approach has to be adapted to the context conditions along a cooperation life cycle[13]. That is where the situational[14] management approach of LSPs comes into play.

The above situation in academic research and business management underlines the relevance of a situational management approach of LSPs throughout a coop-

delivery of the final product or service, through effective combinations of resources that help create value" (adapted from Ellram, 1991 and Frayer, Monczka, 1997).

[13] As discussed in footnote 7 the management of logistics service providers always bases on some type of cooperation form. Hence, 'cooperation life cycle' comprises each connexion throughout a defined life cycle between an outsourcer and a LSP.

[14] 'Situation' means the way in which something is positioned vis-à-vis its surroundings. Hence, in the context of this work 'situational' relates to the management of logistics service providers and its design dependent on the logistical demand and the logistical supply situation in which the shipper and the logistics service provider is situated in.

eration life cycle. For a target-oriented discussion of the management of LSPs, a hypothesis is formulated and guiding research questions are derived. The derivation of the hypothesis and the research questions will be outlined in the following chapter.

1.2 Hypothesis and Research Questions

Bowersox and Closs state: "The channel should be viewed as the logistical playing field" (1996: p. 113) and point out the importance of the design of the vertical range of logistics according to the logistical situation (1996: p. 114). Starting points for this design are primarily the interfaces between the successive activities in the value chain. The foremost question to be answered in the vertical competition strategy therefore is: 'Should upstream or downstream logistics services be done themselves or should it be made by an external supplier, i.e. LSPs?' This question of make-or-buy is not a decision between two extremes but a question within a continuum of design alternatives. This question has been already discussed extensively in the literature (see e.g. Hölscher, 1971; Teichmann, 1995: p. 51f. and the there listed literature). Predominantly, this question has been discussed as a strictly alternative decision and the strategic focus of a long-term optimisation of the definition of the vertical range of manufacture and the corresponding integration approach was neglected.

Nevertheless, restrictions in the available capital or in the company expertise profile, lead to the fact that each company having to design its vertical range of manufacture in all the company's processes. This is particularly important for complex logistical tasks. The vital importance of the optimised design of the vertical range of logistics and the management of LSPs lies within the heavy influence on the strategic position as regards competition and the organisational structure of the respective company. Moreover, the personnel structure and the degree of complexity in the process organisation are affected. In addition, business measurements such as capital lockup, working capital and the complete capital structure are concerned and are directly affected. Wrong decisions concerning the management approach and the bought services can lead to serious strategic aberrations and dependencies. Bowersox and Closs state: "The channel is the arena within which a free market system performs ownership exchange of products and services. It is the battlefield of business where a firm's ultimate success or failure is determined" (1996: p. 13).

Furthermore, the evolutions of LSPs as well as a changing context of logistics and new demands on logistics are driving an ongoing transformation and differentiation of the buying process for logistics services. Logistics services purchased some years ago were usually quite easy to define and the purchase decision was mainly based on the price of the service. These basic logistics services still constitute the majority offered and bought but they are increasingly bought in bundles (see e.g. van Laarhoven, Berglund, Peters, 2000; Andersson, 1997; Andersson, Norrman, 2002; Sink, Langley, 1997; Berglund, 2000). At the same time, various value adding services and Information Technology (IT) services are increasingly included in the bundles of services, which are handled in third-party logistics relationships (see Andersson, 1997; Andersson, Norrman, 2002; van Laarhoven, Berglund, Peters, 2000, Wildemann, 2007). This development increases the complexity of logistics purchasing. The increasingly more advanced tasks companies are trying to outsource today (e.g. logistics management) are much harder to specify and the companies are less experienced. Van Hoek (2000: p. 14) argues that there is a need for further research and understanding of purchasing initiatives supporting the establishment of supplementary logistics services.

The hypothesis derived from the above situation and the foremost strategic question as well as the way numerous successful organisations react is that a situational management approach of LSPs is advantageous, i.e. it is not always useful to outsource a maximum of activities to the most sophisticated service provider. In addition, it is useful to adapt the management approach to the surrounding logistical situation. Hence, the hypothesis of this work is as follows:

> *'The development and application of the situational management approach of LSPs dependent on the logistical situation provides the optimum logistics outsourcing solution from the outsourcer's point of view.'*

The underlying research-guiding primary academic research question for the project at hand, therefore, is as follows:

> *'How should the management approach of LSPs be designed from the shipper's perspective to realise the improvement potential in the elements time, cost, quality and risks dependent on the logistical situation?'*

The word 'how' expresses the explorative character of this research project. The object of investigation is the management of LSPs in cooperation life cycles. The design aspect expresses the implicit business task (Bleicher, 2004: p. 54). Entrepreneurial activities are not accomplished to end in it. Hence, the design of the management of LSPs in cooperation life cycles follows an objective. This objective is to make the potential of inter-relations to LSPs utilisable for the outsourcing company.

It is important to understand that this thesis does not deal with the make-or-buy decision in itself, i.e. the question whether single logistics service should be produced in-house or externally, but with downstream decisions of the choice of the suitable logistical partner, the choice of the suitable cooperation approach and with the management of the LSP. The make-or-buy decision, as strictly alternative routes, is already discussed extensively in the literature. The existing literature can be used to answer this upstream decision in the outsourcing of logistics services. By answering the above primary research question this dissertation tries to diminish the academic deficit and to assist companies in meeting the requirements of LSP management.

From the primary research question, the following secondary research questions can be derived:

- What are the influencing variables for the choice of a specific management approach of the LSP?

- What characterises and determines the logistical demand situation of logistics services?
- What characterises and determines the logistical supply situation of logistics services?
- Is there a taxonomy that can be derived from the logistical demand and the logistical supply situation? Is it possible to use this taxonomy as a basis for the derivation of norm strategies for the design of the management approach of LSPs?
- What are the design elements of the management approach of LSPs?
- Which design elements of the LSP management are relevant in which transactional phase in the cooperation life cycle between outsourcer and shipper?
- How is LSP management applied in practice? What are successful or less successful procedures?

These secondary research questions function as a guideline for the answering of the primary research question as well as comprehensive guidelines for the procedure of this dissertation and the structure of the empirical basis. Furthermore, the research questions allegorise the research aims.

Overall, the aim of this dissertation is to demonstrate the usefulness and practicability of a situational management approach of logistics services dependent on the logistical situation. The dissertation is conceptual in its nature, but based on empirical material that has been collected and analysed over several years of consulting experience with outsourcers/ shippers and LSPs, in both research projects and variants of action research, mainly interviews with logistics managers and case studies.

1.3 Research Aims

The overall purpose of this dissertation is to contribute to a better knowledge of forms of logistics cooperations[15] between outsourcers/ shippers and LSPs on the part of the firm buying the logistics services (i.e. the shipper) and to elaborate a practical management-oriented concept for the situational management of LSPs in diverse logistical situations. The project at hand will identify optimum management approaches for the cooperation with LSPs. This implies identification and structuring of the possible elements of management approaches of LSPs and the derivation of recommendations for the successful implementation in practice. To the extent to which it is applicable, the impact of the different management styles are analysed and interpreted. This requires the development of previously non-existent recommendations for the design of the management approach of LSPs.

From the above initial situation, the research questions were derived. The solution of these questions implies the fulfilment of concrete research aims in the procedure of this dissertation. Therefore, the project at hand includes the following main research aims:

- **To position the management of LSPs into a strategic, comprehensive and integrated frame of reference, from which design recommendations for the practical management of LSPs throughout a cooperation life cycle can be derived.** A conceptual framework will consolidate the existing characteristics of the management of LSPs, of the demand structure of logistics services and the supply structure of logistics services into a comprehensive, complete and consistent managerial model. All essential theoretical and practical concepts are to be formed into an integrative and

[15] In the context of this work, 'logistics cooperations' comprise all activities between shippers/ outsourcers and LSPs whereas 'logistics partnerships' refer to one specific close cooperation form of outsourcer-LSP relationships. Hence, 'logistics partnerships' are also referred to as 'logistics alliances' (see also footnotes 7 and 13).

systematic framework. For the achievement of these objectives, the management of LSPs is to be delimited from other concepts and strategies in the setting of service procurement as well as from supply chain management and it is to be integrated in these concepts and strategies.

- **To investigate the design elements of possible management approaches and management styles of LSPs.** Based on the theoretical frame of reference the design elements of the service provider management will be examined and the conceptual framework will be animated. This examination aims at a detailed analysis of the possible design fields of the management of LSPs and their characteristics dependent on different logistical situations and logistical contexts. This examination centres on a further analysis of relevant literature as well as on the author's personal expertise from conducted management consulting projects. Furthermore, this aim comprises the identification of success factors and best practices within the formulation, implementation and advancement of structural dimensions and activities dependent on the company-specific/ outsourcer-specific logistical situation. The formulation and advancement of structural dimensions and activities aims at a sustainable, effective and efficient performance of LSP management activities in theory and practice. In addition, it aims at optimum results concerning cost-, time- and quality-measurements throughout the complete cooperation life cycle which are to be defined in the course of this work. This relates, for example, to the definition of the controlling approach, the definition of the contract elements, the definition of the interfaces between shipper and LSP as well as design elements yet to be identified.

- **To identify and clarify implications and the results of the companies that have outsourced logistics services in diverse logistical situations.** The examination is to be carried out on a qualitative basis as a result of the literature review, the case study research as well as expert interviews. The influence of the optimised LSP management on the companies' success and competition-relevant factors will be examined.

A definite classification of the above aims into practical and theoretical aims is not possible. Problems and deficits of the management of LSPs exist in business practice and to identify suitable solutions, 'pure science' and 'applied science' have to be carefully evaluated in detail. In business practice and academic research there is a significant lack of procedures and recommendations for the target-oriented, holistic management of LSPs. Hence, many procurement and logistics compartments are not capable of facing the actual and future impact of the management of LSPs. Academic research omits adequate design recommendations. Wildemann states that the management approach of LSPs and the linked recommendations for the design of the management of LSPs needs comprehensive and empirical proven future research (2005a: p. 31). Hence, in this field of research lacking both academic- and business-oriented understanding both characteristics can be defined.

Based on business practice, situations are identified and insights from practical problems and topics are extensively integrated in the research. Therefore, the results of this work can be used as a guide for practitioners also. By the structured evaluation of why and how LSPs are to be managed along the cooperation life cycle, one can find guidance for the formulation, implementation and advancement of integration approaches and the management of LSPs dependent on company-specific logistical situations. A further aim is to reduce fears and provisos against the outsourcing of logistics functions due to the possible increase in dependency on the LSP over a specific period of time and the resulting reduction or even inversion in the initial savings in costs and improvements in performance. In addition, this project also functions as a critical review of existing approaches towards the design of the cooperation with LSPs and the management of LSPs in cooperation life cycles.

1.4 Literature Review

The following literature review gives a comprehensive overview of the relevant literature analysed and used in the context of this work. Relevant works are listed, contextually separated and analysed concerning their contribution in answering the research questions. Additional literature is used throughout this work, particularly in the derivation of the relevant design fields of the management of LSP. The following contributions can be classified into these theoretical fields:

- **Logistics outsourcing**: This thematic block is determined by make-or-buy related logistics outsourcing contributions and logistics outsourcing procedures. It especially refers to the delimitation of possible forms of logistics outsourcing and the bipolar discussion of make-or-buy.
- **Situational buyer-supplier-relationships**: This thematic block deals with the transfer of established academic contributions concerning the differentiation of buyer-supplier relationships, in particular the differentiation of the procurement management approach and the transfer to LSP management. It also refers to forms of inter-organisational cooperation that evolved primarily in supplier relationship research and, as such, the transfer from traditional buyer-supplier relationships to outsourcer-LSP relationships.
- **Life cycle management of logistics cooperations**: This thematic block assesses several academic life cycle research directions, combining them with transaction phases and transfers the results to life cycle management of logistics cooperations between shippers and LSPs.

The literature review has several aims. First, existing literature will be evaluated concerning its relevance in answering the research questions and challenging the research hypothesis. Second, the literature review functions as a further means to derive the relevance of this research. Third, suggestions for the design of a suitable academic framework for the analysis and the design of the optimum management approach of LSPs are seized, gathered and evaluated.

1.4.1 Logistics Outsourcing

In the following section, selected relevant academic contributions that discuss the logistics outsourcing topic mainly from the shipper's point of view[16] are described. Primarily, these try to develop a procedure that evaluates whether or not to outsource logistics services or the logistics activities as a whole. Numerous contributions discuss the logistics outsourcing topic from a practical point of view[17]. The outsourcing procedure literature can be divided in two fields: first, the academic contributions that describe generic outsourcing decision procedure without relating to a specific outsourcing object and, second, academic contributions that discuss the external supply with services. Generic decision processes partially discuss the management approach of LSPs. Therefore, generic and concrete contributions to the outsourcing decision processes are analysed.

In literature, numerous contributions can be found concerning logistics outsourcing on a strategic-qualitative level as well as on a cost-oriented-quantitative level (Walker, Weber, 1984; Benkenstein, Henke, 1993; Hosenfeld, 1993; Benkenstein, 1994; Bühner, Tuschke, 1997; Isermann, Lieske, 1998; Schäfer-Kunz, Tewald, 1998; Antlitz, 1999a, b; Schätzer, 1999; Mehlhorn, 2002; Burr, 2003; Engelbrecht, 2004, Wildemann, 2007). Holistic approaches that define the outsourcing strategy as well as the suitable management approach of LSPs in different logistical situation are lacking. Scherm (1996: p. 46) states that research concerning logistics outsourcing often oversimplifies the basic situation. This means that there is no sufficient analysis of the logistical context that unifies the logistical demand and supply situation as well as in the overall economic context.

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[16] Apart from the selected contributions, numerous other authors discuss the topic of outsourcing logistics services: see Teichmann (1995); Guttenberger (1995); Steinmüller (1997); Vining, Globerman (1999); Fill, Visser (2000); Lynch (2004); Tayles, Drury (2001).

[17] Examples for practically oriented contributions are Bruch (1998); Mayer, Söbbing (2004); Domberger (1998); Hodel, Berger, Risi (2004); Köhler-Frost, Bahrs (2000).

Femerling (1997), McIvor (2000), Francheschini *et al.* (2003) and Kang (2003) provide an overview on generic outsourcing procedures:

- Femerling (1997) developed a strategic-integrative outsourcing procedure, aiming to reduce the practical deficits in outsourcing decisions that are often conducted based on short-term economic comparisons. This approach considers long-term company-strategic aspects. Make-or-buy decisions are discussed as strictly alternative and implications on the management approach with LSPs are not analysed.
- McIvor (2000) illustrates a decision tree on outsourcing that centres on a sequential identification of core competencies and a total cost comparison. In the context of the performance level of the organisation in comparison with competitors, he discusses the resulting scenarios: 'unchanged internal supply', 'optimised internal supply' and 'strategic outsourcing'. The scenario 'strategic outsourcing' is not further differentiated. Implications on the management approach of suppliers or LSPs are therefore only partially discussed.
- Franchescini *et al.* (2003) present a four-phased outsourcing procedure. The first two phases discuss the decision-making process. In a first analysis phase, the outsourcing processes have to be identified by internal benchmarking[18] and an assessment of internal efficiencies and core competencies. Elements of this procedure have been integrated in the analysis of the internal demand (see chapter 4.2.1). Franchescini considers strategic aspects as well as production- and transaction costs. An external bench-

[18] In the context of the present study 'benchmarking' is defined as a process used in management and particularly strategic management, in which organisations evaluate various aspects of their processes in relation to best practice ('benchmarking' is also known as 'best-practice benchmarking') (see also footnote 21). This then allows organisations to develop plans on how to adopt such best practice. Benchmarking may be a one-off event but is often treated as a continuous process in which organisations continually seek to challenge their practices (for the use of benchmarking in LSP management see chapter 5.3.2.5).

marking identifies the best provider of the external components or services. Nonetheless, he does not discuss the management of external suppliers dependent on different demand/ supply situations.

- Kang (2003) bases his work on the prescriptive decision theory and concentrates on the assessment of alternatives in the context of decision-making. He focuses on non-core competencies and analyses them concerning their transaction costs and benefits. Kang discusses this assessment on a highly theoretical level from which the derivation of practical design recommendations for the management of suppliers or respectively LSPs is barely possible.

Academic contributions that focus on the outsourcing of services highlight the distinctiveness of logistical services that has to be taken into account when services are externally supplied. This discussion consists mainly in German academic contributions. Representative of the spectrum in which the discussion takes place are contributions from Fischer (1993), Nagengast (1997), Beer (1998) and Barth (2003):

- Fischer (1993) focuses on the make-or-buy decision in distribution logistics based on the new institutional economics. He modifies traditional procedures such that transaction costs are the sole decision criteria for the choice of the optimum distribution logistics process. In the presented procedure, transaction costs are assessed based on an analysis of the capabilities of the organisation and its employees that result from transaction- or human capital-specific investments. The derived strategic recommendations comprise the definition of the strategic positioning and the corresponding measures. Nevertheless, the management approach of service providers is not discussed in detail.

- Beer (1998) comprehensively discusses the decision-making process in outsourcing company-internal services. Based on several theoretical and conceptual approaches (e.g. all three theories of the new institutional economics as well as concepts of strategic management, and in particular the core competency theory and the company value concept) he develops the procedure and the contents of the information- and decision phase as well as the processing and controlling of outsourcing decisions. Nonetheless, he only derives norm strategies that do not include differing demand and supply situations in a detailed level and hence leaves out important determinants for the definition of the management approach of service providers.

- Nagengast (1997) evaluates different decision-making models for the outsourcing of services based on the modified basic decision model (decision model, technology model and decision calculus). Focus lies on the transaction cost theory and the modifications and extensions required for outsourcing decision-making. In addition, he describes a descriptive-evaluated quantitative empirical study that assesses the diffusion of diverse instruments for decision support in outsourcing questions in practice. Furthermore, he focuses on the outsourcing process and omits most of the derivation of design recommendations for a situational management approach of suppliers and service providers.
- Barth (2003) also bases the process procedure for outsourcing decision on the evaluation of organisational competencies and the assessment of costs and qualitative criteria.

Overall, decision-finding in outsourcing has been extensively discussed in German as well as in Anglo-American and international literature. The theoretical foundation mainly focuses on approaches of the strategic management (core competencies) and the new institutional economics (transaction cost theory)[19]. The results of these approaches will be integrated in the discussion and the definition of the academic frame of reference.

[19] Several studies try to validate the application of these approaches: see Engelbrecht, 2004; Maltz, 1992; Maltz, 1994.

Logistics outsourcing is discussed in detail in specific industries or sub elements of industries such as for small- and medium sized companies (see e.g. Gericke, 2005). Academic or practical contributions in these fields concentrate on one specific logistical situation and do not differentiate between different logistical supply and demand situations. Gericke (2005), for example, narrows the discussion on the outsourcing of complex logistics services.

Most academic contributions in this field do not examine potential connections between the discussed outsourcing decision concerning logistics services and the surrounding situations, namely the logistical demand and the logistical supply situation. The decision-finding processes are extensively discussed but omit a detailed view that the design of logistics cooperations depend on internal and external influencing factors. This requires a close examination of the literature concerning situational approaches towards the management of LSPs.

1.4.2 Situational Buyer-Supplier Relationships

The decision between in-house production and outsourcing of products and services in practice and theory is a classical field of business research and analyses in business practice. Indeed, the external provision of logistics services has a long tradition. From the beginning of industrial production, the division of labour evolved. Companies developed that focused on specialised logistics services such as transport and the storage of produced goods (Lorenz, 2001: p. 19). Comparison between the modern logistics outsourcing and the resulting demands on the management approach of LSPs reveals manifold differences. Both terms 'make-or-buy' and 'logistics outsourcing' can be understood as extremes of several variants of the external supply of logistics services.

Nevertheless, the outsourcing discussion cannot be reduced to a simple make-or-buy decision. In this context, both extremes and the variants in-between are of interest. There is no theoretical holistic approach to define differentiated management approaches dependent on specific logistical situations. Obviously, logistical situations can mean simple transport services as well as the more complex external supply of logistics service bundles or the outsourcing of the complete management of supply chains.

A more extensive analysis of different organisation forms must be conducted. Pfohl and Large (1992) are also of the opinion that make-or-buy should not be interpreted as either 'make' or 'buy'. It is rather a question of a continuum of institutions and contract forms. Leenders and Nollet (1984) who discuss the purchasing aspects of make-or-buy decisions in general also state that it is not a question of 100% make or 100% buy. Williamson (e.g. 1975), however, supported a polarised view of organisational options where only two durable modes, market and hierarchy, existed. Modes in between were seen to be within a period of transition. Later Williamson (1991) has admitted that hybrid forms of organisation, such as long-term contracting, two-folded partnerships or restricted market-based organisations could exist. Such hybrid forms are possible when there is a moderate level of asset specificity (degree to which investments are specific for a certain relation, such as site specificity, physical asset specificity, human asset specificity, dedicated assets, brand name capital and temporal specificity) (Williamson, 1987, 1991) and the frequency of disturbances (frequency and uncertainty) is low (Williamson, 1991: p. 292). Richardson (1972) established a similar typology with three different organisation forms: market transactions (market), direction (hierarchy) and cooperation (hybrid), whereas Coyle, Bardi and Langley divide organisational forms between two extremes: 'transactional' and 'relational': "The ranges of relationship types extend from that of a vendor to that of a strategic alliance" (Coyle, Bardi, Langley, 2003: p. 418).

Differences in the make-or-buy vs. the logistics outsourcing decision do not exclude the possibility that one company is always only faced with one extreme. Very often, numerous types of logistical types of outsourcing of logistics services exist in parallel. For example, particular companies have outsourced their complete procurement logistics but produce distribution logistics services entirely inhouse due to the intense customer contact characteristics of these services. Until recently, companies have been outsourcing only discrete segments of their supply chains to niche providers that are specialised in activities like transportation and warehousing. This was mainly due to the reduced service portfolio the LSPs offered. Therefore, a single company may have had to use numerous third-party logistics providers (3PLs) depending on how large and complex its supply chain was. The automotive industry has been a good example of this. Concomitant to developments in supplier management, automotive original equipment manufacturers (OEMs) began to reduce the number of involved LSPs and aimed at single or dual source solutions for particular services (see case studies four (chapter 6.3.4), eight (chapter 6.3.8) and nine (chapter 6.3.9)). The reasons are obvious: on the demand side, the coordination of numerous LSPs causes high transaction costs and information risks due to manifold interfaces; on the supply side, numerous LSPs widened their portfolio and made significant development in the standards of their logistics performance. This significantly reduces the risks in logistics outsourcing, such as quality or delivery problems.

Hence, there is a fundamental shift in supply chain management. For instance, companies are using suppliers from around the globe and moving to offshore manufacturing because of their lower-priced labour pool. Factors like these make logistics management and the management of LSPs more complex. Some companies are finding that outsourcing single segments to different providers is not really improving their operational efficiencies. Instead, they require providers who can link their discrete logistics segments into more comprehensive solutions that have breadth and depth as well as global reach. This leads to a seamless pipeline perspective, which includes all members of the supply chain (Gibson *et al.*, 1993: p. 212). The overall goal is to provide value and satisfaction to both internal and external customers. Despite the enormous potential in cost savings and service improvement in the integration of LSPs and the management of them, companies are seldom capable of tapping its full potential. Due to the rising importance of logistics, this gap will broaden in the future. The spread of potential logistics services being outsourced and the number of involved LSPs enhances the need for differentiated buyer-supplier relationships.

Various authors have dealt with the differentiated procurement management of logistics service. Most authors concentrate on either a very operative level (see e.g. Baumgarten, 1999; Baumgarten, Darkow, Walter, 2004) or on one form of cooperation (Andersson, 1997). Gould (2003: p. 50) bases the sourcing of logistics services on a differentiated approach. He divides logistics services into four types of purchases. However, he does not differentiate between different logistical supply situations. Deepen (2003: p. 134, 2003) also defines different degrees of outsourcing and management approaches from the logistical demand point of view. Rao and Young (1994: p. 18) list the factors that influence the logistics outsourcing decision: process complexity, product complexity and network complexity and thereby differentiate standard strategies in the purchasing of logistics services. However, the theory of supply chain management provides approaches for a strategic reorganisation of the complete value-added chain based on transaction cost-based considerations (Belz, Kramer, Schögel, 1994; Schneider, 1994). Academic research in organisational theories provides generic approaches for inter-company cooperations (Bleicher, 1990; Schrader, 1995) and coordination (Schrader, 1995; Sydow, Windeler, 1997; Dietl, 1995).

Approaches concerning the 'resource-based-perspective' are of a high relevance in strategic management. Based on this theory, the core competency approach by Prahalad and Hamel became important (Prahalad, Hamel, 1990; Campbell, Sommers Luchs, 1997). This approach is very important for cooperational planning, because complex logistics services require a middle- to long-term planning horizon and cannot be replaced or be produced in-house on a short-term basis. The central importance of logistics requires a strongly interdisciplinary approach; these are mainly discussed from the logistical point of view but also from a procurement point of view:

- Ihde (1984: p. 36) tried to define the advantage of different processing forms of the production of logistics services based on the transaction cost theory. Nevertheless, she restricted her analyses to the cooperation forms between LSPs. Bretzke as well refers to the transaction cost theory to answer make-or-buy questions in logistics (1989, p. 392; 1999: p. 345). Kleer uses transaction cost theory to relate the make-or-buy questions to logistics service bundles and to explore production of logistics services possibilities (1991: p. 77; p. 96). In addition, he analyses the efficient organisation of the supply chain with the help of the transaction cost theory (Kleer, 1991: p. 92).
- Pfohl analyses the design of inter-organisational logistical systems on the basis of the transaction cost theory (2000: p. 15). He does not analyse in detail the influence of logistical supply on the design of the logistics cooperation. Therefore, the influence factors are restricted to the ones of Williamson (1981).

Early procurement research examined the pros and cons of diverse cooperation approaches and management approaches of suppliers. These detailed examinations can be partially translated and used for the design of the management approach of LSPs.

- Matthyssens and van den Bulte (1994) identified a general shift in organisational buying behaviour, from an antagonistic mode to a more cooperative mode, albeit, for goods or services. Since the nineties, especially driven by the automotive industry, long-term collaborative relationships with suppliers are generally considered the (next) source of competitive advantage. The basic principle is as Wildemann (2002a, p. 14) states: "in future single companies will no longer compete with each other but supply chains." However, there are criticisms referring to the 'myth of partnership' (see e.g. van Weele, 2000) and the 'case against partnerships' (Ramsay, 1996: p. 13). A partnership is the result of continuous effort on both sides; it is not a technique, which can be adapted at once. This could explain the rather small number of successful partnerships in goods procurement (van Weele, 2000).

- Ramsay (1996) suggested partnerships are often only appropriate for a minority of a company's purchases and that it is arguable that partnerships are only advisable for very large companies. This is analogue for the purchase of logistics services.
- Lamming (1993: p. 238) and Lamming and Harrison (2001: p. 597) have observed that in practice "the so-called partnership often relies on customer dominance", which means the buyer's dominance or in this case the shipper's dominance. Competitive relationships do not necessarily involve lower trust and adversarial behaviour, according to Parker and Hartley (1997). "Competition may be more effective than cooperation in many buyer-supplier relationships" (Forker, Stannack, 2000: p. 39). It can be argued that companies should pursue both competitive and cooperative strategies simultaneously (Cox, 1995; Lado, Boyd, Hanlon, 1997; Parker and Hartley, 1997). The main point here is that a firm should develop long-term relationships with a relatively small group or only a single key LSP, not with all and only in specific internal and external situations.

Logistics as well as procurement research shows that in the purchasing of goods, as well as in the purchasing of services, companies need a variety of relationships, each providing its different benefits, where no general best type of relationship exists (e.g. Groher, 2002; Young, Wilkinson, 1997; Gadde, Snehota, 2000). Axelsson, Laage-Hellman and Nisson (2002) have stated that much of the purchasing and supply management debate has focused on two opposing purchasing approaches: transaction-oriented and relationship-oriented behaviour. However, the authors emphasised that the two approaches are complementary: a firm can adopt different approaches for different suppliers or, in this case, different

LSPs. In addition, research mostly neglects differences in the management approach throughout a logistics cooperation life cycle.

Furthermore, supply chain management aims at various value categories. From a supply chain perspective Hines *et al.* (2000) describe seven types of value: customer responsiveness, timely supply, high quality goods and services, efficient operating processes, lower prices, impact on profit and highly innovative. The management and the integration approach of LSPs should be tailored to those values that are in line with the overall business value strategy and that correlate with yet to be identified influencing factors. The outcomes of relationships may range from cost savings through to further joint developments in logistical IT solutions. Successful supply chain management requires the effective and efficient management of a portfolio of relationships to suppliers (see Bensaou, 1999) and to service providers. Once the focus (output) is decided, the appropriate relationship can be developed (Cousins, 2002). Obviously not all LSPs are to be dealt with in the same way.

The need for differentiated management LSP strategies requires some sort of classification (Lilliecreutz, Ydreskog, 1999). Therefore, an advanced portfolio model for LSP relations appears to be a useful tool. Effective purchasing, supply management and logistics management requires the selection of strategies that are appropriate to the prevailing circumstances. This underlines the basic proposition that differentiation is needed in managing the management approach of LSPs. Relationships require different mixes of cooperation and competition. Accordingly, the literature emphasises the need for a differentiated situational management approach of LSPs but, to date, fails in providing a holistic, practical approach.

1.4.3 Life Cycle Management of Logistics Cooperations

The management of logistics service providers is to be analysed from a holistic point of view. This leads to the demand for an analysis and design of the logistics cooperation along the complete cooperational life cycle. The product life cycle has often been used to explain these designs of buyer-supplier relationships, in traditional as well as in service relations (Berenson, 1967: pp. 62; Kuhn, Hellingrath, 2002: p. 60; Zahn, Herbst, Hertweck, 1999: p. 10). The model centres on the life cycle of a product with six phases and assigns the individual sourcing activities. In the introduction phase, the first analysis of the demand and of the design of the product or the services and incidental services takes part. Flexible suppliers are preferred in the first phase. The growth phase focuses on retention of the achieved quality. Throughout the maturity phase, price-reductions are in focus. During the product elimination, the early information of the supplier is one of the main tasks of the procurement department. Throughout the phases, the cycle shows an increase and then a decrease in the supply volume and the integration intensity (Pampel, 1993: p. 172). The model examines the complete life cycle of a product. For the management of LSPs this model can provide helpful suggestions.

The Agency-Client-Life-Cycle lists four separate phases: Pre-relationship, Development, Maintenance and Termination (Halinen, 1996: p. 33). This model focuses on the cooperation with advertising agencies. Measures that aim to prevent the need for complex and expensive changes of the agency are developed. This form of cooperation is also applicable to customer-LSP relations. This model demonstrates that parallel to the service (work product) the circumstances of the cooperation (work patterns) as well as the potential of the partners (organisational factors) are important. In addition, the model shows that the influencing factors change over time.

In Just-in-Time supplier relations, Franzier, Spekman and O'Neal developed a transaction-cost based stage-concept. The Interest-Stage can be compared to an analysis- and planning phase. In the Initiation-Rejection-Stage, decisions on the form of the cooperation are made. The Implementation Stage serves to execute the cooperation. The Review-Stage concentrates on the review and the identification of required changes in the cooperation (Frazier, Spekman, O'Neal: 1988: pp.

56). The focus of this concept lies on the identification and the implementation of the most efficient buyer-supplier form of relationship. Thereby, only the relationship in the individual phases is described. In the format of a guideline for all types of inter-company cooperations, Staudt *et al.* distinguish the phases 'Initial Phase', 'Seeking for Partners', 'Constitution', 'Management' and 'Finalisation' (Staudt, Toberg, Linné, Bock, Thielemann, 1992: pp. 25). Pampel developed his phase model analogue along that of Männel. He separates the phases 'Seeking for Cooperation Potentials', 'Development', 'Maturing' and 'Decomposition of the Cooperation'. The basis of his analogy is the common character of useful potentials of an asset as well as of cooperation with a logistics supplier (Pampel, 1993: p. 171).

Wildemann refers to the transaction cost theory, the main phases of which are: the 'information phase', 'agreement phase' and the 'processing phase' and represent a market transaction from a procurement perspective (Wildemann, 2001b: p. 435). In the information phase, the search for potential market partners is carried out. An exact specification of the exchanged service is put down. In the agreement phase, the prices and conditions are negotiated and agreed upon. Throughout the processing phase, the agreed services are delivered. In the frame of this thesis, this model functions as a basis for further discussion of the management approach of LSPs in cooperation life cycles.

1.4.4 Summary

In the preceding literature review, literature relevant to 'logistics outsourcing', 'situational buyer-supplier relationships' and 'life cycle management of logistics cooperations' was assessed with reference to the contribution to the definition and the design of the management approach of LSPs. This literature review of the analysis and design approaches of buyer-supplier or respectively outsourcer-LSP relationships connected with logistics outsourcing further demonstrates the general academic as well as business interest and relevance. The general business interest was already assessed in the preceding sections. Further business relevance will become obvious in the analysis of the case studies. Nonetheless, the literature also reveals that a consideration of 'a situational approach towards LSP management' requires analysis of many fragmented characters.

Secondary Research Questions \ Approaches in Literature	Logistics Outsourcing	Situational Buyer-Supplier Relationship	Life-Cycle Management
Structuring of the Influencing Factors on LSP Management	◐	◐	◐
Definition of an Applicable Taxonomy of Logistical Cooperations	◐	◐	◐
Structuring of the LSP Management Elements	◐	◐	●
Systemisation of the Logistics Cooperation Life Cycle	◐	○	◐
Empirical Impact Analysis of different LSP Management Approaches	●	◐	◐

not discussed ○ discussed to a limited extent ◐ discussed ●

Figure 1-2: Sorting of the Approaches in Literature to the Secondary Research Questions

Figure 1-2 shows an overview of the thematic blocks assessed throughout the literature review and an assessment of their contribution in answering the secondary research questions that function as a working guideline for this work:

- **Structuring of the influencing factors on the management of LSPs**: Single influencing factors can be identified, for example, the choice of the procedure concerning logistics outsourcing. Nevertheless, no complete list of influencing factors could be identified. Hence, the relevant influencing factors are not developed in a sufficient way and they are not linked with the design alternatives of the cooperation.

- **Definition of an applicable taxonomy of logistics cooperations**: Due to the fact that there is no coherent description of the influencing factors on the choice and the design of the management approach of LSPs, no satisfactory and applicable taxonomy can be identified. There is no sufficient attempt to sort the influencing factors in the derivation of types of logistical shipper-LSP cooperation forms. This would be the major preliminary work necessary to elaborate management approaches that integrate contextual factors, such as the logistical demand and the logistical supply situation, in combination with strategic trends. Hence, no closed approach to the design of the management of LSPs dependent on relevant influencing factors could be identified throughout the literature review.

- **Structuring of the management elements of LSPs**: The design fields and acting options are linked incoherently. None of the discussed approaches describes a situational management approach of LSPs throughout a life cycle of logistics cooperations in a sufficient manner. The existing interdependencies have not been fully considered. Thus, there are deficits concerning a holistic procedure. There are approaches in designing the cooperation between purchaser, customer of logistics services, and LSP but there is a significant lack concerning a closed solution and design approach.

- **Systemisation of the logistics cooperation life cycle**: As discussed above, life cycles of cooperations are discussed either from a transactional phase's point of view or from a buyer-supplier point of view. Research concerning life cycle management of logistics cooperations between shippers and LSPs needs to be intensified to answer the research questions at hand.

- **Empirical impact analysis of different LSPs management approaches**: As a result of the insufficient academic structuring of the influencing factors on the management approach and the missing taxonomy, no holistic structured empirical research and, hence, no empirical impact analysis, has been conducted to date. Current research focuses on descriptive analyses, such as motive research and analysis of the economic advantage provided. Rarely, recommendations of practical use are derived. Up-to-date academic and business research shows a gap in this context.

In conclusion, existing approaches cannot be directly transferred to the management of LSPs. Therefore, the project at hand attempts to close this gap and to develop a closed, holistic approach to manage different types of relationships between shippers and LSPs in the context of diverse logistical situations. The aim is to close this gap from an academic point of view as well as from the practical point of view so that practitioners can use the dissertation as a guideline in designing their day-to-day management of LSPs.

1.5 Procedure and Method of Resolution

The aim of this dissertation is to elaborate a practical management-oriented concept for the situational management of LSPs in diverse logistical situations. The basic assumption and defined hypothesis is that a situational management approach increases the fitting accuracy in all phases of a logistics cooperation life cycle and thereby increases the efficiency and the effectiveness of the management approach. In the following Figure 1-3, the overall structure and procedure of this dissertation is outlined. The academic research is based on the subsequent sources and is structured as follows:

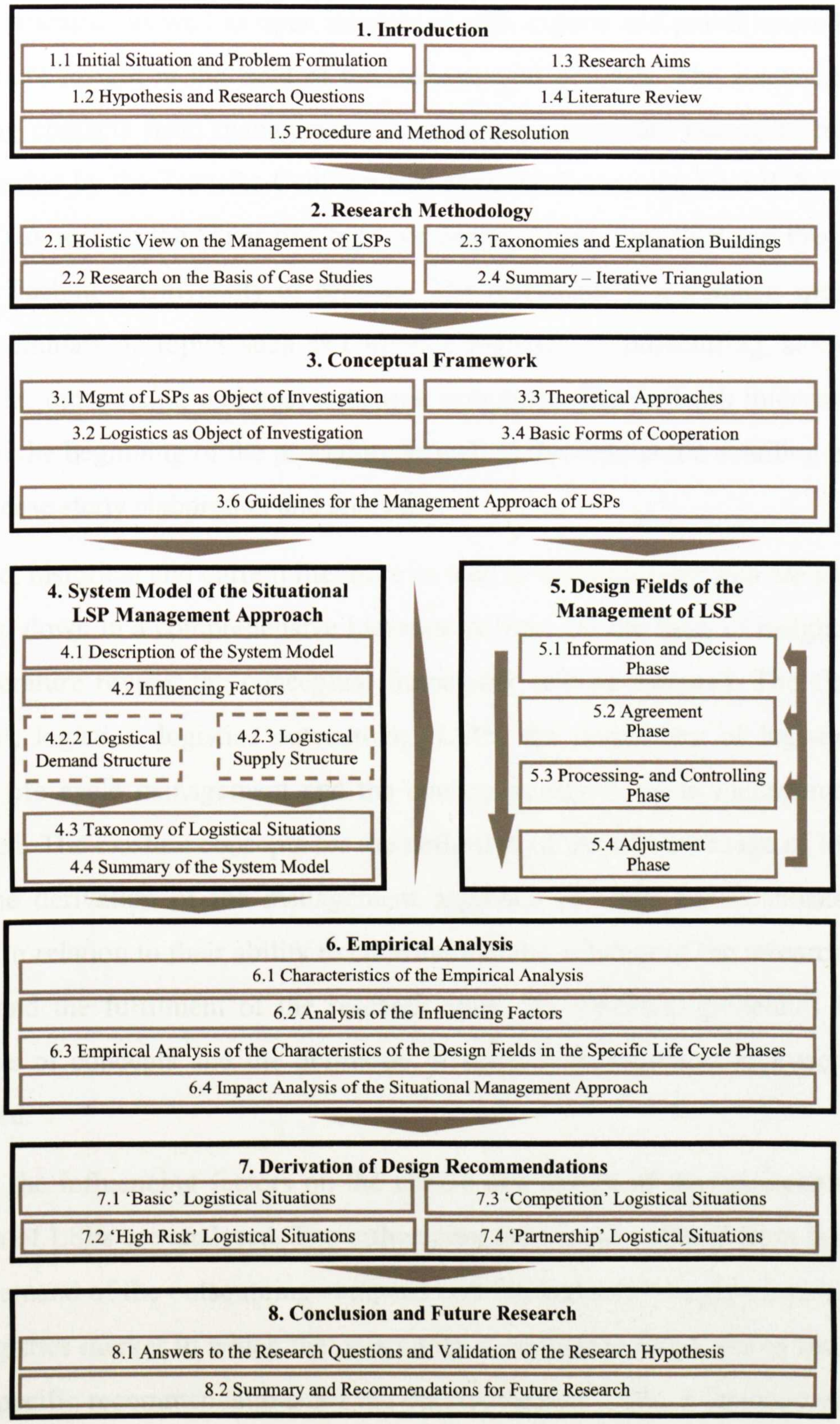

Figure 1-3: Structure of the Dissertation

First, structured as well as open interviews with experts and practitioners help to gain more insight in the field of the management of LSPs. The researcher uses existing contacts from management consulting projects and management seminars hosted by the Transfer-Centrum Management Consulting GmbH & Co. KG (TCW) as well as the Chair of Corporate Management, Logistics and Production at the Technical University of Munich. The researcher is a frequent speaker at these seminars on topics such as corporate logistics, manufacturing, stock management, outsourcing and cost reduction programs. The in-depth interviews are used in the beginning of the procedure as well as throughout the detailing process of the case study elaboration and analysis.

Second, historical and current literature as well as academic research are analysed and put down in a comprehensive literature review. On the basis of insights from the literature review the conceptual framework will be spanned. The fields of interest, logistics, logistics outsourcing, LSPs, the purchasing of logistics services, life cycle management and the context in supply chain management are outlined. The existing concepts for the definition of the vertical range of logistics and the derivation of the management approach of LSPs are established and tested in relation to their ability to contribute to the solution of the research questions and the fulfilment of the research aims. To conclude, guidelines for the analysis of concepts and the definition of suitable management approaches are deduced.

Third, the influencing factors on the choice and design of the management approach of LSPs are analysed. The influencing factors are outlined from the logistical demand of the outsourcing company and the logistical supply provided from the logistics market in which the outsourcer is embedded today and in future. To give specific recommendations for the management of LSPs, a typology of logistical needs and situations is required. In the framework of this typology, similar or related logistical needs are combined such that the optimum LSP profile can be found. Logistical needs are clustered and individual demand profiles are derived. Then, profiles of service providers are developed that are matched with the logistical profiles. These factors are combined to a logistical demand/ supply portfolio from which normative recommendations for the design of the management approaches are derived. The differentiated management approaches are linked to norm strategies. These norm strategies are outlined in brief.

Fourth, the design fields are identified and developed from current academic and business research as well as from the author's personnel management consulting experience. The design fields are formed in their possible characteristics along the life cycle of the logistics cooperation. Possible characteristics dependent on the type of logistics cooperation are discussed.

Fifth, the researcher analyses nine case studies, in which the developed hypotheses are tested. The relevance of the case studies is reviewed, pre-checked and pre-tested by academics and business partners. The analytical process is reviewed in detail in chapter 6. The causal analysis allows complex measurement topics to relate to one another and to evaluate them. The case studies, derived from the consulting experience and activities of the researcher, are analysed and are used for the approval of the guidelines and suggestions towards formation and configuration of logistics outsourcing relationships.

Sixth, the empirical analysis of the management approach of LSPs based on case studies allows the derivation of situational design recommendations. They are based on the identification of success factors in the outlined case studies as well as on the impact analysis of the situational management approach in the selected case studies. The design recommendations are configured for the identified types of management approaches of LSPs throughout the life cycle of logistics cooperations. Finally, answers to the research questions are given, the research hypothesis is validated as well as recommendations for future research are identified and outlined.

2 Research Methodology

In the following chapter, the research design will be outlined in detail. Demonstration of this design will outline the need for a holistic view of the management of LSPs and will highlight the suitability of case study research and the practicability of explanation building based on taxonomic examination in this research context.

The knowledge the researcher is seeking is of an explanatory-descriptive kind. The dissertation is directed towards the simplification of a complex world with the goal to produce a model which illustrates the logistics cooperations in focus and which helps structure and solve practical business problems. For a stringent analysis of the complex context, it is important to define the boundaries by describing a holistic view of the management of LSPs and its respective limitations. Furthermore, the chosen research approach on the basis of case studies and the structuring of influencing factors on the basis of taxonomy are outlined. In this context, the use of explanation building is analysed and explained. The applied research methodology in the dissertation is described and explained in the summary of the research methodology as iterative triangulation. This methodology combines the approaches of literature review, case study analysis as well as expert interviews and bases the solution of the research questions on a revolving basis.

2.1 Holistic View on the Management of LSPs

The dissertation aims at a holistic view of logistics cooperations between shippers and LSPs designed in the context of different logistical situations. Hence, elements of logistics cooperations and LSP management have to be analysed and described on strategic, tactical and operative levels.

Logistics strategy acts between strategic targets of the company and restrictions given from the market context. Strategy can be defined as the determination of the basic long-term goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals (Chandler, 1987: p. 15). In the context of logistics strategy, aims, targets and actions on an aggregated level are defined. Usually, logistics is a derived demand. Therefore, the focus lies on the creation and the appropriation of a competitive supply chain. Competitiveness relates to the dimensions time, cost, quality and risk level. The tactics of a company serves the confirmed and planned execution of the chosen strategy (Schneider, 2000: p. 24). Decisions that lead to a change in the vertical range of logistics or in logistics management are elements of the tactical level. This is valid also for decisions that transfer strategic decisions into the internal structure of a company or the respective supply chain. The operative level deals with the optimum use of logistical resources and the partners involved in the supply chain in focus. These elements lead to a hierarchical view of logistics cooperations (see Figure 2-1).

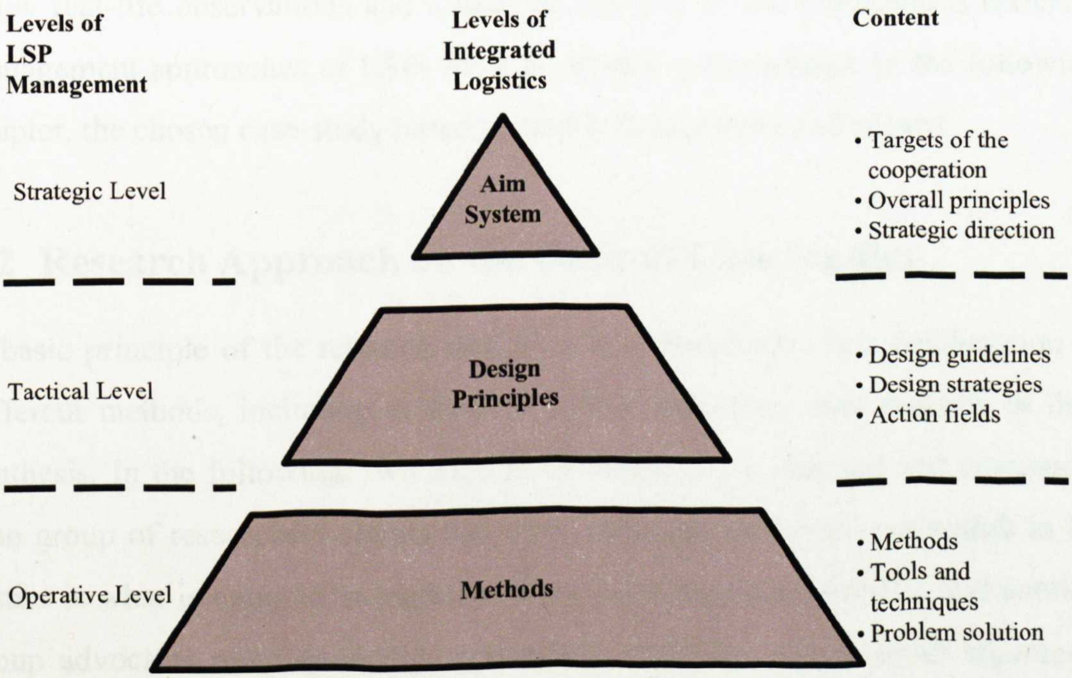

Figure 2-1: Hierarchical Levels in Management of LSPs

The overall aims and targets of the logistics cooperation, the LSP management and the overall principles are located on the strategic level. Here, strategic directions are defined. The derived demand-characteristics lead to a direct correlation with the strategic company aims. Beneath, the tactical level of logistics cooperations comprises the design guidelines and strategies for the management approach of LSPs. Design principles have to transfer the strategic aims in design strategies of the management approach. They have to secure the compatibility of the methods, tools and techniques used in the logistics cooperation life cycle. Methods, tools and techniques are located on the operative level. They operationalise the strategic aims and directions.

The described holistic view on the design of the management of LSPs leads to the need for a holistic analysis of empirical data. The efficiency of situational LSP management approaches can only be analysed by integrating surrounding factors, such as the overall market situation on the supply side, the economic context the company in focus acts in, as well as by evaluating overall aims of the company.

Hence, a case-study-based approach is chosen for this dissertation. Case studies allow real-life observations and a detailed analysis of the implications different management approaches of LSPs have in diverse surroundings. In the following chapter, the chosen case-study based approach is explained and argued.

2.2 Research Approach on the Basis of Case Studies

A basic principle of the research design of this dissertation is a combination of different methods, including methods for data collection, data analysis or data synthesis. In the following, two streams of research are outlined and compared. One group of researchers claims that more stringent quantitative research in logistics is what is required in logistics science and research of today, and another group advocates more qualitative research in logistics science. Both arguments are analysed in detail and challenged concerning their suitability in answering the research questions of this work.

Until the end of the 1960s, logistics research was dominated by the analytical research tradition. Even at the beginning of the 1980s research approaches other than the analytical were often viewed with scepticism, since they were not regarded as 'true science'. New and Payne (1995) suggest that, due to measurable and generic criteria of what 'good research' is, operations research/ management have been alienated from reality. According to Ellram (1996), attention has recently been given to the fact that the majority of empirical research in logistics focuses on quantitative research methods, namely simulation, model building and statistical testing of survey data. Ellram (1996) argues that logistics research is dominated by quantitative non-empirical research, but she believes that empirical and qualitative methods are receiving increased attention due to the need to improve the relevance of business research. Denzin and Lincoln (1994) state that qualitative research differs from quantitative research in five significant ways:

- **Uses of positivism:** The positivist view centres on an outside reality to be studied that can be fully comprehended, not just approximated (Guba, 1990: p. 22).
- **Acceptance of post-modern sensibilities:** Researchers that work with qualitative data seek alternative methods for evaluating their work. The combination of methods is acceptable.
- **Capturing the individual's point of view:** Qualitative investigators are of the opinion that they can get closer to the actors' perspectives through detailed interviewing, observation and examination of case studies. This also provides a well-defined reason to discuss existing case studies with involved managers throughout the process of case studies analysis.
- **Examining the constraints of everyday life:** Qualitative researchers are more likely than quantitative researchers to confront the constraints of the everyday social world. They see this world in action and embed their findings in it. Qualitative researchers are committed to an idiographic, case-based position, which directs their attention to the specifics of particular cases.
- **Securing rich descriptions:** Qualitative researchers believe that rich descriptions of the social world are valuable, whereas quantitative research-

ers, with their nomothetic commitments can be less concerned with such detail (Denzin, Lincoln, 1994: pp. 5-6).

Dunn, Seaker and Waller (1994) on the other hand argue that surveys are seldom used for stringent statistical analysis and hypothesis testing. They are of the opinion that building logistics theory on research that relies on ambiguous or general description of phenomena leaves logistics knowledge on a treacherous footing, especially when the phenomenon is presented in qualitative derived and prescriptive relationships. However, the quality of this research is determined in the derivation and detailing of the described phenomenon. Ellram (1996) has classified different research methods according to the type of data and analysis used. She claims that empirical research has not been so popular in materials management and logistics since there is a risk that there may be no meaningful results, even though significant efforts may be put into a research project. Even if there are meaningful results, they will be less predictable and less controllable compared to the modelling approach. New and Payne (1995) suggest that there is a trade-off between abstractly solving artificial problems (mathematical model building, optimisation, simulation) and to pursue a real issue. These 'real issues' can be more important from the managerial point of view. This especially relates to 'real-world problems' in outsourcing such as the examination and evaluation of trust between the outsourcing partners in logistics cooperations.

Yin (2003: p. 7; Yin, Davis, 2006) states that "the first and most important condition for differentiating among the various research strategies is to identify the type of research question being asked". He states that in general, case studies are the preferred strategy when 'how' or 'why' questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context (Yin, 2003: p. 1). Figure 2-2 lists the different research strategies and the relevant situations in which they are used (source: COSMOS Corporation in Yin, 2003: p. 5).

Research Strategy	Form of Research Question	Requires Control over Behavioural Events	Focuses on Contemporary Events
Experiment	how, why	yes	yes
Survey	who, what, where, how many, how much	no	yes
Archival Analysis	who, what, where, how many, how much	no	yes/ no
History	how, why	no	no
Case Study	how, why	no	yes

Figure 2-2: Relevant Situations for Different Research Strategies

McCarthy and Golicic (2005: p. 256) cite Stuart *et al.* (2002: p. 422) and list that focused case studies and best-in-class-cases are appropriate in two cases: "first, mapping: identify and describe critical variables" and second, "relationship building: identify linkages between variables, causal understanding" (McCarthy, Golicic, 2005: p. 256). Both cases are given in this research. Causal understanding is especially required for the derivation of holistic and practical design recommendations.

Healy and Perry (2000: p. 118) define four paradigms of research: 'Positivism', 'Critical Theory', 'Constructivism' and 'Realism'. They define scientific research paradigms as overall conceptual frameworks within which some researchers work (Healy, Perry, 2000: p. 118). Deshpande (1983) states that a paradigm is defined as a set of linked assumptions about the world that is shared by a community of scientists investigating the world. 'Realism' believes that there is a real world to discover even though it is only imperfectly apprehensible (Godfrey, Hill, 1995; Guba, Lincoln, 1994; Merriam, 1988: p. 19; Tsoukas, 1989). Stake (1995: p. 3) distinguishes between two qualitative paradigms of realism and constructivism (Healy, Perry, 2000: p. 120):

- **Intrinsic case study research:** The case itself is the focus. The participant's perceptions are being studied for their own sake.
- **Instrumental case study:** The case is being used to understand something else. The perceptions of the case study are being studied because they provide a window to a reality beyond those perceptions.

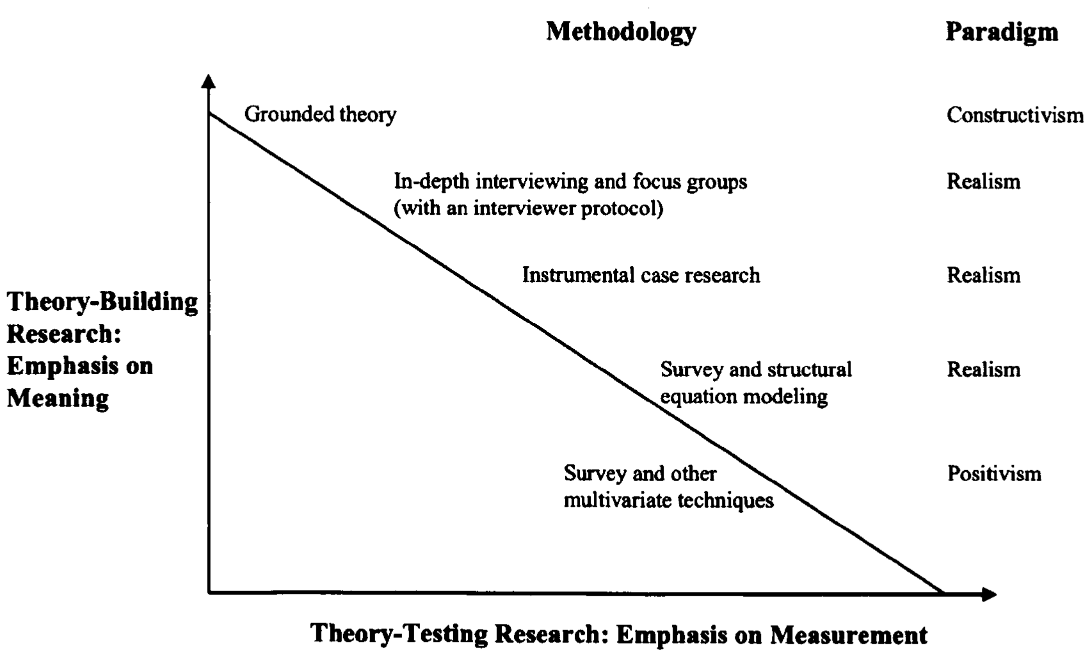

Figure 2-3: A Representative Range of Methodologies and their Meanings

Figure 2-3 demonstrates the positioning of this dissertation between constructivist grounded theory that denies outside reality and positivistic surveys that have restricted possibilities when the topic in focus is too complex and the measurability is restricted (source of Figure 2-3: adapted from Yin, 2003; Yin, Davis, 2006; Healy, Perry, 2000). Hence, this dissertation focuses on instrumental case study research. The case studies are described with the help of in-depth interviewing in the course of consulting projects but also afterwards in the analysis of the case studies. Additional interviews have been conducted in advance of and in parallel to the literature review in which the relevance of the research had to be verified but also the concrete topic had to be isolated.

The case study is preferred in examining contemporary events, but one where the relevant behaviours cannot be manipulated (Yin, 2003: p. 8). In other words, the case study is a research strategy that focuses on understanding the dynamics present within single settings (Eisenhardt, 1989: p. 534). The core elements are direct observation and systematic interviewing (Yin, 2003: p. 8). As demonstrated above, case studies have distinctive advantages when a 'how' or 'why' question is being asked about a contemporary set of events over which the investigator has little or no control (Yin, 2003: p. 9). The absence of control is especially true in the fields of complex managerial surroundings such as logistical networks and interacting participants in separate hierarchical entities (shipper/ outsourcer and LSP). A suitable way to prepare is to conduct a detailed literature review. It serves to develop sharp and insightful questions about the topic in focus. This detailed literature review is conducted in chapter 1.4 but also in chapter 5 where it is used to identify the relevant design elements of logistics cooperations and their possible characteristics.

This dissertation centres on multiple case studies, which can be seen as a variant of case study design (Yin, 2003: p. 14). Nevertheless, the overall ambition must be to achieve both managerial and academic progress. Dealing with complex problems demands methodological developments. Therefore, the approach chosen in this dissertation combines the analysis of case studies with the verification of open interviews with experts. The interviewed experts were mainly contacted in the frame of seminars at the TCW Transfer Centrum in Munich. There, procurement and logistics managers from diverse industries are available for in-depth discussions of the working hypotheses as well as the outcomes of this dissertation. In addition, logistics managers involved in the management consulting projects of the authors are consulted for the set-up of the case studies analysed in the empirical analysis of this dissertation but also for the validation of the consolidated findings out of the case study analysis. Case studies typically combine data collection methods such as archives, interviews, questionnaires and observations. These interviews verify the practicability of the selected case studies as well as preventing the author from developing a narrowly defined model (Patton, 1990: p. 464). New and Payne (1995) suggest a similar combined approach. They suggest a research model based on case studies, which describes the behaviour in particular cases in combination with surveys as a way of extending the explanatory spirit of the case study approach. The panel meetings, used by New and Payne (1995), bridged gaps in the picture presented by the survey analysis, and pointed out avenues of interpretation which otherwise would have been missed. In-depth expert interviews have the same purpose. Sink, Langley and John (1996) advocate the combination as well. A combination of three different methods, a focus group, case studies, and a survey has been used by Sink (1995) in his dissertation. The arguments presented in his study approach, as well as the realisation in the procedure of his work, functions as a reference for the research method of the case studies in the present investigation. The functions of his conducted surveys are taken over by detailed interviews of which the results are worked in into the case study description and analysis.

As a result, a case study approach in combination with open in-depth interviews with experts was chosen as the most suitable research approach for the analysis and the design for the management of LSPs. In-depth interviews were conducted at the beginning of the research as well as throughout the writing-up process. The case studies used are project experiences written up by the author. The author's personal experiences enabled a holistic evaluation of the surrounding conditions especially the logistical situation the players are involved in.

This holistic evaluation is needed for the evaluation of the initial hypothesis that a situative management approach of LSPs is useful, namely integrating the logistical demand and supply situation into the design of the management approach. By analysing the actual current design of the management approach and comparing it to the to-be design of the management approach in each case study, the usefulness can be assessed along to be defined performance and risk parameters. The current design becomes visible from the detailed description of the initial management approach in each case study. The to-be design of the management approach is derived from, first, the assortment of the case study to one theoretical logistical situation, that allows first derivations of norm strategies and, second, by the characteristics of the design fields that will be outlined along a cooperation life cycle. Therefore, for the assessment of these several interdependent factors, case studies can be considered as the best possible empirical basis.

2.3 Research Approach on the Basis of a Taxonomy and Explanation Buildings

In order to analyse and compare multiple case studies a common explanation pattern about the cases has to be built. "The explanation building procedure is mainly relevant to explanatory case studies. To explain a phenomenon is to stipulate a presumed set of causal links about it" (Yin, 2003: p. 120). Yin also states that "in most studies, the links may be complex and difficult to measure in any precise manner" (2003: p. 120). Hence, the research in this dissertation is based on an explanation-building platform built upon the case study method described above.

One reason for choosing this approach is that the research area is relatively new, mainly management-consultancy driven and at the outset there were no clear-cut models or hypotheses to be tested. However, research questions and research aims as well as a basic hypothesis have been formulated and each of them points to certain elements that need to be examined within the scope of the study (see chapter 1.2 and chapter 1.3). Flynn *et al.* (1990) argue that the origin of a theory-building study is not the fully formulated hypothesis but rather assumptions or perceived problems. They also discuss why data should be used to build theories, not only to test them. The notion of pure hypothesis testing is inappropriate for theory building since probability distributions and random selection of data are not used; the work is instead a question of an interpretative exercise to produce a theory for later testing. Eisenhardt (1989: p. 535) lists several examples of inductive case study research in which case studies are used not only to test hypotheses but also to build up theories and explanation buildings.

In traditional analytical research, tests of hypotheses are vital. However, analytical research does not have to start with hypotheses, as in many cases the objective is to produce hypotheses, i.e. explorative investigations. The hypothesis, in the context of this dissertation, should lead to the possibility of deriving design recommendations for the management approach of LSPs dependent upon logistical situations. The starting point of the empirical analysis is the observation of diverse management approaches and diverse success developments of these. Hence, in this context, the hypothesis is used as starting point to define research questions as well as research aims but also as a means to build up a basis for the development of a conceptual framework.

This work is based on the case study approach, and Yin's (2003) opinion that the most desirable strategy of case study analysis is pattern-matching logic. Such logic compares an empirically based pattern with a theoretically predicted pattern. These predicted patterns are differentiated by an empirical or theoretical based typology. The theoretically predicted patterns are defined by the description of the design fields of the management approach and their characteristics along the cooperation life cycle (see chapter 5). These are then matched with the actual characteristics of the case studies in the empirical analysis (see chapter 6). A special type of pattern-matching is the explanation building approach. In this study the goal is to analyse the case by building an explanation of management approaches dependent on logistical situations along life cycles of logistics cooperations.

According to Yin (2003), an often-cited concern related to case studies and explanation building is the limited basis for scientific generalisation. This is another reason for the empirical analysis in the basis of a well-founded taxonomic view. The outcome is only generalisable to the boundaries of a specific type/ taxonomy of logistical situation, which derives from a specific logistical demand as well as a specific logistical supply situation in which the outsourcer and the LSP interact. Taxonomy generally bases on configurations of design variables. Miller and Friesen (1984: p. 112) define configurations as "commonly occurring clusters of attributes or relationships ... that are internally cohesive", while Meyer, Tsui and Inings describe them as "any multidimensional constellation of conceptually distinct characteristics that commonly occur together" (1993: p. 1177). The distinguishing characteristic of configuration models is the multidimensional profiles used to describe organisational, strategy, or process types or, in this case, types of logistics cooperation forms and their design. The pedagogical and theoretical power of configurations is evidenced by the typology of the strategic types of Miles and Snow (1978) or the generic strategies of Porter (1980). In addition, similar approaches are, for example, chosen in manufacturing management. Optimisations and changes of manufacturing strategies are often related to ideal types of manufacturing capability groupings (see Sweeney, 1993: p. 62; Baumgärtner, 2006: p. 143). Yin (2003) argues that the generalisation is not of a statistical kind but instead is a matter of analytical generalisation. The idea is to compare various theoretical constructs with observed empirical patterns.

To understand the usefulness of configurations, it is first necessary to review the concepts of strategic fit and equifinality[20]. Researchers have long distinguished between 'environmental fit' and 'internal fit' (Miller, 1992; Lawrence, Lorsch, 1967; Thompson, 1967). According to Miller, the concept of environmental fit "demands that organisations match their structures and processes to their external settings" (1992: p. 161), while internal fit centres on the development of organisational structures and processes that are 'internal complementaries'. Both environmental and internal fit are seen as central to organisational effectiveness. In this context, both internal and external aspects are integrated. Internal aspects will be integrated by the analysis of the overall logistical strategy of the organisation

[20] 'Equifinality' is the principle that in open systems a given end state can be reached by many potential means (see e.g. Croft, 1996).

in focus as well as the logistical demand profile that is defined by the complexity of the externally supplied logistics services. External aspects will be considered by analysing present's performance and abilities of the possible LSPs as well as the development potential a LSP can demonstrate. Thereby, environmental fit can be achieved by an adequate development of internal structures and by an adequate design of the external surroundings.

To analyse internal fit, one must consider simultaneous, complex interactions among a wide range of interdependent variables with a unit, such as process choices, work force skills, information technology involvement, planning and control systems and other infrastructure variables. Equifinality takes the concept of a fit a step further (Katz, Kahn, 1978). The equifinality argument states that there are multiple, equally effective ways in which an organisation can achieve environmental or internal fit (van de Ven, Drazin, 1985). These alternatives are typically represented as 'patterns of context and structure' (Katz, Kahn, 1978). Furthermore, the set of viable patterns might be contingent on the contextual factors facing an organisation or, in this context, a company-spanning cooperation form.

The importance of strategic fit and equifinality has led to multiple ways of framing and testing the concepts. Venkatraman (1989) identifies perspectives of strategic fit. Each perspective proposes different relationships between the variables of interest and hence, modelling forms. In the following, the main forms are defined and reasons for choosing the taxonomy technique are demonstrated:

- First, **moderation** and **mediation** are the most commonly modelled perspectives. The functional relationships between two or a restricted number of variables of interest are highly specified, usually modelled as linear, and tested within the context of a particular criterion, such as return on investment or market share (Arnold, 1982; Venkatraman, 1989). The assumption is that relationships between components can be viewed in isolation.

Moderating and mediating models have been criticised due to the limited number of variables, which can be analysed at any one time, and that assumptions of linearity are driven more by the statistical techniques than by theory (Miller, 1981; Miller, Friesen, 1984). When a theory is described in terms of multidimensional types, as it is in the case of the present research, moderating or mediating models may be wholly unsuited.

- Second, **configuration models** were developed in response to these limitations (Venkatraman, 1989; Miller, 1981). First, the configuration view asserts that organisations are particularly useful when the research goal is to determine dominant patterns in organisations, or when the relationships between individual variables are either ill understood or too complex to be modelled using traditional approaches. Second, the configuration perspective typically argues that there are a limited number of viable strategies or organisation types in a given situation. This combination of parsimony and equifinality has made configuration models popular for both pedagogical and research purpose (Miles, Snow, 1978; Porter, 1980). It also makes configurations particularly well suited to evaluating equifinality arguments.

- Third, configuration models are typically divided into **taxonomies** and **typologies** (Miller, Friesen, 1984). While both offer multidimensional views of organisations, they differ markedly with regard to their underlying purpose, key characteristics, and the theoretical statements embodied within them.

  Typologies and taxonomies describe ideal types, each of which represents a unique combination of organisational attributes. It is possible that no existing organisation will perfectly match a proposed ideal type. Good typologies and taxonomies have three other characteristics. First, they should provide a generalisable, grand theory and middle-range theories applicable to individual types (Doty, Glick, 1994) that can build the basis for the derivation of situational design recommendations (Kieser, Woywode, 1999). Second, good typologies specify the "one-dimensional constructs that are the building blocks of traditional theoretical statements" (Miller, 1996: p. 507). Finally, good typologies qualify as theoretical statements because the underlying hypotheses are empirically testable. One could state that a typology is not fully developed until it has been empirically validated. In this context, the taxonomies are derived on the basis of project experiences as well as previous research in the field of logistics and procurement management that conclude with comparable taxonomies (see e.g. Wildemann, 2000; Herold, 2003).

Unlike typologies, taxonomies do not define ideal types. Rather, they attempt to classify organisations or in this case forms of organisational co-operations into mutually exclusive and exhaustive groups (Doty, Glick, 1994). In the frame of this research, these borderlines vanish. Due to the continuous character of the influencing factor characteristics, the distinction between is fluent. Hence, in this context, the terms 'typologies' and 'taxonomies' are used synonymously.

Arguably, the most important decision in developing a taxonomy centres on the choice of variables used to classify organisations (Miller, 1996). Theses variables must be carefully selected based on existing theory and the task at hand. Good taxonomies are relatively unaffected by the techniques or sample data used to create them. Finally, it is important to realise that, while taxonomies are often derived using clustering or other multivariate techniques they can be based on observation as well (Woodward, 1965). It is the descriptive power of taxonomy, more so than the methods used to derive it, which is important (Miller, 1996).

2.4 Summary of the Research Methodology – Iterative Triangulation

The described choice and the embodiment of the research design and methodology provide the opportunity to achieve academic and managerial progress. Therefore, the research at hand focuses on case studies with today's relevance. The case studies derive from practical management project experience of the author. The practical involvement in the case studies analysed is essential for the comprehensive building of the taxonomies of logistical situations.

The main elements of the present methodology derive from a defined managerial perspective into research approaches of LSPs and can be summarised as follows:

- Research on the basis of detailed **practical-based case-studies**;
- **Explanation building** on the basis of theoretical analysis of literature and management consultant experience;
- **On theoretical basis identified design variables** and
- **Derivation of design recommendations** for the management of LSPs on the basis of **well-founded taxonomies** which could be verified in further research and could be pressed into an empirically-based typology.

Lewis (1998) defines this methodology approach as 'iterative triangulation' which means the research approach employs systematic iterations between literature review, case evidence, intuition and, in this case, extensive management consultancy experience from the author. 'Triangulation' derives from the combination of the different research methods: expert interviews, case study research, and theoretical literature research (see Marschan-Piekkari, Welch, 2004: p. 162). According to Bak, "triangulation through the use of blending techniques … assists the researcher in generating more complex and explanatory insights" (2005: p. 340).

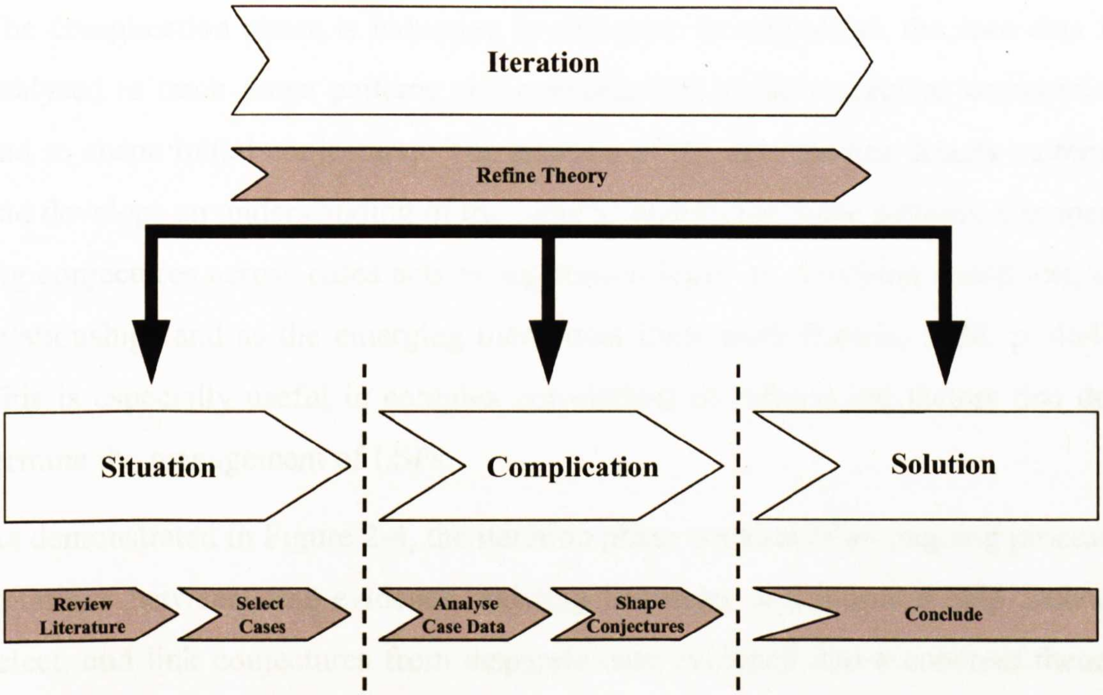

Figure 2-4: Methodological Process – Iterative Triangulation

The resulting methodological process – iterative triangulation – unfolds in four phases (see Figure 2-4; source: own figure). These phases were followed in the development of this research. The phases illustrate the order of the defined methods and elements used: research on the basis of case studies, explanation buildings, taxonomies and an iterative procedure throughout the phases.

In the situation phase, research questions are initially defined. Clarifying research questions, constructs of interest, and case search strategies and selection criteria provide a framework that guides later phases. An extensive literature review helps specify research questions and the constructs of interest, which provide the boundaries of the theoretical domain (Lewis, 1998: p. 460). The cases were selected according to defined boundaries from several sources, such as management consulting projects that the author personally attended and reasons of confidentiality. The case studies are listed in chapter 6.1. The structuring for the case studies elements were derived from the procedure in chapter 4 and the literature review that identifies and verifies the design variables in chapter 5.

The complication phase is inductive in character. In this phase, the case data is analysed to track down patterns and consistencies in the respective taxonomies and to shape initial conjectures. The analysis of the case studies detects patterns and develops an understanding of the 'why's' underlying those patterns. Comparing conjectures across cases acts as replication logic, as clarifying constructs, as relationships and as the emerging theoretical framework (Lewis, 1998: p. 464). This is especially useful in complex correlations of influencing factors that determine the management of LSPs.

As demonstrated in Figure 2-4, the iteration phase consists of an ongoing process. Iterations between case evidence, existing literature, and intuition help extend, select, and link conjectures from disparate case evidence into a coherent theory (Lewis, 1998: p. 465). Iterations help in explanation building. Weick (1989) lists several techniques that help to improve theory quality by continuous refinement.

In the solution phase, the iterative triangulation ends. This phase concludes the theory development process by evaluating the theory and suggesting further research possibilities (Lewis, 1998: p. 466). Chapter 7 assesses theoretical contributions, bridges theory development, and theory testing.

The choice of this research methodology allows the author to approach a new field of research and to combine practical experience with the theoretical development of a comprehensive model. As such, it permits an important contribution to both academic and managerial theories not available through alternative methods.

3 Conceptual Framework

The purpose of the conceptual framework is to prepare a base that can be applied to the empirical data. Analytical concepts are evaluated concerning the suitability to assess and judge logistical situations and the management approach of LSPs. Conceptual frameworks serve to build up a to-be reality in business practice. A design model is used to demonstrate design options and to derive design recommendations, which means it is not necessarily a universally valid and generally applicable formula (Kieser, 1993: p. 3). Design models are supposed to function as a basis for the comparison of design options in the business world. Existing concepts are made available for discussion and comparison on the basis of the conceptual framework. For the examination of concepts a consistent and standardised terminology is developed. The conceptual framework is used to demonstrate a benchmark for the evaluation of practical and theoretical concepts, which means it demonstrates a best practice[21]. This implies that conceptual frameworks have to be based on a high quality grade to be able to serve as a benchmark. In other words theoretical concepts are prepared to be confronted with empirical evidence and practical experiences of implementation. Building up the conceptual framework forces to be selective (Miles, Huberman, 1994: p. 18): one has to decide and analyse which variables are most important, which relationships are likely to be most meaningful, and, as a consequence, what information will be collected and analysed in the case study research.

Concepts are design models of a formulated future reality that include the fundamental components and their interrelations as well as their interactive structure. The model is amenable for various concrete forms and deductions (Lofland, 1974: p. 102). The conceptual framework of strategic elements of the service

[21] The Best Practice Ad hoc Committee of the GSA Office of Government wide Policy, 1999 defines 'best practice' as: "Best practices are good practices that have worked well elsewhere. They are proven and have produced successful results". Therefore, 'best practices' are no general solution to management problems but provide a helpful guidance for the solution of company-specific problems.

provider management forms the basis of the concepts to be defined. The case study research and their empirical examination that base on this conceptual framework, and on the derived guidelines, as well as on the definition of the design fields, underline the validity and the reliability of the concepts and their content. Furthermore, they deliver statements of their suitability and their borders.

3.1 Management of LSPs as Object of Investigation

The management of LSPs deals with the planning, design, steering, management and controlling of cooperations between outsourcing companies and (a) LSP(s). The aim of the cooperation with LSPs is the complete utilisation of the joint expertise and the exhaustion of potential savings in costs as well as potential service and quality improvements. The management of LSPs consists of three main elements:

- **The identification and definition of suitable LSPs:** On the basis of logistical needs, the logistical supply should be matched according to the structure of the respective logistics services supplier. The most capable LSPs are identified. Changes in the logistical demand of the focal company as well as changes in the market of logistics services require a periodical matching of the demand and supply structure of logistics services.
- **The choice of the suitable management approach for the matching LSP:** From the matching of the logistical demand and supply structure diverse requirements concerning the cooperation intensity and style can be derived. Complex demands tend to require a more detailed and close cooperation approach. Standard demands tend to be handled in a looser cooperation and management style. In addition, LSPs with lower profiles tend to require a more detailed and close cooperation approach, whereas improved capability profiles can be handled in a looser cooperation and management style.

- **The management of LSPs:** The management of LSPs consists of planning, steering and controlling elements of the cooperation with the LSP. The management tasks are spread out over the complete life cycle of the cooperation: 'Analysis Phase', 'Start-up Phase', 'Operating Phase' and 'Break-up Phase' or, in the nomenclature of the transaction cost theory: 'Information- and Decision Phase', 'Agreement Phase', 'Processing- and Controlling Phase' and 'Adjustment Phase'. The content and the tasks of the design fields of the management of LSP vary according to the chosen cooperation and management approach throughout the cooperation life cycle.

In fact, all intermediate forms of cooperation have to be examined throughout the cooperation life cycle. Therefore, the term 'integration' or 'management' are chosen in this context. The terms 'integration' (of LSPs) and 'management' (of LSPs) include all cooperation relations and extend the scope to a continuum of possible supply and cooperation forms. The term 'integration' is the most widespread one, which again is not defined consistently (see Buzzell, Gale, 1989: p. 138; Teece, 1980: p. 224; Weiss, 1992: p. 17). The term 'integration' does not strictly distinguish between activities within and outside the company. In fact, it examines the relations between two successive value-added steps. A profound integration can not only be reached by in-house-production but also by a close involvement with a LSP by means of a detailed and long-term contract (Harrigan, 1985: pp. 398; Picot, Schneider, Laub, 1989: p. 379; Baur, 1990: pp. 94).

Hence, the decisions around the management approach of LSPs also comprise the definition of cooperation approaches and contract forms. In this context 'integration' means the outsourcing of services to LSPs that are 'integrated' into the companies` activities and processes. They are integrated by means of organisational, IT, process and personnel linkages. The management of all the linkages to an external LSPs results in the management of LSPs that is defined as the object of investigation in the present study.

3.2 Logistics as an Object of Investigation

This chapter defines the main logistical terms used in the context of this thesis. First, logistics and logistics outsourcing are defined and are segregated concerning surrounding terms. Second, logistics services are defined and structured.

3.2.1 Logistics

Logistics has experienced various definitions and interpretations throughout its history[22]. The word logistics is French in origin, a military term meaning the art of transport, supply, and quartering of troops[23]. The term 'logistics' originates from the French term 'loger' (to lodge or to quarter). In his Précis de l'Art de Guerre (The Art of War), published in France in 1836, Baron Antoine Henri de Jomini created the word 'logistics' and defined the concept according to which management of flows presented a problem to be solved at the same time as strategic and tactical decision were taken. At the same time 'strategy' was military strategy and 'flows' concerned all goods, from food to weaponry, that needed to be transported to, or close to, the battlefield.

Literature, today, provides a spectrum of concepts and definitions, some of them even contradictory. The definitions range from an academic-conceptual understanding (logistics as academic education), to a listing of various logistical tasks as well as content-driven approaches. These content-driven approaches are either a managerial coordinational approach (logistics as the coordination of the material flow) or a strategy-oriented (logistics as trans-sectoral strategy to optimise the production of goods or services). Holmes quotes the definition of the term 'logistics' according to the European Logistics Association: "the organisation, plan-

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[22] For the history of the term 'logistics' see Dehler, 2001: pp. 9f; Näslund, 2002: p. 49.

[23] For the development of 'logistics' from the military origin to the economic meaning see Weber, Kummer, 1998: pp. 1-6.

ning, control and execution of the goods flow from development and purchasing through production and distribution to the final customer in order to satisfy the requirements of the market at minimum costs and minimum capital use" (Holmes, 1995: p. 3). Stock and Cooper switch the emphasis to the customer's needs and cite the definition of 'Strategic Logistics Management' from the Council of Logistics Management (1986): "the process of planning, implementing and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods, and related information from point-of-origin to point-of-consumption for the purpose of conforming to customer requirements" (Stock, Cooper, 2000: p. 7; Cooper, Lambert, Pagh, 1997: p. 2). Martin (1998: p. 4) states that logistics is the process of strategically managing the procurement, movement and storage of materials, parts and finished inventory (and the related information flows) through the organisation and its marketing channels in such a way that current and future profitability are maximized through the cost-effective fulfilment of orders. The main reason for the differences in definition is that logistics has no academic origin but a managerial one. In practice, there is a wide array of definition for logistics and logistical networks. Literature agrees on the central content of the term logistics: "Logistics is the target-oriented overcoming of spatial and temporal disparities" (see Magee, Copacino, Rosenfield, 1985: pp. 1; Ihde, 1991: p. 2; Pfohl, 2000: p. 12; Christopher, 1998: p. 11). Logistical activities link spatially and temporally separated processes of production and consumption without changing the physical characteristics of products. Therefore, logistics refers to the art of managing the flow of materials and products form source to user. The logistical system also includes the total flow of materials, from the acquisition of raw materials to delivery of finished products to the ultimate users, and the related counter flows of information that both control and record material movement.

Logistics in this context deals with the management of logistical networks and the management of several players in a system. In this dissertation the focus is placed on the interaction of several players, namely the outsourcing company and the LSP(s). The primary activities of logistics are transportation, inventory and order processing; secondary functions involve decisions reaching beyond routine operations to longer time spans. Simultaneously, they involve coordination with other areas of the firm. All logistics activities are affected by environmental factors that influence the direction the system must take to survive. Logistics comprises the holistic planning, steering and controlling of all company-internal and company-spanning goods- and information flows. Logistics provides customer- and process-oriented solutions for partial and complete systems in companies, consolidated groups and networks (Baumgarten, 2000: p. 6). Hence, logistics develops and applies methods and tools for the coordination of goods- and informational flows. These flows usually cross the barriers of departments. Therefore, logistics overcomes company barriers and interfaces and finds solutions concerning these problems. Wildemann classifies four logistical concepts (Wildemann, 2001: pp. 6):

- **Instrumental logistics conception:** This dimension comprises the managerial-technological instruments that are required to execute logistical tasks. The instrumental logistics conception deals with the development and the application of methods for the planning, management and coordination of logistical processes or logistical systems as well as the application and the utilisation of technologies of material flow management, information and communication.
- **Functional logistics conception:** The functional view considers company logistics as a task complex that consists of all operative, administrative and planning activities that are needed for the adequate supply and disposal of materials and goods for a company (Weber, Kummer, 1998: pp. 7). In this conception logistics is seen as a functional subsystem alongside traditional company functions such as R&D, procurement and sales.
- **Institutional logistics conception:** The institutional logistics conception integrates company logistics into the organisational system and the com-

pany organisational structure (see Wegner, 1993). The functional view does not necessarily need independent organisational logistical structures. Nevertheless, the reorganisation of existing organisational structures is considered a factor for success in the implementation of the logistics conception. The bundling of tasks and competencies in independent organisational units is a prerequisite for a holistic optimisation of the material- and information flows.

- **Management logistics conception:** The management-oriented logistics conception considers company logistics as a management concept and highlights strategic design elements (see Bowersox, 1990; Bowersox *et al.*, 1989; Magee, Copacino, Rosenfield, 1985). Logistics is seen as a cross-functional attitude aimed towards a time-efficient, customer- and process-oriented coordination of value-adding activities. The management -oriented logistics conception exceeds the traditional field of logistics. This understanding implies logistical thinking and acting in all company units and throughout the company hierarchy.

Academic literature presents a consensus that logistics developed alongside various evolutionary steps (see e.g. Bowersox, 1990; Bowersox *et al.*, 1989; Bichler, Gerster, Reuter, 1994; Hewitt, 1994; Weber, Kummer, 1998; Göpfert, 1999; Klaus, 1999; Weber, 2002). These evolutionary steps correlate with the different understandings as described above. Figure 3-1: demonstrates the evolution of logistics according to Wildemann 2001a: p. 6).

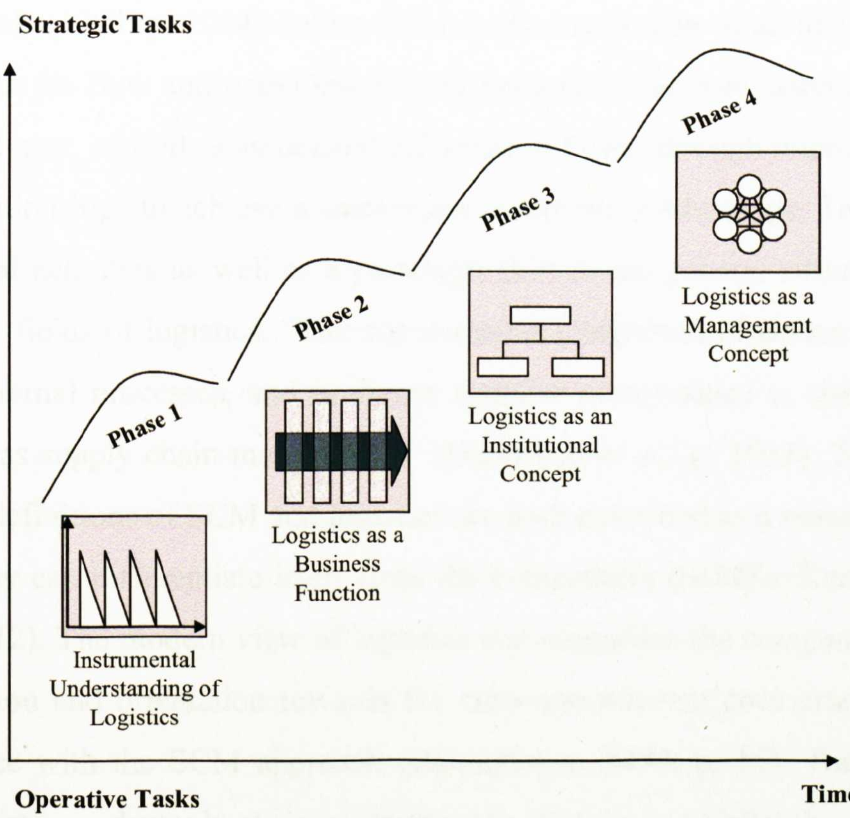

Figure 3-1: Evolution of Logistics in Evolutionary Phases

These phases describe a learning curve that increases the logistical knowledge. The phases are consecutive and build on each other. Due to the fact that each sequential phase includes the contents of the predecessor plus additional tasks, the phases are shown as on top of another. In the first two phases, improvement in efficiency of logistical processes by the means of specialisation, function-spanning bundling and the coordination of material flows are the focus. In the third phase, logistics is seen as an institutional concept in which logistics has a leading role. Logistics is responsible for the implementation of logistical thinking throughout the organisation. In the fourth phase, the borders of the organisation are overcome. Logistics is seen as the management and the coordination of logistical networks – the complete supply chain. The present study is embedded in this understanding of 'logistics'.

Literature often discusses 'Supply Chain Management' (SCM) (Hirschsteiner, 2003: pp. 104f) as analogous to the management logistics conception. Handfield and Nichols (1999: p. 1034) define SCM as the integration of all activities associated with the flow and transformation of materials from raw materials through to the end user, as well as associated information flows, through improved supply chain relationships to achieve a sustainable competitive advantage. This includes managerial activities as well as a paradigm shift in the general attitude towards the action fields of logistics. "The simultaneous integration of customer requirements, internal processes, and upstream supplier performance is commonly referred to as supply chain management" (Handfield *et al.*: p. 1035). The service-oriented definitions of SCM and logistics are both described as a means by which a company can differentiate itself from the competitors (Schäfer-Kunz, Tewald, 1998: p. 12). The modern view of logistics that comprises the company-spanning optimisation and orientation towards the customer-relevant core processes is in accordance with the SCM approach (Baumgarten, 2000: p. 15). Therefore, the terms logistics and supply chain management will exist in parallel throughout this study.

3.2.2 Logistics Outsourcing

Logistics outsourcing is defined as the use of a third party (not necessarily a third-party LSP) in a specified contractual relationship, in the execution of all or part of the organisation's logistics operations (Bolumole, 2001; Lambert, Emmelhainz, Gardner, 1999; Maltz, Ellram, 2000). Various terms, such as logistics alliance (Bowersox, 1990), operational alliances in logistics (van Laarhoven, Berglund, Peters, 2000; van Laarhoven, Sharman, 1994), contract logistics (Kearney, 1995), contract distribution (Wilson, Fathers, 1989) and third-party logistics (Lieb, 2001; Lieb, Schwarz, 2002a, b) have all been used to describe logistics outsourcing.

Parallel to the term 'logistics', there is no unified definition of the term 'outsourcing' in literature. Usually outsourcing is seen as one of two possible results of the make-or-buy decision. The Institute for Supply Management (ISM) defines make-or-buy as "a determination of what products or services an organisation should manufacture or provide in-house, as opposed to purchasing them from outside sources" (2004). Outsourcing is "a version of the make-or-buy decision in which an organisation elects to purchase an item that previously was made or a service that was performed in-house; often utilised for services ..." (Bendor-Samuel, 2000; ISM, 2004). Hence, there are factual and temporal differences between the terms 'outsourcing' and 'make-or-buy' (Bliesener, 1994: p. 278). According to that outsourcing decisions are a subset of make-or-buy decisions. In addition, there is a temporal difference: make-or-buy decisions are made in a very early phase of the product development or even earlier; outsourcing decisions only relate to product or services that have been previously produced in-house (Gruhler, 1994: p. 163; Zahn, Barth, Hertweck, 1999: p. 6). In contrast, Schäfer-Kunz and Tewald (1998: p. 8) define both terms as synonyms due to their strategic character.

In the context of this dissertation, outsourcing of logistics is used as a generic term for buying logistics services and logistical solutions (e.g. transportation, warehousing services or management of logistics networks) in any kind of relationship with a producer of logistics services. Sink (1995) distinguishes between only two different types of logistics outsourcing occurring in the US today: The first involves limited acquisition of tactical services requiring large capital investments or being labour intensive (e.g. contract transportation services, fleet management, warehouse pick and pack labour). The second is the procurement of an integrated or bundled logistics service package under the management of a single provider.

The latter definition is a common one in logistics outsourcing literature and neglects any forms of logistics cooperation between the extremes of 'case-by-case' outsourcing and long-term logistics partnerships. The latter of the two types is often referred to as third-party logistics.

In many situations, however, third-party logistics is used as a synonym for outsourcing single services in arm's length agreements, since the term 'third-party' just refers to the external producer of the logistics services, that between the first party (the consignor) and the second party (the consignee). In logistics literature, third-party logistics is often used in a similar context to outsourcing. In this manner, third-party logistics is only used to define a specific type of LSP. Third-party logistics can mean almost anything from a one-time purchase of a transport service, to turnkey logistical systems for a whole firm. The first type of relationship is often referred to as arm's length. Gardner, Cooper and Noordewier (1994: p. 125) state that "this type of relationship is characterised by single-transaction contracts, no financial interdependencies beyond timely payment, minimisation of relational components (e.g. no sharing of benefits and burdens), and a total 'a la carte' approach to the range of value added services offered".

Mainly due to the historical development of the term logistics outsourcing, there is no unified understanding of the object of discussion. First definitions relate to the outsourcing of information technology[24]. Bühner and Tuschke define outsourcing as the external processing of IT tasks (1997). Furthermore, several definitions relate either to material goods or services. This narrow definition does neither correspond with the original meaning of the term[25] nor with the predominant usage of the term in literature and practice (see e.g. Behme, 1993: p. 291; Bliesener, 1994: p. 278; Zahn, Barth, Hertweck, 1999: p. 5; Linder, 2004: p. 54). In this context, outsourcing is defined in a broader sense: outsourcing is the required direct or indirect supply of a company with input factors from an external source. Input factors can be material goods as well as services.

In contrast to the above definition, outsourcing also relates to services not previously produced in-house. Very often, literature defines outsourcing as a long-term

[24] See e.g. Picot, Maier, 1992; Köhler-Frost, 1993.

[25] See Barth (2003: p. 8) who defines the outsourcing object as a neutral one.

process in partnership cooperation with a LSP (see e.g. Gebhardt, 2006: p. 25). In contrast to previous definitions, here the author defines the term outsourcing as cooperation with a LSP notwithstanding the time frame of the cooperation. Therefore, short-term transport services that are performed on a day-to-day basis are also a focus of the present study. Therefore, the definition is orientated towards Sydow (1992b: p. 104) who defines "outsourcing as external supply in the continuum in-between the extremes between hierarchical coordination (vertical integration) and market coordination (trading on the spot)". In the following chapter, logistics services are defined. All described and classified services can, in principle, be part of logistics cooperations and can therefore be outsourced.

3.2.3 Logistics Services

Most of the differences between the procurement of services and the procurement of goods apply to the purchase of logistics services (see for example Axelsson, Wynstra, 2002). Services differ from goods since they are (Zeithaml, Berry, Parasuraman, 1985: p. 43):

- intangible,
- heterogeneous (not standardised),
- inseparable (meaning difficult to separate production of the service from the consumption),
- and perishable (not possible to stock).

Logistics services also possess these characteristics. However, they also differ from a large number of the services described in the service literature. For instance, logistics services mainly involve business-to-business relationships, where not only the shipper is the critical stakeholder, but also his customer who can be directly affected by insufficient services. Furthermore, in many cases there is a need for close interaction with both the client's and their customer's processes.

There are various types of logistics services that differ in various factors. The distinguishing factors will be outlined in chapter 4.2.1. At one extreme, company-spanning logistics services, in the framework of SCM concepts, form a category of services that can only be performed by specialised LSPs in closest cooperation with the supply chain-involved companies. The steering and management of company-spanning networks is one of the most complex scopes of these duties. Steering in this context comprises the target-oriented influencing of the complete supply chain by variation of its influencing parameters, such as the capacities in the valued added chain, safety stocks and supply chain event dates. The steering and management of supply chains therefore comprises all comprehensive measures that aim at an improvement of the results of the complete supply chain. On the strategic level this means the planning of networks and Enterprise Application Integration, on the tactical level storage and stock planning and management and on the operative level the planning of transports and tours as well as job control. At the other extreme are unified, non-complex logistics services that do not need specialised expert and can be performed by a larger number of LSPs.

The spectrum of logistics services has grown significantly throughout the last years. In the past a differentiation in the spectrum from transport to order processing was sufficient (Zöllner, 1990: pp. pp. 86-88). The understanding of logistics in industry and trade, and the offered spectrum of LSPs has a two-way influence. On one hand, logistics services as a derived demand are heavily dependent on the industry and trade developments. On the other hand, LSPs induce outsourcing potential by broadening their service portfolio for industry and trade. Significant for this development are innovations in technology, mostly in the field of information technology, and promoters of these developments are the quantum leaps in the technological environment, mainly in the information and communication sector.

Hence, in this study logistics services are defined in a broad sense. The development of logistics services reflects a rising degree of complexity, a bigger share of additional service efforts and an increasing demand for resources. In addition to conventional services, customer-individual services such as assembling services in the context of late-fit-strategies or quality assurance services can be found in the standard-portfolio of LSPs. Significant higher resource availabilities are needed for holistic logistics services, for which complete logistical processes, such as order processing including the management of return shipments, customer relationship management or the complete intra-company material flow, are in focus. In these fields, highly-specialised LSPs with an extensive vertical range of services have established themselves in ascertained industries.

The spectrum of logistics services can also be differentiated by activity processes. Hereunto, the distinction between the process elements development, supply, and order processing including production and distribution as well as disposal is suitable (Baumgarten, Thoms 2002). Another activity-based form of classification of the logistics services market lies in the classification into operative, coordinating and strategic services. Along with that goes the offering of value-added services. LSPs that act mostly on the operative level not usually offer value-added services. Parallel to the increasing of duties and responsibilities, the requirements concerning the competence of information- and communication systems rise. These criteria to classify are backed up by several studies of the logistics department of the Technical University of Berlin, in which companies were asked which services they attribute to logistics. In the course of time more and more services are assigned to logistics. Therefore, Weber distinguishes five forms of logistics performance (Weber, 1986: p. 1198): first, the provision of logistical production factors such as the provision of logistical assets; second, the execution of logistical processes such as transport or handling services; third, the overcoming of space and time disparities such as storage services; fourth, the securing of the availability of resources and fifth, disposition as independent form of logistics services. In the context of this work, these five forms of logistics performance as discussed by Weber are used.

3.3 Theoretical Approaches to the Design of the Management of LSPs

The importance of, and the reasoning for, situational approaches to the management of LSPs can be examined by various theoretical approaches. The aim of this chapter is not a complete repetition of the theoretical approaches but to scrutinise their suitability in making a contribution to the construction of a differentiated design in the management approaches of LSPs, as well as their ability to assist in the answering the research questions.

The literature analysed orientates itself towards the solution of a different set of research questions than the ones defined in the present study. Throughout the definition and design of the vertical range of logistics and the design of the management approach the questions that arise are:

- Why are there different cooperations and ways to cooperate between customers and LSPs?
- Why do customers outsource parts of their logistics and transfer them to LSPs?
- Why do LSPs take over new services that have not been part of their portfolio?

Throughout the literature, various different approaches have been employed to try and explain them. In the following section, these approaches are characterised, the contextual connections are clarified, and the most suitable approaches to answer the research questions are examined. The aim is to define the most suitable approach(es) to decide upon and to define the optimum management approach of LSPs. Hence, each theoretical approach is analysed with regards to its contribution to the analysis and design of the management approach of LSPs.

The theoretical approaches can be further distinguished as follows: first, traditional approaches which are elements of neoclassical theory and focus on direct cost comparisons; second, strategic approaches that mainly consider the core competencies of an organisation; third, modern approaches that are elements of the new institutional economics that consider cost comparisons as well as interdependencies between the main actors on the market (and thereby strategic considerations as well). This distinction is used in the context of the present study to structure the theoretical approaches.

In the following section, the main established concepts that are used to define the vertical range of logistics and the management approach of LSPs are discussed and evaluated. The most important approaches are: first, the cost-calculating approach and the learning curve-concept, second, the theory of core competencies, the market-based and the resource-based view and, third, the network approach, the principal agent theory, the transaction cost theory as well as the total cost of ownership (TCO) approach. The selection of the chosen approach, the TCO approach in combination with the main transaction cost phases, but also the respective influences of the other analysed approaches, is reasoned throughout this chapter and summed up at the end.

3.3.1 Traditional Approaches

Cost-calculating approaches are traditional methods to reason integration- or disintegration decisions (Wingert, 1997: p. 132). The first theoretical approaches concerning make-or-buy decisions were published in the 1960s and 1970s and focused on cost calculation (Männel, 1968; Männel, Dumke, 1973). These 'traditional' approaches with a cost-calculating focus centred mainly on the neoclassical production cost theory that works on the assumption of complete information and rationale acting. This information transparency leads to a complete market and a market balance (Männel, 1968: p. 90). Organisations are only represented by their production functions. Relevant traditional theoretical approaches are the cost-calculating approaches as well as the learning curve concept.

3.3.1.1 Cost-Calculating Approaches

Basic idea of the cost-calculating approaches is the comparison of the costs of a product being produced in-house versus the costs that occur when being purchased from an external supplier (Deyle, 1996: p. 191). Hence, the costs for the external supply by a third party are compared to the costs of in-house production (costs of goods manufactured) (Hosenfeld, 1993: pp. 14)[26].

The costs to be considered depend on the time pattern of the decision as well as on the utilisation of the available capacities. For the purpose of these integration- or disintegration decisions as well as the preliminary management approach decision, cost comparisons take into consideration all resources and processes that are affected by a possible change of source (Picot, 1991a: p. 340). Here, the basic assumption is that the decision between in-house production and external supply by a third party is made based on an efficiency comparison that demonstrates the profitability of a choice (Männel, 1996: p. 70). To evaluate alternatives of external supply and in-house production each are quantified concerning costs and revenues or payments. The cost-calculating approaches recommend the alternative with the lowest costs. Cost-calculating approaches focus on the analysis based on existing potential. Restrictions concerning the capacity load and the employment grade are considered in detail (Reichwald, Dietel, 1991: p. 425). Two cases can be separated: free capacities and bottlenecks. Cost-calculating approaches are mostly short-term oriented (Hosenfeld, 1993: p. 14) and concern the definition of the vertical range of manufacture focus on the production costs. Other make-or-buy related costs, such as the costs of a dislocation or the complete external purchase costs are not examined (Wildemann, 2000: p. 45). This procedure does not take into account structural changes, which means that the reduction of fixed costs is not considered.

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[26] Fröhling (1994) demonstrates the complete process of a cost-calculating based comparison of make vs. buy.

The cost-calculating approaches provide a basis for the analysis of the management approach of LSPs. With the help of cost-calculating approaches cost elements are divided into fixed and variable parts that result from different forms of management styles and integration approaches. Hence, the cost-calculating approaches serve as a preparation tool for the design of the management approach of LSPs.

3.3.1.2 Learning Curve Concept

The learning curve concept acts on the assumption that with a duplication of the cumulated output the costs per piece are lowered by a constant percentage rate. This percentage rate normally amounts to 20 to 30 percent (see for example Coenenberg, 1999: p. 210). The learning curve concept has been empirically validated in the chemical and the metal-working industry (Henderson, 1974: pp. 115 ff.) and since then validated in several additional contexts. The learning curve concept can be explained by the following elements (Crawford, 1944: pp. 268 ff.):

- The **concept of the learning curve** centres on the observation that a human being perfects their abilities over a period of time. This results in a shortening of the finishing time of a specific task. There are numerous possibilities of improvements by experience values. Weak points and bottlenecks are made visible, redundant methods and waiting times are reduced, procedures are simplified or technical abilities of the employees are increased. This results in decreasing proportionate costs per piece. The learning curve is not autonomous; it only describes a potential saving in costs. Its realisation depends on the dedication of the respective enterprise.
- **Economies of scale** mean that the costs per piece decline with an increased output and a constant size of the enterprise. The overall costs are raising but due to the increasing output the costs per piece are declining. The productivity of an enterprise rises with the technical progress made.

This means a constant raise in the share of fixed costs and a reduction in the share of variable costs.

- All additional cost-lowering measurements such as standardisation or process optimisation are summarised to **rationalisation**. Productivity is also raised by technical progress. Technical progress also adds to the effect that the share of fixed costs rises whereas the variable costs per piece are reduced.

The lesson learned from the learning curve concept for the make-or-buy and the management decision in logistics is that logistics services and processes are to be made internally only if there is no other provider that is able to produce on a higher scale in a more efficient manner. In addition, the logistics services outsourced should be focused on as few LSPs as possible. Thereby, the LSP gets the possibility to realise learning curve effects in its own production of logistics services. Hence, the general aims for the shipper should be a standardisation of the logistics services and to spread the procurement amount on as few LSPs as possible.

3.3.1.3 Assessment of the Traditional Approaches

The definition of the vertical range of manufacture and the definition of the management approach of LSPs purely on the basis of cost comparisons is problematic due to several reasons:

- First, **the quantification of in-house production costs on the basis of full costs is insufficient**. The allocation of general and administrative costs to the cost units does not reflect the actual cost causation. Therefore, the full cost calculation tends to support in-house production. The blanket consideration of full costs does not support efficient decisions. A heavy orientation on variable costs is problematic in capital-intensive or asset-intensive industries. It is more important to consider the relevant costs and to divide them according to their appearance (Männel, 1996: p. 81). Decision-relevant costs are influenced by, and directly attributable to, the respective alternative source. Costs that are influenced neither by the in-house production nor by the external procurement should not be considered. In addition, the market price is often not a pure cost figure. Partially, suppliers are offering too low prices to get a contract and are speculating on a later increase in the prices. General and administrative costs are internally postponed and relocated until the lowest priced supplier quits. Therefore, the decision on in-house production or external supply can only be a purely cost-based decision if all occurring costs are quantifiable and comparable and the cost-development can be predicted over a longer period of time. Both preconditions are usually not completely given in logistics outsourcing decisions or in the analysis and the design of the management approach of LSPs.

- Second, often, **cost-calculating approaches are criticised for not being able to allegorise the decision on the type of buyer-supplier relation**. The internal cost calculation systematics is not exact enough to identify the 'de facto' costs in a value-adding step. The make-or-buy and the management approach decision are endangered by political interests (Lamming, 1994: p. 190; Fischer, 1993: p. 21; Schneider, Baur, Hopfmann, 1994: p. 63). The biggest problem is that numerous factors are not, or only partially, quantifiable. Therefore, they are not considered throughout the make-or-buy and the management approach decision. For example, the coordinational procurement efforts can be saved by an internal production. On the other hand, investments of the LSP into expertise and assets are an advantage due to the fact that these investments do not have to be made internally (Lamming, 1994: p. 186). Traditional cost-calculating approaches neglect cost elements that occur before, during and after the supply of logistics services from external parties (Wißkirchen, 1999b: p. 284) and therefore have no life-cycle view on the cooperation with a LSP.

- Third, **cost-calculating approaches do not consider non-cost factors such as strategic aspects** (risks and quality assurance). In addition, cost-calculating approaches concentrate on the extremes of in-house production and external supply. The spectrum in-between, such as cooperational forms or strategic partnerships, which can take the form of cooperations or joint ventures, is not taken into account (Antlitz, 1999b; Wingert, 1997: p. 136; Picot, 1991a: p. 340; Zahn, Barth, Hertweck, 1999: p. 8). Nevertheless, the complete spectrum is of practical relevance and will be elaborated in the frame of this work. Thus, the classical cost-calculating approaches do not balance the make-or-buy decision with the aims and strategies of the company. A pure operative short-term approach is chosen that does not correspond with a long-term optimum business approach (Fischer, 1994a: p. 293). Nevertheless, the cost-calculating approaches have their eligibility for short-term decisions. This is valid if in a full-employed company short-term peaks are outsourced. Scarce resources and capacities are disburdened for the sake of a more efficient production.

Despite these limitations, the cost-calculating approaches are the most used approaches for make-or-buy decisions and for the assessment for the management approach of LSPs in literature as well as in management practice (Picot, 1991a: p. 340; Schneider, Baur, Hopfmann, 1994: p. 59). The main advantages of cost-calculating approaches are their relative convenience of use and the operative method. Therefore, the approaches of modern cost-calculation can make a contribution to the decisions on the management approach of LSPs. They help in calculating the basic cost data that goes into the overall assessment approach. Nevertheless, further aspects such as strategic elements and interdependencies between market supply and demand, and the main actors have to be taken into account.

3.3.2 Strategic Approaches

Strategic management research deals with the reasons for success or failures of organisations and companies (Rumelt, Schendel, Teece, 1995: p. 9). The aim is to explain why some organisations are more profitable for a long period than others. Accordingly, the business environment as well as the internal status of an organisation is analysed. On this basis, measures are identified that induce a sustainable, long-term, and successful development of the organisation's business (Antlitz, 1999b: p. 40; Rasche, Wolfrum, 1994: p. 501).

In some aspects, the strategic approach is the antithetic procedure of the cost-calculation approaches. The described approaches, which are relevant in this context, as well as approaches such as scoring models or the value of benefit analysis aim at the consideration of qualitative criteria (Picot, Maier, 1992: p. 20; Nagengast, 1997: p. 181; Fischer, 1993: p. 25). Relevant for the analysis and the design of the management approach of LSPs are:

- **the core competency approach**, which defines the abilities of an organisation to secure sustainable competitive advantages;
- **the market-based view** that analyses the surrounding conditions of an organisation as well as
- **the resource-based view** that focuses on internal resources and capabilities as the source for the success of organisation.

In the following section, these three approaches are described and analysed concerning their possible contribution to the analysis and the design of the management approach of LSPs in different logistical situations.

3.3.2.1 The Core Competency Approach

Prahalad and Hamel (1990: p. 85) suggest that companies should only generate products that are derived from the concentration of some central company capabilities – the core competencies. A core competency can take various forms, including technical/subject matter know how, a reliable process, and/or close relationships with customers and suppliers (Mascarenhas *et al.* 1998: p. 119). Core competencies are defined as capabilities, that:

- allow a successful entrance to diverse markets,
- perform a significant contribution to the customer's benefit and
- are difficult to imitate by the competitors (Prahalad, Hamel, 1990: p. 93; Wildemann, 2000: p. 59).

The outsourcing of non-core activities and hence the concentration on core competencies allows to focus scarce resources on strategically relevant areas (Quinn, Hilmer, 1994: p. 43; Rembeck, 1973: p. 27; Picot 1991a: p. 339). This leads to a reduction of complexity by changing the coordinational mechanisms: instead of the coordination by plans in a hierarchy the coordination by price and the market gains in importance (Barth, 2003: p. 14). Furthermore, the concentration on relevant organisational functions allows a reduction of the overall business risks. Dependent on the contract design (see chapter 5.2.1), parts of the business risks are transferred to the LSP (Quinn, Hilmer, 1994: p. 50; Bruch, 1998: p. 33).

These core competencies are not restricted to products but generally also comprise outstanding abilities of the company such as the control of specific processes or a fast realisation of new technologies (Wildemann, 2000, p. 59). This orientation switches the approach of resources from the pure market view to an examination of internal potentials (Quinn, 2002: p. 12; Rasche, Wolfrum, 1994: p. 397; Kligge, 1992: p. 140; Prahalad, Hamel, 1990: p. 82). The aim of the core competency approach is to switch the focus from a pure market and competition view. At the front of this approach is the need for an evaluation of existing resources. Other uses of existing resources have to be analysed (Friedrich, 1996: p. 70; Prahalad, Hamel, 1990: p. 71). By definition, each function in a company can contribute to the overall cost level and provide a basis for differentiation (Rose, 2000: p. 149). Strategic partnerships and cooperations provide the possibility to use external resources and capabilities (Thiele, 1997: p. 93). Porous company borders emerge that allow a comprehensive expertise- and resource transfer. Hence, the outsourcing of logistics functions is a logical continuation of the core competency philosophy.

Overall, the core competency theory helps in evaluating the cooperation with a LSP not only from a 'status-quo' driven evaluation of the cost implications but also from a strategically-oriented point of view: This includes the evaluation of possible future influences of management approaches with LSPs on the expertise of the outsourcing company.

3.3.2.2 The Market-Based View

The market-based view derives from the assumption that the market environment mainly determines a successful strategy (Friedrich, 2000b: p. 11). In this context, strategy can be defined as the "determination of the basic long-term goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals" (Chandler, 1987: p. 15). An organisation analyses the industry-specific competitive forces and its strategic positioning and derives an adequate strategic position that secures long-term profits. Due to the focus on the industry environment, the market-based view is also called 'industrial organisation' (Bamberger, Wrona, 1996: p. 386).

The basic assumption of the market-based view is also called the 'Structure-Conduct-Performance-Paradigm' (Rühli, 1995: p. 93; Friedrich, 2000b: p. 11). The research approach is driven by Porter's model of competitive forces (1999: p. 25). He analysed industry structures and their strategic implications. Porter (1999) distinguished five competitive forces:

- The **threat by new competitors** that is dependent on the probability that they enter the existing market. The entry barriers such as economies of scale, capital need, switching costs or state regulation (Porter, 1999: p. 30), mainly determine this risk.

- The **threat by substitutes** (products or services) that is derived from new products/ services from other industries that can be compared on a functional level. These substitutes restrict the profit potential of an industry.
- The **bargaining power of customers** can also restrict an industry's profit potential. Bargaining power centres on customers that purchase standard products, that are able to exchange sources and providers very easily and quickly and that are able to threaten with a backward integration of production of products or services.
- Analogue to the bargaining power of customers, the **bargaining power of suppliers** leads to the possibility that cost increases from preliminary products can be passed on and thereby reduces the profitability of an industry. Bargaining power rests on either important or differentiated products of the supplier or on the possibility of forward integration.
- The **degree of rivalry** between the established companies describes the competitive behaviour in an industry. The rivalry is determined by factors such as the number of competitors, the speed of the industry growth and the existence of entry- and exit barriers.

Competitive forces determine the attractiveness of an industry and define the strategic positioning of an organisation. Hence, competitive forces define the behaviour of LSPs among each other as well as the competitive behaviour between shipper and LSP. Porter (1999: p. 62) developed three basic strategies:

- The **strategy of cost leadership** aims at achieving a competitive advantage by a comprehensive advance in costs. This cost advantage centres on the realisation of efficiency improvements and (partially) on the transfer of the cost advantage by lower prices to the customer. [27] This strategy is employed by various carriers as well as third-party logistics party providers, which aim at realising efficiency effects. The widespread choice of the cost leadership strategy led to an intense cost competition on the logistics market on which various LSPs tried to escape by offering value added services.

- The **differentiation strategy** bases on the offer of superior products or services. Superior in this case means superior from the customers' point of view. The customers' superior benefit rests on improved design or technology of the products and services or on accompanying activities and characteristics such as service quality, delivery reliability, or image factors. This positioning reinforces the customer loyalty and lowers the price sensibility, therefore opening up windows of opportunity in pricing. Lead logistics provider or fourth-party logistics providers choose the strategy that focuses on the offer of management or value added services.
- The **focussing strategy** implies the specialisation on a market niche, for example the specialisation on the needs of a specific customer group, a specific product programme or a geographically restricted market. In the focussing strategy a cost leadership or a differentiation strategy has to be chosen.

Porter states that one of these strategies has to be aimed at (Porter, 1999: p. 71). Otherwise, a company cannot stay competitive in the long-term and runs the risk of being 'stuck in the middle'. The market-based view is relevant due to the necessity of the analysis of the strategy of the LSP. This is a main influencing factor for the analysis of the logistics market, the logistical supply. For the logistical

[27] According to Barney, an organisation has a competitive advantage as long as an existing or potential new competitor does not simultaneously choose the chosen strategy (1991: p. 102).

demand it is important to define whether the logistics services that are being outsourced are relevant elements for the competitive positioning of the shipper. The basics and considerations of the market-based view enter the definition of the logistical demand/ logistical supply portfolio.

3.3.2.3 The Resource-Based View

The resource-based view allegorises a change of perspectives in strategic management since the 1980s. In contrast to the industry economics that focuses on external factors as determinants for a company's success, the resource-based view focuses internal resources and capabilities as the source for the success of an organisation (Bamberger, Wrona, 1996: p. 131). Object of interest is the organisation and its resources as the basis for adequate competitive strategies (Rasche, Wolfrum, 1994: p. 502; Rühli, 1995: p. 94; zu Knyphausen, 1993: p. 772; Friedrich, 2000b: p. 12).

The basics of the resource-based view go back to Penrose (1959) who was the first to discuss the connection between internal capabilities and the organisation's success. Companies are seen as a bundle of resources. Above-average profits base on unique resources and on the knowledge that these resources can be efficiently used, developed and coordinated (Penrose, 1959: p. 54). The current understanding of this approach is characterised by Wernerfelt (1984). Several authors advanced his paper (see Barney, 1991; Grant, 1991; Rumelt, 1991).

Resources are defined in several ways throughout literature. Wernerfelt defines them in a broader sense: "By a resource is meant anything which could be thought of as a strength or weakness of a given firm. More formally, a firm's resources at a given time could be defined as those tangible and intangible assets which are tied semi-permanently to the firm" (1984: p. 172). Bamberger and Wrona define it in a similar way. Barney defines them as "all assets, capabilities, organisational processes, firm attributes, information and knowledge, controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness" (1991: p. 101). Bamberger and Wrona differentiate between four different types of company resources (1996: p. 132)[28]:

- **Physical (tangible) resources** comprise all kinds of machines, assets, materials, the access to raw material and factor markets as well as immovable property and the geographical location.
- **Intangible resources** comprise on the one hand the capabilities and on the other hand the property rights of an organisation. Capabilities base for example in the knowledge and the experience of the employees. Property rights are patents, brand names, and the reputation of a company as well as running contracts. Intangible resources often have a strategic relevance (Dierickx, Cool, 1989: p. 1505; Rühli, 1995: p. 97; Barney, 2001: p. 648).
- **Financial resources** describe the internal and the external financing possibilities of a company.
- **Organisational resources** comprise processes and systems that are closely linked to the organisation. For example, management systems, organisational structures or the company culture (zu Knyphausen, 1993: p. 777).

The basic assumption of the resource-based view is that of asymmetric resource allocations of companies that developed by different histories and the imperfection of the factor market (Rasche, Wolfrum, 1994: p. 503; zu Knyphausen, 1993: p. 775). Imperfection in the factor market is the main requirement for the development of competitive advantages based on sets of resources (Barney, 2001: p. 645). Different resources give organisations their individuality and are the basis for competitive advantages that result in profit differences (Freiling, 2000: p. 185; Grant, 1991: p. 126). To use differences in the configuration of resources,

[28] There are other typologies of company resources. See for example Barney (1991: p. 101) who differentiates between physical resources, human resources and organisational resources. For the use of the work at hand the Bamberger and Wrona (1996) approach is considered as suitable.

the resources have to be valuable and scarce (Bamberger, Wrona, 1996: p. 135). To generate sustainable competitive advantages the following additional characteristics of resources are needed (Barney, 1991: p. 106; Grant, 1991: p. 123; Rasche, Wolfrum, 1994: p. 503; zu Knyphausen, 1993: p. 776):

- **The resources do not use up:** Tangible resources (with the exception of immovable properties) deteriorate and are consumed over time. The same applies to financial resources. Hence, tangible resources have a reduced stability and therefore are not usually the source for sustainable competitive advantages.
- **The resources cannot be imitated:** The value of a resource grows when the fewer competitors are able to imitate them. Barriers of imitation are, for example, patents, natural barriers such as reasons in historical contexts or special learning curve effects (Barney, 1991: p. 141; Teece *et al.*, 1994: p. 16; Dierickx, Cool, 1989: p. 1507). Furthermore, competitive advantages often derive from complex relations between different resources that are unrecognisable to outsiders. Barney calls these resources 'invisible assets' (1991: p. 142).
- **The resources are not interchangeable:** Resources are difficult to substitute when they cannot be exchanged by the same or similar competitors' resources (Bühner, Tuschke, 1997: p. 23). In the logistics market, this is especially true for complex value-added services and technological developments such as RFID-based services.
- **The resources are not transferable.** Resources are only a basis for a sustainable competitive advantage if they cannot be achieved by market transactions by competitors (missing or incomplete mobility). The resource has to be specifically assigned to an organisation. This means the resource loses significant parts of its value when used in any alternative way or surrounding. This element links the resource-based view strongly to the

transaction cost theory. Rasche and Wolfrum (1994: p. 503) and zu Knyphausen (1993: p. 777) speak of transaction cost specificity in this context.

Resources that fulfil the above requirements and that can be combined to fulfil customers' needs are the source of sustainable competitive advantages. This is especially true if competitors can be prevented in achieving this or the resulting benefit for them can be lowered. Wernerfelt compares these resources to market entry barriers (Porter, 1999: p. 29) and speaks of 'resource position barriers' (Wernerfelt, 1984: p. 173).

The high relevance of intangible resources and company capabilities for sustainable competitive advantages led to the advancement of the resource-based view to the competence-based approach by Prahalad and Hamel at the beginning of the 1990s (Prahalad, Hamel, 1990). Halley and Beaulieu (2001: p. 14) link the resource-based theory and supply chain integration. They widen the resource-based view from an organisational-internal one to a supply-chain comprising one. The competence-based view is outlined in the resulting guideline for the analysis and the design of the management approach of LSPs.

In the present study, the resource-based view is especially relevant for the derivation of taxonomies of forms of logistics cooperations between shippers and LSPs. The considerations of the resource-based view are integrated in the definition of the logistical demand/ logistical supply matrix. The resources a LSP already holds and the ones he wants to possess in future fundamentally influence the behaviour in relation to the competitors and their customers (the shippers). Hence, the resource-based view on the logistics market and the relations between LSPs and shippers explains major elements that define the power balance on the logistics market. In addition, the resource-based view highlights potential risks. Numerous articles focus on the risks that occur when logistics services that are positioned closely or are closely linked to core competencies of the shipper are outsourced. A strict orientation to cost optimisation reinforces the risk of loosing core competencies or missing the possibilities of further developing required core resources

(Prahalad, Hamel, 1990: p. 84). In this case Prahalad and Hamel stress that the development of core competencies is also possible together with a partner (Prahalad, Hamel, 1990: p. 84), i.e. cooperating in a logistics alliance. Furthermore, the resource-based view stresses the risk of resources being imitated when being outsourced. Nevertheless, core-competence-close logistics services can be procured on the market if they are for example closely linked with other resources and thereby a distinctive characteristic compared to the competitors is elaborated (Bamberger, Wrona, 1996: p. 142).

3.3.2.4 Assessment of the Strategic Approaches

The main advantage of the strategic approaches for the design of the vertical range of logistics and the design of the management approach of LSPs is the consideration of qualitative aspects (Fischer, 1993: p. 25). This is especially true in comparison to the quantitative cost-calculating approaches. Nevertheless, it is difficult to analyse and conceive any design alternatives in-between the extremes make-or-buy of logistics services. It is problematic to define manifold decision-relevant factors so that they are non-ambiguous, on a continuous scale and without any major overlappings. Nonetheless, strategic approaches for the design of the management approach of LSPs function are an important navigation in the mid- and long-term design of the cooperation approach.

Accordingly, strategic approaches make an important contribution to the assessment of the logistical situation. Strategic decisions are required to select competencies with which an organisation tries to be at the forefront of the competition (Friedrich, 2000a: p. 308). The protection of these resources is of high relevance. As discussed previously, the assessment of these risks does not only depend on the internal view but also the evaluation of resources from the competition- and the market-view. Furthermore, strategic approaches highlight the importance of the further development of resources in the cooperation with LSPs. This aspect is important for the analysis and the design of the management approach of LSPs with respect to the choice of suitable providers as well as for the definition of the suitable cooperation approach and the contractual design.

Overall, the resource-based and competence-based approaches add important aspects and perspectives to the design of the management approach of LSPs. They build the theoretical foundation for the evaluation of the risk positioning and the risk management. On the other hand, these approaches are criticised due to their imprecise definition of the term 'resources'. Freiling states that the resource-based approach therefore cannot be considered as a closed and stringent one (2000: p. 184). Other authors as well criticise the resource-based view due to the unclear definition of the term 'resource' such that it does not allow the derivation of useful design or action recommendations in business practice (Grant, 1991: p. 115; Quinn, Hilmer, 1994: p. 44). According to them, concrete techniques for the analysis of the identification of competencies and competence gaps in organisations are missing. The same goes for the definition of concrete action recommendations how to create and develop resources (Priem, Butler, 2001: p. 31).

Numerous authors consider the market-based approach and the resource-based view as complementary. They should be combined in strategic management (Rühli, 1995: p. 103; Rasche, Wolfrum, 1994: p. 513; zu Knyphausen, 1993: p. 781; Grant, 1991: p. 133). Porter (1991) argues that resources are only useful if they are able to generate a competitive advantage in the market (Porter, 1991: p. 108). This view is integrated in into the core competence approach. In this context, it is important first to integrate the logistics market view to be able to analyse the interdependencies between shipper, LSPs and market constellations and then to integrate concrete cost data in order to derive arguable design and action recommendations for business practice.

3.3.3 Modern Approaches

Modern approaches for the design of the vertical range of logistics mainly base on the new institutional economics. The new institutional economics centres on a different assumption concerning the economic players and the market surrounding. The neoclassical theory assumes the role of completely informed players that want to maximise their usefulness on complete markets that reflect complete information by prices (Fischer, 1993: p. 31 and the there listed literature). The new institutional economics tries to correct the main deficits of the neoclassical theory by analysing the behaviour of the market actors and their interactions. The main changes are a more realistic understanding of the actors' behaviour, the cancellation of the assumptions of complete information and the consideration of the information acquisition- as well as coordination-related costs (Fischer, 1993: p. 31). The aim of the new institutional economics is to explain the structure, the behaviour, the efficiency, and the changes of economic institutions (Ebers, Gotsch, 2001: p. 199). At the centre of analyses are coordinational problems and costs occurring in interchange relations as well as the analysis with which coordinational forms dependent on various factors lead to minimum costs and maximum efficiency (Fischer, 1994b: p. 582). Two approaches that build on each other are considered as relevant for this research:

- the **principal agent theory** (or agency theory) and
- the **transaction cost theory** (or transaction cost economics).

In this context, the network approach is additionally considered as relevant theoretical approach related to the new institutional economics. Therefore, in this chapter it is outlined before the basic new institutional economics approaches. It contributes to the explanation of the behaviours between the actors of interest: the consumer of logistics services, the shipper and the supplier of logistics services, the LSP. In addition to the above theoretical modern approaches, the TCO approach will be outlined as a comprehensive method with which to analyse and design the management approach of LSPs.

3.3.3.1 Network Approach

The network approach analyses economic actions that relate to the relationship between two or more actors (Stölzle, 1999: p. 89). In this case, actors can be single individuals as well as organisations that interact within institutional, social, and cultural contexts (Hippe, 1997: p. 21). The behaviour of the interacting actors is analysed and suitable network constellations and structures are assigned (Klöter, 1997: p. 46).

Concerning the development of a differentiated management approach of LSPs, it is important to analyse and structure the ambivalent variables of differentiation and integration, autonomy and dependency, trust and control, as well as cooperation and competition. The network approach systematically analyses the important fields: 'power', 'trust', 'reputation', 'collectivity', and 'culture' that are all needed for the definition of differentiated cooperation strategies (Beer, 1998: p. 118). These fields are integrated into the derivation of the logistical cooperation portfolio that integrates the logistical demand and the logistical supply view.

3.3.3.2 Principal Agent Theory

Principal-agent theories address the analysis and the design of buyer-supplier relations (Picot, Reichwald, Wigand, 1998: p. 47). They focus on the contract and its role in the interchange relation between a principal (the shipper) and an agent (the LSP). In the context of this work, principal agent theory is used to analyse the relationship between the involved players and to derive guidelines for the reduction of potential problems between them.

Similar to the transaction cost theory, as described in the next chapter, restricted rationality, a tendency towards opportunism and acting guided by self-interest is assumed for all players (Kleinaltenkamp, 1994: p. 10; Fischer, 1993: p. 68). The contractor-consignee relation is characterised by asymmetrically allocated information and insecurity about specific circumstances as well as uncertainties about the behaviour of the respective contract partner (Picot, Reichwald, Wigand, 2003:

p. 47). The level of information determines the roles of principal and agent in the relationship. As a result, of the information asymmetry between principal and agent, the agent gets potential room for opportunistic manoeuvre. The agent can use it for his advantage (Picot, Reichwald, Wigand, 2003: p. 48; Kleinaltenkamp, 1994: p. 10). To minimise the information asymmetry between principal and agent the principal has to monitor and control the contract fulfilment. Conversely, the agent could offer guarantees to convince the principal that it is not acting opportunistically. These controlling-, monitoring- and guarantee-activities cause costs that are subsumed to agency-costs. The agency costs are the efficiency criteria for the principal agent theory (Picot, Reichwald, Wigand, 2003: p. 48).

The principal-agent relation can be classified by the underlying information asymmetry between the principal and the agent. Three problem types can be differentiated:

- **Hidden characteristics**: The problem with hidden characteristics is that the principal does not have transparency about the important characteristics of the potential agent or the offered services. The resulting danger is to choose the wrong contract partner. This is called adverse selection (Akerlof, 1970: p. 493).
- **Hidden action**: When the contract is concluded, the problem of hidden action can occur. The principal cannot evaluate other opportunities or the evaluation is linked to high costs. The agent has the potential to exploit his room for manoeuvre available for opportunistic actions that would harm the principal. This is called moral hazard (Arrow, 1985: p. 38).
- **Hidden intentions** refer to a situation in which the principal has to make ex-post evaluations. Nevertheless, specific investments the principal has made for the transactions establish a dependency on the services of the agent. If the behaviour of the agent is not in accordance with that expected or the agent does not adhere to the arrangement then a hold-up situation can emerge.

To address these problems the principal agent theory recommends several measures and instruments that all aim on the reduction of the information asymmetry between principal and agent (Picot, Reichwald, Wigand, 2003: p. 49). To reduce the information asymmetry in the hidden characteristics situation signalling- and screening-measures are recommended. Alternatively, it is suggested that a self-selection-situation be designed (Picot, Reichwald, Wigand, 2003: pp. 49; Kleinaltenkamp, 1994: p. 10). Signalling behaviours are those that signal the characteristics or the performance of the agent to the principal. Screening implies an initiative of the principal by which additional information about the characteristics or the performance of the agent is obtained. Self-selection refers to a confrontation with the agent with a situation that induces a behaviour from which the principal can conclude on specific characteristics or the performance of the agent. The problem of hidden action can also be reduced by reducing the information asymmetry. The principal tries to build up additional information about the agent and thus reach a situation of perfect information. There is also the possibility that the agent provides information to the principal, either on a voluntary basis or by demand of the principal. Hidden intention means that the principal is not able to state more precisely or to substantiate the expected actions of the agent. The recommendation is to implement hierarchical elements that signal the agent to follow the directives of the principal and that enable the principal to apply sanctions against the agent.

Given that every buyer-LSP-relation is a principal-agent-relation, the three described problems of information asymmetry occur and, as such, one or a combination of the demonstrated actions is required to minimise agency-costs. Buyer-supplier-relations in logistics constellations centre on hybrids of described ideal types of principal-agent-relations. Often, the risk is shared between the principal and the agent to obtain a higher efficiency combined with a greater flexibility. Primarily, this is a question of contract design. A shifting of the risk has an important boundary: the destruction of the mutual trust basis of the cooperation (Jacobsen, 2001: p. 35). Mutual trust is the basis for a reduction of agency-cost

(Sydow, 1992a: p. 226). Even if it is difficult to distinguish several causes of opportunistic behaviour, it is still possible to derive common characteristics for the initial situation. Logistics cooperations with a high danger of opportunistic actions should aim at higher incentives to continue the partnerships rather than breaking up every time. In parallel, the principal has to protect themselves from opportunism and failure of the agent by suitable institutional solutions such as monitoring or quality assurance.

The more expensive the acquisition of information and the more inferior the information about the services of the agent are, the more the principal watches the quality of the services and the more he introduces the methods of punishment or guarantees. If low priced and accessible information exist, the principal will design the payment- and incentive system according to the efforts of the agent. A division of labour with a low coordinational effort, if coordinational tasks can be delegated to the agent with a low risk of opportunism, is advantageous. Adjacent to the reduction of information asymmetry, the risk of opportunistic actions can be reduced by an intense mutual trusted cooperation. Trust can be built up by a target agreement or long-term cooperations. In addition, it can be enhanced by signalling, with continuous reporting of the project status or about internal expertise. Furthermore, suitable contract constellations can help reduce the agency costs (Eisenhardt, 1989: p. 226). However, long-term contracts and the definition of incentive- and sanction-systems reduce the autonomy of the contractual partners. Suitable controlling systems are needed to implement an early-warning system which can point out opportunistic behaviour of one contractual partner.

Hence, aim of the design of the principal agent relationships between LSP and shipper is first, to identify the information asymmetries and to find suitable strategies to reduce them. This can be achieved by an adequate information- and decision phase and by a contract design that aims at a reduction of adverse selection, moral hazard and hold up potential. Second, the monitoring of the relationship has to be designed with based on a suitable controlling approach.

3.3.3.3 Transaction Cost Theory

The transaction cost approach demonstrates the profitability of specific transactions in different coordination structures on the basis of an institutional analysis (Barringer, Harrison, 2000: p. 368). Coase published the basic assumptions of the transaction cost theory in 1937. He defined 'market' and 'organisation' as alternative and substitutive forms of coordination of economic activities. Coase tried to answer the question why the division of labour economy can lead to organisations by his transaction cost theory (1937: p. 390). The focus does not lie on the exchange of product or services but on the assignment of property rights that accompany these exchanges (Beer, 1998: p. 52). "Transactions are not the exchange of commodities but the alienation and acquisition, between individuals, of the rights of property and liberty created by society, which must therefore be negotiated between the parties concerned before labour can produce, or consumers can consume, or commodities be physically exchanged" (Pfohl, Large (1992: p. 17 citing Commons (1931: p. 652). All costs that occur in defining, assigning and implementation of these property rights are assorted to the transaction costs. Also included are the costs of overcoming barriers in the information and communication processes that occur during in-house production as well as in external production of logistics services.

The combination of transaction costs and the price of logistics services allow the calculation of a TCO of logistics services in different logistical situations. The long-term minimisation of these overall costs in different logistical supply and demand situations is the overall aim of the dissertation at hand. A comparison of these costs in different coordination alternatives allows the identification of profitable solutions in specific coordinational structures.

For the analysis of these transaction cost, an assessment pattern is required. Picot (1991a: p. 344) describes a useful assessment raster. It is important to relate only to costs that are relevant for the present analysis. They must directly relate to different management approach of LSPs and need to be influenceable in the future (no sunk costs) (Hummel, 1993: p. 1714). Furthermore, costs for processing and controlling activities rise, for example, for quality control. With these patterns, the benefits of a specific form of logistics cooperation have to be carefully evaluated. In contrast to other authors, (Ebers, Gotsch, 2001: p. 227) the author is of the opinion that a close examination and, if possible, a detailed one-time calculation of the transaction costs is needed. To obtain the necessary tools for the analysis of logistical forms of cooperation in the following the basics of the transaction cost theory will be explained in detail.

Williamson defines the term transaction in reference to the above definition by Commons (Williamson, 1975: p. 3). Like Commons, Michaelis references transactions as the exchange of rights of disposal (Zöllner, 1990: pp. 162-163). Picot also defines transactions as an exchange of rights of disposal that enable the exchange and that constitute benefit (Picot, 1991a: p. 147). The conditions under which rights of disposal are exchanged are defined in contracts (Michaelis, 1985: p. 72). Williamson states that every problem that can be expressed as a contract problem can be analysed concerning the reduction of transaction costs (Williamson, 1990: p. 20). Furthermore, he states that the transaction cost theory defines the problem of economic organisations as a contract problem. In any case, an explicit or implicit contract and corresponding additional precautions are needed (Williamson, 1990: p. 22). Therefore, in this work the following definition of transaction will be used: A transaction is the exchange of rights of disposal. A contract is the legal manifestation of this transaction, e.g. transactions are processed with the help of contracts.

A system for the coordination of tasks is referred to as institution. Commons defines institution as "collective action in control of individual action" (Commons, 1931: p. 69). Williamson differentiates the following economic institutions: market, the company and cooperative models in-between. The character of institutions is determined by one or several characteristic contract types. On one hand, institutions are constituted by contracts. On the other hand, contracts between the transaction partners of existing institutions regulate the exchange of rights of disposal. In individual cases it is difficult to differ if the transaction is managed by the concretion of the constituting (long-term) contract or by an additional contract.

Bössman outlines a classification of transaction costs. The term coordinational cost is chosen as a generic term. In his understanding, transaction costs are coordinational costs for the coordination of markets, while organisational costs are costs relating to the internal economic coordination inside a company (Bössmann, 1982: p. 665). The same thought leads to a distinction between internal and external transaction costs (Gümbel, 1985: p. 151). The main reason for this distinction is the differentiated view of Commons who speaks of "managerial bargaining transactions" that cannot be separated from the other activities (Commons, 1931: p. 64). Transaction costs always refer to a specific situation and the chosen contract form. Internal transaction costs inside of companies or other institutions are also results of contracts that have been signed between transaction partners. These contracts do not have to exist in written form. Therefore, organisational costs according to Bössmann can be understood as costs for the execution, specification or controlling of a long-term contract relation. This results in the above definition of transaction costs.

Picot and Maier suggested the distinction of transaction costs into cost elements. Picot carried out a basic distinction of transactional costs into four cost elements each illustrated with examples (1992: p. 20):

- **Initiation costs:** for example, costs for the researching of information on a potential supplier or a provider of services and the terms and conditions (e.g. travel costs, communication and consulting costs);
- **Agreement costs:** for example, negotiation costs that depend on the intensity and the temporal delimitation of the negotiations, costs of the formulation of the contract and, in the case of obscurities, costs for the agreement process (e.g. costs for legal consulting, general and administrative costs for coordinating departments in the organisation);

- **Controlling costs:** for example, costs for the controlling of defined deadlines, qualities, quantities, prices or confidentiality agreements (e.g. cost for process management, coordination and steering of the transactions, quality control);
- **Adjustment costs:** for example, costs for the enforcement of deadlines, quality-, and quantity- or price-changes due to changed conditions during the validity of the contract (e.g. adjustments due to performance deficits).

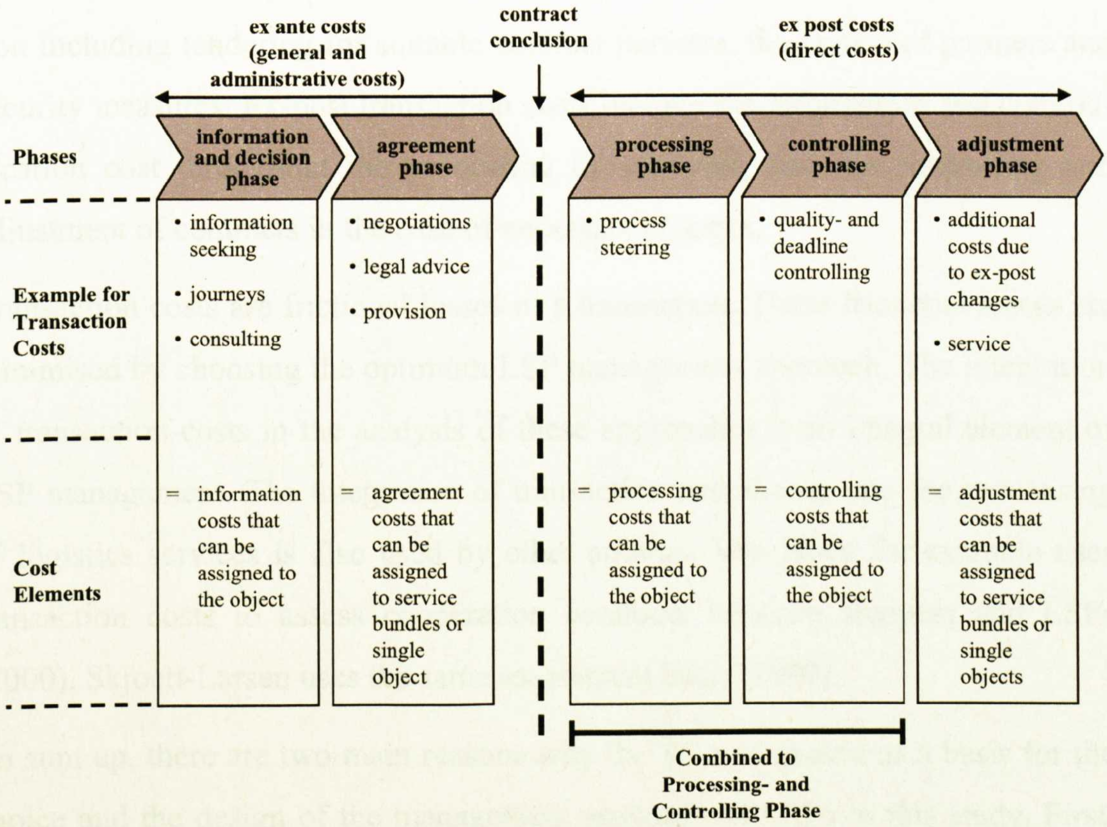

Figure 3-2: Transaction Costs in Cooperation Life Cycle Phases

The author has added the processing phase, which runs in parallel with the controlling phase. Figure 3-2 assorts the transaction costs to the life cycle of a logistical cooperation (source: own figure). Dependent on the chosen cooperation approach, the processing phase can cause a reasonable amount of transaction costs. Albach also adds termination costs (1989; Williamson, 1990: p. 10-11). This phase is not relevant for short-term contracts because of the termination of the contract relation after the transaction. Nevertheless, it becomes relevant for long-term relations. Therefore, one could add another phase:

- **Termination costs:** for example, costs for the termination of contracts, layoffs, compensation payments, costs for social plans, obsolescence of fixed assets.

Furthermore, transaction costs have to be distinguished into ex-ante and ex-post transaction costs (see also Figure 3-2). Ex-ante costs occur before the signing of the contract and comprise the costs of the contract draft, of initiation and finalisation including tendering for suitable contract partners, the choice of partners and security measures. Ex-post transaction costs include the information and communication cost throughout the processing of activities, and the controlling and adjustment of contracts in the case of necessary changes.

Transaction costs are frictional losses of a transaction. These frictional losses are minimised by choosing the optimum LSP management approach. The integration of transaction costs in the analysis of these approaches is an integral element of LSP management. The integration of transaction cost theory into the purchasing of logistics services is also used by other authors. Van Hoek for example uses transaction costs to assess cooperation contracts between shippers and LSPs (2000). Skjoett-Larsen uses the same assessment basis (1999).

To sum up, there are two main reasons why the TCA is chosen as a basis for the choice and the design of the management approach of LSPs in this study. First, several authors have recently used TCA and this theory is suggested by several logistics and purchasing researchers as a suitable framework for outsourcing decisions and, especially important in this context, a suitable framework for discussions on governance structure and logistics (see e.g. Ellram, 1991; Schary, Coakley, 1991; Pfohl, Large, 1992; Aertsen, 1993; Maltz, 1994; Cox, 1996). Pfohl and Large (1992) argue that, in order to choose a certain form of coordination for logistics, it is necessary to decide what kind of costs and benefits each form creates. These authors claim that TCA supplies the required tools for analysing different organisational forms of logistics. Second, empirical studies (see e.g. Andersson, 1997: p. 80) indicate that a higher degree of uncertainty leads to higher levels of transaction costs. This restricts the success of logistics cooperations and therefore functions as a target regardless of the type of logistical situation and form of cooperation. Logistics cooperation fails as soon as in long-term transaction cost dominates the positive operative cost effects.

Nonetheless, an additional component has to be added to the transaction costs: the price. The inclusion of the prices, which are also influenced by the logistical supply and demand situation, leads to the total costs of ownership. The TCO is the target figure in the choice and the design of the management approach of LSPs and hence, will be explained in the following section.

3.3.3.4 Total Cost of Ownership

Carr and Ittner (1992) present an overview of TCO approaches used by several organisations. The models, which they present, are all modified versions of the cost ratio method. Using the cost ratio method, an organisation usually identifies several key factors that increase costs. Factors that increase costs, such as those resulting from poor quality and late delivery, are added to the total purchase price. Dividing theses total costs by the total purchase price yields an index. This index is then used as a multiple for future bids/ prices from the supplier with which to evaluate the true total costs of ownership of doing business with a specific supplier or LSP. Ellram and Siferd (1993) developed a conceptual framework for costs to be included in TCO analysis. Ellram used case studies of organisations, which have used formal TCO analysis to develop a framework for TCO implementation (Ellram, 1996). Ellram (1996) also developed a taxonomy for classifying TCO models according to the type of buy, also known as buy class (type of purchase), and whether the TCO model is standard or unique.

Approaches similar to the TCO in purchasing have been advocated in the logistics literature (Stock, Lambert, 2001; Tyndall, 1988; Cavinato, 1992) and strategic management literature (Hergert, Morris, 1989) as means of understanding total costs throughout the supply chain. Selection and evaluation approaches, which are closely aligned with TCO, include life cycle costing (Jackson, Ostrom, 1980), cost-based supplier performance evaluation (Monczka, Trecha, 1988), and the cost-ratio method (Soukop, 1987). None of these approaches has received significant, widespread support in the literature or in practice for a variety of reasons. Previous work on logistics, such supply chain costs, is conceptual in nature. Such work does highlight the importance of understanding TCO related to logistics in developing a realistic cost perspective of the total logistics channel. Thus, TCO concepts can make a significant contribution to understanding the total logistics channel costs. Wildemann, Boeck and Wahl provide a useful configuration of relevant cost elements in logistics cooperations (Wildemann, Boeck, Wahl, 2007: p. 308). The combination of these cost aspects in the TCO approach allows the evaluation of price changes that occur with differing management approaches of LSPs as well as the transaction cost implications that occur with the parallel change of the management form.

Furthermore, in combination with the transaction cost theory, the TCO approach allows assessment of the overall costs that occur throughout a cooperation life cycle between buyer/ outsourcer and seller/ LSP. Traditional life cycle costing focuses primarily on capital or fixed assets (Jackson, Ostrum, 1980). The emphasis is on understanding the purchase price of the asset and also on determining how much it actually costs the organisation to use, maintain and dispose of that asset during its lifetime. Pre-transaction costs tend to be de-emphasised. The life cycle approach is congruent with TCO but represents only a subset of TCO activities. TCO is broader in scope and includes the pre-purchase costs associated with a particular supplier or LSP. In addition, this approach also focuses on consumer or investment goods. A detailed view on life cycle costs of logistics cooperation is not present in the literature to date.

3.3.3.5 Assessment of the Modern Approaches

The combination of the transaction cost and the TCO approaches provides the basis for the analysis and the design of the management approach of LSPs. The transaction cost theory widens the appraisal perspective of different cooperation approaches to the integration of transaction-related cost elements throughout a logistics cooperation life cycle. The TCO approach adds the view, that first, the price also depends on the coordinational form and second, that the coordinational forms of market and hierarchy are only extremes in the continuum of possible cooperation mechanisms. In-between these are numerous possible approaches for the cooperation between shippers and LSPs. These approaches range from one-time purchases or short-term contracts to investments into a LSP's business (Wißkirchen, 1999b: p. 341; Bretzke, 1999: p. 341; Kaas, Fischer, 1993: p. 689; Benkenstein, Henke, 1993: p. 85). These intermediate coordinational mechanisms allow, for example, an easier change of LSPs and the exploitation of market advantages (Erlei, Jost, 2001: p. 54).

Modern approaches for the analysis and the design of the management approach of LSPs consider realistic behavioural assumptions of the market participants. The consideration of all occurring cost elements throughout the cooperation life cycle between shipper and LSP leads to the conclusion that the most suitable theoretical approach, in this context, is a combination of the transaction cost theory and the TCO ownership approaches.

3.3.4 Choice and Reasoning of the Suitable Theoretical Approach

Traditional approaches to supplier selection and ongoing evaluation include selecting and retaining a service provider based on price alone, based primarily on price, or qualitatively evaluating the service provider's performance using categorical or weighted point/ matrix approaches (Soukop, 1987). While the latter approaches are preferred to a price-only focus, they tend to de-emphasise the costs associated with all aspects of a LSP's performance, the life cycle costs of a logistics cooperation and generally disregard internal costs. In addition, the price-only focus neglects the dependency of overall costs on the logistical situation. These examinations are the strength of the combination of the TCA and the TCO approach.

The combination of the resource-based, competence-based as well as the transaction-cost theory and the TCO approach is described by numerous authors to analyse and explain outsourcing phenomena (Dibbern, Güttler, Heinzl, 2001; Maltz, Ellram, 1997, 2000; Antlitz, 1999a; Lonsdale, 1999; Beer, 1998; Bühner, Tuschke, 1997; Hinterhuber, Stuhec, 1997; Fischer, 1994a). The reason for this is that these approaches 'imply different, but arguably complementary, theories of vertical integration: that is theories of why some activities are organized within the boundary of the firm and some organized across markets' (Langlois, 1995: p. 72). The application of these combined approaches overcomes the limitations outlined above.

To combine outlined approaches the basic assumptions of each have to be similar. The main assumptions are a basic understanding of the actors (shipper and LSP), the object of interest and the efficiency concept.

- The approaches centre on the basic assumption of bounded rationality and, therefore, have the same **basic understanding of the actors involved** (Mehlhorn, 2002: p. 62). In the resource-based view, bounded rationality shows in entrepreneurial design options which Amit and Schoemaker describe as "imperfect and discretionary decisions to develop and deploy selected resources and capabilities, made by bounded rational managers" (1993: p. 33). In the transaction cost theory, bounded rationality is reflected by information asymmetry and the impossibility of complete contracts. This is also true for the TCO approach.
- At first sight, the **objects of interest** of the theoretical approaches appear different. The resource-based analyses focus on the configuration of a company as a whole, whereas the transaction cost theory focuses on the

transaction of goods or services between transaction partners. Antlitz demonstrated the comparability of the approaches (1999a: p. 63). Moreover, Jarillo (1988) and Biervert, Monse, Bruns and Reimers (1992) state that the internally oriented resource-based view and the externally oriented transaction cost theory can be combined to evaluate outsourcing questions of logistics services and thereby the management approach of LSPs. The combination is achieved by the value chain concept of Porter (1999). Porter (1999) divides logistics chains and companies in separate activities that create value for customers. The exchange activities from the transaction cost theory can be seen as activities as defined by Porter (Jarillo, 1988: p. 35). Execution of these activities requires resources in the organisation (respectively bundles of resources and competencies) as well as coordination, including activities for the agreement, processing and controlling of the performances. In the context of the present study, the question of which is the optimum way of coordinating the external supply with logistics services arises in turn, this results in the question about the optimum management approach of LSPs.

- As central objects of interest, **activities** are able to combine the analysed theories. Activities centre on resources and competencies and, in parallel; they pose the question about the optimum coordinational form of their supply. The question for the optimum coordinational form in business practice is usually posed for bundles of activities. This derives from the fact that processes are a group of activities that start with an 'input' and end with an 'output' that is delivered to an internal or an external customer (Harrington, 1997; Hagen, Springer, Stabenau, 2002). The objects of interest in this work are therefore processes that are needed for the production of logistical processes.

- The **efficiency concept** of the described approaches is complementary to the activities (Langlois, 1995: p. 72). The transaction cost theory aims at cost minimisation by selection of the optimum coordinational approach.

The resource-based view aims at the maximisation of benefit, i.e. generating profit by providing a superior customer benefit that is generated by unique bundles of resources. The main criterion for the analysis and the design of the management approach of LSPs is the sum of the overall coordinational cost and the cost of the market prices. Some authors even describe these costs as 'process costs' (Madhok, 1996: p. 580; Gruhler, 1994: p. 167; Balling, 1998: p. 108; Berlien, 1993: p. 155). Process costs, in the sense of overall resulting costs of the external supply of logistics services, are the target figures in this context. The integration of the efficiency concepts is possible and useful.

To sum up, the chosen combination of approaches, especially the combination of the TCA approach and the TCO approach are derived from the classical as well as the modern theoretical approaches but mainly from critical analysis of the transaction cost theory:

- **The definition of the exact level of the transaction costs is often very difficult:** The comparative approach of transaction cost calculation helps in defining suitable decision guidelines. Some authors even state that a clear quantification is not needed due to the comparative character of the TCA (Richter, 1991: p. 421; Bretzke, 1999: p. 345; McIvor, 2000: p. 27). The derivation of cooperation taxonomies is done partially on the comparative approach.

- **The TCA focuses on the costs that occur when property rights are transferred:** Internal coordinational costs are seldom considered (Sydow, 1992b: p. 275). In addition, purchasing price differences that are derived from different management approaches of LSPs in varying logistical situations are not considered. Hence, the combination of the transaction cost theory and the TCO approach is chosen.

- **Differences in service levels and performances in different forms of logistics cooperation also stay out of focus:** Williamson (1987: p. 22) fixes this topic as a fundamental assumption in the basis of the transaction cost theory. Improvements in the logistics service level that are influenced by the type of logistics cooperation are not considered. Disturbances in the logistics performance or rising risk elements can induce high costs. Hence, the overall costs and service improvements are taken into account in this context.

Overall, it can be stated that traditional approaches neglect qualitative and strategic elements of the analysis and the design of the management of LSPs. Transaction cost theory allows a simplified derivation of norm strategies but focuses on a static view that often omits out the life cycle changes of logistics cooperation. The resource-based view as well as the market-based view focuses on dynamic and comprehensive perspectives but in the actual definition of concrete measures that can be derived by their analysis, are difficult to grasp.

Hence, the combination of the transaction cost theory and the TCO is applied as the basic theoretical approach to analyse, evaluate and design the optimum management approach of LSPs in different logistical situations along cooperation life cycles in logistics. Furthermore, it is used for the derivation of taxonomies of forms of logistics cooperations, the impact analysis of the situational management approach throughout the empirical analysis and the derivation of design recommendations along the identified design fields in the result chapter.

3.4 Basic Forms of Cooperation

Other than the influencing factors mentioned the organisation of the transaction mainly determines the level of the transaction costs, namely the institutions or the contracts. The influencing factors are given as basic conditions. Economic entities have the possibility to lower the transaction costs by choosing the best contract form[29] according to the transactional situation. Therefore, transaction costs can be seen as function of the influencing factors and the institution. Picot talks of type of integration (Picot, 1991a: p. 344). The choice of an institution by the comparison of discrete structural alternatives is a phase in the design of a coordination system of logistics cooperations. In the following figure (Figure 3-3, source: own figure), possible cooperational forms are listed.

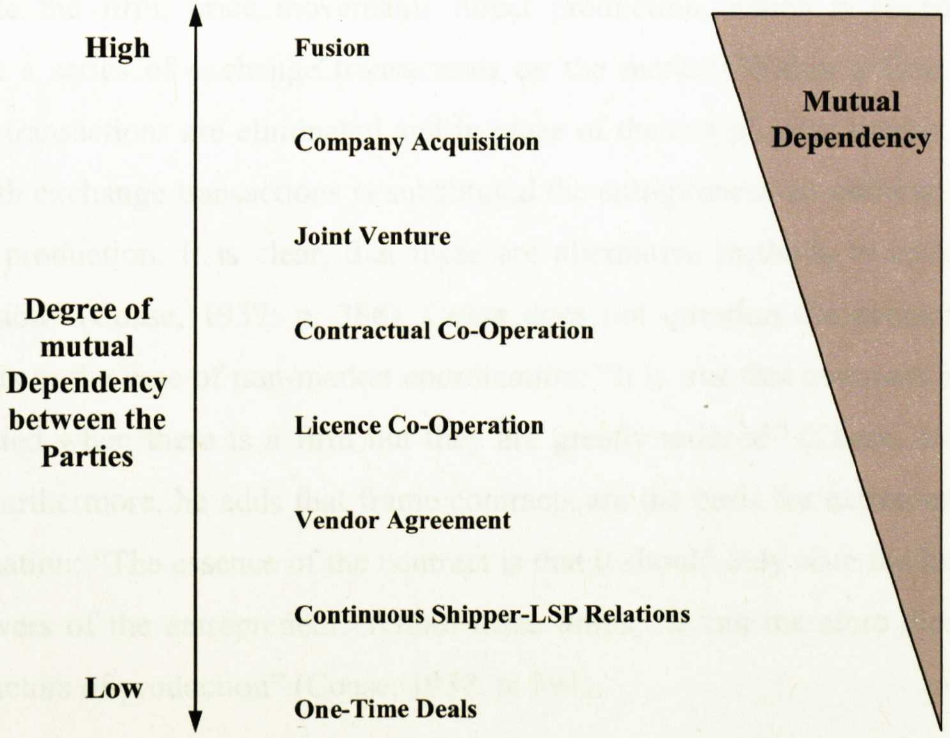

Figure 3-3: Cooperational Forms sorted by Mutual Dependency between Involved Parties (Shipper and LSP)

In the next section, first, market and hierarchy are outlined as the basic alternative economic institutions according to differing contract types. Second, the resulting economic institutions are transferred to the logistics cooperation market and are described as the basic forms of logistics cooperation as demonstrated in Figure 3-3.

[29] 'Contract', in this context, is related to legal contracts in the literal meaning but also to the design of the cooperation between the shipper and the logistics service provider.

3.4.1 Market or Hierarchy as Alternative Economic Institutions

Market and hierarchy are described as alternative economic institutions (see e.g. Williamson, 1975). Hierarchy is seen as the 'non-market alternative' (Williamson, 1975: p. 41). This view centres on the work of the transactions cost theory derived from the 1932 work of Ronald H. Coase as described above. At first sight, Coase differs fundamentally between market- and company-coordination: "Outside the firm, price movements direct production, which is coordinated through a series of exchange transactions on the market. Within a firm, these market transactions are eliminated and in place of the complicated market structure with exchange transactions is substituted the entrepreneur-co-ordinator, who directs production. It is clear, that these are alternative methods to coordinate production" (Coase, 1937: p. 388). Coase does not question the necessity for contracts in the case of non-market coordination: "It is true that contracts are not eliminated when there is a firm but they are greatly reduced" (Coase, 1937: p. 391). Furthermore, he adds that frame contracts are the basis for entrepreneurial coordination: "The essence of the contract is that it should only state the limits to the powers of the entrepreneur. Within these limits, he can therefore direct the other factors of production" (Coase, 1937: p. 391).

Economic institutions can be classified by the degree of autonomy of the transaction partners. At the end of the continuum one can find the completely external market organisation, in which each transaction partner is an owner of the transaction-relevant production factors. Transaction-based success can be assigned to the owner and they do not have to undergo external control or directives (Picot, 1982: p. 273). With the distinction between the terms company and complete hierarchy there is also the distinction between market- and complete market-organisation. The complete market-organisation is the extreme in the spectrum of institutions with far less market-based elements. The framework in which hybrid forms can be concretised is defined by the presentation of the two extremes: complete hierarchy and complete market. This defines the continuum of coordinational forms.

In the following the resulting basic forms of logistics cooperations are outlined and described. The effects on the transaction costs and the total costs of ownership are highlighted.

3.4.2 Basic Forms of Logistics Cooperations

In the context of this work, any cooperational forms are defined as 'cooperation' or 'logistics cooperation'. The TCA divides the make or-buy-decision into three basic resulting forms: hierarchy (internal production), market (external production) and cooperation (hybrid organisation). The present study attempts to broaden the knowledge between the two extremes that constitute the majority of actual logistical situations. The hypothesis is that the management approach has to be designed according to the logistical supply and demand situation a company faces. This means that logistics cooperations, in the definition of this study, can be all possible forms of interrelations between shippers and LSPs between the extremes of make (hierarchy) and buy (market). Various forms of logistics cooperations can be placed in a continuum. As demonstrated in Figure 3-3 a continuum distinction of mutual dependency can be listed. Ellram (1993) has defined four potential buyer-seller (shipper – LSP) relationships also along a continuum:

- **Type 1: Basic Alliance:** To ease transaction flows, information is shared on an as required basis. The involved parties are aware of each other and may or may not have contractual or non-contractual understandings related to potential future business.
- **Type 2: Operational Alliance:** One can identify respect and mutual trust related to the transaction flow of business. Personnel can be exchanged on a small scale. Ideas are exchanged with the aim of joint problem solving.
- **Type 3: Business Alliance:** All of the elements of type 2 plus an increased recognition of mutual dependence. The shipper has reduced its supplier base and intends to work with the remaining suppliers/ LSPs over an extended period if the performance and the price development are satis-

factory. Joint technology development is common. This constellation may involve 'ad hoc' teams that are made up from both firms to solve specific problems.

- **Type 4: Strategic Alliance:** All elements of type 3 plus the sharing of long-term strategies. This includes early supplier involvement in new product/ service/ process idea conception, concurrent engineering, and the mutual recognition of a long-term, ongoing relationship between the buying and the selling firm (the shipper and the LSP). The supplier makes important contributions to the firm's competitive strategy. The contributions by the supplier/ LSP are not readily available from other suppliers. They involve ongoing joint teams, top management support and involvement, ongoing contacts and visibility.

These types focus on differing forms of logistics alliances. Therefore, they unify the design of the business alliance starting from the second type in the first differentiation. Bowersox *et al.* (1989) have further classified strategic alliances in logistics into three different groups.

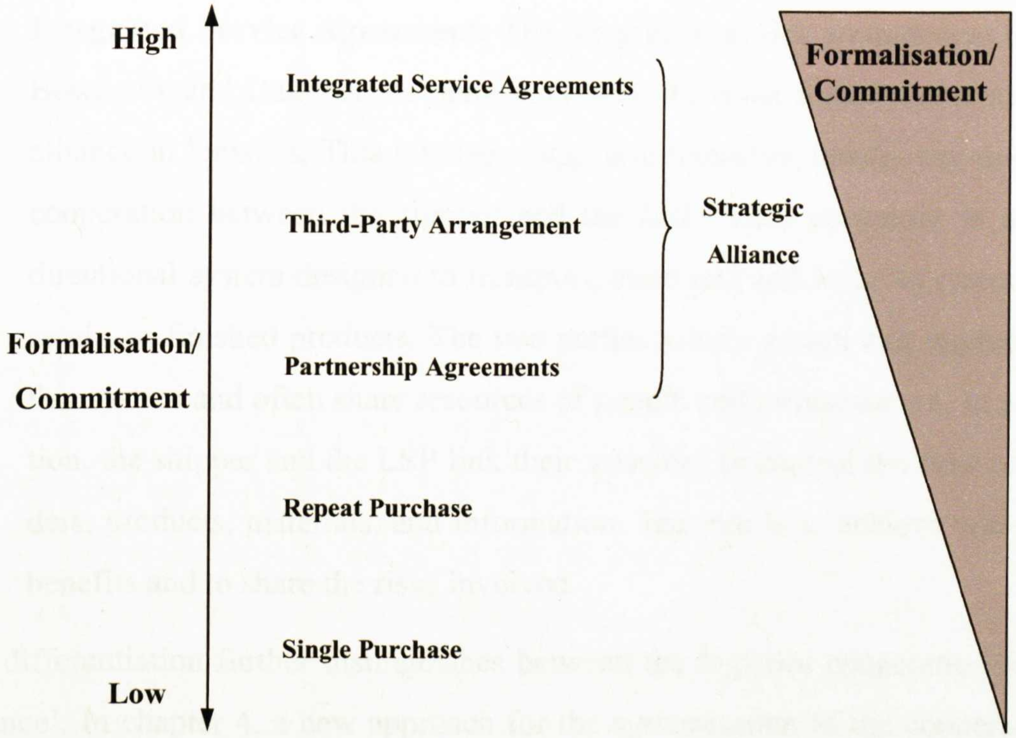

Figure 3-4 Cooperational Forms sorted by Formalisation/ Commitment

Figure 3-4 lists these possible forms. The three groups of strategic logistics cooperations, or alliances, are differentiated by the degree of formalisation and commitment.

- **Partnership Agreements:** Partnership agreements are the most informal type of Bowersox and Daugherty's strategic alliances. In this kind of relationship, the parties acknowledge dependencies but typically do not deal in formal or exclusive arrangements and they do not extensively change their business structure or procedures due to one specific logistical cooperation.

- **Third-Party Arrangements:** A third-party arrangement is more formalised and expected to last longer. Usually it is based on a formal agreement. The main benefit of a third-party arrangement is, according to Bowersox *et al.* (1989), that it offers a formalised framework for the service provider and the shipper to modify their logistics practices in order to jointly achieve benefits. Often, equipment or facilities are modified to meet the shipper's requirements.

- **Integrated Service Agreement:** The integrated service arrangement is, in Bowersox and Daugherty's opinion (1989), the most formalised strategic alliance in logistics. This involves long-term intensive, mostly day-to-day, cooperation between the shipper and the LSP. They cooperate in a bi-directional system designed to transport, store and add value to materials, semi-, or finished products. The two parties jointly design and implement this system and often share resources of people and infrastructure. In addition, the shipper and the LSP link their activities to control the flow of orders, products, materials, and information. The aim is to achieve win-win benefits and to share the risks involved.

This differentiation further distinguishes between the logistics cooperation form 'alliance'. In chapter 4, a new approach for the systemisation of the cooperation and management approaches of LSPs will be outlined and argued.

The present study orientates itself on Wildemann (2001a, b; 2005b) who examines cooperations empirically, theoretically and with regards to practical aims. In principle, there are vertical as well as horizontal forms of cooperation. Horizontal cooperations imply a combination of formerly competing companies. This paper refers exclusively to vertical cooperations between shippers and LSPs.

This chapter defined the basic possibilities to cooperate with LSPs. In the following chapter, the overall resulting guidelines for the design and the management approach of LSPs will be developed from the consolidated findings of the conceptual framework.

3.5 Guidelines for the Management Approach of LSPs

Having defined the conceptual framework for the management approach of LSPs, the guidelines for the design of the management approach throughout a logistics cooperation life cycle are outlined. An efficient management approach of LSP shall follow the principles that can be derived from the theoretical approaches outlined above. In the following section, the guidelines for the analysis and the design of the management approach of LSPs are outlined and are evaluated concerning their influence on the design elements.

3.5.1 Holistic View of the Management Approach

The principle of 'holistic view and acting' is based on the system-theoretical thesis, that the complete system is greater than the sum of the parts. The thesis implies that the integration of isolated elements results in additional performance potentials that can be assigned to the total system and that are bigger than the summed up performance potentials of the sub elements. The resulting synergy effects are the reason for the integrating view of logistics and on the management approach of LSPs. They justify the logistical approach of coordinating and consolidating existing cross-functional and company-spanning sub activities.

Furthermore, the principle of the holistic view serves as an explanation for the concept of total costs in logistics. The total costs concept means that all logistics cost elements and their direct and indirect interdependencies have to be considered in logistical decisions (Magee, Copacino, Rosenfield, 1985: pp. 217; Ihde, 1991: pp. 20; Pfohl, 1996: pp. 30; Bowersox *et al.*, 1986: pp. 286; Shapiro, Heskett, 1985: pp. 61). This results mainly from the analysis of the TCO and the TCA approach. Cost interdependencies lead to the minimisation of single cost elements, which do not necessarily result in an overall optimum. Hence, the total cost approach does not focus on the minimisation of isolated cost elements (e.g. capital lockup) or of specific cost trade-offs (e.g. production- vs. storing costs) but the optimisation of the overall decision-relevant cost. This can result in a potential increase of specific cost elements; however, an overall optimum can be achieved. One central conclusion for the design and operation of the management approach of LSPs can be drawn from the total cost concept: an increase in logistical efficiency cannot be achieved by an isolated optimisation of single logistical processes but by a holistic view on the logistical system. Logistics is a company-spanning function that is responsible for finding optimum constellations in business networks with several partners.

Therefore, improvements in supply chain constellation, network configuration, as well cost and quality potentials in information and material flow and rights of property can only be identified by examining the focal company surrounding circumstances and partners. The examination of the general framework that is determined by the logistical demand and the logistical supply situation is the basis for the derivation of an efficient situational management approach of LSPs.

3.5.2 Process Orientation

Traditional, hierarchical types of organisation are often incapable of achieving competitive targets concerning time, costs and quality. The complexity of targets and the function-based structures in companies paralyse the internal and external processes. The more a company aims at impartial and performance-related criteria, the more the company organisation has to orient itself towards a process-oriented organisation (Droege, Eger, 1998: p. 96). Process management is of high significance to logistics because, as a cross-sectional function, it is aligned to continuous material and information flows (Baumgarten, 1999: p. 227). By means of a process-organisation, new tasks and activities derive for the service provider and the buyer of the logistics services. The originally rigid company border becomes penetrable. The process orientation represents a new paradigm in the organisational design of companies. In the foreground, one can find the addition of customer-relevant value, the necessary input of resources, transparency, and flexibility. At the nucleolus of the process organisation are activities that are essential to produce a specific output. Through process optimisation non-value adding processes and time wastes such as redundancies, long-running decision processes, modifications, insufficient communication and information are avoided. Activity series can be combined to form a process. Hence, the link between the activities of the buyer/ outsourcer and the ones of the LSP has to be designed according to the guidelines of 'process orientation'.

3.5.3 Differentiation of the Relation between Shipper and LSP

This guideline recommends a departure from a uniform management approach. It aims at the design of an approach that respects and integrates diverse forms of cooperation. The management style has to follow a situational approach that is designed according to the logistical situation, namely the logistical demand and the logistical supply situation.

One can identify a continuum of cooperation forms between the extremes of 'make' or 'buy'. As a coordination instrument the price loses weight the more the cooperation is based on a partnership. On one hand, cooperative structures promise effective, long-term and successful strategies. Whole on the other, numerous disadvantages are embodied in a biased cooperative approach. This implies differing design approaches are not evaluated. Under certain circumstances an intensified competition between LSPs can be more useful than an intense cooperation. To get optimum results the intensification of the competition between LSPs and the implementation of close cooperations have to be combined. A logistics strategy has to include adversative as well as cooperative elements since purely cooperative interrelations easily lead to decelerated improvement processes. Cooperative relations to LSPs have to be combined with price-competition. Therefore, situational cooperation and management approaches demand situational methods and management instruments.

3.6 Summary of the Conceptual Framework

LSPs play an important part in securing a high logistics quality in the supply chain. Their services are evident for the success in the order processing, in the end-customer-business as well as in the business-to-business-area. The central task for the efficient design of the cooperation with the LSP is the abolishment of coordinational and motivational problems. The motivational problem lies within potentially divergent target systems that are pursued by the cooperation partners. To bridge these coordinational and motivational problems costs are incurred. These costs diminish, or even destroy, the benefits of logistics cooperations. Such costs are called transaction costs. The design of the management approach of LSPs can be explained as an endeavour, which seeks to minimise transaction costs and the purchasing which endeavours to minimise the total costs of ownership of logistics services throughout a complete logistics cooperation life cycle. Structural changes in logistics cooperations can be regarded as a response to the efficiency required to reduce overall logistics costs.

The efficient, transaction cost optimised cooperation depends significantly from an efficient, logistical situation-dependent and company-specific management situational management approach. Therefore, the central challenge in the design of an efficient and flexible logistics conception is an individually designed management approach to the LSP. The resulting guidelines for the design of an optimised management approach discussed above will be used as assessment criteria for the comparison of management models. These guidelines centre on the above defined combined theoretical approach of optimising the transaction costs plus the price along the cooperation life cycle.

To sum up, first, the traditional theoretical approaches guide in defining the relevant costs of outsourced logistics services (cost-calculating approaches). They direct towards a reduction in the involved LSPs, basing on decisions on the cost decreasing effects of the learning curve concept. Second, the strategic approaches help in considering the internal as well as the external view on the logistical situation. This view leads to the situational design of the management approach of LSPs. Third, the modern approaches help in designing the situational approach concerning the interactivity of the players in the outsourcer/ LSP relationship. In addition, the transaction cost theory in combination with the TCO approach provide the analytical tool for the analysis and the design of an efficient situational management approach of LSPs. Figure 3-5 demonstrates which theoretical approaches have a significant influence on the transaction phases throughout the logistics cooperation life cycle.

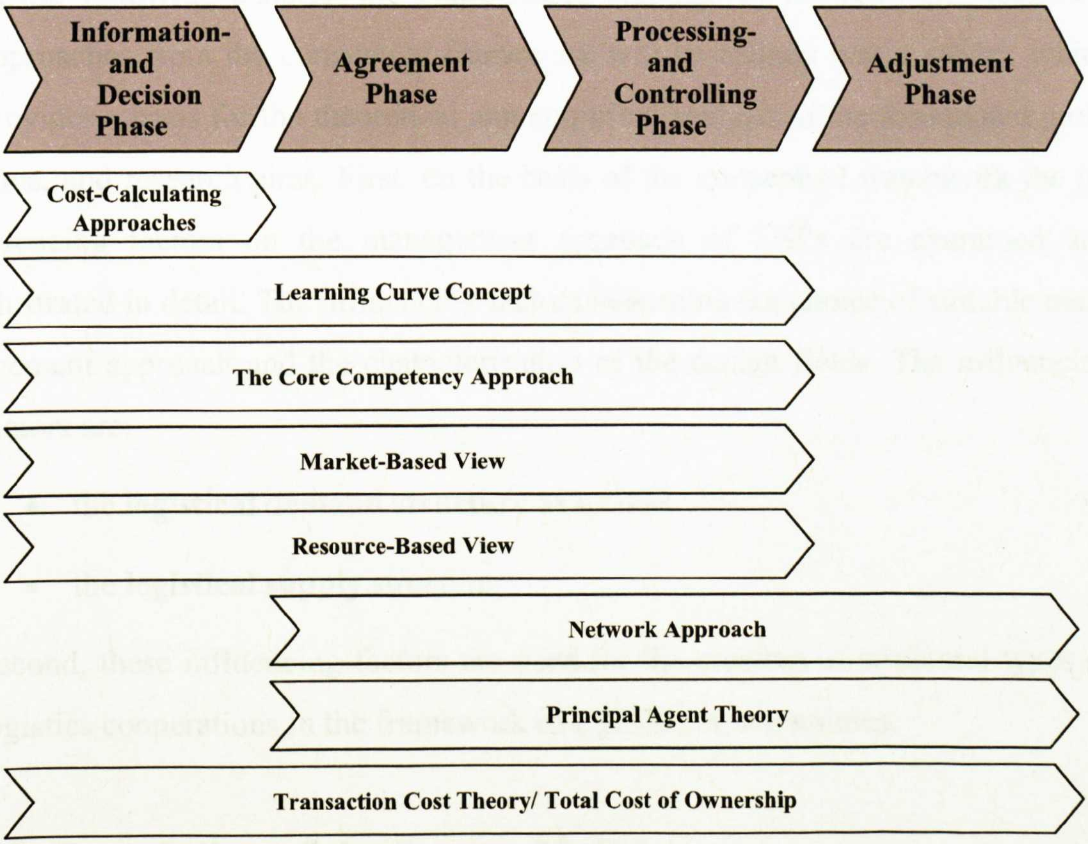

Figure 3-5 Relevant theoretical Approaches per Transaction Phase

The relevant theoretical approaches are integrated in four different ways. First, the theoretical approaches were the basis for the derivation of guidelines for the management of LSPs in the theoretical framework (see chapter 3.5). Second, they provide the basis for the derivation of taxonomies of logistical situation in the system model of the management approach (see chapter 4.3). Third, they help in evaluating the design fields in chapter 5 and fourth, the theoretical approaches provide the basis for the assessment of the case studies throughout the empirical analysis (see chapter 6).

4 System Model of the Situational LSP Management Approach

In the following chapter, the consolidated findings of the relevant theoretical approaches from the conceptual framework will be refined into a model, which provides a basis for the theoretical and empirical analysis of the formulated problems, and research aims. First, on the basis of the conceptual framework the influencing factors on the management approach of LSPs are examined and illustrated in detail. The influencing factors determine the choice of suitable management approach and the characterisation of the design fields. The influencing factors are:

- the **logistical demand structure** as well as
- the **logistical supply** structure.

Second, these influencing factors are used for the creation of structural types of logistics cooperations in the framework of LSP-buyer taxonomies.

4.1 Description of the System Model

The present study seeks to identify successful situational strategies for the management approach of LSP management in different logistical situations. Complex connections between influencing factors can only be analysed in the framework of a 'ceteris paribus'[30] model so that interdependencies can be identified. Therefore, in the following chapter the chosen system model approach, as well as the portfolio technique for the derivation of suitable classifications, is defined and explained.

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[30] 'Ceteris paribus' is a Latin phrase that stands for 'all other things being equal'. In complex models, a prediction, or a statement about causal or logical connections between two states of affairs, is qualified by 'ceteris paribus' in oder to acknowledge, and to rule out, the possibility of other factors which could override the relationship between the antecedent and the consequent.

4.1.1 Reasoning of the System Model Approach

A model is an abstract system that represents another (mostly real) system in a simplified manner (Krallmann, 1994: p. 12). Hence, a model is a simplified and condensed picture of the reality. An abstract model (or conceptual model) is a theoretical construct that represents something, with a set of variables and a set of logical or quantitative relationships between them. Models in this sense are constructed to enable reasoning within an idealised logical framework. These processes are an important component of scientific theories. Idealised here means that the model may make explicit assumptions that are known to be false (or incomplete) in some detail. Such assumptions may be justified because they simplify the model while, at the same time, allowing the production of acceptably accurate solutions.

The purpose of a model is to provide an argumentative framework for applying logic and/ or mathematics that can be independently evaluated (in this context by testing it on the basis of the case study analysis) and that can be applied for reasoning in a range of situations. Models are used throughout the natural and social sciences, psychology and the philosophy of science. Some models are predominantly statistical (e.g. portfolio models used in finance), others use linear algebra or convexity. Of particular political significance are models used in economics, since they are used to justify decisions regarding taxation and government spending. Abstract models are used primarily as a reusable tool for discovering and structuring new facts, for providing systematic logical arguments as explicatory or pedagogical aids, for evaluating hypotheses theoretically, and for devising experimental procedures to test them. Reasoning within models is determined by a set of logical principles, although the reasoning used does not necessarily have to be a mathematical one.

In contrast to a theory, a model relates to a specific problem without developing overall valid explanations (Krallmann, 1994: pp. 12 f.). Similar approaches are often chosen in logistics research (see e.g. Persson, Virum, 2001, pp. 707-724).

The overall aim is an optimum level of transaction cost in combination with the price of the logistics service (TCO of the logistics service). This implies the fulfilment of the company's quality- and time-targets as well as the achievement of defined performance levels that are important for the achievement of sales targets.

The model is based on the identification and analysis of influencing factors on the management approach of LSPs. The influencing factors are derived from the outlined theoretical approaches for the design of LSPs' management, a literature review as well as the transfer of equivalent influencing factors used in purchasing management. These influencing factors are sorted by their effect on the logistical demand on one hand and by their effect on the logistical supply on the other. Both influencing factor blocks are separated in two independent categories and are aggregated in two portfolios. These two portfolios are then combined to one logistical demand/ supply portfolio. This portfolio characterises the logistical situation in which the logistics cooperation takes place. From this portfolio, taxonomies of logistical situations can be derived. These taxonomies provide the basis for testing the research hypothesis in the frame of the case study analysis and for a preliminary derivation of norm strategies that will be challenged in the course of the case study analysis.

4.1.2 System Model on Portfolio Basis

A portfolio refers to a collection of different but connected items. In general, the portfolio concept focuses on the interdependencies among management decisions and emphasises an integrated approach (Turnbull, 1990). The portfolio concept stresses the importance of the whole rather than the constituent parts. It reflects the importance of balance in a collection of individual elements. As a consequence, it allows differentiation and diversification, an optimal use of limited resources and therefore a minimisation of the TCO of logistics services. Literature on buyer-supplier relationships tends to focus on a single relationship or a single type of relationship, ignoring or downplaying the important interdependencies between relationships and the important task of allocating scarce resources between relationships (Olsen, Ellram, 1997: p. 102). Thus, there is a need for the development of models to assist in the management of a company's entire portfolio of LSPs and logistical demands.

The portfolio concept has its roots in financial investment in the 1950s. For business purposes, portfolio approaches have been developed for applications in investment theory, strategic management, and marketing and, to a more limited extent, in purchasing management (see e.g. Gelderman, 2002). Portfolio models have received special attention in strategic planning (Armstrong, Brodie, 1994). Porter (1980) suggested the use of portfolio models to analyse competitors, customers and suppliers but the use of comprehensive, practicable portfolio models in purchasing has been very limited. A number of authors have also suggested the possibility of using portfolio models to analyse the company's supplier relationships (see Turnbull, 1990; Krapfel, Salmond, Spekman, 1991; Cova, Salle, 1991). The basic model on which the portfolio used is based centres on work by Kraljic (1983) and is further developed by Syson (1992: p. 213). Kraljic (1983) introduced a comprehensive purchasing portfolio approach, including a matrix that classifies a firm's purchased items into four categories on the basis of their impact and supply risk. The Kraljic (1983) matrix has become the standard in the field of purchasing portfolio models (Gelderman, 2003: p. 207; Lamming, Harrison, 2001; Cox, 1997). For the purpose of this work, the Kraljic portfolio approach is adapted. In addition, taxonomies are renamed to suit the work's aims. The disregard for the supplier's side in the Kraljic matrix (Homburg, 1995; Kamann, Bakker 2004) is supplemented by the integration of the logistical supply portfolio that analyses the influencing factors on the LSP's and the logistics market side.

Hence, in this study, a portfolio model is defined as 'a tool that combines two or more dimensions into a set of heterogeneous categories/ taxonomies for which different (strategic) recommendations are provided'. Three basic elements are to be recognised in this definition: First, dimensions, second, categories/ taxonomies and third, strategic recommendations. The use of portfolio models implies the classification of objects/ subjects, usually presented in the form of a two-dimensional matrix and combinations of two two-dimensional matrices in an overall matrix. The basic idea is that the positions of the units on the grid, or in the matrix, should determine the formulation of the most appropriate strategy (Yorke, Droussiotis, 1994).

The purpose of this system model is to develop a normative portfolio to assist in managing different kinds of LSP relationships. Portfolio models can be used as an analytical tool to organise information and create a classification framework of the items included in the portfolio. The portfolio is considered a valuable tool for structuring and basing the development of situational management approaches of LSPs and "to give useful design recommendations" (Wildemann 2005b: p. 110). However, portfolio models have been criticised, pointing at measurement problems and objections of principle. Gelderman and van Weele (2005: p. 9) state that arguments in favour of portfolio models are derived from (qualitative) case studies, while counter-arguments are based on theoretical and conceptual studies. They provide evidence in their study that the usage of portfolio models can be associated with a differentiated procurement approach, called purchasing sophistication (see also Gelderman, van Weele, 2003).

4.2 Influencing Factors on the Design of the Management Approach

In the following section, the influencing factors on the choice and design of the management approach of LSPs are listed and defined. Namely, the company-specific logistical demand and the respective logistical supply are analysed and defined. These influencing factors are analysed concerning their relevance on the description of logistical situations and are combined in a logistical demand/ supply portfolio from which taxonomies of logistical situations can be derived.

4.2.1 Logistical Demand Structure

The characteristics of the demanded and supplied logistics services determine the requirements on the LSPs. The specificity of the logistics service as well as the complexity and the insecurity connected with the external supply of a specific logistics service determine the logistical risk of logistics services. In combination with the value of the goods and the services handled (extent of damage), the requirements of the logistics demand structure is defined. They represent the crucial influencing factors on the choice and the design of the management approach of LSPs. This definition is an analogy to the assessment and definition of risks in general. Risk is defined as:

Risk = Occurrence Probability * Extent of Damage

The occurrence probability of economic damage influenced by logistics is determined by the factors listed above: specificity, complexity, insecurity and measurability of a logistics service. The extent of damage manifests in the possible economic influence of the logistics services in focus on the overall business situation and the business model of the buyer of the logistics services. This includes possible costs as well as possible sales effects. Figure 4-1 shows the influencing factors and the respective characteristics of the logistical demand risk. Figure 4-1 will also be used as a managerial checklist for the later assessment of the logistical demand situation (see Figure 4-2). In the following all listed influencing factors and their influence on the logistical demand structure will be outlined in detail.

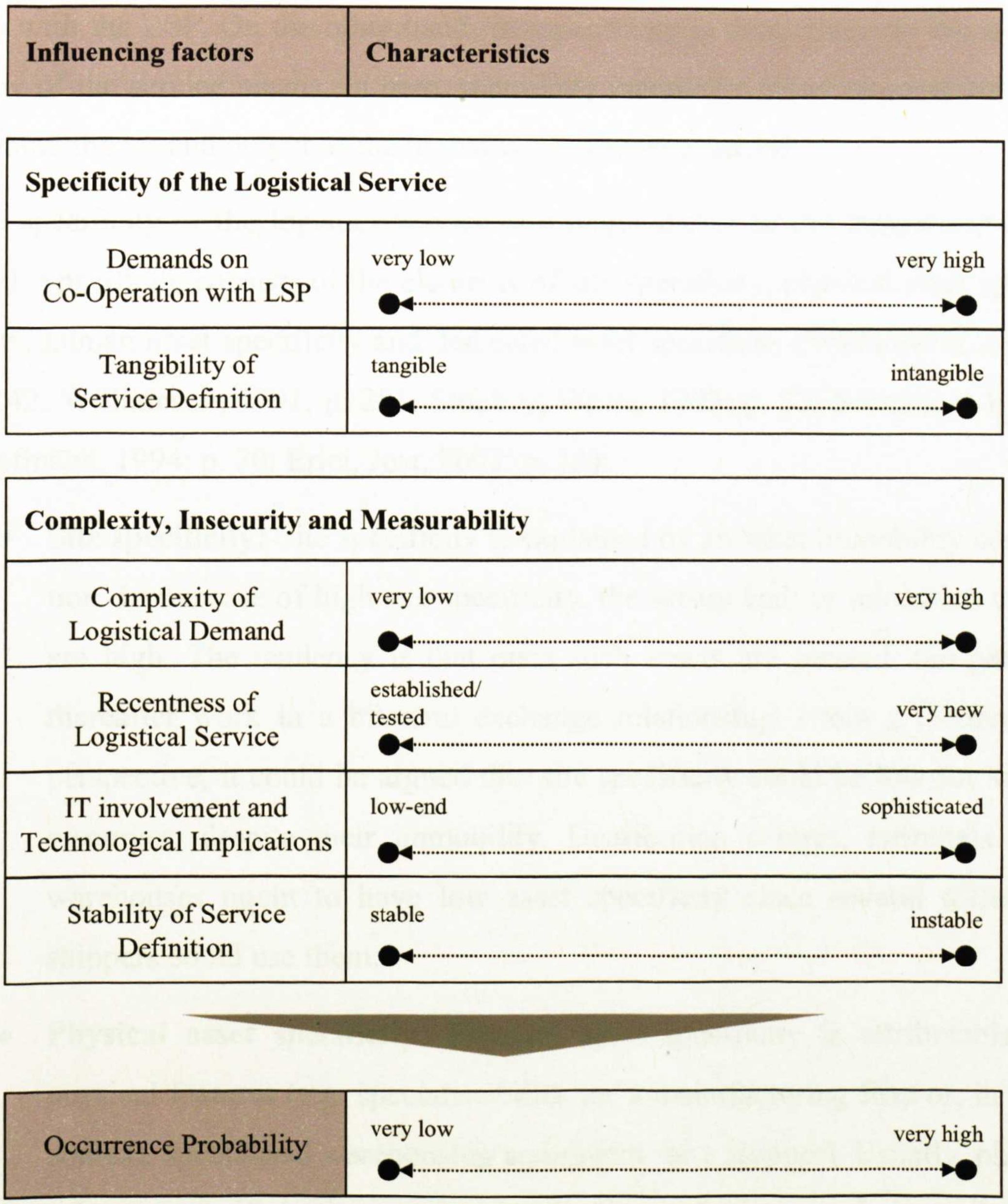

Figure 4-1: Influencing Factors on the Occurrence Probability

4.2.1.1 Specificity of Logistics Services

The specificity of the logistics service is determined on one hand by the differentiation contribution of the specific service (compared to the competition), which means the degree of individualisation of the logistical activity outsourced. The specificity of the service influences, for example, the effort a LSP has to put into the adoption of their processes and assets to the demands of the outsourcing company, the shipper. In here, the specificity determines the demand on the cooperation with the LSP. On the other hand, the specificity is determined by the tangibility of the service means. In here, specificity means the effort required for describing the in- and output of the logistics services outsourced.

The specificity of the logistics service is a major driver in the transaction cost level. Specificity consists of the elements of site specificity, physical asset specificity, human asset specificity and dedicated asset specificity (Williamson, 1989: p. 142; Williamson, 1991: p. 281; Stuckey, White, 1993: p. 73; Schneider, Baur, Hopfmann, 1994: p. 70; Erlei, Jost, 2001: p. 12):

- **Site specificity:** Site specificity is explained by an asset immobility condition. In the case of high site specificity, the set-up and/ or relocation costs are high. The tendency is that once such assets are located, the parties thereafter work in a bilateral exchange relationship. From a theoretical perspective, it could be argued that site specificity could be low for some resources, despite their immobility. Distribution centres, terminals and warehouses ought to have low asset specificity since several different shippers could use them.
- **Physical asset specificity:** Physical asset specificity is attributable to physical features (e.g. specialised dies for a manufacturing firm or, in this context, specialised warehousing equipment for a shipper). Usually, physical asset specificity is considered to be low in logistics and, according to Schary and Coakley (1991), transportation and warehousing have, with minor adaptations, traditionally served numerous customers. Nevertheless, specificity increases when there are special trucks (e.g. suspension, handling equipment, special containers, climate control) or warehousing equipment (e.g. handling equipment, climate control and security installations). The trend towards outsourcing of more advanced logistics services is a major driver for physical asset specificity.
- **Human asset specificity:** Human asset specificity is based on specialised learning curve effects or problems in transferring human capacities. It

arises through a process of learning through experience (Williamson, 1981). The knowledge of how to run and maintain a logistical system is quite generic. Nevertheless, each shipper has its own procedures and organisational preconditions about which the LSP has to learn. The specific knowledge consists of knowledge of transport planning, required service levels, customers, and products and processes. Hence, learning processes influence cost and service performance as well as the transaction cost level.

- **Dedicated asset specificity:** Dedicated asset specificity involves the expansion of existing resources on behalf of specialised logistical supply demands, that is, on behalf of a specific shipper. Dedicated asset specificity is a matter of general investments especially made for a special customer or product and, if the contract will be terminated there, will significantly exceed capacity. These capacities can consist of personnel and facilities that have been dedicated to the logistics cooperation. It is also possible that a high degree of dedicated personnel could, after some time, result in human asset specificity.

The external supply of logistics services with high specificity can result in a strong dependency from the LSP. In the case of individual adaptations of processes to the shipper's demands, a change of the LSP can be made difficult. A high dependency increases the risk of opportunistic behaviour, which leads to higher demands on the detailing, and the time pattern of the cooperation contracts. This additional effort results in higher one-time transaction costs. Furthermore, the transaction costs in the processing- and controlling phase are higher, e.g. for the quality check costs. Hence, the higher the specificity of a logistics service, the higher the demands on the design of the management of LSP are.

4.2.1.2 Complexity, Insecurity and Measurability of Logistics Services

The second major influencing factor on the logistical demand is the complexity, insecurity and the measurability of a specific logistics services. Complexity, insecurity and the measurability are directly linked to the complexity of the logistics service, the recentness, respectively the stage of maturation, and the diffusion of the service on the logistical market.

The complexity of the logistical demand represents an important, but nonetheless diffuse, influencing factor on the choice and the design of the integration approach. This diffusion is mainly derived from the influence of other determinants. The complexity of a service can relate to the number and/ or the variety of products involved but also to the process itself or the expertise required (e.g. information technology, supply chain network integration abilities, knowledge about dangerous goods). The outsourcing of logistics services to competent LSPs can lower the logistical complexity without having to lower the complexity of the logistics service in itself.

- **Complexity of a logistics service:** The complexity of a LSP manifests directly in the demands on the cooperation with a LSP. The cooperation with external suppliers places demands on the interfaces and the fields of interaction. This relates to inter-organisational demands on the cooperation such as the personal fit of the cooperating functions and teams. The Just-in-Time objective of reduced inventory relies on the necessary supplies arriving at critical points in the production and overall supply chain-process. These tighter delivery time windows demanded by Just-in-Time systems require service performance by carriers. Service specificity is gaining in importance as a criterion in the selection of specific carriers (LaLonde, Cooper, 1989: p.13).
- **Recentness of a logistics service:** The recentness of a logistics service mainly refers to the diffusion of a logistics service in the market. A high recentness of a logistics service results in high qualitative demands on the capabilities and the expertises of the LSP.

An up-to-date example is the implementation of radio-frequency identification-based services (RFID[31]). Buyers that have to work on the basis of recent logistics service do relate more on external competencies. Specialists as well as specialised expertise for detailed tasks are required. The field of new developments in logistics services varies. It ranges from real new developments that are based on individual patents to improvements of existing processes. Hence, if the logistics service to be purchased is particularly new, the shipper has to pay greater attention to the supplier relationship.

- **IT involvement and technological implications:** Besides more system integration between shippers and service providers, essential for establishing third-party logistics relationships, web-based freight exchanges have emerged. These drive the position of transportation services towards a more 'non-critical item', which is easy to define, and with a working market place. The growth of electronic data interchange forms (i.e. EDI[32]) as a means of communicating between firms is perhaps the most pervasive change to affect the practice of logistics in recent history. The ability to communicate in a rapid, accurate manner is becoming increasingly critical to providing good logistics service.

- **Stability of service definition:** Changes in the service definition over time are a driver of the complexity of the logistical system. The LSP taking over a specific logistics service or a complete logistical system has to demonstrate specific characteristics. The LSP has to be able to adapt to

[31] 'Radio-frequency identification' (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. An RFID tag is an object that can be stuck on an object for the purpose of identification using radio waves. RFID increases the speed and accuracy with which inventory can be tracked and managed thereby improving logistical effectiveness while reducing logistical cost.

[32] The term 'Electronic Data Interchange (EDI)' is defined in detail in chapter 5.3.1.1.

changing process definitions of the shipper and its customers, to evolving IT specifications and overall changes in the logistical concepts such as changes of suppliers or changes in the customer base. Therefore, a stable service definition leads to reduced demands on the LSP. Vice versa, frequent changes in the service definition enhance the complexity of a logistical situation.

The above factors define the complexity and insecurity linked to outsourced logistics services. A further important influencing factor is the measurability of logistics services. Andersson (1997: p. 118; Andersson, Calabro, 1990) adds measurability as another major influencing factor on the level of transaction cost and the definition of the management approach of LSPs. Ouchi (1980) and Coase (1937) state that transaction costs can be caused by difficulties in assessing the value of goods or services. These difficulties are based on the underlying nature of the goods or services or the lack of trust between the parties (Ouchi, 1980). Pfohl and Large (1992) also state that one of the reasons for transaction costs are the measurement costs. Aertsen (1993) as well argues that the ease of measurement must be taken into account in addition to asset or, in this case, logistics service complexity and insecurity. According to Ouchi (1980), market relations are efficient when there is little ambiguity about performance or performance levels, as the hierarchy or the partnership relationship can accept both a moderately high performance ambiguity and a moderately high goal incongruence. Andersson (1997: p. 118) highlights that costs have to be transparent in order to help both sides (i.e. LSP and shipper) in an outsourcing situation to guard against opportunistic behaviour. According to Coase (1937), the most obvious cost in the use of price mechanism is the cost of identifying what the relevant prices are. This is true for the problems many shippers are facing in logistics cooperations. The more complex and the more individual a logistics service becomes the more difficult it gets to be able to receive comparable offers that can constitute a price. Hence, measurability is to be considered as an important influencing factor on the logistical demand situation. Nevertheless, it has to be regarded as a resulting factor that is derived from the direct influencing factors tangibility of service definition as well as of insecurity and complexity that again are reflected by the complexity of a logistical demand, the recentness of a logistics service, the IT involvement, and technological implications as well as the stability of the service definition.

4.2.1.3 Extent of Potential Damage by Logistics Services

The extent of damage is defined by the potential influence on the business model of the shipper by the LSP. Influences that are difficult to measure, such as an important image influence of logistics, have to be taken into account as well as the direct damages of insufficiently performed logistical services, namely the potential negative influence on the cost situation as well as the influence on the sales position.

Image factors describe the importance of logistics to the company's image among customers and suppliers. Any analysis has to include the overall image of the company and the brand name. In addition, one has to consider potential environmental and safety concerns. Furthermore, the extent of damage is a significant influencing factor for the identification of a cost-reduction lever in the field of logistics cooperations. The value defines the economic relevance of the demand. The classification of logistics services on the basis of their value enables the management to focus on important logistical levers and resources. A modification of the well-known ABC-analysis for products applied to logistics services demonstrates that relatively few logistics services represent a high share of the overall logistics costs. Conversely, a relatively large number of C services sum up to a small share of the purchase volume of logistics services.

The economic factors describe the economic importance of the logistics service in terms of the economic value of the logistics service and the value of the goods handled, as well as the impact on the company's profit. These factors are combined in the term 'extent of damage'. To capture the interdependencies between purchases of logistics service bundles, the economic factors should also include an evaluation of the extent to which the logistics services purchased are critical in achieving leverage with the LSPs for other buys or if there are even linkages to the purchase portfolio of other goods.

4.2.1.4 The Logistical Demand Portfolio

As demonstrated above, the drivers of the occurrence probability of problems in logistics cooperations are: first, the specificity of the logistical service, i.e. the demands on the cooperation with the LSP and the tangibility of the service definition and, second, the complexity and the recentness of the logistical demand, the level of IT involvement and technological implications as well as the stability of the logistics service definition. This assessment of the occurrence probability of logistical services has to be combined with the potential extent of damage of the logistical services. Thereby, the logistical demand situation can be defined.

For the visualisation of the logistical demand situation, a modified version of Kraljic's (1983) and Wildemann's (2000) purchasing product portfolio is used. Figure 4-2 provides a checklist for the assessment for the occurrence probability of the logistical demand risk. In combination with the assessment of the economic influence of the logistics service procured by an external supplier, the logistical demand portfolio can be filled in.

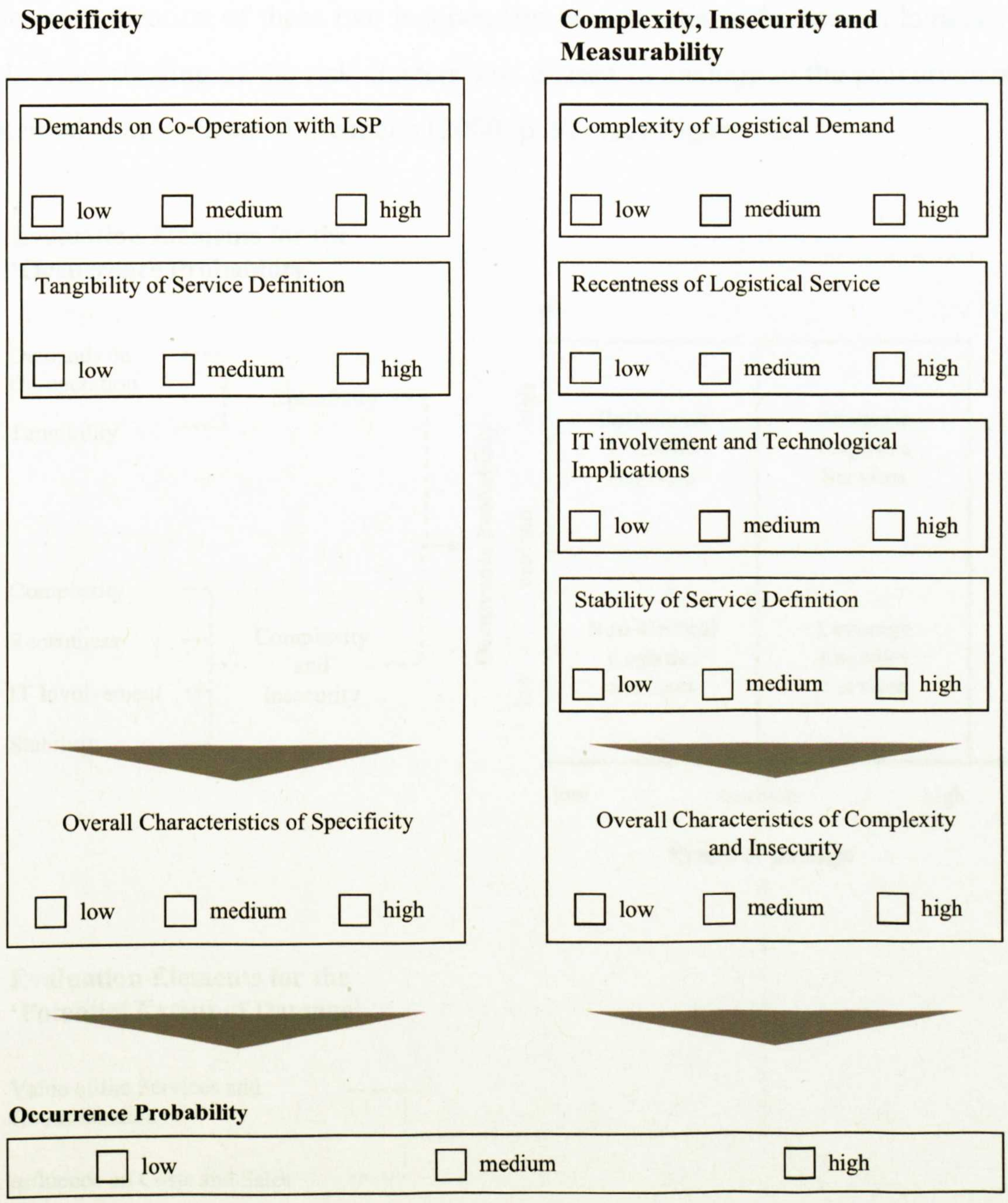

Figure 4-2: Checklist for the Assessment of the Occurrence Probability

On the x-axis in Figure 4-3, clusters of the logistical demands are positioned. The position on the 'financial impact axis' (y-axis) is determined by the above described influence of the outsourced logistical services on the business model of the shipper. Hence, the influence of logistical failures and problems is evaluated on the y-axis.

The multiplication of these two independent axes results in the overall logistical risk. The labelling of the risk clusters was chosen in analogy to the procurement potential analysis from Wildemann (2000: p. 91) (see Figure 4-3).

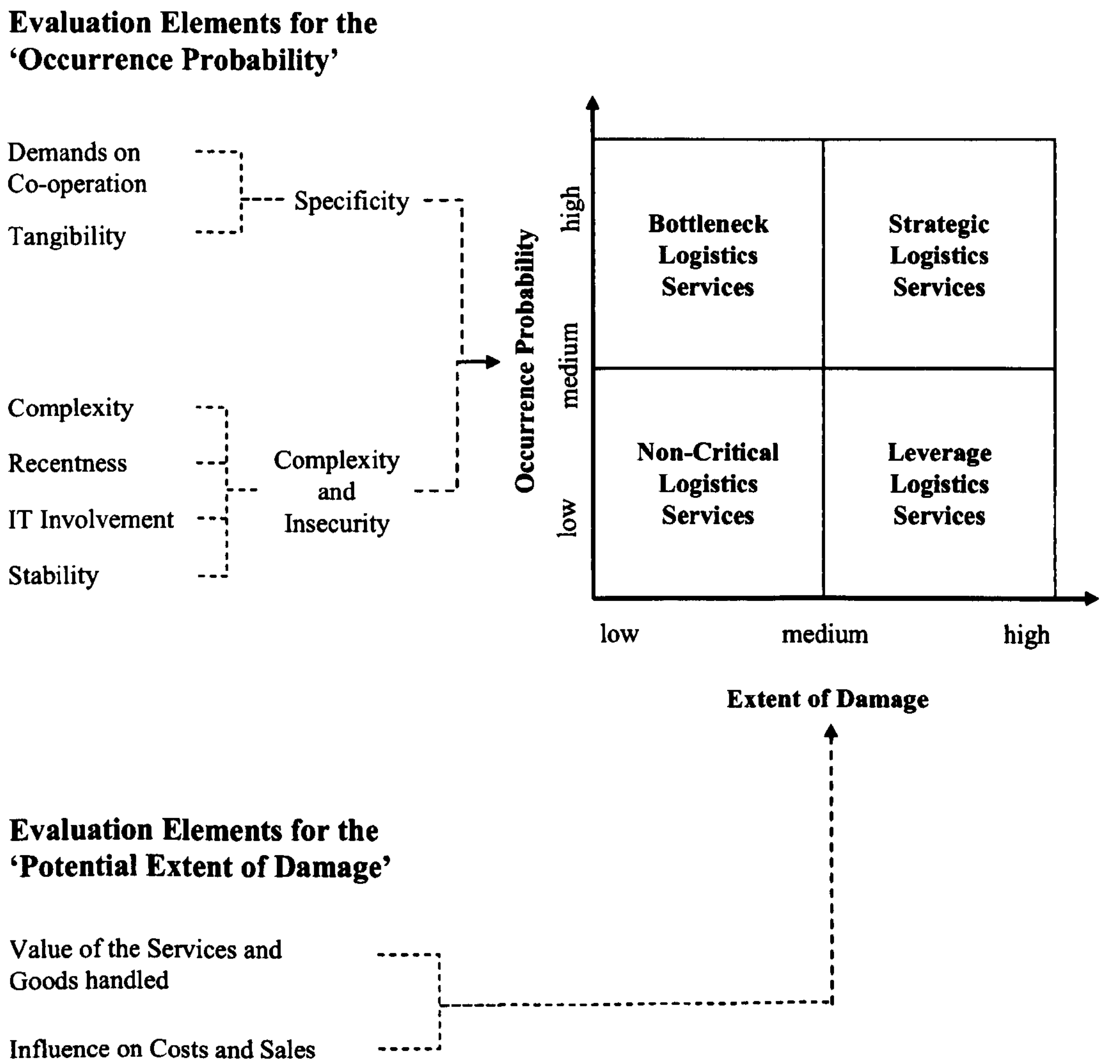

Figure 4-3: The Logistical Demand Portfolio

Figure 4-3 illustrates the resulting four categories of logistics services being purchased. Independent of the logistical supply structure, first indications are given concerning suitable management approaches of LSPs:

- The **leverage category** includes logistics services that are easy to manage but strategically important to the company. When managing these logistics services, it is important to identify potential cost-cutting and overall changes in the supply chain structure. The relationship tends towards a closer cooperation with the LSP. Leverage items allow the shipper to exploit its full purchasing power, for instance, through tendering and target pricing.

- The **non-critical category** includes logistics services that are easy to manage and with a low strategic importance. The keywords for this category are standardisation and consolidation. The focal company should reduce the number of involved LSPs and should try to standardise the logistical demands so that other forms of purchasing such as internet-based procurement of logistics services are possible. The relationship should ideally be geared towards self-management, i.e. relatively low management capacity is needed. The shipper could use blanket order or system contracting. The focus in this category is to reduce administrative costs. Hence, non-critical logistics services require efficient processing, service and product standardisation, order volume management and inventory optimisation.

- The **strategic category** encompasses logistics services that are difficult to manage and strategically important to the shipper. The relationship tends towards a closer relationship with the LSP, focusing on early LSP involvement and joint development of logistics services and supply chain concepts. The relationship maintains a long-term value focus, lowering poor performance and quality costs. The LSP is seen as a natural extension of the firm.

- Finally, the **bottleneck category** includes the logistics services that have a low strategic importance but are difficult to manage. To manage these logistics services more effectively, the company should try to standardise the logistics services, reduce complexity or find a substitutive logistical concept if possible. The company should try involving the LSP in the value analysis of the logistical concept and processes in order to lower the cost of operations. Bottleneck logistics services cause significant problems and risks which should be handled by volume insurances, LSP control, security of inventories and backup plans.

These first deviations of strategies for the management of LSPs are idealistic recommendations that only take into consideration the basic characteristics of the logistics services externally supplied. Hence, the next step is to analyse the logistical supply, which determine the actual relationships between shipper and LSPs.

4.2.2 Logistical Supply Structure

Suitable approaches towards the management of LSP cannot only be defined according to the characteristics of the logistical demand. In fact, restrictions for the successful implementation from the logistics market surrounding have to be taken into consideration. An analysis of the current and the potential LSPs in the form of a feasibility check is required. In addition, the supply risk has to be analysed with respect to the logistics market structure and the company-individual relation to the LSP.

The market analysis aims at the identification of LSPs that offer the required logistical solution in the defined quality-, time- and cost demands. Market analyses are usually conducted by the shipper's outsourcing project team, consulting companies or a combination of both (Wißkirchen, 1999a: p. 168). Based on the analysis of the logistical demand structure, it is important to define an accurate present and, if possible, future profile of the logistics service or logistical solution required. The definition of the required performance level is the basis for a to-be profile of the LSP.

To analyse and define the logistical supply structure a second portfolio is developed. Analogous to the Kraljic approach (1983), the focus lies on the power balance between the LSP and the shipper and the development potential respectively the capabilities of the respective LSPs. By plotting the buying strengths of the supply market, three basic power positions are identified: balance, exploit, and diversify (Kraljic, 1983: p. 112). The general idea of Kraljic's model is to minimise the supply risk and make the most of buying power (Gelderman, van Weele, 2003: p. 207). Hence, in the following, the market power of the LSP as well as the competencies and the development potential of the LSP will be assessed and assorted in a portfolio.

4.2.2.1 Market Power of the LSP

The market power of the LSP theoretically determines the willingness to cooperate. This basic assumption is derived from the analysis of the modern theoretical approaches and their basic assumptions concerning the activities of market players. The willingness to cooperate is another important determinant in the definition of a suitable management approach of LSPs. This willingness to cooperate depends on three main influencing factors:

- **The distribution of power between the participants of a logistics cooperation.** This influencing factor consists of two main aspects. First, the attributes and the qualities of the LSP. Second, the market situation in which the LSP in focus operates.
- The **expected benefit** of cooperation.
- The development of **mutual trust.**

The allocation of power is an influencing factor for the willingness of the LSP to provide capabilities and services to the buyer and to cooperate in close connection. Power means to have the potential to carry one's point, even against reluctance in a social relationship (Weber, 1972: p. 28; French, Raven, 1959: p. 155). Differences in market power exist throughout the initial contract design phase and are difficult to influence by the design of the management approach of LSPs. The above supply power of the LSP is based on two main aspects:

- First, it is a **direct consequence of the existing market situation**: The number of potential LSPs (including future demand- and supply-development and the economic situation in the market) and barriers for the market entry for new LSP competitors defines the market situation. Monopolistic or oligopolistic market structures enhance the supply power.

- Second, the **specific supplier-buyer constellation** is important for the assessment of the supply power: The sales share of the specific shipper for one LSP (including the demand development of the shipper), possibilities for the in-house production of the services and the capacity load of the LSP are all influence factors on the willingness to invest in the business relationship with the outsourcer/ shipper.

Differences in the characteristics of the supply power influence the share of tasks, the decision-making system, and the definition of job profiles. Hence, they influence the organisational structure. Imbalances in the demand-supply power can lead to a one-sided dependency and to a hierarchical structure of coordination. The existence of a hierarchical structure, for example, allows the buyer to force the LSP to publish its internal cost calculations. These influencing factors also directly influence the expected benefit of the cooperation and in combination with the design of the management approach influence the long-term development of mutual trust. Figure 4-4 lists the influencing factors determining the market power of the respective LSP.

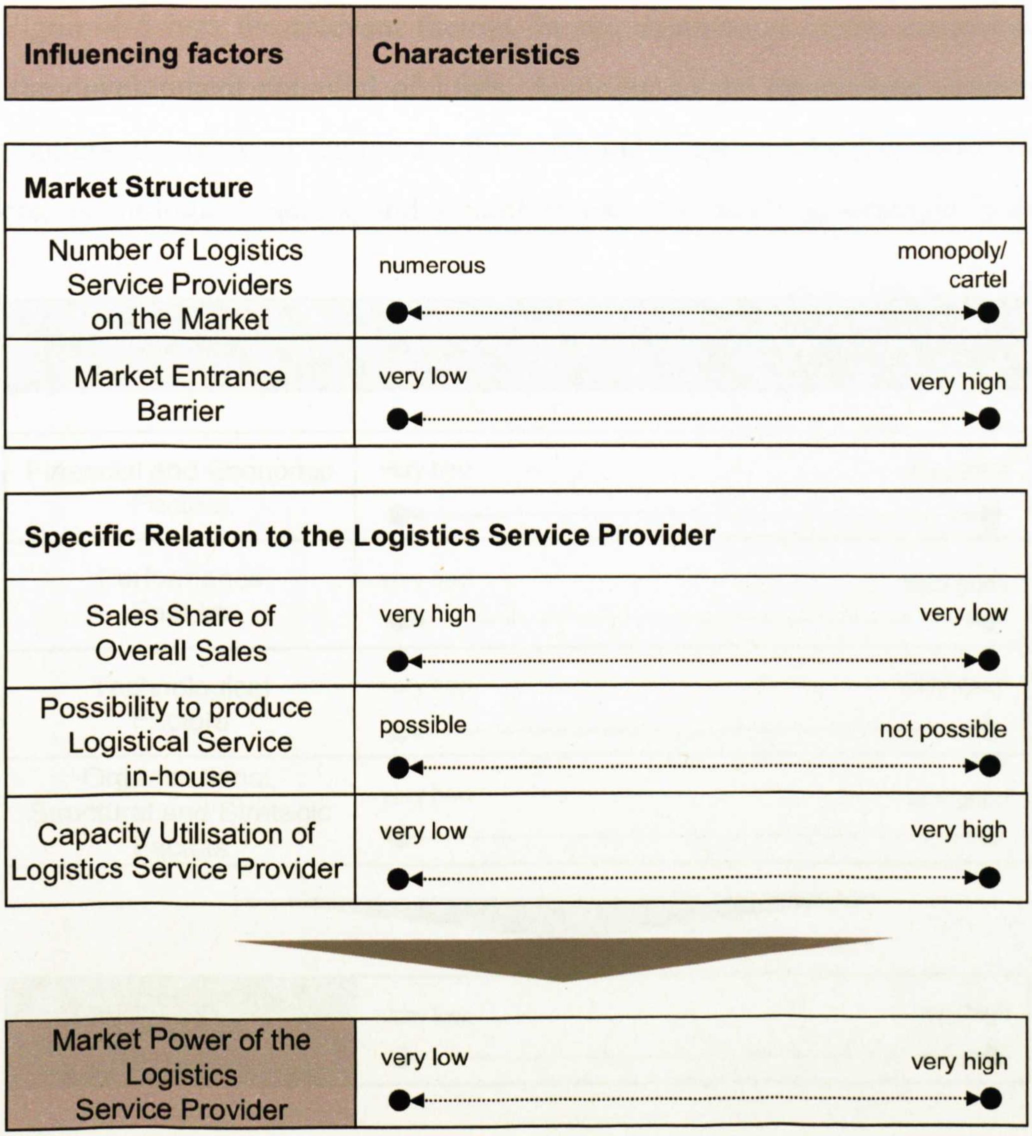

Figure 4-4: Influencing Factors on the Market Power of the LSP

4.2.2.2 The Competencies and the Development Potential of the LSP

Competencies subsume skills and capabilities (Weiss, 1992: pp. 59). Competencies play an important role in the cooperation with LSPs. Therefore, the evaluation of the competencies of a service provider aims at the definition of the qualification as a logistics partner. Today's logistical demands can be so high that the buyer of logistics services alone cannot provide the development and the implementation of logistics concepts. They depend on competent and innovative LSPs. Therefore, the capability to identify the buyers' logistical problems and the ability to develop suitable solutions is an important factor for the cooperational fit. Figure 4-5 lists the relevant factors for the assessment of the competencies and the development potential of LSPs. Analogue to the established assessment of suppliers, the relevant factors are financial and economic factors, performance factors, technological factors, and organisational, structural and strategic factors.

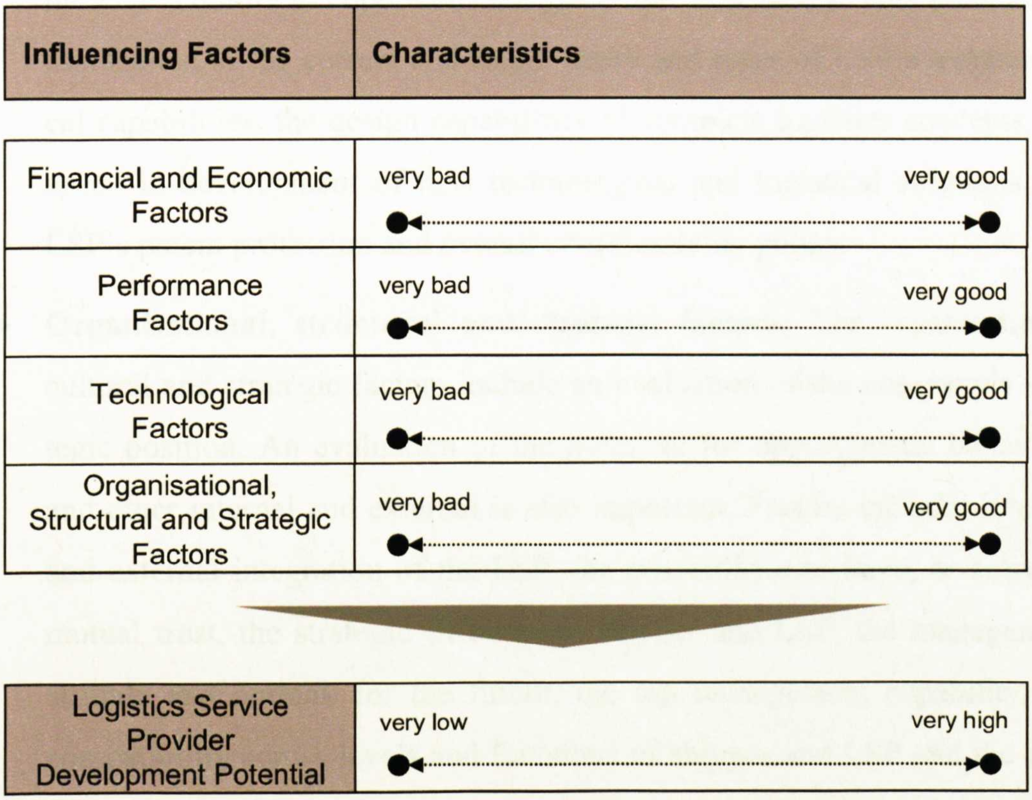

Figure 4-5: Influencing Factors on the LSP Development Potential

In the following, these influencing factors are described:

- **Financial and economic factors:** Financial and economic factors include an evaluation of the supplier's margins and financial stability. These factors are especially important for complex logistical situations in which there is a tendency towards long-term relationships. These relationships normally centre on mutual process adaptations and changes in the IT structures. Insolvencies, therefore, can have substantial effects on the business continuity of the shipper.
- **Performance factors:** Performance factors include a traditional evaluation of delivery reliability and quality in various dimensions and price.

Overall, the performance factors centre on a detailed assessment of the capabilities of the LSP, an observation of the surrounding market as well as in-depth audits.

- **Technological factors:** Technological factors include an assessment of the LSP's ability to cope with changes in the technology. This includes an assessment of the current and future depth and types of LSP's technological capabilities, the design capabilities of complete logistics concepts, the speed in development of new technological and logistical solutions, the LSP's patent protection and overall confidentiality policy.
- **Organisational, structural and strategic factors:** The organisational, cultural and strategic factors include an evaluation of the company's strategic position. An evaluation of the potential for opportunistic behaviour and other internal and external is also important. Factors include: internal and external integration of the LSP, the possibilities to have, or activate, mutual trust, the strategic fit between shipper and LSP, the management attitude and outlook for the future, the top management capability, the compatibility across levels and functions of shipper and LSP and the general risk and uncertainty of dealing with the specific LSP. According to various authors, mutual trust plays an important role in the definition of the management approach of LSPs. From a theoretical point of view, mutual trust is a derivative of economic rationality. Mutual trusts can bridge existing insecurities, reduces social complexity or function as a means to gain economic benefits. Nevertheless, mutual trust is the basis for long-term logistics partnerships. It becomes even more important the closer a partnership is designed. Child and Faulkner state: "Cooperation between organisations creates mutual dependence between them and requires trust to succeed" (Child, Faulkner, 1998: p. 45). This trust often manifests often in the pre-definition of possible LSPs in the information- and decision phase.

It is important to state that this evaluation includes an assessment of the 'status quo' of the LSP as well as an assessment of the future development potential. A proven strategy is, for example, building-up an 'own' LSP from scratch. This normally stems from on a negative result of the first assessment of the capabilities of a specific LSP but on a positive outlook on the development potential across the above factors.

4.2.2.3 The Logistical Supply Portfolio

Often, the supplier's side of the buyer-seller relationship or, in this respect, the shipper-LSP relationship is disregarded in traditional models, especially that of Kraljic. The Kraljic approach does not explicitly take into account the possible strategies and reactions of suppliers or, in this case, LSPs. A differentiated analysis on the management approach of LSPs demands the integration of the logistical supply market. Thereby, mismatches between shipper and LSPs are more unlikely to occur if one takes into account how a LSP assesses (or will assess) the current situation (or the chosen future situation). Figure 4-6 and Figure 4-7 provide checklists for the above influencing factors on the logistical demand situation.

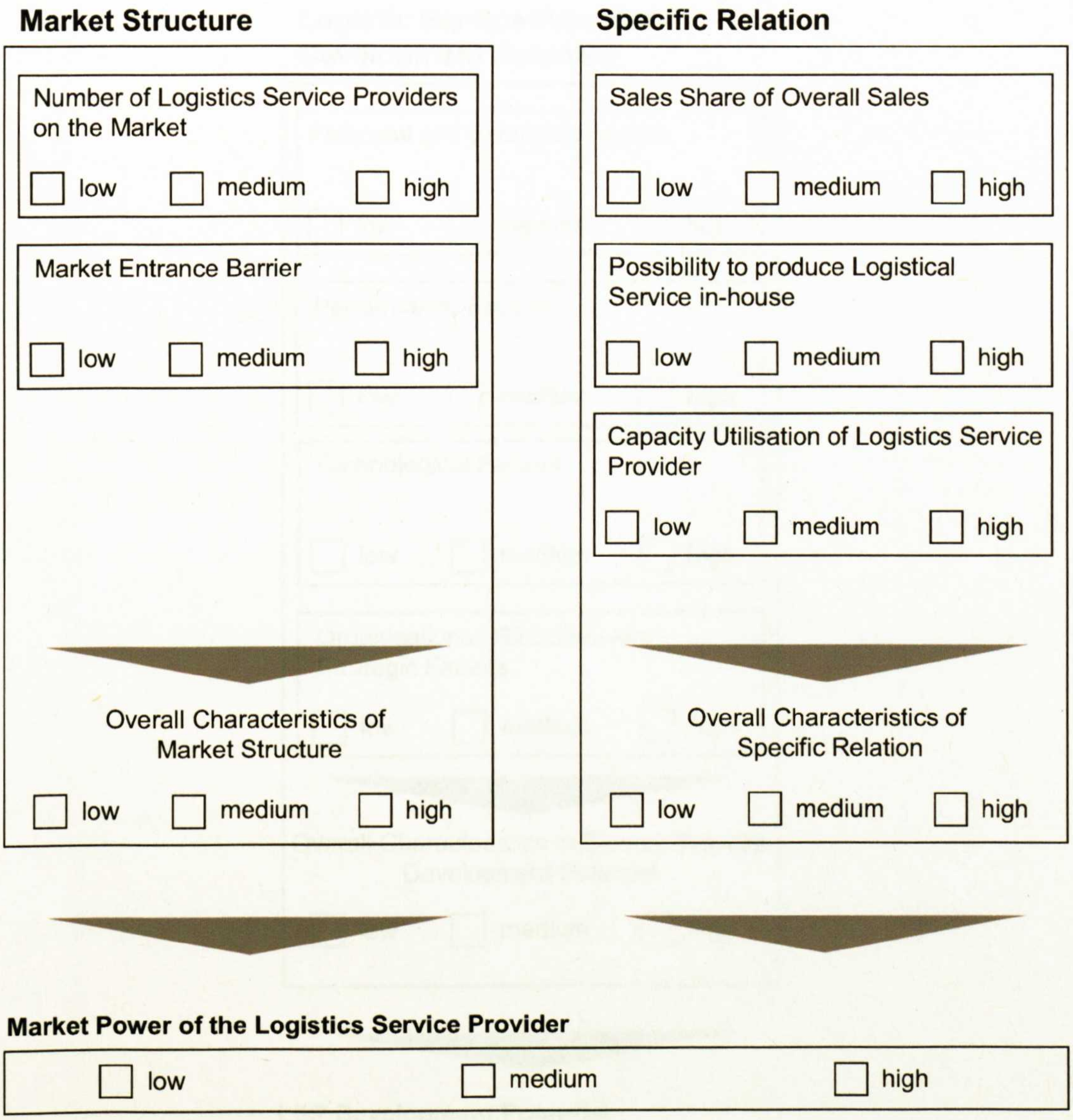

Figure 4-6: Checklist for the Assessment of the Market Power of the LSP

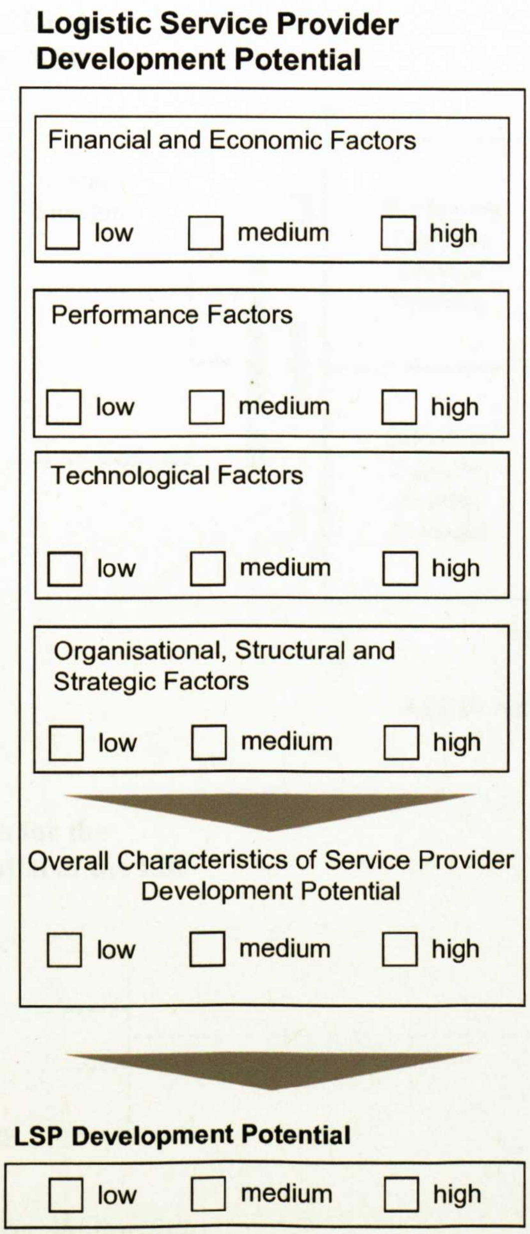

Figure 4-7: Checklist for the Assessment of the LSP Development Potential

The logistical supply portfolio combines the elements market power and supplier development potential to structure the logistical supply situation into clusters. The elements are independent from each other and multiplicatively combined. The labelling of the clusters was again chosen according to Wildemann's 'Procurement Potential Analysis' ('Einkaufspotenzialanalyse') (2000). The numbers, as seen in Figure 4-8, are used for the calculative assigning of case studies in the empirical analysis of the management approach of LSPs discussed later.

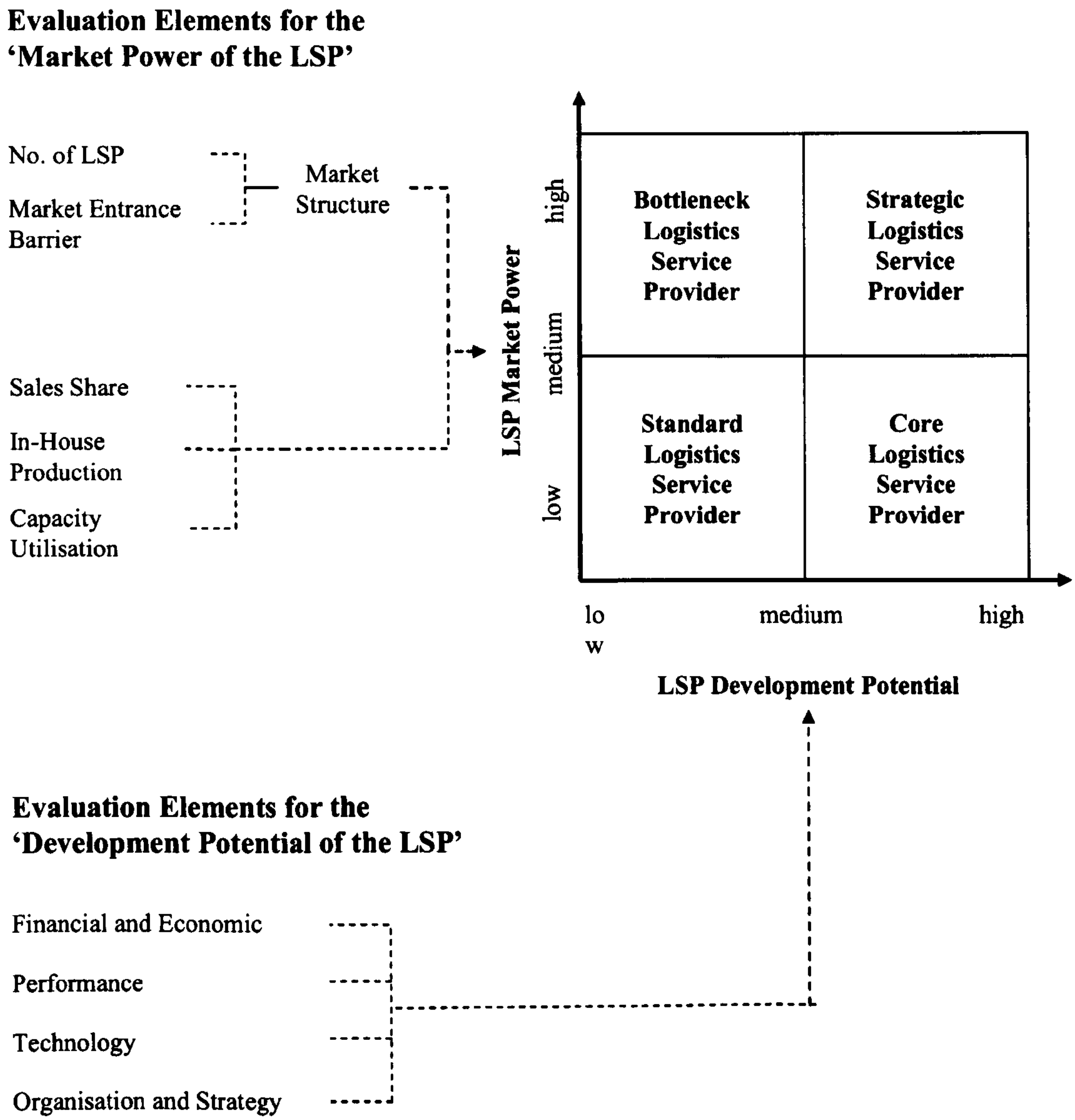

Figure 4-8: Logistical Supply Portfolio

Figure 4-8 illustrates the resulting four categories of logistical supply situations. Similar to the logistical demand portfolio, first indications of strategies for the design of the management of LSPs can be derived. Criteria for the definition of the supplier development potential and the market power demonstrate that the characteristics depend from the respective logistical demand. On one hand, one supplier can have high potential and high cooperation willingness for a specific logistics service but can on the other hand, be an inadequate supplier for other logistics services. The better a LSP is assessed concerning its development potential, the more useful a long-term cooperation with a specific LSP is to be considered. However, if situated in a good market power position, there are more incentives and long-term perspectives that have to be integrated into the logistics cooperation which negatively influence the overall transaction cost level. This results in the need for an analysis of each logistics service or service bundle. For each logistical service, a logistical supply portfolio has to be elaborated before combining it in the overall logistical demand/ supply portfolio.

4.3 Creation of a Taxonomy of Logistical Situations

In the preceding paragraphs, the influencing factors on the design of the management approach of LSPs and thus the influencing factors for the derivation of a practically useful taxonomy were described. The relevant dimensions are:

- **The supply risk of the logistical demand** which is determined, first, by the possible extent of damage induced by the logistics services (value of the goods handled and the value of the logistics services) and second, by the occurrence probability which is determined by the characteristics of the logistics services.
- **The LSP market** which is characterised by the supply power of the LSP as well as the LSP development potential.

On the basis of these dimensions, in each case a two-dimensional space was described. The management approach of LSPs is determined by the overall logistical situation. This logistical situation is determined by the above influencing factors. One can state that there is a multiplicative cohesion between the dimensions described in the logistical demand and the logistical supply portfolio and therefore, they are theoretically independent.

The combination of the logistical demand and the logistical supply portfolio allows the illustration of the logistical situation of a company or a supply chain. The combination is achieved by a systematic decomposition of the logistical supply portfolios into the described quadrants. This decomposition is equivalent to the decomposition of the dichotomy of outsourcing and in-house production as described in the conceptual framework. This traditional picture has been replaced by a continuum of possible cooperation forms for the supply of logistics services. These cooperation forms are situated between the extremes of external supply and in-house production.

To categorise logistical situations in a practically useful portfolio model, the shipper needs to assign weights to each of the factors demonstrated in chapter 4.2. The weights can be changed according to the perceived importance of the factor to the company's operations. The literature contains a variety of methodologies to assign weights to a number of factors (see Narasimhan, 1983, Thompson, 1991, Min, 1994). In this context the approach of Narasimhan was chosen to assign weights to the respective factors. Narasimhan's (1983) methodology can be used to assign weights to factors describing the same dimension according to their perceived significance. Instead of comparing all factors describing the dimension, Narasimhan (1983) suggests that factors are compared on different levels in a hierarchy. The purpose of the methodology is to determine the weight of each of the factors on the lowest level of the hierarchy, e.g. complexity and risk. Instead of comparing all the factors on the lowest level, the factors are compared at different levels, reducing the number of factors that have to be compared. It is important that the investigative team uses the entire scale when evaluating each logistics service or principle. The scale is relative, and companies in different industries cannot compare logistics services by this system. The purpose of the portfolio model is to categorise the company's logistical situation and relationships to LSPs to improve the resource allocation and the management approach of LSPs and not to compare two different companies. Based on the evaluation, the logistical situation can then be depicted in the portfolio.

In the empirical analysis in chapter 6, the assorting of the weights is not analysed in detail. The weighting of the factors is a team-based decision (normally the project team responsible for the outsourcing activities of the shipper) that reflects the overall logistical situation of a competitive surrounding. The relative weighting inside a market assures the correct weighting of factors. Nevertheless, results between markets are not directly comparable. Hence, the empirical analysis starts with a direct allocation of logistical situations and case studies.

The assortment to the respective field in the matrix is not conducted as follows: Starting with the logistical demand portfolio the logistics services are assorted to the respective quadrant in the 4x4 fields' matrix. This means that the vertical side of the portfolio is considered first. The LSPs are assigned in a second step. Thereby, the horizontal level of the portfolio is considered. Due to its norm strategic character, the positioning inside a specific logistical demand/ logistical supply field is not seen as relevant. The norm strategies are assorted to each relevant field. Each dimension is a continuum used to describe relative measures. Hence, the beneath 16 fields' matrix results and indicates a typology for logistical situations (see Figure 4-9). The typology nomenclature is carried out according to Wildemann (2000: p. 107) who has performed a similar taxonomy for the purchasing of products and components.

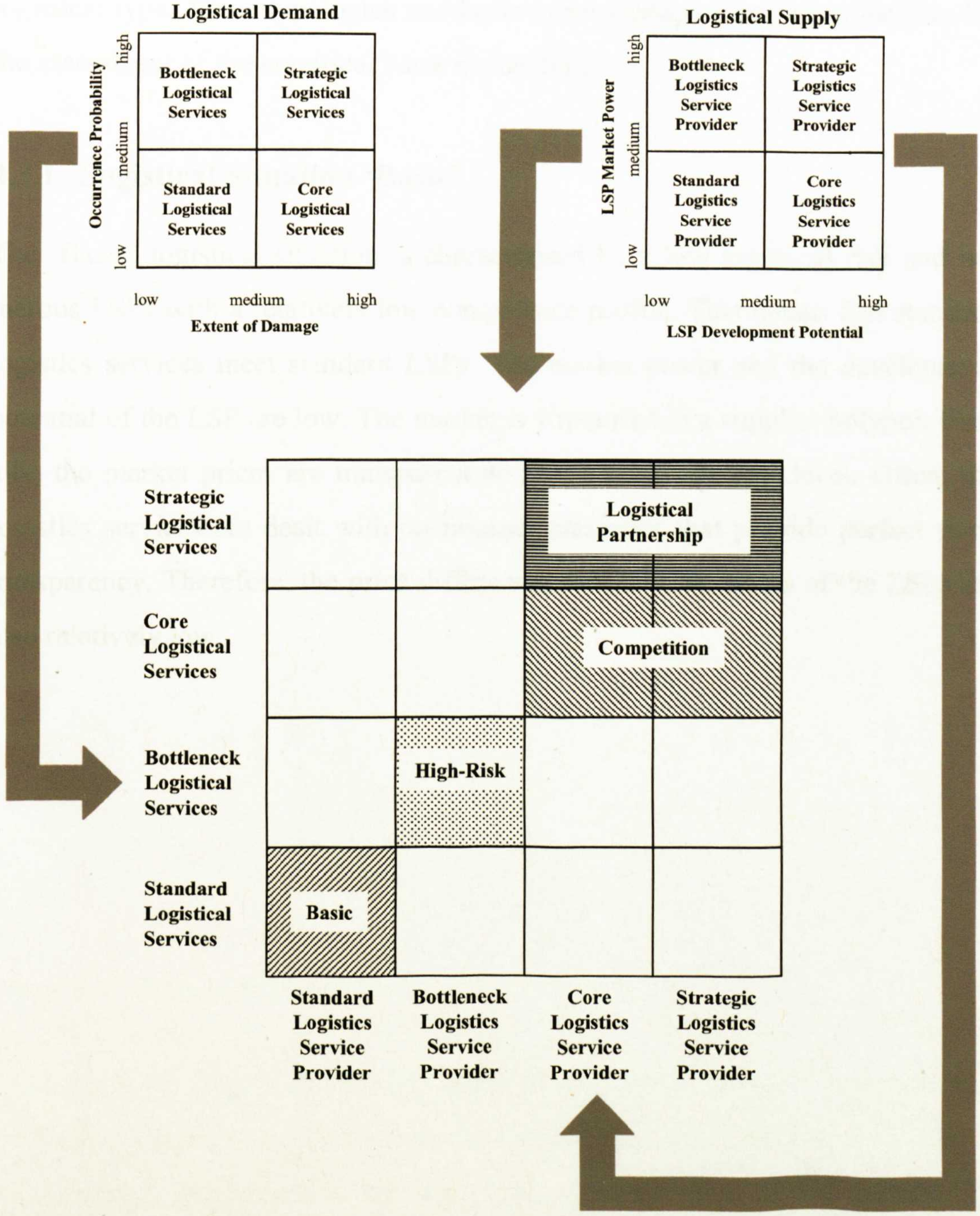

Figure 4-9: Combination of the Logistical Demand and the Logistical Supply Portfolio

In the following, the main types of logistical situations and the basis of the influences on the management approach are defined and described. Not all logistical situations can be assorted to one single type of logistical situation. Nevertheless, the physical nearness can be considered as a hint towards the belonging to one logistical type. These typologies and basic norm strategies are the guidelines for the assessment of the empirical basis in chapter 6.

4.3.1 Logistical Situation 'Basic'

The 'Basic' logistical situation is characterised by a low logistical risk and numerous LSPs with a relatively low competence profile. This means that standard logistics services meet standard LSPs. The market power and the development potential of the LSP are low. The market is structured in a supplier polypol. Usually, the market prices are transparent and on a relatively low level. Often, the logistics services are dealt with on internet platforms that provide perfect price transparency. Therefore, the price differences between the offers of the LSPs are also relatively low.

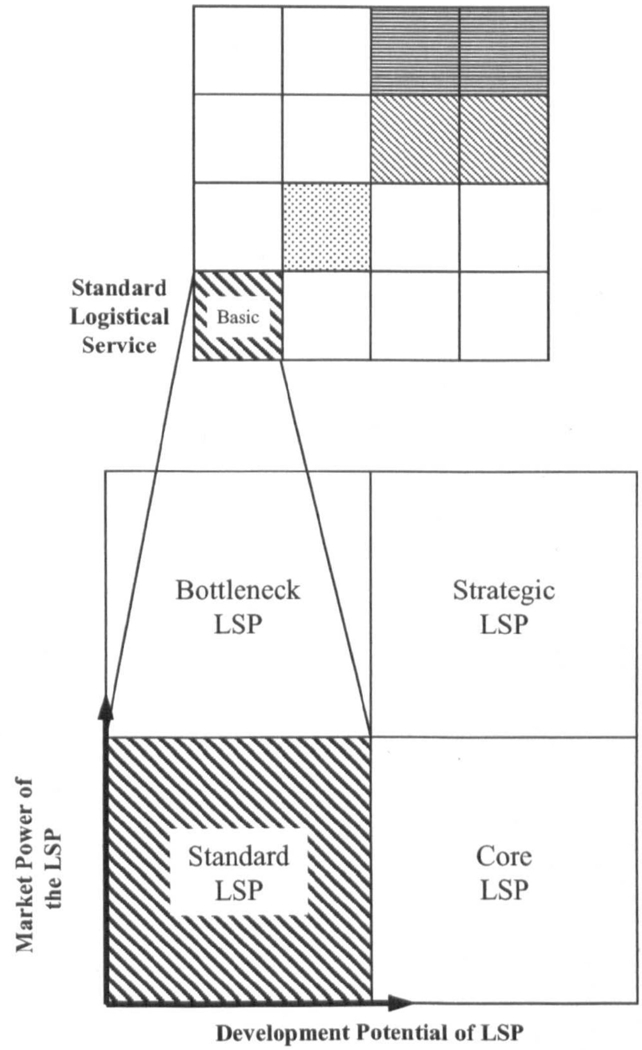

Figure 4-10: Logistical Situation 'Basic'

The aims of the shipper and the LSP are contrary. The shipper is able to dominate the business relationship. Hence, in the 'Basic' logistical situation, internal and inter-company efficiency are the main aims for the design of the management approach of LSPs. This means that the logistical services demanded should be kept on a standardised level or that additional standardisation potentials should be assessed. The order volume monitoring and purchasing should be optimised by efficient processing.

In this logistical situation, based on short-term purchase contracts and individual orders, standardised, simple and tangible logistics services can be bought. The transparent price of the logistics services in this logistical situation loses its coordinational character for more complex, high-risk logistics services. Here, information can be exchanged purely on the basis of market prices.

4.3.2 Logistical Situation 'High Risk'

The logistical situation 'High Risk' is characterised by a high occurrence probability of logistical problems and by a supply market that is dominated by LSPs with a high market power but a relatively low development potential. This constellation of the highest risk, high costs of non-availability despite of a relatively low value of the goods and services handled can arise from a supplier oligopoly or a multiple-monopoly. This is possible, for example, if the customer impact on the logistics service is very high or the dependency on other products or services is significant. The LSP development potential is restricted.

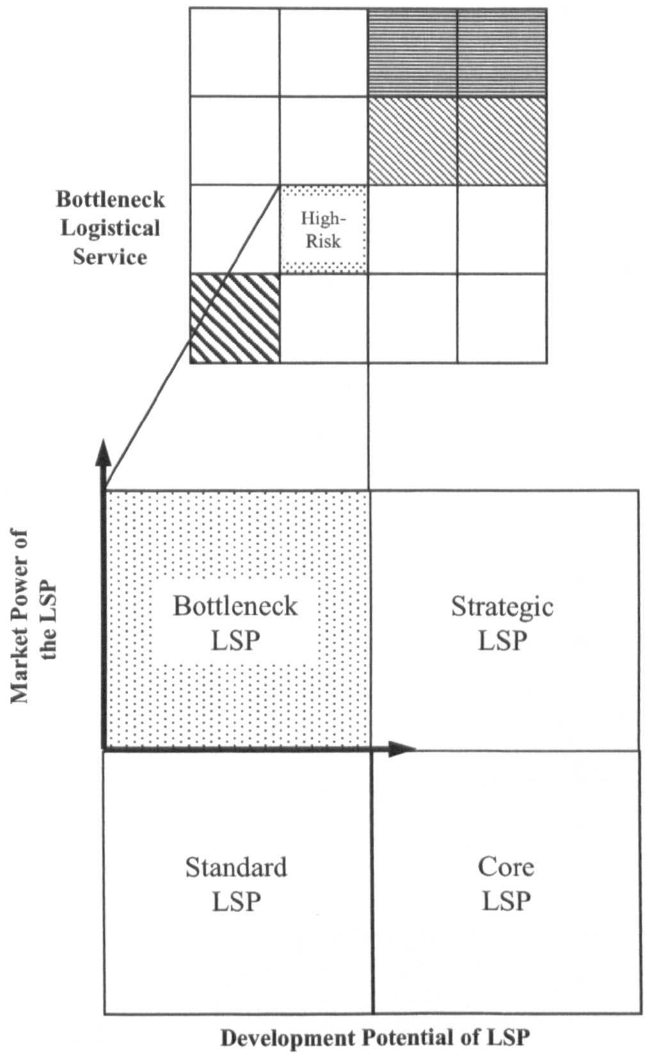

Figure 4-11: Logistical Situation 'High Risk'

The aims of the shipper and the LSP are contrary. The LSP is able to dominate the business relationship. The purchasing power should be fully exploited. Additional standardisation potential of logistics services should be assessed for the use of the possible integration of additional service providers.

4.3.3 Logistical Situation 'Competition'

In the logistical situation 'Competition', core and strategic LSPs provide core logistics services. The influence of the logistics services outsourced on the business model of the outsourcer has significant effects on the design of the logistics cooperation. The LSPs have a relatively high development potential and are able to work in innovative forms of logistics cooperations.

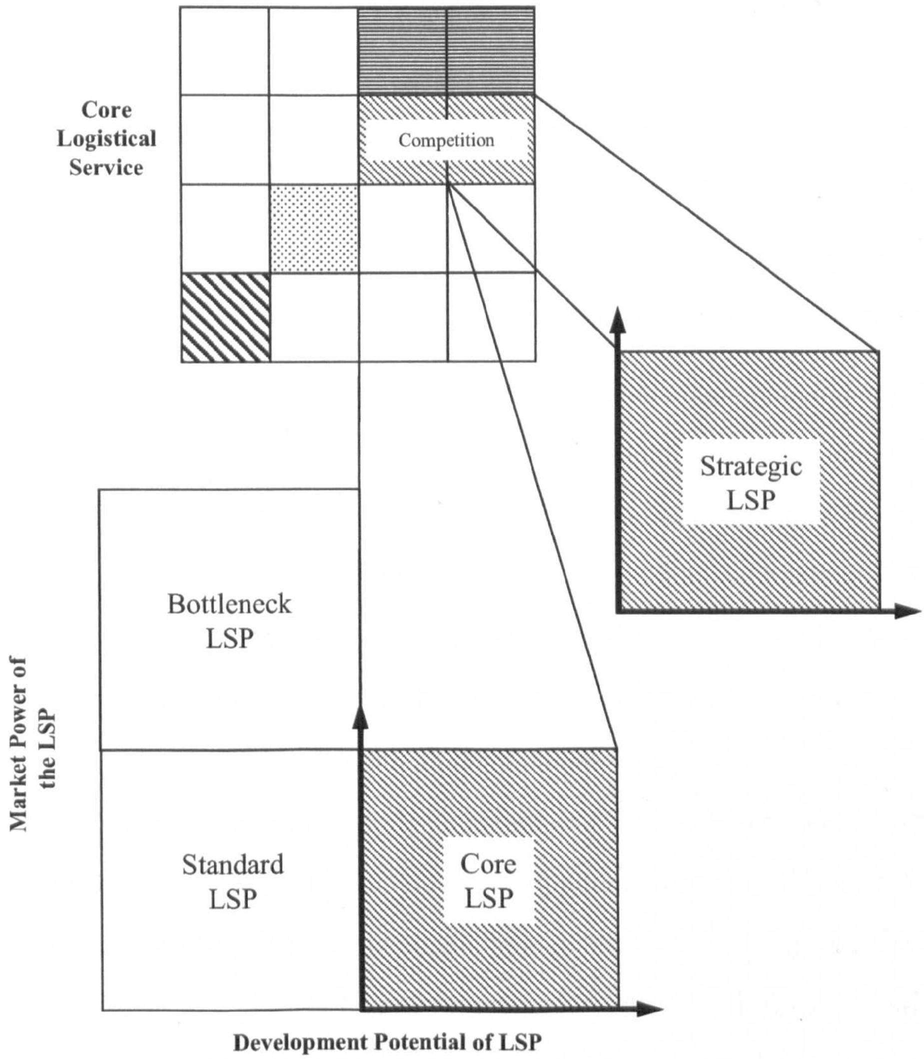

Figure 4-12: Logistical Situation 'Competition'

This logistical situation centres on an intensive risk level. The supply of logistics services should be secured by volume insurances (at a costs premium if necessary) and by the elaboration of detailed back-up plans. A detailed controlling of the LSPs is needed.

4.3.4 Logistical Situation 'Partnership'

Strategic logistics services have a high value concerning the goods and the services handled and thereby a high influence on the business model of the outsourcer. Compared to core logistics services they have a higher logistical risk. This higher logistical risk leads to the cooperational form logistics partnership. A mutual dependency between shipper and LSP reduces the logistical risk. The internal logistical risk is lowered by an intensive use of the LSP's expertise. Incentives for the LSP also have to be integrated for this form of cooperation.

Bagchi and Virum define logistics partnerships as a synonym to logistics alliances as "a long-term partnership arrangement between a shipper and a logistics vendor (LSP) for providing a wide array of logistics services" (1996: p. 93). By using logistics partnerships in which one (or two) LSP(s) take care of a number of logistics services, the number of LSPs can be reduced. Bowersox *et al.* (1989) characterise an alliance as a cooperative relationship in which the parties seek to establish jointly rewarding relations in an atmosphere of mutual trust. They define it as: "business relationships in which two or more independent organisations decide to work closely together to achieve specific objects" (Bowersox, 1988; Bowersox *et al.* 1989). These definitions imply that in the long run the aims of the shipper and the LSP are not contrary anymore. Hence, LaLonde and Cooper (1989) define a partner relationship based on four factors: first, the sharing of benefits and burdens; second, planning, and future orientation; third, level of scope and contact and fourth, open information exchange. In order to create commitment and synergy the participating companies share the risks and rewards in a joint effort. The essence of a logistics alliance is, according to Bowersox *et al.* (1989, 1992), the fact that the service provider assumes some of the risks in the logistics process and therefore reduces the transaction costs. The sharing of benefits and burdens is based on equal sharing of the risks and not on the economic strength of the parties (LaLonde, Cooper, 1989). Lewis (1990) also argues that a strategic alliance must be based on a mutual need and that the parties share the risks involved in achieving the common objective. Lewis (1990) and Killing (1983) also share the opinion that successful cooperation depends on mutual trust and understanding, which takes time to develop.

In the first step, the reduction in the number of LSPs will lead to a reduction of transaction. Second, in-depth cooperation opens up the possibility for further reduction of transaction costs due to economies of scale and scope and learning curve effects on the LSP's behalf and on the shipper's behalf.

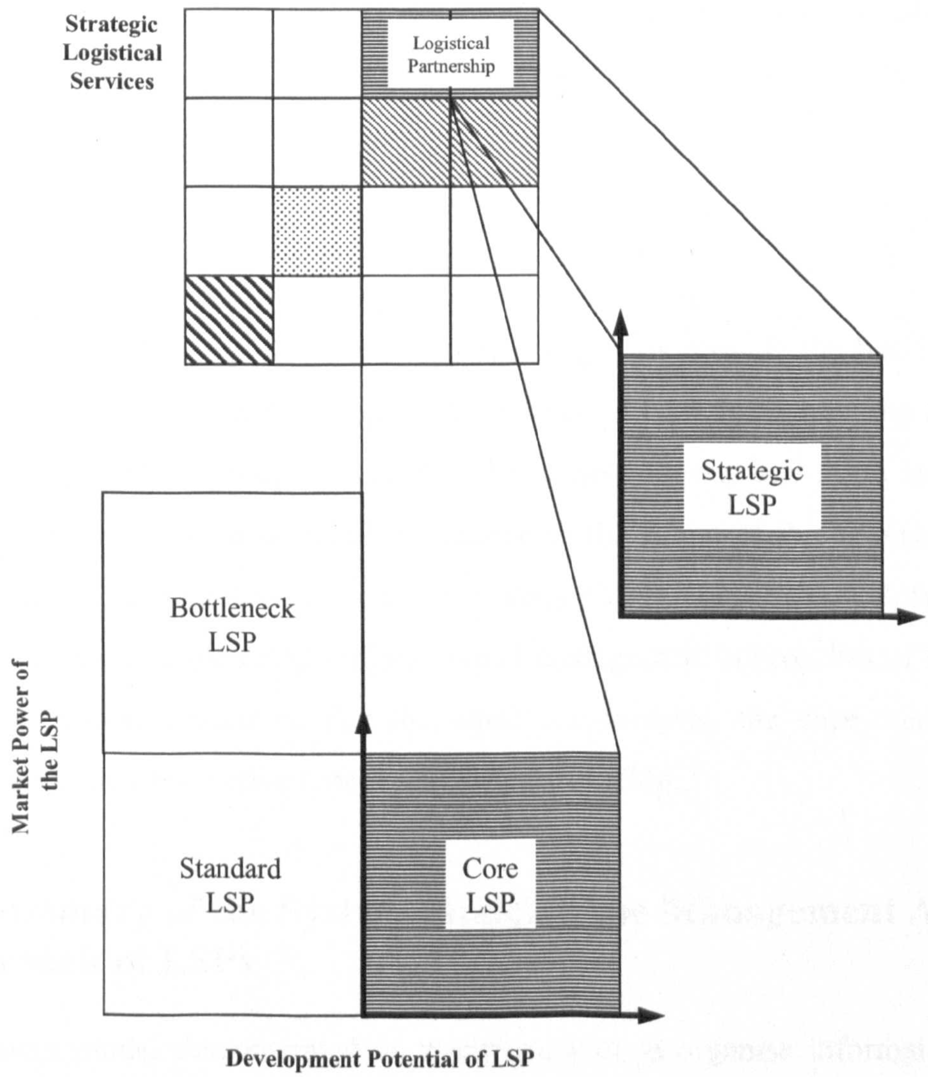

Figure 4-13: Logistical Situation 'Partnership'

In this logistical situation, the business relationship has to be cooperative. As norm strategies for the design of the management approach of LSPs the following activities can be named:

- **Use of the expertise** of the LSP,
- **Integration of a cooperational approach** throughout the transaction life cycle.

The logistics partnership aims at a reduction of logistical risks for the shipper and the realisation of efficiency potentials by intensive cooperation throughout the complete supply chain. This includes joint accurate demand forecasting, risk analysis and contingency planning.

4.3.5 Summary

The above-described typologies of logistical situations provide the basis for the differentiated design of the management approach of LSP throughout the transaction life cycle. The typologies describe ideal constellations and norm strategies that have to be analysed in detail in practice in the frame of the empirical case study analysis. Nonetheless, their norm-strategy characters provide helpful guidance in the analysis and design of situational management approaches of LSPs in diverse logistical situations. For the empirical analysis, the case studies are aligned with their respective types of logistical situation.

4.4 Summary of the System Model of the Management Approach of LSPs

The system model demonstrated an analytical tool to organise information and create a classification framework for logistics cooperations. Taxonomies of logistical situation can be derived from the framework. It is important to emphasise that the process of categorising the logistical situations and the derivation of taxonomies in practice can be as important as the classification and the derivation itself. This is because during the process of categorisation, the decision-makers have to discuss inconsistencies among themselves and agree on the importance of the different logistical demands, logistical supply situations, LSPs and relationships that are being classified in the portfolio model.

The identified influencing factors on the design of the management approach of LSPs are the logistical demand structure and the logistical supply structure. With these influencing factors, logistical situations can be holistically described and taxonomies of logistics cooperations can be derived. The logistical demand structure is, first, influenced by the specificity and the complexity, insecurity and measurability of the logistics service and, second, by the extent of the potential damage to the business model of the outsourcer. From these influencing factors, the logistical demand portfolio was derived. The logistical supply structure is, first, influenced by the market power and, second, by the competencies and the development potential of the LSP. From this, the logistical supply portfolio was derived.

Both influencing factors can be interpreted as independent ones. They form the two axes of one diagram. To be able to define a practical-useful taxonomy for the empirical analysis, the diagram was divided into separate fields. The combination of both portfolios resulted in a 16 fields matrix. This matrix provided the basis for the definition of the above taxonomies of logistics cooperations. Thereby, four characteristical forms of logistical situations could be identified: The 'Basic', 'High Risk', 'Competition' and 'Partnership' situations. These logistical situations were described concerning their influencing factors and first indications of norm strategies.

Thereby, the portfolio approach delivers a structured framework for the discussion of the overall logistical situation and improvement potentials in the form of norm strategies. In combination with the design fields that will be discussed in the next chapter a framework for the optimisation of the logistical surrounding of a company is given and, hence, the optimised design of the management approach of LSPs is defined. The taxonomies of logistical situations serve first, as the framework for clustering, analysing and describing the case studies in the course of the empirical analysis and second, as a tool for deriving norm strategies that can be compared to the chosen strategies in each case study. In theory and practice, the above strategies build the basis for the elaboration of the basic competition and cooperation strategy in different logistical situations.

With the definition of the system model and the definition of types of logistical situations, the design of the situational management approach of LSPs can be conducted on the basis of a theoretical-deductive and an empirical-inductive study. This situational approach will be structured along the life cycle of logistics cooperations and will be outlined in the next chapter.

5 Design Fields of the Management of LSPs

A situational approach for the design of the management approach of LSPs throughout the transaction life cycle demands an analysis of each specific phase throughout the life cycle of logistics cooperation. Thereby, the initial thesis that a logistical situation-dependent management of LSPs is advantageous compared to a unified management style that ignores the logistical demand and the logistical supply surroundings, is outlined. Therefore, the design fields are analysed, evaluated and described along the phases of a logistics cooperation as described in the conceptual framework. On the basis of the conceptual framework and the defined system model, the transaction phases are analysed. Hereby, theoretical approaches from literature are systemised, analysed concerning their ability to answer the relevant questions and are further developed, if needed. On one hand, design options are analysed in the respective phases and on the other hand, instruments that are useful in the respective phase. In the following, four phases are analysed in detail and shaped towards the demands of holistic LSP management:

- The **information- and decision phase** in which the initial logistical situation is assessed,
- The **agreement phase** which ends with the conclusion of (a) contract(s),
- The **processing- and controlling phase** in which the transactions occur and
- The **adjustment phase** in which the original bases of the contracts, as agreed upon in the agreement phase, are changed. This phase ends with the termination or the change of the contract(s) and ends the logistics cooperation or returns to one of the preceding phases.

The design of the management approach of LSPs has to follow the ultimate aim of minimum overall costs with given quality demands. Hence, the ultimate aim is the minimisation of the overall costs as demonstrated in chapter 3.3. This means that the sum of the overall transaction costs plus the prices for the logistics services have to be minimised. Therefore, aims concerning quality, costs and time have to be achieved by a suitable choice and embodiment of the design fields.

The design fields are the unified forms of the management approach of LSPs. The identification of the logistical demand and the logistical supply, in the form of suitable LSPs, are core elements of the information- and decision phase. Furthermore, in this phase the decision basics for the design of the logistics cooperation are defined. It is obvious that this phase cannot be designed dependent on the typology of logistical situation due to the fact that the typology is the result of the information- and decision phase. Hence, the information- and decision phase has to be completed independently of the typology. The same applies to the resulting definition of the vertical range of logistics strategy. Further activities are the choice of the suitable LSP(s), the design of the organisational structure between shipper and LSP as well as the definition of the risk management approach. The organisational form defines the structural framework between LSP and shipper and determines the division of labour.

The defined basics from the information- and decision phase are then concretised in the agreement phase. Here, the design and the contents of the logistics cooperation contracts have to be defined and the overall incentive systems have to be shaped. The contract design substantiates the mutual expectations of the logistics cooperation. Closely connected to the contractual framework, the incentive system has to be designed. Aim is the ongoing motivation of the LSP to contribute to a continuous improvement process. The agreement phase closes with the signature of the logistics cooperation contract(s).

The design of the information- and communication structure has to be defined in the processing- and controlling phase. In addition, the controlling systems have to be developed which centre on the design of the incentive systems from the agreement phase. The design of the controlling system serves as the main tool for the monitoring of the contract elements and the development of quality-, cost- and time-measures.

Finally, the adjustment phase has to be concretised concerning its triggers and re-entry point into the logistics cooperation life cycle. Dependent on the changes in the logistical demand and supply situation, the adjustment phase redirects the cooperation life cycle into the information- and decision phase, the agreement phase or into the processing- and controlling phase.

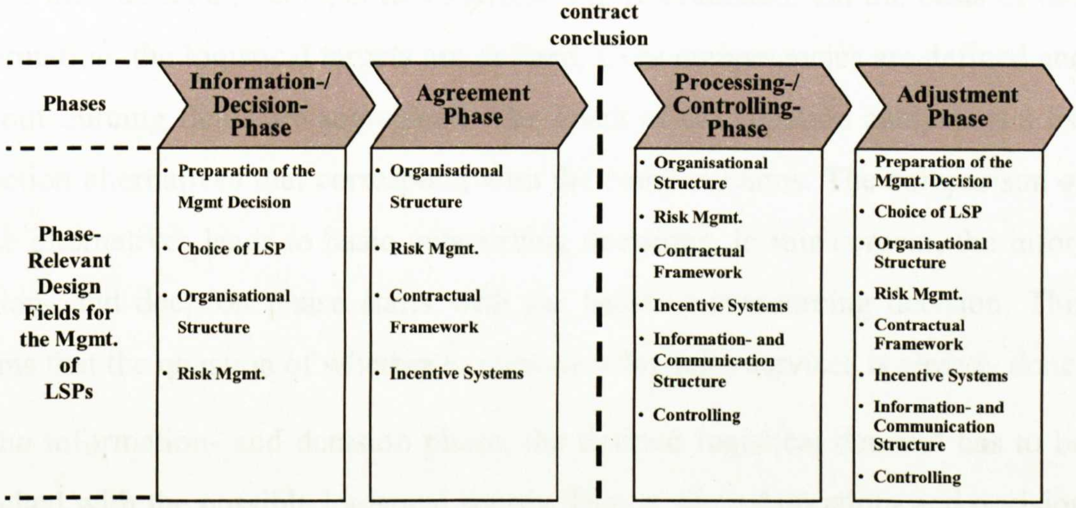

Figure 5-1: Relevant Design Fields of the Management of LSPs in the respective Cooperational Phases

The relationship between LSP(s) and an outsourcer/ shipper is holistically and exhaustively described by the above design fields. Their combination leads to a complete description and design of the management approach dependent on defined logistical situations. In the following chapter, the design fields are defined and their characteristics dependent on the logistical situations, as well as their respective influence on the transactional costs, are described. As a result of this theoretical-deductive study, characteristics of the phases of a logistics cooperation can be derived that will be challenged afterwards in the course of the empirical analysis.

5.1 Information- and Decision Phase

The initial start for the outsourcing of logistics services are company-internal problems or optimisation potentials, changes in the market environment or overall changes in the vertical strategy of logistics that is often linked to changes in the overall company strategy. An analysis of the logistical situation is required, where the market and competition surrounding is evaluated. On the basis of this information, the logistical targets are defined. Core competencies are defined and the outsourcing fields are segregated. The result of the situation analysis is a list of action alternatives that correspond with the company aims. The comparison of these alternatives leads to basic outsourcing decisions. In this context, the information- and decision phase starts with the finished outsourcing decision. This means that the question of whether to outsource logistics services is already done.

In the information- and decision phase, the defined logistical demand has to be matched with the possible logistical supply. Hence, the information- and decision phase enables to assort the focal company's logistical situation to one of the types of logistical situations as described in chapter 4. This also means that suitable LSPs have to be identified; chosen and corresponding decisions have to be made.

5.1.1 Preparation of the Management Decision

The main aim of the information- and decision phase is the reduction of the information deficits of the decision makers. The information acquisition comprises all activities of information search from internal and external sources, the analysis of this information and its synthesis for the derivation of concrete demand and supply profiles.

The internal analysis aims at the identification, evaluation and analysis of interdependencies of internal competencies with logistical processes and services. The external analysis focuses on the competition and relations in the logistics markets by analysing potential LSPs and external requirements. Both analysis steps should be conducted in parallel. The completion of these analytical steps forms the basic requirement for the definition of the position in the logistical demand/ logistical supply matrix. As will be demonstrated later, the definition of the strategy of the vertical range of logistics should always be a resulting element of the internal and external analysis. If the vertical range of logistics strategy is defined beforehand, the resulting risk is a falsification of the neutral analysis of internal logistical demands and external logistical supply possibilities.

5.1.1.1 Internal Analysis

The aim of internal analysis is to reduce information deficits concerning the exact nature and complexity of the logistics services, the related processes, as well as an evaluation of the cost- and the service-level of the logistical activities. Furthermore, the logistics services have to be analysed from the resource- and competence-based view. From the competence-based view, the interdependencies between the logistical processes and services and the resources and competencies of the organisation have to be analysed concerning the resulting competitive advantages.

The Process View: The required transparency of the logistics services is independent from the targets the organisation aims at with the external supply of logistics services (Schäfer-Kunz, Tewald, 1998: p. 101). The demands on the level of detail of the transparency rises with the complexity of the logistics services supplied. The problem is that for the final definition of this complexity, transparency must be achieved beforehand. Therefore, transparency is an overall demand on the outsourcing constellation independent of the logistical situation, i.e. independent from the logistical demand and the logistical supply. Numerous articles discuss external logistics services from a functional point of view (e.g. the outsourcing of a warehouse or the outsourcing of distribution logistics) (Rabinovich *et al.*, 1999; Guttenberger, 1995; Maltz, 1994; LaLonde, Maltz, 1992). Nevertheless, logistics services are normally cross-sectional activities and therefore the complete processes, and not functional structures, should be analysed (Näslund, 2002: p. 52; Bruch, 1998: p. 63). The analysis should be process-focused which is defined according to the understanding of logistics as described in chapter 3.2. Focus lies on the coordinational activities of logistics services. This view allows a cross-sectional analysis that comprises planning and auxiliary activities that are often performed in organisational areas other than the original logistics organisation.

- First, one has to **analyse the logistical activities in detail**. Logistical activities have to be combined to form cross-sectional process chains. The analysis should comprise all logistical activities, independent of the logistics services that are supplied externally. This provides the possibility of identifying interdependencies and links between the logistics services. This information provides the basis for the discussion of alternative management approaches for LSPs. In addition, they provide the basis for the formulation of tenders and to evaluate the proposals of LSPs.
- Second, the **logistics services have to be evaluated concerning the costs they generate**. Since logistics costs have to be evaluated according to a process cost systematic, this evaluation is often not available and difficult to generate. Significant elements of the costs are assorted to general and administrative costs and are matched with cost centres later on (Weber, Engelbrecht, 2002b: p. 108). The definition of the relevant internal logistics cost is relatively easy if the logistics services in focus fit completely with a cost centre. This can apply, for example, for warehouses or car fleets (Schäfer-Kunz, Tewald, 1998: p. 111). Nevertheless, at least once, a process cost calculation has to be conducted (Wißkirchen, 1999b: p. 290; Lenz, Demuth, 1991: p. 94; McIvor, 2000: p. 32). Lynch states that the use of the process cost calculation technique is inevitable (2001: p. 15; 2004: p. 112). Schäfer-Kunz and Tewald (1998: p. 119), Wißkirchen (1999b: p. 290) and Teichmann (1995: p. 143) demonstrate practical techniques for defining and analysing process costs for logistics services. Activities- and sub process-costs are assigned to the cost centres. The costs of a specific process add up from the sub-processes and activities multiplied with the

frequency of the specific process (Wißkirchen, 1999b: p. 301). Dispositive and coordinational costs also have to be integrated. Accordingly, the internal coordinational costs are calculated and the implications of different management approaches for the external LSP can be evaluated and discussed. Moreover, this initial process cost calculation should be further used for the definition of a detailed controlling systematic (see chapter 5.3.2).

- In addition, the **logistics performance has to be evaluated for each process output**. Weber demonstrates the logistics performance calculation in detail (2002: p. 62). As such, measures of different levels are important. Weber distinguishes potential-related, process-related, result-related, and effect-related levels (2002: p. 65). In the context of the analysis and the design of the management approach of LSP one has to analyse the relevant contracts at the process level (e.g. transport, storage) as well as distilling such information into effect-related or result-related key performance indicators (e.g. delivery time, service level, failure rate). First, this forms the basis for the controlling of the logistics cooperation (see chapter 5.3.2) and second, the basis for the proposal- and bidding-process (see chapter 5.1.2). Furthermore, this procedure ensures that focus remains on the customer-relevant logistics service. This result in the cooperation with a LSP, not only result-related key performance indicators (KPIs[33]) are relevant since such results not depend solely on logistical processes and therefore LSPs cannot only be compared on the basis of these result-related KPIs (Guttenberger, 1995: p. 139).

[33] 'Key Performance Indicators' (KPI) are financial and non-financial metrics used to quantify objectives to reflect strategic performance of an organization. KPIs are used in Business Intelligence to assess the present state of the business and to prescribe a course of action (Gleißner, 2004: p. 108).

A widespread successful visualisation systematic is 'value stream mapping' which was established as the key tool for understanding the flow of material and information as well as the passage of titles. 'Value stream mapping' was first described by Rother and Shook (1998) and further developed by several authors (see e.g. Baumgärtner, 2006: pp. 235-237). This methodology provides a basis with which to gather the information from the process view.

The Competence View: The detailed information from the process view concerning logistical processes, the resulting costs, and the performance levels provides the basis for the competence view in the internal analysis. The central aim of the competence view is the analysis of the specificity and complexity of the logistics services in interdependency with the internal competencies of an organisation. This analysis defines the level of difficulty the external supply of a logistics service causes. Hinterhuber and Stuhec define a process-oriented procedure in analysing the 'outsourcing-ability' of a logistics service or process (1997: p. 17). Basically, this analysis aims at analysing the specificity of a logistics service and thereby defining which resources and competencies are required inside an organisation to produce, or externally handle, these logistical processes.

In a first step, the logistical processes in focus are checked concerning their ability to generate competitive advantages by differentiating the organisation (Bouncken, 2000: p. 878). This analysis view is based on the research of Porter (1999). The evaluation of the process view is reflected in the results of the external view. Therefore, the internal and the external analysis have to be conducted in parallel. This also fits to the basic hypothesis that the management approach of LSPs depends on the logistical situation that is determined by the logistical demand and the logistical supply. This parallel procedure can be conducted by a detailed benchmarking of the logistics services with the ones of the main competitors or best-practice solutions[34]. Benchmarking is conducted on the basis of the result- and effect-related KPIs from the process analysis. The decisive result is the achieved customer benefit. By this, processes or process elements can be identified that have a current influence on an organisation's differentiation level. The less the differentiation contribution of a logistics service the easier the external handling and management gets.

Competence-based analyses are nonetheless needed for logistics services that differentiate the organisation in focus from their competitors. Logistical processes that differentiate from the competition from the customer's point of view are based on bundles of different internal resources such as organisational structure and knowledge (Boos, Jarmai, 1994: p. 20). Therefore, the differentiating logistical processes have to be examined with respect to their required specific competencies. These competencies are an important influencing factor in the definition of the specificity and the importance of a logistics service.

This procedure centres on the resource-based view. The consolidated findings from the resource- and the competence view have to be mirrored by the external market-based view. The method described assumes that the differentiation potential of a logistics service is an indicator for the specificity and often for the complexity of a logistical activity. According to chapter 3.3.3.5 this assumption is feasible.

The competence view allows the division of logistical processes into those that differentiate and those that do not. The low performance specificity only has a minor effect on the competitive positioning. This assessment is valid for the 'status quo' of the logistical demand situation. The future situation has to be

[34] Frederick Taylor (1919) puts it: "Among the various methods and implements used in each element of each trade there is always one method and one implement which is quicker and better than any of the rest" (Taylor, 1919). This viewpoint came to be known as the 'one best way' (Kanigel, 1997). This one best way in this context is defined as 'best practice'.

analysed through an evaluation of the future competitive impact of logistics services.

5.1.1.2 External Analysis

The main aim of the external analysis is the assessment of the situational surrounding of the logistics services. Information required for the internal analysis is also needed for the external analysis and vice versa. Therefore, both analytical steps are in practice conducted simultaneously. The external analysis comprises three main components: the industry environment, the performance environment, and LSPs. These dimensions form the analytical framework for the analysis of the defined relevant elements for the assessment of the logistical supply structure as described in chapter 4.2.2. Boos and Jarmai (1994: p. 23), Scherm (1996: p. 50) and Jennings (1997: p. 88; 2002: p. 28) describe the relevance and the characteristics of these dimensions.

The Industry Environment: The analysis of the industry environment aims at an identification of the logistical influences of competitive forces of an industry in the organisation in focus. The procedure is oriented towards the industry analysis of Porter (1999). This analysis is conducted from a logistical point of view, meaning that focus lies on effects that have implications on logistical processes and activities. The analysis provides information for the identification of strengths and weaknesses as well as important industry trends. This information contributes to the competence view of the internal analysis. The results on the current, the future logistical capability, and service offering of competitors build the basis for the evaluation of logistical processes on the organisation concerning their competitiveness. In parallel, the information generated contributes to the demand profile for the LSP. The competitive forces analysis of Porter (1999) provides a suitable analysis framework to define the strategic positioning of an organisation concerning its logistics performance as well as the current and the future demands of customers and suppliers. Consideration of these elements meets the scientific postulation in strategic management of combining the resource-based and the market-based view (see chapter 3.3 and Beer, 1998: p. 170).

Due to the altered focus of the analysis of Porter's (1999) concept in this context, the procedure has been modified slightly. Usually, the analysis of new and existing competitors is conducted separately. The analysis in this context is conducted in parallel and the analysis of substitution threats is omitted. The customer benefit is the main aim of the analysis. The customer's benefit does not depend on the type of logistical processes needed to fulfil the demand due to the fact that logistical activities are considered a derived demand[35]. Hence, substitution threats are not relevant for logistical processes and activities. The relevant elements for the external analysis are:

- **Analysis of existing and potential new competitors:** The logistics performance of existing and potential new competitors of the organisation in focus provides the basis for the evaluation of their own performance level. In the context of competitor analysis, a benchmarking comparison to the leading competitors is required[36]. The analysis should be based on a result-related view. The logistics performance is normally perceived by the customers as a product producer's performance and not as a performance brought by a LSP. Hence, the method of the production of logistical activities is irrelevant. The main aim is to identify the competitor with the best-perceived logistics performance from the customers' perspective. These best-in-class logistics performances have to be measured in a way that they can be compared with their own performance levels. On this basis the dif-

[35] 'Derived demand' means, that the demand for one good or service occurs as a result of demand for another. Demand for transport is a derived demand, as users of transport are very often consuming the service not because they benefit from consumption directly (except in cases such as pleasure cruises), but because they wish to partake in other consumption elsewhere.

[36] Guttenberger also describes benchmarking as a tool in the context of logistics outsourcing (1995: p. 157).

ferentiation potential of the logistics services can be evaluated in the context of the internal analysis. In addition, the logistics strategy of leading competitors are analysed for a prognosis of the future performance levels.

- **Analysis of the future customers' demands:** The creation of customer benefit is the central aim of logistics services; the creation of unique customer benefit is the potential to differentiate on the basis of logistics services and to use logistical activities as a competitive advantage. This implies that the organisation knows the specific customer demands. Qualitative and quantitative market research provide the ability to identify the customers' demands. Proven research techniques are, for example, Conjoint Analysis or customer questionnaires and focus groups (Meffert, 2000: p. 149). In this context, it is important to note that the customer can be an external as well as an internal one. The aim of this analytical step is the achievement of transparency concerning the type of logistics services that the customer appreciates today and will appreciate in future. In addition, the current and future differentiation potential is evaluated. Accordingly, basic services and differentiation services can be distinguished. Basic services have to be delivered by each company of an industry to be accepted by the customers. Differentiations services open up the possibility of achieving sustainable competitive advantages.
- **Analysis of the suppliers' demands:** Similar to the customers' demands, today's and future demands of suppliers should be considered in the definition of the management approach of LSPs. This is especially relevant for in-bound logistics services.

The analysis of the industry environment is of particular relevance when designing the management approach of LSPs. The differentiation potential of logistics services is a strong indicator of the importance of logistics services for the company's success. Thereby, the inherent logistical risk can be defined as discussed in chapter 4.2.1.3. In addition, the benchmarking of the logistics performance defines the logistics positioning as well as the level that has to be achieved and managed by the management approach of external providers. Furthermore, benchmarking also determines the service level that has to be defined in the information and decision phase.

The Performance Environment: The analysis and the definition of the management approach of LSPs have to consider relevant and influencing trends in the performance environment. Information on the future complexity and dynamics of the environment are important criteria for the evaluation of core competencies and for the evaluation of their sustainability.

As with the work of Kreikebaum (1991) the relevant framework (the performance environment) can be analysed from different views: the legal, the economic, the technological, the socio-cultural and the ecological view (Kreikebaum, 1991: p. 34 but also Scherm, 1996: p. 48; Bacher, 2000: p. 72; Nieschlag, Dichtl, Hörschgen, 2002: p. 98). These perspectives overlap at some points but are a useful analysis raster in this context:

- **The legal environment** is determined by the expected activities of the government and the legislation, which have an influence on the external supply of logistics services and the cooperation with LSPs. This relates, for example, to matters of employment law that arise from jurisdiction in the field of 'transfer of operations' (Schäfer-Kunz, Tewald, 1998: p. 43; Beer, 1998: p. 139). Company-specific legal matters can also arise from increasing demands concerning the storage and transport of dangerous and hazardous goods. Obviously, this reduces the number of potential LSPs, increases the risks of the supply with logistics services and poses higher demands on the external supply with LSPs. Other relevant aspects of the regulatory environment include new taxes such as the highway tolls.
- **Economic trends** relate to implications from macroeconomic trends as well as trends from the industry of the shipper and the LSPs. The resulting information adds to the competitor analysis and should therefore be ana-

lysed in the same structure. The analysis of the logistics market should provide additional information about overall trends and the development of specific LSPs such as expected mergers or cooperational movements. This serves as an additional source for the choice of a suitable LSP.

- **Technological trends** play an important role in logistics. IT-technological linkages of logistical processes with internal and external IT systems impose high demands on expertise and the required capital investments. Cooperations with external LSPs are a widespread strategy to gain expertise in new technologies.
- **Social developments** can be responsible for socio-cultural trends. These trends can be relevant for the design of the management approach for LSP especially in the choice of the suitable LSP (see chapter 5.1.2). Mainly responsible for this are changes in the social value set that result in economic implications. An example is the rising appreciation of sustainable management approaches especially concerning security issues.
- With regard to the **ecological environment**, a trend analysis is needed especially concerning new and modified guidelines. This analysis field contains overlaps with the legal environment. Measures to save the environment or the choice of an ecologically sustainable LSP could provide the basis for additional differentiation potential.

Logistics outsourcing decisions, as well as the design of the management approach of LSPs, are built on a mid- to long-term basis. Hence, this information concerning the performance environment should contribute to the assessment of the logistical demand and the logistical supply situation. This is especially valid for the assessment of future changes in the logistical supply market.

Service Provider: The third component of the external analysis adds information of external service providers to the industry analysis. External LSPs position themselves in diverse markets. The assessment of LSPs is conducted on the basis of the results of the other elements of the external analysis, namely the defined customer demands and the expected changes in the performance environment. The aim of this analysis is the identification of potential external LSPs that suit the logistical demand situation of the shipper. This information is the basis for the choice of the suitable LSP (see chapter 5.1.2).

The number of potential LSPs is high for most logistics services. There are market niches in which the number of potential LSPs is restricted (e.g. third-party LSPs that perform specific services in the telecommunication industry such as flashing of software). Nevertheless, for most logistics services the number of closely examined LSPs has to be reduced in a very early step due to the high costs that occur in the service provider selection process. Often, criteria for the assessment of LSPs are already available in the shipper's organisation (Engelbrecht, 2004: p. 195).

On the basis of these criteria, and the above information concerning the demands on the logistics services required characteristics and knock-out criteria can be put together. These criteria should contain the results from the internal and the external analysis. Steinmüller (1997) presents a comprehensive list of characteristics. Additional information about LSPs can, for example, be found on industry compendia such as Klaus (2003). Overall, the defined criteria for the assessment of the logistical supply structure, as demonstrated in chapter 4.2.2, have to be assessed in detail.

5.1.1.3 Assessment and Definition of the Vertical Range of Logistics Strategy

The assessment and definition of the vertical range of logistics is directly related to the question of the optimum vertical range of manufacture. The most extensive and best-known empirical study concerning the optimum vertical range of manufacture, the PIMS[37]-study, comes to the conclusion that there is a U-shaped

[37] The 'Profit Impact of Marketing Strategy' (PIMS) was developed with the intention of providing empirical evidence of which business strategies lead to success, within particular

course of the return on investment (ROI[38]) dependent on of the absolute vertical range of manufacture (Buzzell, Gale, 1989). Very and marginally integrated companies have the highest ROI. The mean is considered as disadvantageous (Wildemann, 2000, p. 60).

The postulation of keeping specific core fields in-house is broadly accepted (see chapter 3.3.2.1). The vertical range of logistics specifies the percentage of the logistics service added value to the overall added value (see footnote 2). The strategy of the vertical range of logistics is the determinant of whether logistics services are outsourced to external LSPs at all. In addition, the vertical range of logistics strategy defines the guidelines for the general acquaintance contacts with LSPs as well as the number of LSPs that should be involved in the performance of the required logistics services.

The long-term implications of the strategic effects of the external supply with logistics services are relevant for the competency basis of an organisation. It is important to note that from today's perspective some core competencies and resources may not be relevant for the competitive positioning but could become important tomorrow (Bühner, Tuschke, 1997: p. 23). On the other hand, critical logistics services could be substituted or imitated by a competitor in future. Hence, LSPs have to be assessed concerning their future development potential.

A possible reduction of the vertical range of logistics results in an increase in external transactional relations. An optimisation of the complete logistical chain necessitates an avoidance of transaction costs by a redesign of the interfaces

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industries. Data from the study is used to create strategies in strategic management and marketing strategy. The study identified several strategic variables that were found to be highly correlated with profitability (e.g. market share, product quality, investment intensity, and service quality). The PIMS project was started by Sidney Schoeffler, working at General Electric in the 1960s, and then picked up by Harvard's Management Science Institute in the early 1970s, and has been administered by the American Strategic Planning Institute since 1975.

[38] The return on investment (ROI) is the ration of money gained or lost on an investment relative to the amount of money invested.

between the LSP and the buyer. This fundamental objective concerning the vertical range of logistics has to be part of the logistics strategy. There are a reduced number of companies that insist on in-house logistics, which comprises all logistical activities. In particular, examples can be found in the retail industry. For most companies it is a question of how high the percentage of external supply of logistics services has to be.

Alongside the basic definition of the question of whether to use external logistics services, the question about the targeted optimum LSP structure also has to be answered. The exercised supplier structure policy has a significant influence on the possibility of cooperation potentials by allowing or restricting the entrance to an essential part of the logistical supplier market (Pampel, 1993: p. 38). Pampel states this for the supplier of goods, which is also valid for LSPs. First, the buyer has to define to which extent the LSP has to compete against each other in the acquisition phase. Bonaccorsi and Lippardi (1994: p. 137) describe three possible models in the new product development case. This can be transferred to the logistical system design phase: the traditional model, the Japanese model, and the progressive model. The traditional model represents open competition, the Japanese model defines the LSP from the start, and the progressive model cooperates with a small number of selected suppliers. Open competition is very often not practicable. Reasons are:

- a lack of transparency in the logistics market (expertise of the suppliers, size of the suppliers) and
- the impracticality to handle the number of the applying service providers and problems concerning the confidentiality of important logistical information.

The progressive model generates the most ideas. Nevertheless, problems occur with repeatedly unnoticed service providers. On one hand, the LSP loses interest in the cooperation due to lost investments in the acquisition phase. On the other hand, the basic possibility to build up mutual trust becomes more difficult. A portfolio with too many LSPs hinders the realisation of synergies. A reduction on one or two LSPs leads to a higher risk profile and to a decrease in competition. Benchmarking activities becomes more difficult.

The basic strategies are single sourcing, multiple sourcing or the preferred service provider concept. The defined logistics services have to be spread across the LSP in an optimum way. Empirical analyses show that concentration on a lower number of LSPs improves profitability (Buzzel, Gale, 1989: p. 54). This is valid up to a certain specific number of suppliers. An increasing number of LSPs reduce the supply risk on the other side of the transaction costs throughout the phases increase. For the definition of an optimum number of LSPs one has to balance aspects of risk and costs.

Single sourcing means that logistics services are obtained from only one LSP. One could differentiate single sourcing according to its extent. In certain cases, single sourcing relates to a complete logistical network, a complete supply chain, a company, a plant or only to specific logistical processes. Single sourcing very often aims at the reduction of costs. The concentration on one LSP provides the basis for the realisation of economies of scale and the degression of fixed costs. In addition, the demand power of the buyer increases (Heimbrock, 2001: p. 224). Furthermore, single sourcing enables the development of expertise. This is called strategic single sourcing.

Multiple sourcing means that the demand is spread across several LSPs. This reduces the supply risks. The supply from two LSPs is called dual or double sourcing (Lamming, 1994: p. 224). Multiple sourcing is implemented, when:

- critical logistics services are demanded,
- the capacity of the first LSP does not suffice or
- the demand implies low costs for a switch between LSPs. Then, the competition can be used on an ongoing basis.

The preferred LSP policy leads to relations with selected preferred partners. A specified demand is usually supplied from one supplier and a fixed relation is build up. Possible reasons for this policy are:

- the possibility to bundle demands and
- the possibility to build up mutual trust.

The definition of the strategy of the vertical range of logistics has to focus the overall costs induced by a logistical concept. This includes the alignment of the logistics strategy along the logistical demand and the logistical supply structure. The vertical range of logistics strategy always needs to be a resulting element of the internal and external analysis. There is a high risk of defining the vertical range of logistics too early in the management approach definition process. This directly leads to prejudices in the assessment of the logistical situation.

5.1.1.4 Summary

The management decision towards dealing with their logistical situation and with LSPs should be prepared on the basis of comprehensive internal and external analyses of the internal logistical demand and the external logistical supply. As a result, detailed demand/ supply profiles are defined. This results in a logistical situation-dependent definition of the vertical range of logistics strategy. Thereby, it becomes obvious that the preparation of the management decision should be designed independently from the shipper's logistical situation. Rather, it is the case that the in-depth internal and external analysis is the basis of first, the definition of the logistical situation type a company is in and second, the derivation of the situation-dependent embodiment of the design fields later on in the transactional life cycle.

5.1.2 Choice of Suitable LSPs

The strategic direction of impact concerning the choice of suitable LSPs has been defined in chapter 5.1.1.3. The aim of this step and, therefore, of a structured choice of (a) suitable LSP(s) is to reduce the number of possible outsourcing partners so that the selection of offered solutions becomes reduced in numbers. One can distinguish between service level requests for proposal and system requests for proposal. In the case of the service level RFP[39] usually only the defined logistical field, the logistics service, the service level and the relevant framework are described. The LSP elaborates a logistical solution based on this information. The LSP integrates his own and external resources in the logistical concept (Gudehus, 2000: p. 398). A system RFP restricts the design possibilities of the LSPs. In this case, the logistical concept is normally already defined by the shipper or by a cooperating consulting company (Gudehus, 1995: p. 30).

The LSP selection process is a sub process of the LSP management process. The selection includes the question of which the LSP is able to provide the required services. The selection process is divided into the two phases: strategic and operative choice of LSPs. The strategic choice of a LSP determines if a specific LSP can provide a defined service. The operative choice of a LSP takes place after the strategic choice and decides the provision of a specific service. Hence, a differentiation between these two phases is only valid if more than one LSP is defined as the possible supplier. The more LSPs are defined as suppliers, the more operative decisions are required. Example is the recurring decision for parcel services, which can be organised by the definition of preferred LSP lists. In practice, the distinction between strategic and operative selection of LSPs is often not made (Wolters, Hirschfelder, 1999: p. 146; Hagedorn, 1993: p. 377). However, a differentiation of these phases is important for the definition of a differentiated situational management approach. An important element in this choice of the LSP is the evaluation of the market power of the LSP. This element defines the willingness to cooperate (see chapter 4.2.2.1).

[39] A 'Request for Proposal' (RFP) is an invitation for suppliers or, in this case LSPs, through a bidding process, to submit a proposal on a specific product or service.

The development potential of the LSP always includes a current, as well as a future, assessment of the potentials. The evaluation elements are adherence to delivery dates, quality levels, innovation abilities, IT abilities, personnel and fixed assets capacities, flexibility, specialisation, expertise-transferability, process management, project management, price, scalability. Figure 4-6 and Figure 4-7 demonstrate a structured list for the choice of LSPs. Apart from performance- or cost-related quantitative criteria, qualitative information should be gathered such as references, the customer structure and examples of service contracts in comparable solution fields (Bruch, 1998: p. 152). The resulting costs of the respective logistical solution or complete concept should be finalised through an assessment of the realisation costs such as the adaptation of IT processes, IT solutions, interfaces and organisational changes (Schäfer-Kunz, Tewald, 1998: p. 79).

The aim of the decision on the awarding of a contract is to find a source that fits to the specific demands of the logistical solution. 'The goal of this phase is to identify best-in-class providers for the service(s) required (Gould, 2003: p. 51). From the pool of possible LSPs suitable suppliers are chosen. The result is the definition of the form of logistics cooperation which is concretised in the agreement phase. The position of points from this decision results in the determination of relevant transaction costs that are difficult to revise in the process of a logistics cooperation life cycle.

The diverse practical forms of logistical situations demand a target-oriented procedure that has to consider all relevant terms and conditions. The choice of suitable LSPs should integrate all relevant decision-makers and should be based on justifiable efforts. Otherwise, the transaction costs for seeking, screening and evaluating the logistics market increase. Different logistical situations suggest diverse forms of LSP selection processes. Below, the main characteristics are demonstrated. Namely, direct awards, online auctions, classical tendering and concept competitions are described. The forms of the choice of LSPs are arranged by the transaction costs they induce in the information- and decision phase.

5.1.2.1 Direct Awards

The aim of the direct award approach is the minimisation of transaction costs in the information- and decision phase. It is very important to specify exactly the general framework and the targets that have to be achieved with the respective logistics services. Otherwise, the resulting transaction cost advantages can have a negative influence if not all regional and global logistics markets are exploited. In practice direct awards are relevant in two cases:

- **Time-restricted procurement of logistics services:** Time-constraints can lead to a shortened information- and decision phase. In this case system-based recommendations or researched LSPs are commissioned to perform selected logistics services. This approach is only valid for services with a low value or a reduced influence on the business model of the shipper and reduced reiterations. In practice this is often used for services inside a specific amount range. This approach can only be chosen in a 'Basic' logistical situation. This means that the risk, the transaction costs and the time constraints have to be evaluated in advance.
- **Direct awards to a preferred LSP:** Many shippers define preferred suppliers. Established LSPs that have proved their abilities are also assigned to this status. In this case, direct awards of specified logistics services and single services are possible. Another reason is a monopolistic logistics market structure. In this case, there is no alternative to the monopolistic LSP. This dependency can only be solved by a change in the specifications of the logistics service or by a long-term development of an alternative provider.

Complex logistics services in the logistical situations 'Competition' or 'Partnership' can only be directly awarded if cost transparency of the LSP is achieved. Otherwise, the direct award of logistics services is used for relatively standardised and repetitive logistical demands.

5.1.2.2 Online Auction

The internet has a vital influence on the organisation of companies. Possible fields include market surveys for LSPs, observation of the market for logistics services, communication with service providers, as well as the possibility to actually order logistics services. Electronic marketplaces have gained in importance especially for clearly defined logistics services in non-complex logistical situations. For technological products electronic marketplaces are widely established. These electronic marketplaces are normally operated by third parties and combine offers and demands from several buyers and sellers (Holland, 2000: p. 95).

Online auctioning is a time-restricted offer process of selected qualified LSPs. Throughout the online auction, the prices offered for clearly defined logistics services and the prices of the bidders are transparent for the shipper as well as for the LSPs. This dynamic pricing leads to the realisation of saving potentials (Wildemann, 2002b: p. 23). Based on the logistical demand and a target price of the shipper, as well as clearly defined contract terms and conditions of the shipper, the lowest offer is awarded.

Suitable logistical demands for online auctions have to be carefully evaluated in advance. The characteristics of the demand have to be clearly specified and relatively standardised. In addition, the logistical supply situation has to be considered. Restraints from logistical demands online auctions are:

- a low degree of standardisation,
- competition-relevant information that can leak through an open online auction,
- provisos brought forward by the logistics department and other specialists departments and
- the effort for the exact specification and the online auction procedure (Wildemann, 2002b: p. 25).

Restraints derived from the logistics market are:

- distinctive market power of the LSPs and
- high development potentials of the LSPs.

Due to these logistical demand and logistical supply restraints, online auctions are mainly suitable for 'Basic' logistical situations. Complex demands in 'High Risk', 'Competition' or 'Logistics 'Partnership' situations are seldom applicable due to the characteristics in the logistical demand and on the logistics market.

All variables in the contract awarding process are distilled to the price. Therefore, the exact specification of the logistical demands is needed. The boundary of online auctions is reached when the specification is not exact enough. This would lead to an over-proportional increase of transaction costs due to discussions during the online auctions or afterwards between shipper and LSP. Hence, online auctions are an adequate and helpful form of contract rewarding for specified, relatively standardised logistical demands in the logistical situation 'Basic'.

5.1.2.3 Tendering

Classical tendering in the logistics market bares similarities to tenders known from public building industry. Building companies that take part in public tenders, elaborate detailed offers and are audited and evaluated before the reward of the contract. Both tenders have in common that the demand has to be specific enough to build the basis for the contract. The offers (tenders, bids) include all relevant information, a project outline (outsourcing procedure) and a price quote.

Classical tendering is also possible via new media platforms such as intranet, extranet and internet. For example, on the internet platform www.transporeon.de tenders can be placed. Some shippers install a homepage on which the demanded services are placed on a temporary or a permanent basis and presented to a worldwide LSP pool. This procedure animates an ongoing competition amongst potential LSPs. The increased competition and the possible identification of additional potential LSPs opens up the potential for the supplier to realise further cost reductions. Efficient IT-based processes lead to relatively low transaction costs in the information- and decision phase. Analogous to the online auction, tendering is applicable for relatively standardised logistics services in markets where numerous potential LSPs are active.

5.1.2.4 Concept Competitions

Similar to classical tendering, concept competitions can be derived from the public building sector. In the public sector, it is used for competition between architects. Public authorities define the general framework and architects elaborate and submit order related drawings and concepts that are evaluated against each other. For logistics services, the RFP should contain at least the following information in detailed functional specifications (Guttenberger, 1995: p. 175):

- Organisational structure and process descriptions of the outsourcer/ shipper;
- Description of the logistical process and the interfaces;
- Strategic framing conditions (framework);
- Detailed qualitative performance level (e.g. the desired service level);
- Detailed quantitative performance level (definition of the quantity structure);
- Responsibilities for the planning and the realisation as well as
- Milestones and final deadlines.

The system RFP should be formally standardised to restrict the playing field of the LSP. In addition to an increase in transparency, the offers are easier to compare.

Traditional supplier evaluations for the supplier selection are centred on the basis of available products or anticipated performances. The selection of LSPs, especially for more sophisticated logistics services very often focuses on the anticipation of future performances. Concept competitions are suitable if the logistical demand is not specified in detail and external ideas are desired. The shipper should specify the general framework as well as basic guidelines in time, quality and cost. These guidelines are also fundamental criteria for the evaluation of the concepts. The result of the concept competition is a long-term contract with one or two LSPs. This already indicates the suitability of logistical demands in the field of 'Competition' or 'Partnership'. Long-term contracts provide the opportunity for the LSP to regain the costs they had during the concept competition phase. Concept competitions are usually divided into three steps:

- **The preparation step:** In the preparation phase LSPs are pre-selected. The demands of the logistics concept are defined. The pre-selection of the LSPs considers minimum requirements such as the global footprint, company size and liquidity and the status of third-party certifications. The restriction to well-known LSPs neglects the opportunity to identify a new high-potential LSP that could be developed into a sophisticated single source. On the other hand, trusted and funded relations to established LSPs elevate the acceptance of concept competitions. This trust helps with the exchange of competition-relevant confidential data. These two elements have to be considered and balanced. The specification of the logistical concept is gathered in a contract specification document. The target costs and the desired quality are defined in the contract specification. A weighting of the performance measures should be defined by the shipper in advance. The LSPs can build up a specific target system and are able to evaluate diverse solution approaches by themselves. The transmission of the contract specification document to the potential LSPs ends the preparation step of the concept competition.
- **The execution step:** In the execution step, LSPs elaborate concrete results on the basis of the contract specification document. LSPs elaborate a logistical concept on the basis of time-, quality- and quantity-related factors. Means of transport, storage, processes and IT-systems employed are described with regard to basic input- and output-relations. Innovative ship-

pers demand an open-book policy from the LSP. This open-book policy offers the opportunity for a mutual investigation of additional cost saving potentials. The presentation of the logistics concepts ends the execution step.

- **The decision step:** In the decision step the presented concepts are analysed and compared. Technical, financial and time-related facts are evaluated. In this step, an evaluation team is highly recommended. This team consists of a core- and an extended logistics team. The logistics- and the procurement department form the core team. In the extended team, all departments that are affected by the logistical demand have to be integrated. Namely, the production department, controlling, quality assurance and marketing should be involved. An involvement of all relevant departments reduces the risk of incorrect decisions and losses of time. The decision step ends with the selection of one or two LSPs and the conclusion of (a) contract(s).

The inherent scope for development in a concept competition often induces alternative solutions with new conceptual approaches and additional logistics costs saving potentials. Furthermore, the shipper achieves an in-depth market transparency and a relatively fast implementation time with a low number of negotiation loops. The concept competition considers important characteristics for the cooperation with the LSP, innovation potential, as well as the ability and willingness to synchronise complex logistical processes, systems and hierarchies. LSPs that reach the final rounds of the concept competition have invested significant resources to compete. Compensations for these efforts are seldom part of the concept competition arrangement. Larger shippers sometimes agree upon compensations in advance. This allows smaller, non-established, and innovative LSPs to take part in the concept competition. Furthermore, confidentiality agreements are an important part of pre-competition arrangements.

5.1.2.5 Summary

The choice of the suitable LSP depends heavily on the results from the analysis of the logistical situation as well as on the definition of the strategic approach towards the purchase of logistics services. Direct awards and online auctions are only suitable if the logistics services can only be awarded to one LSP (such as easy-to-handle transport services). This means that standardised processes and process elements (such as transport services) can be procured without extensive preparations. Complex or specific logistics services are normally procured on the basis of functional specifications. Complex logistics services such as the management of logistics networks or the outsourcing of the complete distribution logistics to third-party or fourth-party logistics providers often require the development of a complete concept in advance (Lynch, 2004: p. 38). A collaborative elaboration of the logistical concepts opens up the possibility of gaining external knowledge from the LSP concerning process-, IT or organisational expertise. The description of the logistics services and the logistical concept should be as solid as possible. This ensures the ability to compare the offers of the LSPs (Guttenberger, 1995: p. 174). This becomes more difficult with the complexity of the service and the more an innovative solution for logistical problems is expected. In this case, a concrete description of solution elements or modules should be targeted. The detailing level of the expected solutions should be more concrete in each consecutive agreement step. A systematic approach ensures that innovative concepts and solutions can be presented, discussed and eventually considered but also that the description becomes solid enough to define a contract as well as defining a suitable controlling concept for the controlling- and processing phase (see chapter 5.3.2). Hence, concept competitions are the most intense forms of selection for a suitable LSP. High transactional costs are induced before the award of the logistics services. Hence, concept competitions are only suitable for complex logistical situations ('Competition' and 'Partnership') and in some 'High Risk' constellations.

5.1.3 Organisational Structures between Shipper and LSP

The organisational structure between shipper and LSP is defined in the information- and decision phase. This does not necessarily mean that the defined structure will be kept until the end of the cooperation life cycle. Nevertheless, the first definition will be stable until the beginning of the information- and controlling phase. The term 'organisation' is linked to diverse contents (Remer, 1982: p. 203). The term is defined in an institutional, instrumental or functional way. Sociologists normally focus on the institutional view whilst business academics focus on the functional and instrumental views (Brummund, 1983: p. 78). This view sees the organisational structure as a practical, target-oriented interaction structure (Remer, 1982: p. 5) and as a means to optimise cooperations. The organisational structure is a form of interaction between people in processes that serve the target achievement of a specific system (Brummund, 1983: p. 78).

The design of the organisational structure between a LSP and a shipper is an important design field in the information- and decision phase of a logistics cooperation life cycle[40]. A suitable organisational structure opens up the possibility for continuous efficiency improvements and an improvement in the readiness for an intense cooperation especially with LSP with an extensive market power. According to the intensity of cooperation and the degree of division of labour two basic forms of cooperation can be separated: the selective interaction/ interface model and the team model. The interface model is characterised by separate project work throughout the cooperation life cycle. The shipper defines its needs and hands over a more or less detailed catalogue of requirements to the LSP after an initial analysis and preparation. The team model is based on mutual project work in the information- and decision phase as well as in the agreement phase. The team approach is normally needed in more complex logistical situations and in

[40] For the relevance of the cooperation organisation see e.g. the assessment of lateral coordination between LSP and shipper by Huiskonen and Pirttilä (2002).

cases where a strategic decision for a standard or basic LSP was made. This design field spreads over the first three phases in a logistics cooperation from the information- and decision phase to the agreement phase and the processing- and controlling phase. In the following section, both organisational forms are described in the respective phases.

5.1.3.1 Selective Interaction/ Interface Model

In the selective interaction/ interface model the shipper elaborates a catalogue of requirements that include the field of analysis, a description of the problem situation. This catalogue of requirements is usually defined alone or with the help of external consultancies. The catalogue of requirements can be used for concept competitions as well. There are also some weaknesses in this organisational form. The completed concept is less transparent for the shipper. Costs for changes are not easy to recalculate. Therefore, a conflict results in the aim of defining each element in the catalogue of requirements and the possibility for the LSP to define an optimised closed logistical concept.

The interface model is suitable for less complex logistical situations in which the services are clearly defined and the LSP can easily be exchanged. For LSPs with a very high problem solution capability the interface model can also be suitable. They are encouraged to develop a complete logistical situation, which centres on a very basic catalogue of client requirements. In this case, the activities of the LSP should have a minimum transparency, otherwise, the dependency risks rise. The reduction of dependencies can be assured by the definition of milestones that have to be presented in the course of the project or by the exchange of personnel. In this case, the interface model can also be used for very complex logistical demands.

5.1.3.2 Team Models

Internal team models are normally already chosen for the elaboration of the logistical concept and, in some cases, external ones throughout the information- and decision phase. In the switch from the agreement phase to the processing- and controlling phase the concept teams are disintegrated. After this switch, often the former team meets up in regular periods. The basic principle of the team model idea is that the two teams of the shipper and the LSP cooperate on an equal basis. This form of cooperation induces high transaction costs due to the high cooperational needs. High transparency between the team members is required to foster team building. The team model for the elaboration of logistical concepts can be compared to the team models in product R&D in which the supplier cooperates with the buyer during the development of new parts or components. The main contribution of the supplier is the part- or component-related expertise and the buyer is responsible for the integration of the component into the overall system. The LSP is integrated into the problem solution at a very early stage of the cooperation. In very complex logistical situations, LSP teams can also be integrated into the information- and decision phase. This is especially true, if the elaboration of a logistical solution is only possible on the basis of very detailed logistical demand information that can only be provided in direct interaction with the shipper. Complexity in IT linkages is a major driver for team models. This also reveals major problem fields for this organisational form. The LSP is integrated very early. The first risk that occurs is that the effort that is required to control and handle several LSPs disturbs the information- and decision phase. Second, important and confidential information as well as specific expertise needs to be exchanged to provide the opportunity to the LSPs to elaborate detailed and fitting logistical concepts. On the other side, the LSP shares parts of their competitive expertise with the shipper. This leads to the precondition that a narrowing of the possible LSPs in complex logistical situations has to be done in an early stage of the cooperation. The competitive risk has to be tamed in the design of the cooperational contract (see 5.2.1). The solution potential of the parties, the shipper and the LSP, can lead to synergy effects that demonstrate the usefulness of cooperational team models. Overall, the following risks have to be dealt with in the framework of team models:

- an increasing coordinational effort and therefore rising transaction costs;
- unclarities, tensions and conflicts in the team are highlighted and strengthened by various interfaces in-between the companies;
- the effort for transparency and IT linkages rises;
- parallelism of the activities can lead to doubled work elements which thereby reduces the efficiency of the cooperation;
- the risks of the elaboration of logistical concepts can seldom be handed over to the LSP.

Due to the above risks and potential problems, the following preconditions are required to establish successful team models (Wheelwright, Clark, 1992: pp. 188ff.):

- Common aims and targets including a clear definition of tasks, competencies and responsibilities of each team member;
- Management support that is defined in a contract that includes the targets, costs, resources and key performance indicators for the measurement of the project success;
- Varying dimensions of the team dependent on the project phases;
- Choice of a strong and qualified project manager as the integrator of the team;
- Support of the middle management and
- Intensive communication of the team members supported by information systems.

In some cooperational situations it can also be possible that personnel interchanges are conducted. This occurs in case specific problems that can only be solved by the integration of the respective expert. Examples can especially be found for IT topics such as the integration of IT interlinkages between the shipper and the LSP in complex logistical situations. This is especially valid in conflict situations. Very often, third parties are integrated. Conflict resolutions by neutral third parties can be carried out by middlemen, mediators or arbitrators. Middleman or negotiators are involved to include a neutral third role. Neutrality and experience in mediation can help to dissolve conflicts (Endres, Wehner, Jordine, 1996: pp. 106). Nevertheless, mediators can be disadvantageous due to the fact that their improvement proposals can be denied which raises the transaction costs. Arbitrators can get decisions accepted on the basis of relatively low transaction costs. The cases in which arbitrators become active should be contractually defined. Judicial conflicts should be avoided due to high transactional costs and possible damages of business continuance and image.

5.1.3.3 Summary

The definition of the cooperational structure between shipper and LSP plays an important role in the design of the management approach. The early definition of the above structure does not necessarily mean a steady constellation throughout the cooperation life cycle. On the contrary, existing personnel structures are redesigned for situative problems that can occur, such as IT problems, problems in the pricing of services or inter-personal problems. Overall, the different transaction cost implications indicates that there is a strong correlation between the characteristics of this design field and the design of the management approach in various logistical situations.

5.1.4 Risk Management

As soon as a shipper decides to buy logistics services from a third party, they accept a certain level of risk. The level of risk tends to correlate to the contractual nature of the relationship with a LSP. If a shipper is dealing with a third party on a day-to-day transactional basis, it is possible to change the LSP, almost on a daily basis. The main reason for this is that day-to-day relationships only function in non-complex logistical situations with easy-to-perform logistics services. However, if the shipper is dealing with a limited number or with just one third party on a contractual basis or for an extended time, the problems, risk, and expense of switching are likely to be much more severe.

Overall, the outsourcing of logistics services can be accompanied by risks that can reduce the positive performance, cost and risk effects or even overcompensate them. Thus, the aims of the organisation can be at risk. The risk management of outsourced logistics services follows the main risk management possibilities. One can:

- reduce risk profiles,
- avoid risks or
- manage risks.

These basic risk strategies are outlined in the following sections, alongside their possible characteristics.

5.1.4.1 Dependency Risks and Risks of Expertise Loss

Dependency rises with the length of the outsourcing contract, the complexity of the logistics services outsourced and with the concentration on a low number of integrated LSPs (Sertl, Andeßner, 1998: p. 162; Bretzke, 2004: p. 34). Due to the cutback or non-composition of internal capacities and therefore the internal possibilities of producing logistics services in-house, outsourcing decisions are irreversible in the mid-term. In addition, a short-term change of the LSP is normally impossible due to long-term contract periods, integrated processes and IT infrastructure or that it induces high costs (Nagengast, 1997: p. 126; Bruch, 1998: p. 35; McIvor, 2000: p. 25). The resulting dependency of the outsourcing company increases the risk of opportunistic behaviour of the external LSP. Dependent on the specificity of the outsourced logistics services, the LSP could use this position to demand higher prices or changes in the outsourcing contract (Harting, 2004: p. 50; Schott, 1995: p. 21).

Dependency risks and risks of expertise losses are divided into four main streams:

- The traditional concern with the outsourcing of logistics services or networks is the **loss of control**: this concern runs in parallel with the purchase of complex product parts or components in purchasing management. By handing over some logistics function (or any other function) the concern of management is that it does not really control the flow of materials, products or information through some segments of the supply chain. This potential loss of control is aggravated by the fact that the LSP is often in direct contact with the shipper's customer base. While this concern continues as a factor in the shipper's decision making regarding the LSP, more and more shippers have mitigated the risk by developing linkages between their information systems and the information systems of their LSPs. It is obvious that the investment required raises the transaction costs in the start-up phase of a logistics cooperation and throughout the processing and controlling phase. Hence, these information linkages are more likely to be made in longer-term contractual relationships rather than in the shorter transaction-based relationships.

  Overall, the risk management strategies directed towards the loss of control are the definition of suitable logistics sourcing strategies, such as a second source or even multiple-sourcing strategies (see chapter 5.1.1.3) as well the clear definition of the controlling approaches (see chapter 5.3.2).

- In addition, the reduction of functions in an organisation always leads to the **loss of expertise**. The standard justification for this phenomenon is that only border areas are outsourced. Nevertheless, in many industries, logistics is a major competitive element. Therefore, the loss of competition-relevant expertise is imminent. The loss of expertise increases the dependency on third parties and can have severe impact on the positioning of the company in the long run (McIvor, 2000: p. 26; Picot, 1991a: p. 339; Friedrich, 1996: p. 248). Städtler-Schumann and Britsch emphasise that outsourcing of logistics does not mean to give away completely the core competency logistics with strategic relevance (Städtler-Schumann, Britsch, 1999: p. 51).

Suitable risk management strategies are a detailed core competency analysis (see chapter 5.1.1) and the design of the controlling approach (see chapter 5.3.2).

- Furthermore, there are **confidentiality risks** in the case that the LSP transfers expertise to external parties or competitors. In complex logistical situations in which a logistics partnership is achieved the LSP obtains in-depth insights into the processes and structures of the outsourcing organisation. This includes the risk that the LSP uses this expertise in the cooperation with competitors (Bruch, 1998: p. 35; Nagengast, 1997: p. 125).

  Measures to reduce confidentiality risks have to be defined in the contracts and have to be controlled throughout the logistical cooperation (see chapter 5.2.1 and chapter 5.3.2).

- Moreover, there is a **specific expertise element at risk**: proximity to the market, respectively to the final customer. The LSP often takes over the final interface with the customer. This risk can only be reduced or handled by a close relationship with the LSP (even if it is not in the form of a logistics partnership) and by continuous and open communication (Bretzke, 1989: p. 394). A qualitative feedback loop has to be established.

5.1.4.2 Risks of Cost Increases

Cost increases in the logistics cooperation can occur: first, by an increase in the prices on the side of the LSP. Reasons for this are overall increases in the LSP price level due to for example rises in the oil price or reasons derived in the overall dependency situation as described above (Nagengast, 1997: p. 115). Second, there are often underestimates in the costs that the outsourcing process will induce and which transaction costs will occur. Often, potentials are not realised due to delays in the reduction of fixed costs or due to the fact that they cannot be reduced (ongoing job contracts, fixed assets).

Strategies against cost increases are the conduction of detailed pre-analysis as described in chapter 5.1.1 and the stringent definition of the controlling approach (see chapter 5.3.2).

5.1.4.3 Performance Risks and Hazardous Risks

Another concern is the issue of continuity. The risks that the entrepreneur would disappear from the scene or that short-term financial reverses could severely impact the company's performance are very real concerns in logistics cooperations. The cessation or erosion of service performance in key market areas is obviously a serious problem to the buyer of third-party logistics services. This is especially true for complex logistical situations in which investments have to be made and changes of LSP take time and increase the overall transaction costs significantly. Close working relationships, the establishment of a second source, good communication and openness, consulting services and financial support of the LSP are the primary methods used by shippers to assess continuity problems in the third-party segment of the logistics network.

The outsourcing company only has reduced possibilities to influence outsourced process elements and services. This is, for example, valid for employees and the manner in which the logistics services are performed. Hence, performance risks relate to loss of quality, insufficient alignment to the customer's requirements or complete breakdown of performance. The final customer associates insufficient logistics performance with the outsourcing company not with the LSP. The results are image problems and competitive disadvantages (Barth, 2003: p. 20).

There can be further risks in a logistics cooperation. For example, the shipper, for some reason, might decide to make major shifts in the way it handles or distributes its products. The LSP, for whatever reason (e.g. financial resources, management philosophy, business strategy, openness to change), may decide that the change is too radical or is not in their best interest. Similarly, short-run changes, new programs, and new technology on the part of the shipper may make what are considered unreasonable demands on the resources of the LSP. The potential impact of these risks increases as the relationship between the seller and the LSP becomes more customised. That is, in contract relationships where the third-party handles a broader range of value-added services for the shipper, there is obviously more risk than when the shipper purchases a limited menu of logistics services in a targeted geographical area. These risks also tend to increase as the scope and nature of logistics services increase from a transactional base to a contractual partnership base.

Risk management strategies to avoid performance and hazardous risks concentrate on second source or multiple source strategies (see chapter 5.1 and chapter 5.1.2) as well as ongoing benchmarking activities as described in chapter 5.3.2. In addition, detailed security plans have to be elaborated.

5.1.4.4 Summary

Risks in logistics outsourcing cooperations can be reduced, abolished or managed. In this context, the above risks are assessed in the definition of the system model, the derivation of the taxonomy as well as influencing factors on the logistics performance concerning time, quality and costs. Obviously, the detailed design of the above risk management strategies depends heavily on the logistical situation in which the logistics services are bought.

5.2 Agreement Phase

In the agreement phase, contracts with the chosen LSP(s) have to be defined. In addition, the incentive systems have to be designed. The design of the incentive system has to be a part of the initial logistics cooperation contract and usually forms the basis for the definition of the controlling system in the beginning of the processing- and controlling phase. All basics for the processing- and controlling phase have to be manifested in the agreement phase.

5.2.1 Contractual Framework of Logistics Cooperations

The central task of the agreement phase is the definition and design of a crisis-proof contractual framework for the logistics cooperation throughout the cooperation life cycle. The design of the contract gains in importance if conflicts or dissonances in the cooperation arise. Contracts define the legal claims and duties of both (or several) cooperation partners. Legal bases are the competition laws, corporation law, duties of secrecy, labour law and the patent law. The logistics outsourcing contract serves the purpose to protect and secure the cooperational partners. By defining the legal process, the contract is the formal basis for the logistics cooperation and can reduce the danger of opportunistic behaviour (Beer, 1998: p. 238).

As discussed in the conceptual framework, all economic actions are based on the transfer of rights of disposal. Failures in the contractual definition of the aims, coordination mechanism, quality, result-sharing, payments, conditions of delivery and break-up conditions can lead to time-consuming conflict situations and therefore to high adjustment costs in the processing- and controlling phase as well as in the adjustment phase. Hence, mutual preparations and checks of the contractual basis of logistics cooperations have to be carefully evaluated in advance and configured according to the logistical situation.

5.2.1.1 Design Elements in Logistics Cooperation Contracts

Outsourcing contracts relate to two different areas. On one hand, outsourcing of logistics services usually relates to in-house organisational units that have produced the logistics services in question before. Hence, for these capacities one has to define legal solutions, even if they are closed down completely. On the other hand, there is a need for the definition of the newly emerging business relation between shipper and LSPs (Pracht, Riegl, 1999: p. 245).

In practice, the shipper and the LSP first sign a letter of intent. In the following negotiations, this serves as a basis for the cooperation contract. The letter of intent includes a description of all main vertices of the contract. In a first step, the letter of intent is the basis for the preparation activities of the LSP. The letter of intent should include the following aspects:

- the subject matter of the contract;
- the extent and comprehension of the logistics services, that is the logistical concept;
- information concerning the procedure in the event of changes of the specifications;
- the integration into the project work of shipper's employees or other external workforce;
- the subcontractors (if involved);
- non-disclosure agreements (NDA[41]) and data protection;
- pricing;
- cancellation periods;
- measures and liabilities in the event of deficient logistics services and
- the duration of contract and, if given, expiration of the contract.

If the existing capacities are kept in operation it is necessary to define if the assets are to be transferred to the LSP or if they are provided in any other legal form

[41] A non-disclosure agreement (NDA), also called a confidential disclosure agreement (CDA), confidentiality agreement or secrecy agreement, is a legal contract between at least two parties that outlines confidential materials or knowledge the parties wish to share with one another for certain purposes, but wish to restrict from generalised use.

such as rental or leasing. The contract has to deal with each specific asset and the inner reserves. Normally, inventions or special expertise elements have no major influence on the contract design in logistics cooperations. Expertise-rich logistical fields are assigned to a company's core competencies and are normally not outsourced (Pracht, Riegl, 1999: p. 248).

As a rule, comprehensive outsourcing of logistics services goes along with changes in the personnel structure. Otherwise, at least a change in the work content of the employees is normal. Therefore, employment law is affected and has to be considered in the outsourcing process, especially if organisational units or process elements are scaled back or eliminated employment law play an important role. In the case of a transfer of the business, special employment law effects have to be taken into account. National judicature in Europe is oriented towards changes recently defined by the European Court of Justice. In the past, the transfer of business was defined by the analysis if business-like or immaterial assets were transferred. Today, the definition is geared to an activity-related interpretation (see EU guideline 2001/ 23/ EU, Cap. II: L 82/ 17-18). If complete business elements according to this guideline are transferred, there are special employment law conditions. According to this definition, the logistical elements outsourced are a transfer of businesses if they have formed an organisational unit of persons and assets that perform a separate business activity. If a business transfer took part, all job contracts have to be transferred to the outsourcing partner, the LSP, for a minimum duration of one year. The shipper and the LSP are liable for existing job contracts throughout this period (in Germany this is defined in §613a Abs. 2 BGB).

In addition, the business relations between the outsourcing partners in the logistics cooperation have to be defined. The overall principle is that the contract should be designed as securely as possible without restricting the LSP's problem solving ability and freedom of action. Windows of opportunity are especially important for comprehensive outsourced logistical solutions and/ or complex logistical situations in which LSPs are involved. In German law, there are no predefined contents or restrictions in the form of the design of the cooperation contract. Generally, the various types of outsourcing of logistics services contain buying elements, contract for work and labour elements as well as agency elements. Hence, analogous to the described letter of intent, a logistics cooperation contract should contain (Pracht, Riegl, 1999: p. 256):

- **Subject matter of the contract, preliminary remarks and definitions:** The initial situation and the main aims are to be considered. The overall aims relate to cost, time or quality such as a reduction of stocks, an improvement in delivery times or a cut in the overall logistics costs. This is especially important in the beginning of a logistics partnership due to the fact that not all risks are integrated and not all design fields are completely analysed. In addition, the definition of overall aims is needed for complex logistical situations in which the problem solving ability of the LSP is especially required. Problems that occur later can be solved with the overall aims as guidelines. Furthermore, all terms used in the contractual context should be exhaustively defined to reduce the risk of later misunderstandings. This part of the contract should also contain the overall timeframe that defines the transfer of operative responsibilities to the LSP.
- **Usage of assets and rights:** In the case that the required assets are not transferred to the LSP and usage rights are defined it is important to define exactly the content, the extent and the timeframe for the usage of assets and rights. This includes rental and leasing of mobile and immobile assets and the definition of maintenance cycles.
- **Service level agreements (SLAs) and commitments of the LSP:** On the basis of the subject matter of the contract, the logistics services have to be defined in this contract element. First, one has to define the logistical key performance indicators; second, the assets and the personnel capacities have to be defined; third, the financial means have to be described as far it is useful and does not restrict the LSP business concept. Technical details

can be attached in a separate document, as it can be very comprehensive. Furthermore, if logistical units or logistical processes remain within the shipper's organisation the tasks and the resulting interfaces should be defined as far as possible.

- **Quality agreements, warranties, measures and liabilities in the case of faulty services:** There are various 'quality norms' that describe the definition of quality arrangements. In Europe, the ISO[42] norms are the most frequently used. Hence, the quality definition of the agreed logistics services should be carried out in accordance with ISO 9000ff. These norms also include the certificates the LSP should be able to demonstrate. The rights and duties of both parties should be defined to be able to secure the quality arrangements. This includes the right to conduct quality assurance (QA) audits or the obligation to the physical presence of documents of the quality assurance system. Furthermore, the warranties should be quoted in the frame of the outsourcing contract. The predefined legal formalities are normally not exact enough. Besides the extent and the duration of the warranties, the procedure for the elimination of defects or a system for the elimination of faults has to be included. From the perspective of the LSP, non-influenceable risk positions should be excluded. To reduce the conflict potential and to secure a stable processing- and controlling phase, non-influenceable risks should be a transitional position. Occurring clashes should be organised in advance by defining conciliation approaches apart from legal processes and by the definition of an arbitral court and the responsible jurisdiction (Dörrie, 1993: p. 5).

[42] The International Organization for Standardization (ISO) (in French: L'Organisation Internationale de Normalisation) is an international standard-setting body composed of representatives from various national standards bodies. Founded on the 23rd February 1947, the organization produces worldwide industrial and commercial standards.

- **Information concerning the procedure if there are any changes in the range of activities or the surrounding conditions:** Logistics cooperations can have different contract durations. Complex logistical situations in logistics partnerships are usually long-term business relations. In this case technological, company-external and -internal types of changes are probable. Criteria for the modification of contracts therefore have to be included from the start.

  Approaches for a mutual correspondence and problem solutions should be included to diminish the conflict potential and therefore to reduce the transaction costs and thus the total costs of ownership of the logistics services bought. Unpredictable incidents such as catastrophes, terrorism and accidents should also be included by defining escalation strategies that minimise the coordinational need and that secure business continuity.

- **Integrated activities of the shipper:** Depending on the logistical situation, the shipper is integrated into the supply of the logistics services. Therefore, the duties of the shipper also have to be defined. First, one has to agree upon the provision of all needed data for the planning, disposition and fulfilment of the logistics services and second, one has to define the shipper's support in developing technologies and new methods. A mutual definition is recommended due to the fact that there are usually numerous interrelations between the work packages. Liabilities can only be defined if both work packages are clearly separated.

- **Subcontractors (if integrated into the service fulfilment):** Often, further LSPs or other vicarious agents are involved in the production of the services. For complex logistical solutions that are carried out by third-party LSPs, it is common that other carriers are integrated. The definition of fourth-party logistics even demands the involvement of carriers and third-party LSPs. This means, that first, an expanded definition of the liabilities has to be integrated into the contracts and second, that the shipper has to include an authorisation for the outsourcing partner that they are allowed to involve further partners into the logistical solution ordered.

- **Data- and information exchange:** The share of responsibilities has to be integrated in this element. Theses factors have to be defined according the phases: plan, build and run. In the context of the present study, it is especially important to define all interfaces in detail. The data exchanged can function as a basis for the controlling and the billing of the outsourced services. The complete controlling concept, resulting measures and conflict mechanisms should also be part of the contract. Exchange of data and information increases the risk of misuse. Therefore, confidentiality agreements and clear definitions of the scope are required.
- **Payment systematics:** The main aim of the definition of the payment systematics is the elaboration of a non-ambiguous calculation basis. This implies the notation of payment modalities such as payment periods, pay downs or reimbursements and detailed structure- and quantity-data. The effort rises significantly with the complexity of the logistics service. Nonetheless, the basis of the controlling system has to be pinned down in the contractual context. As far as possible, it is useful to define the pricing of isolated logistics services. Single logistics services can be billed output-congruent and the risk of inflated pricing is reduced. In addition, this basic definition of price levers forms the basis for quarterly, biannual or annual price discussions on an objective basis. Price reductions can be agreed upon beforehand on an annual basis that is derived from learning curve effects and resulting economies of scale of the LSP (Wißkirchen, 1999a: p. 178). Furthermore, one has to consider unscheduled reductions in the workload and remaining fixed cost elements. Completely variable billing therefore has its limits. For example, fixed costs can be billed according to a gradation (Dörrie, 1993: p. 5).

- **Contract length and cancellation periods:** The exact contract length and the requirements for a continuation or a cancellation of the outsourcing contract have to be defined. The influences on the cooperation conditions have to be pinned down. If relevant, the usage of rights and assets, and the possible reassignment to the shipper needs to be discussed in the contracting phase. Expertise increases and learning curve effects should be documented so that a reassignment of the logistics services can be built upon an improved service level in-house.
- **Attachments:** The attachment should contain all documents that are required in the context of the logistics cooperation. This includes separate written regulations, flow charts of defined processes, organisational charts, standardised documents and IT specifications (Wißkirchen, 1999a: p. 178).

The above design elements are listed and described with little reference to the needs of diverse logistical situations. In the following, the characteristics of the design elements of logistics cooperation are embellished according to differences in the logistical supply and logistical demand situation.

5.2.1.2 Characteristics of Logistics Cooperation Contracts

The design of the contract elements depends on the type of logistics cooperation and on the extent of the outsourced logistics services. In the case of the outsourcing and collaboration in single logistical fields, or of isolated logistics services, there is a restricted need for comprehensive contract bases. On the other hand, large service packages or complete logistical concepts have to be defined in comprehensive contractual bundles (Büttner, 1996: p. 12). In contradiction to this basic rule is the effect that comprehensive logistical concepts depend heavily on the problem solving ability of the LSP(s). This means, that the more complex a logistical concept is, the looser a cooperation contract should be. The poles can be described by an 'input-driven' cooperational contract that clearly defines all input factors the LSP inserts into the cooperation and by an 'output-driven' cooperational contract that aims at the maintenance of output performance factors for which the LSP has its own responsibility. In the framework of logistics cooperations, basic contractual elements have influence on the cooperational risk, on the profitability and the conflict potential. In the following, these contractual elements are analysed concerning their above influences and the suitability to diverse logistical situations and thereby are analysed concerning their input- or output driven orientation.

The definition of result targets is an essential element of cooperational contracts. Some contracts contain a break-up clause if the defined targets are not achieved. These targets can have a time-, cost- or quality character. These clauses build up an incentive- as well as a securing system. Monczka *et al.* (2005: p. 444) give a good overview for the decision of whether a contract should be short-term or long-term and whether the contract should be a fixed-price or a cost-based one. The definition of result targets functions for all logistical situations. The more complex a logistical demand gets, the less concrete the targets become: this means that low-complexity logistical services can be defined by one-to-one factors such as transported weight whereas complex logistical services can only be measured by overall output factors such as delivery reliability.

Cooperation handbooks function as additional coordination instruments in agreements concerning responsibilities and decision-making power. Elements can be planning and steering tools, meeting policy, team work, reporting structures and cooperation culture. These reporting structures can be used for 'Basic' as well as 'Competition' logistical situations. Nevertheless, a comprehensive cooperation handbook is normally used in companionship with long-term contracts of logistics partnerships. The reasons for this are the relatively high setting costs and a higher probability of learning curve effects. This means that relatively high transactional costs in the agreement phase only amortise over a longer period of time. Conflict clauses are especially found in contracts in long-term logistics partnerships to avoid negative effects from conflicts. According to Figge (2001), negative effects are break-up risks and costs, delays, longer periods of inactivity or blockades of the cooperation. Preventive and reactive measures for the avoidance of conflicts should be parts of the cooperational contract. In addition to regulations that define the rights and liabilities of the cooperational partners, personnel exchange projects can be introduced in long-term partnerships (see chapter 5.1.3).

Expertise and business detail agreements concerning inserted or mutually elaborated expertise are especially important for close logistics partnerships. Logistics cooperations admit conclusions concerning sales figures, market and sales strategies, portfolio strategies and marketing. Contractual elements relate to expertise, patents and licenses, the usage of business data, nondisclosure agreements, and exclusion agreements. The contractual definition of expertise protections serve to reduce the risk of an opportunistic usage of external knowledge. Subject matter of non-disclosure agreements are brought in for information, especially technical and business data. These confidentiality agreements function as a protection against unintended disclosure of information and expertise to third parties. The arrangement has to be defined according the guideline that all information has to be only used for the sake of the logistics cooperation. Corridors for information usage have to be agreed upon. Failures to comply with these rules have to be assigned with clear sanctions. In some cases, non-competition clauses can be useful. Nevertheless, this is only possible in logistics cooperations in which the shipper is very powerful or the expertise is very specific. In other cases, non-competition clauses are very expensive over a longer period and induce high additional transaction cost.

Quality assurance arrangements are included by a separate contract or as a part of the contract construction. Very often, LSPs take over quality assurance services for shippers as value-added services. This means that the quality measuring points have to be clearly defined. Elements in these contracts are ppm[43]-benchmarks, maintenance intermittent, range of the quality assurance, labelling of the products and the framework of the quality assurance documentation.

Furthermore, contracts for complex logistics services and comprehensive logistical concepts contain cost targets, time targets and quality demands. In addition, rights of disposal, for example, for LSP-driven consignment stocks, and confidentiality agreements have to be agreed upon. It has to be defined if the LSP is allowed to assign sub-providers and if the LSP for other customers can use expertise from the logistics cooperation. Expertise protection can be a special problem if new IT-related developments such as RFID are developed together with the shipper and could be used in parallel for other logistics cooperations. Penalties and sanctions have to be part of the initial contract. Compensations for damages or delays are integrated in the contractual basis of a logistics cooperation. Payments for the surrender of assets such as storages and potential compensations for preliminary R&D have to be negotiated in advance. Clear definitions are also required if the shipper tries to integrate a second source into one-on-one logistics partnerships to get permanent benchmarks, a further reduction of risks and to increase competition. Contract clauses for mutual expertise protection are needed.

The introduction of sanction- or penalty-methods enforces the compliance with contractually defined logistics service levels and makes the risk of opportunistic behaviour of the cooperation partner more calculable. For this reason contract penalties, cancellation criteria and compensation payments are defined in advance. Penalties are the consequence for the non-performance of logistics services. A failure to meet a defined deadline leads to contract penalties. Failures in quality or specifications of the logistics service lead to penalties for inadequate performance. Cancellation criteria mainly function as preventive measures to

[43] ppm, parts per million, for example 5,000 ppm equals 0.5% measures the share of defect parts per million produced parts in a period.

align the partners of the logistics cooperation. Regulations concerning compensation payments already define the financial impact of non-performance.

Overall, on one hand, long contract periods lower the transaction cost concerning agreement- and contractual costs. On the other, long-term contracts provide the basis for opportunistic behaviour. Cooperation cancellation criteria offer the opportunity to combine long-term contracts and reduced risk positions. Rules on cancellation periods, cancellation criteria, profit- and loss-shares, and compensation payments define the cancellation criteria and set out in writing cancellation reasons and the calculation methods for potentially evolving damages. First, the criteria protect the partner against an unintended exit from the cooperation. Second, both partners receive a preventive threat potential to minimise opportunistic behaviour. The intensity and sharpness of the cancellation criteria rises with the length of the contract. Therefore, complex logistical situations such as 'Competition' and 'Partnership' should base on contracts that include detailed criteria for a potential early cancellation of the logistics cooperation.

5.2.1.3 Summary

As demonstrated above the design of a logistical cooperation contract depends heavily on the logistical situation. The overall guideline for the definition of logistics cooperations is oriented towards a very detailed description of the design elements without restricting the flexibility of both contractual partners to react to new surrounding conditions and without restricting the expertise and the problem solving ability of the LSP(s). Along with the above described design elements and the defined characteristics the suitability of input-driven contract constellations and output-driven contract constellations have to be assessed. Usually, the ability to define output-driven contracts depends first, on the abilities of the chosen LSP(s) and second, on the level of mutual trust between the involved parties.

5.2.2 Incentive Systems

Incentives are a means to steer and manage a logistics cooperation. These incentives are closely related to the definitions of the logistics cooperation contract. Nevertheless, further incentives are required to set-up successful logistics cooperations.

The LSP hopes to attract new business from the shippers or to reduce their own costs. The shipper hopes to reduce his own costs or to be provided with additional innovative services by the LSP. This expected economic advantage for both co-operational partners is of utmost importance for the success of the logistics cooperation. Especially in logistical situations in which LSPs dispose of a substantial market power, the development of incentive systems is important for the acquisition of suitable LSPs but also for a successful ongoing management of LSPs in the controlling- and processing phase.

Logistics cooperations can be assessed on the basis of the 'incentive/ contribution-theory'. Barnard states that "the individual is always the basic strategic factor in organisation. Regardless of his history or his obligations, he must be induced to cooperate, or there can be no cooperation" (Barnard, 1974). The theory originally relates to intra-company structures. Nevertheless, it can be transferred to inter-company cooperations and thus to logistics cooperations. According to the incentive/ contribution theory, the cooperations deliver satisfying results as long as the respective incentives are more valuable than the contributions.

Incentive systems can be structured into active, organisational and passive approaches. In the case of the passive approach, the shipper provides the basis for incentives and the LSP performs innovative ideas. In the case of the active approach, the shipper provides the impulses. Both parties drive organisational approaches: the shipper and the LSP.

5.2.2.1 Passive Approaches

In traditional management approaches of LSPs, logistics services are either considered to not be relevant enough or the basic incentives for the LSPs (sales, additional business) are considered as a sufficient enough incentive. This management approach can be valid for non-complex logistical situations in which the LSP has a restricted market power. In complex situations, especially in situations in which the LSP operates with a significant market power, added incentives are useful for the management of successful logistics cooperations. Hence, the traditional management approach cannot bind a powerful LSP to a shipper. The main reason for this is that the shipper can only influence indirectly additional sales or profit. Many other influence factors are decisive for the LSPs' business models.

One could state that leading LSPs improve their long-term competitive position by continuously improving their service performance and by continuously innovating in the relevant fields of logistical performance such as information technology or process capabilities. Nevertheless, positive developments compared to the competition of LSPs should lead to a preferred status for successive logistical orders and projects. Long-term, repetitive business relations are an incentive for LSPs.

LSPs very often quote shippers that are known as market leaders or positive examples in a specific industry as reference customers; this is, for example, valid for automotive OEMs or the aircraft industry. The reference customers have the image of requiring high-level detailed logistical demands and can therefore function as a benchmark for the capabilities of a specific LSP. Reference customers of LSPs can function as 'door-opener' for the acquisition of new business. Positive experience from the logistics cooperation can be 'sold' as a marketing tool by the respective LSP.

5.2.2.2 Organisational Approaches

Organisational approaches refer to two different types of personnel: first, top management employees are integrated to increase the awareness for the logistics outsourcing cooperation. Second, experts from the shipper have to look for a close cooperation approach with the respective experts from the logistics service provider.

The success of in-depth long-term cooperations is fundamentally based on the involvement of top management employees. A member of the board or of top management should be defined as the 'godfather' of the logistics cooperation (Jacobsen, 2001: p. 41). They take over the role of an intercessor and intervene in critical situations. This role can be helpful for an early de-escalation management. Hence, the impact on transaction costs can be very high. Problems in early phases of the logistics cooperation are likely to sum up in later phases of the relationship between shipper and LSPs.

According to the logistical situation and the size of the shipper, the integration of personnel resources of the shipper is highly recommended. Especially from a strategic point of view, the maintenance of strategic control and logistical expertise depends on the integration of own internal personnel into the interfaces of the logistics cooperation with the LSP. This is especially true for complex logistical situations, i.e. 'Complexity' and 'Partnership'. In these situations, it can be useful to employ full-time employees for the supervision of the logistics cooperation. These people can be situated in the controlling as well as in the logistics or supply chain department. At any rate, it is useful if this employee is in charge of the controlling of the LSP(s). In some organisations, there is a strong link with the sourcing or buying department. The employee in charge has to be communicated clearly to the LSP(s).

5.2.2.3 Active Approaches

Active approaches are fixed in LSP workshops that are designed similarly to supplier workshop techniques. Workshop- and creativity techniques can create an atmosphere of company-spanning problem solving and can enhance positive cooperational effects. Important are an in-depth preparation, wrap-up, professional moderation, as well as the formation of the workshop team. The selection of workshop participants is one of the keys to success. The group should be a heterogeneous mix of all the relevant competencies and interests. In addition, it is important for the acceptance of the elaborated problem solutions that all affected interfaces are represented in the participants of the workshop and that the participants back up the basic idea of the two-sided problem-solving approach from the start. The wrap-up of the workshops has to include the relevant ideas and defined measures have to be carried over in a controlled and monitored action plan.

Another instrument for mutual information transfer and intensification of the cooperation between LSP and shipper is a LSP day. This day is created similarly to supplier days known in procurement management. The shipper organises a one- or two-day event consisting of presentations and group sessions around logistics cooperation topics. These days can function as pure information as well as problem-solving events.

5.2.2.4 Summary

The definition of incentive systems is important for the long-term success of logistics cooperations. In complex logistical situations this can relate to common problem solving approaches that increase the expertise level on both sides; in standard logistical situations defined developments in the remuneration structure of the LSP. The design of the incentive system is closely connected to the definition of the contract constellation in the agreement phase as well as to the controlling structure in the processing- and controlling phase.

5.3 Processing- and Controlling Phase

The processing- and controlling phase commences with the realisation and implementation of the logistics outsourcing concept. Existing or new processes are assigned to the LSP and responsibilities are switched. "The most important operational aspect of the entire process is the implementation" [of the logistical cooperation, the author] (Lynch, 2004: p. 165). Negative effects can influence the cost as well as the sales figures. Furthermore, negative performances in logistics can influence the overall image of a company. Hence, the processing- and controlling phase aims at long-term continuity as well as at a continuity of competitive structures to minimise the risk of price changes or performance from the LSP. In the frame of the processing- and controlling phase the information- and communication structure, as well as the controlling, have to be defined and shaped.

5.3.1 Information- and Communication Structure

In the context of shipper-LSP relationships information- and communication technology is important from two points of view. The first relates to the way in which demand and supply meet on the logistics market. This aspect is discussed in chapter 5.1.2. The second relates to the information- and communication structure between outsourcer and LSP in a running logistical transaction-system. This aspect is focused on in the following section.

5.3.1.1 Information Technology

Logistics IT systems aim at an increase in the transparency of relevant information in companies and in the logistical chain in-between the involved partners and thereby at an optimisation of transaction costs. SCM-Systems form the basis for the planning, steering and controlling of the logistical networks. Overall, information technology plays a major role in contractor-client relationships regardless of the outsourcing object. Simchi-Levi, Kaminsky and Simchi-Levi list the objective of information technology in SCM (2003: p. 267):

- **Providing information availability and visibility:** As discussed in section 5.1.1, information availability and visibility is the precondition for the identification of waste in the supply chain as well as future possible bottlenecks. In addition, IT improves the speed and accuracy of information availability. Critical data can be recorded and retrieved, physical and monetary flows can be executed and controlled and higher-level tactical strategic decision-making can be supported. Thus, the transaction costs for the ongoing transactions are lowered. However, the needed investments are high and the transparency of business date increases.

- **Enabling single point of contact of data:** The exchanged information becomes unambiguous with the usage of IT linkages. The number of involved persons is reduced; as a result, the tracking of data becomes possible.

- **Allowing decisions based on total supply chain information:** The overall target of the IT integration is that supply chain decisions can be made on the basis of information that not only integrates one player in the supply chain but several. The optimisation of the information flow is a key aspect in supply chain management (Cooper, Lambert, Pagh, 1997: p. 8). The use of IT tools supports the efficient collaboration in the supply chain. Important fields include specific supply chain software such as different SAP modules, data-warehouse-concepts; electronic data interchange via EDI as well as internet-based tools.

- **Enabling collaboration with supply chain partners:** The above aims illustrate that information technology linkages provide the basis for a detailed collaboration with supply chain partners, i.e. suppliers, customers and LSPs. Through information technology, information can be moved and shared across firms and between users.

These objectives are applied on two functional roles of IT in supply chain management and in the cooperation with LSPs. First, it supports friction-reduced, or even frictionless, transaction execution and thereby substantially reduces transaction costs by improving day-day operative business. Second, IT-based decision support systems (such as advanced planning and scheduling (APS) and supply chain event management (SCEM)) can be used to aid better decisions. Kloth states: "The main IT tasks can be separated into supply chain planning and supply chain execution" (1999: p. 30). Supply chain planning focuses on all planning tasks in the logistical chain and aligns capacities. Informational barriers in-between the supply chain partners and LSPs should be diminished and an integrated planning should be enabled. A company-spanning planning and controlling is subsumed with the term supply chain execution (Arnold, Mayer, Urban, 2001: p. 23).

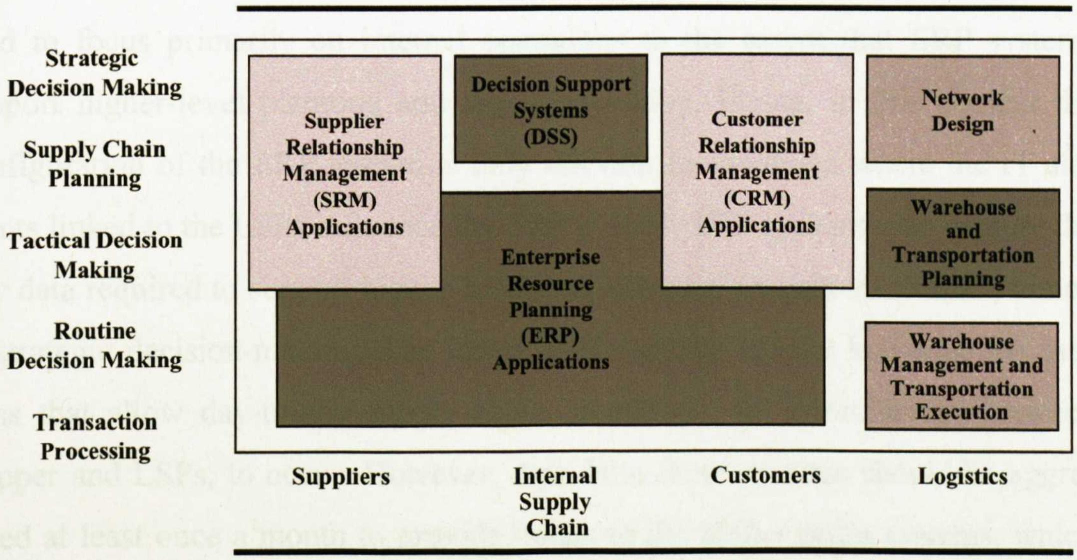

Figure 5-2: Supply Chain Management Information Technology Systems

In Figure 5-2 the various applications are distinguished by level of functionality (strategic, planning/ tactical, and customers) (source: Monczka *et al.*, 2005: p. 594). Logistics applications deal with warehousing and transportation issues, such as determining warehouse locations, optimising transportation systems, and controlling the movement of materials between supply chain partners.

This figure illustrates how high-level strategic decisions span SRM[44], decision support, CRM[45], and network design systems. The types of information provided here include the size and structure of the supply base (number of LSPs, capabilities, and performance experiences), supply chain metrics, customer support metrics, and logistics network costs. Although these systems provide data for strategic decisions, supply chain planning, and tactical (mid-term) decisions, they are supported by a broad enterprise-level system that collects transactional level data. Of particular relevance for the management of LSPs is the logistics level. In logistics, tactical and transactional data are often collected through detailed warehouse and transportation execution system. Nevertheless, until recently, they were not always linked to the enterprise resource planning (ERP) system. ERP systems integrate business transaction processing and reporting systems. These systems tend to focus primarily on internal operations to the extent that ERP systems support higher-level planning and decision-making. Hence, in this context the configuration of the ERP system is only relevant in situations where the IT elements linked to the LSPs influence the ERP system. ERP systems also capture the raw data required to support higher-level decision support systems (DSS[46]) aimed at strategic decision-making. The lower level systems are the key enabling systems that allow day-to-day supply chain operations, the coordination between shipper and LSPs, to occur. However, data from these systems should be aggregated at least once a month to provide inputs to the higher order systems, which

[44] The term 'Supplier Relationship Management (SRM)' describes the methods and processes of corporate or institutional buying. In this context it especially relates to supporting IT tools (see also footnote 45).

[45] The term 'Customer Relationship Management (CRM)' refers to concepts used by companies to manage their relationships with customers, including the capture, storage and analysis of customer, vendor, partner, service providers (incl. LSPs) and internal process information.

[46] 'Decision Support Systems (DSS)' are a class of IT-based information systems including knowledge-based systems that support management-decision making activities.

support senior management decisions related to the overall structure of the supply chain.

Supplier and customer relationship management applications (SRM and CRM) are directly focused on planning and managing the firm's external linkages. In special cases, LSPs are directly linked to supplier relationship management applications. It is obvious, that this constellation demands a high level of trust and is only useful in long-term logistics partnerships. The link to the supplier relationship management tools is definitely needed in JIT systems or in LSP managed inventory constellations. The IT systems directly linked to logistics can be divided into three main categories:

- **Network Design Applications:** Network design applications address long-term strategic questions such as the location of warehouses or the sizing of the transportation fleet. An example is illustrated in chapter 5.1.1. These applications are often based on simulations, visualisation techniques, and optimisation modelling.
- **Transportation and Warehouse Planning Systems:** These systems attempt to allocate logistics capacity in the optimum way. The systems help in building an optimisation model that uses data on warehouse capacities, demand levels, supply levels of the LSP, cost data such as shipping costs and capital lock-up to generate the lowest cost solution. Collaborative planning, forecasting and replenishment (CPFR[47]) links customer demand with replenishment scheduling to reduce inventory in the system. This results in smaller, more frequent shipments. LSPs are able to combine these

[47] 'Collaborative Planning, Forecasting and Replenishment (CPFR)' is a concept that aims to enhance supply chain integration by supporting and assisting joint practices between supplier/ LSP and customer/ shipper. CPFR seeks cooperative management of inventory through joint visibility, joint planning and management and replenishment of products throughout the supply chain.

smaller shipments into truckloads, reducing freight and handling costs and enhancing the entire distribution process.

- **Execution Systems:** Execution systems trigger and control the movement of materials between supply chain partners (outsourcing company/ LSPs/ suppliers/ customers). Similarly, bar-code systems and global positioning systems (GPS[48]) have changed the ability of businesses to manage actual movements in the distribution system. This is especially important for sophisticated 'tracking and tracing systems'[49]

At present, the level of integration between these applications and those in the other areas of Figure 5-2 is weak. The increasing level of integration between logistics and other SCM applications presents both technical and organisational hurdles to firms. On the technical side, efforts to integrate decision across sales, operations, and distribution increase the complexity of the optimisation and simulation models currently used. On the organisational side, firms have to be aware of the risks and the investments involved in the early involvement of external LSPs.

Electronic Data Interchange (EDI) is the most widespread inter-organisational linkage between suppliers, outsourcing companies and LSPs. EDI involves a communications standard that supports inter-organisational electronic exchange of common business documents and information. It is a cooperative effort between a buyer and a seller to become more efficient by streamlining communication processes. Despite the promise of greater diffusion of EDI via value-added

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[48] The 'Global Positioning System (GPS)' is a global navigation satellite system which utilises a constellation of medium earth orbit satellites that transmit microwave signals. The system enables a GPS receiver to determine its location, speed and direction as well as time (see www.gps.gov).

[49] 'Tracking and Tracing' systems assist in locating property that is being forwarded from an origin to a destination through various hubs and passing along spokes, and determining the location and other status of such object.

networks, EDI remains a technology that requires significant investment by companies to implement. Therefore, only long-term partnership logistics constellations use this technology. Today, the internet facilitates collaboration between parties in the supply chain occurs through a 'virtual private network' (VPN[50]). VPN does not require any significant investment on the part of either buyer or LSP. Thus, it is more widespread in non-complex logistical situations. Johnson and Wood (1996: pp. 114, 160) note that with EDI, "buyers and sellers are linked by computer … to exchange orders and other routine information" (1996: p. 599). EDI reduces order processing and inventory costs (Coyle, Bardi, Langley, 2003), and enhances efficient coordination of logistics systems (Williams, 1994). According to Mackay and Rosier (1996), the greatest EDI benefits are administrative cost/ staff savings and improved customer service which provide higher transparency in the interactions with the logistics service. EDI enhances the cooperation and makes communication more efficient. In addition to EDI, further operative IT interlinkages were established:

- **Bar Coding:** Barcodes represent the most commonly used automatic identification technology. The consistency of technologies is essential for moving products effectively and efficiently throughout supply chains.
- **Extensible Mark-up Language:** XML is a method of packing information for movement on the Internet. The potential of XML is that over time it will prove to be a preferred substitute for the use of electronic data interchange.
- **Data Management:** Today, handheld devices are used for data management. Furthermore, handheld devices are used for optical scanning.

[50] A 'Virtual Private Network (VPN)' is a communications network tunnelled through another network, and dedicated for a specific network. One common application is secure communications through the public Internet. VPNs can be used to separate out the traffic of different user communities over an underlying network with strong security features.

- **Imaging:** Imaging allows a company to scan, or take electronic photographs of, essential documents. These images can then be stored centrally and communicated when necessary. This technology is used frequently by LSPs that are asked to provide proof of delivery by many of their customers.
- **RFID Technology:** Particularly useful in the warehouse or distribution centre, radio frequency identification allows users to relay information via electromagnetic energy waves from a terminal to a base station, which is in turn linked to a host computer. When combined with a barcode inventory system for identifying inventory items, an RFID system can update inventory records in 'real time'. This results in significant improvement to the quality of order-picking and shipping accuracy.

5.3.1.2 Summary

The above description of the design fields of the information- and communication structure between shippers and LSPs are structured into supply chain planning- and supply chain execution elements. From the TCO approach, it is useful to define the practicability of potential IT tools in the supply chain planning fields from a logistical demand perspective. This means that the choice of required IT tools such as SCM visualisation tools is determined by the complexity and the importance of the outsourced logistical services. Supply chain execution elements are useful in the case of more complex logistical situations due to the required investment as well as the higher basic transactional costs.

Simple transaction processes such as order intake can easily be measured and thus the benefits of automating them with IT can be quantified. The use can be demonstrated in every logistical situation. However, it is more difficult to quantify the influence on transaction costs and the certainty of profits from information sharing. Drivers for the use of IT in transactions are different from those in information sharing. Whereas key drivers in implementing IT systems transactions, especially EDI, are transaction volume and stability of relationship, in information sharing other aspects have to be considered as well. Effective information sharing with IT, especially system to system, requires more effort and investment than automating transactions. Before systems can be used there has to be mutual understanding on the use of shared information. Using IT in information sharing requires a process re-design that is less straightforward than just automating ordinary transactions. Before such systems for analysis are in place it is sufficient to receive supply chain visibility information in more manual ways, for example through web-portals. In less volatile environments and less complex logistical situations using IT for information sharing is not vital.

5.3.2 Controlling

The central task of the logistics cooperation controlling is to secure an efficient planning, management and monitoring of the logistics cooperation. Controlling is defined as a management concept that "defines and installs an integrated planning- and controlling-system for the target-oriented management of a company with adherence to the process- and structural organisation by using business management tools and methods" (Huch, 1992: p. 15; Horváth, 1990: p. 144; Wolff, 1994: p. 41). To narrow this definition for a suitable controlling approach of divergent logistical situations, the main approaches of controlling need to be outlined.

The controlling of the LSP and the logistics cooperation focuses on two targets. First, one has to control the success of the implementation of the logistics cooperation in the course of the processing- and controlling phase and second, one has to check if the initial aims of the outsourcing of logistical processes are fulfilled throughout the complete cooperation life cycle. This comprises the monitoring of the contractually defined services, ascertainment of the expected cost savings and quality improvements of the logistics performance (Büttner, 1996: p. 134). This is determined through figures that have been already defined throughout the outsourcing decision, the data collected throughout the information- and decision phase but also new configured controlling figures. In addition, the controlling systematics should enable both outsourcing partners to define benchmarks concerning processes and methods and thus allow constant comparisons between competitors as well as other branches. These benchmarks provide the basis for improvement checks, continuous improvement processes and changes in the contract definitions. By this process, a continuous improvement of the outsourcing partnership can be secured (Wißkirchen, 1995: p. 236).

Pampel structures the controlling approaches into the management concept that assists the result targets and the meta-management concept that helps to achieve long-term company values such as shareholder value (1999: p. 556). Pampel further separates the two concepts into planning and steering instruments. Planning comprises process standards, quality assurance (e.g. QFD or TQM), responsibility assignment (derived by transaction cost analyses and expertise aspects), concept competitions (as described in chapter 5.1.2.4), interface analyses and target agreements (derived from the responsibility assignment and the contract). Steering comprises the controlling of deadlines, controlling of costs, controlling of quality and modifications, auditing measures and benchmarking activities. Wildemann distinguishes the controlling of procurement activities[51] first into, the financial perspective that reflects the success of the procurement and logistics strategy and the success of the process integration; second, the process perspective that measures the effectiveness and the efficiency of the integration of the LSP; third, the customer perspective that provides information on the success from the customers' point of view and fourth, the supply perspective that shows

[51] Wildemann discusses the procurement of services in the context of classical procurement objects (products and components). Therefore, in this context, Wildemann's contents are transferred to the procurement of logistics services and the controlling of the management of logistics service providers.

the optimum LSP performance from the comparison of different cooperational forms (Wildemann, 2001a: p. 229).

The main task of the controlling concept is the definition and steering of targets for quality, cost and time in the framework of the logistics cooperation. In addition, the controlling concept has to enable an early derivation of actions in the case of deviations from the plan as well as the possibility of establishing comparable and repetitive benchmarking data (Wolff, 1994: p. 44). The resulting transparency and reduced asymmetries in information helps to reduce incalculable risks and losses, prevents from unintentional expertise drain, and protects from opportunistic behaviour (Lange, Schaefer, Daldrup, 2001: p. 81).

In the following chapter, the main elements for a comprehensive controlling concept in the context of logistics cooperations between outsourcers/ shippers and LSPs are examined, described and configured according to the logistical situation. The main elements are the controlling of quality, costs and time as well as a supporting concept for the auditing of LSPs and the design of a repetitive benchmarking concept.

5.3.2.1 Controlling of Quality

The integrated controlling of quality comprises the controlling of the quality of both, the logistics service in it, as well as the controlling of the quality of the logistics cooperation. The prophylactic effect of quality deficit prevention is of main importance (Wildemann, 2000: p. 302). The basis for this form of quality orientation was the total quality management[52] concept of Demming.

Focus of TQM is not only the continuous improvement of the process performance but also of the utilisation of resources, the qualification of the employees

[52] The International Organisation for Standardisation (ISO) defines TQM as "a management approach for an organisation, centred on quality, based on the participation of all its members and aiming at long-term success through customer satisfaction, and benefits to all members of the organisation and to society".

and the management as well as the quality of the cooperation in itself (Töpfer, 1999: p. 356). In this context, in Europe the DIN EN ISO 9001[53] norm was defined. This norm focuses on quality management and is relevant for buyer-supplier relations as well as for logistics cooperations between LSPs and shippers. The quality assurance elements of the ISO 9001 comprise management-, employee training-, measures for the check of products and contracts as well as measures for correction and prevention. For example, the Ishikawa diagram[54] is a method for the analyses of quality problems. This method is of reactive character. In relation to logistical inter-company processes, it functions as a method to identify reasons of performance deviations by assorting the identified failure to predefined influencing factors. In close logistics cooperations, i.e. in the logistical situation 'Partnership', combined teams of both logistical partners work on these correcting measures.

The instruments of quality controlling relate to the TQM role model of the management, the encouragement of total quality by continuous improvement of the personnel resources, the encouragement of decentralised decision-making power and efficient communication across hierarchy levels. Nowadays, the ISO 9001 norm is widespread and all types of LSPs have gained certification and work continuously on quality improvements. Furthermore, the ISO norms are usually defined as preconditions for the participation of LSPs in contract negotiations throughout the information- and decision phase as well as in the agreement phase.

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[53] DIN is the abbreviation for 'Deutsches Institut für Normung/ Europäisches Komittee für Normung/ International Organisation for Standardisation). Certification to an ISO 9000 standard does not guarantee the compliance (and therefore the quality) of end products and services; rather, it certifies that consistent business processes are being applied. Although the standards originated in manufacturing, they are now employed across a wide range of other types of organisations and thereby are applicable to LSPs and their processes.

[54] The 'Ishikawa diagram' is also known as 'fishbone diagram' or 'cause and effect diagram'. The causes in the diagram are based around pre-defined categories such as the 4S's (surroundings, suppliers, systems, skills). The diagrams reveal the relationship among various variables and possible causes. These causes provide insights into process behaviour (see e.g. Wildemann, 2000: pp. 319).

5.3.2.2 Controlling of Costs

Costs in this context are defined according to the chosen theoretical concepts as reasoned in chapter 3.3.3.5. This means that the TCOs of the logistics services have to be analysed on a today's as well as on a potential future basis, differentiated by the respective transaction phases. Tasks of the controlling of costs are the determination and the management of occurring costs as well as the early recognition of mutual reduction of deviations and their potential reasons. The analysis of time- and cost-drivers helps to identify starting points that serve to identify weak points throughout the information- and controlling phase of the cooperation. Closed-loop controlling systems have to be implemented that allow the definition of early cost targets, that identify main cost drivers and that admit the evaluation of solution approaches (Seidenschwarz, Niemand, 1994: p. 263). The different methods for the target cost analysis are:

- **Benchmarking**: Objects of comparison can relate to company- or industry-internal functions and processes, to competitors or to best-in-class companies or processes (Gleich, Seidenschwarz, 1999: p. 585) and thereby can form a basis for benchmarking. Objects of comparison are the basis for systematic analysis, identification and evaluation of performance- and cost-differences as well as the assessment of causes for these. Comparisons are of utmost importance for the management and improvement of logistics cooperations between LSPs and shippers. Therefore, benchmarking as a tool for defining and controlling objects of comparison is discussed in section 5.3.2.5.

- **Target Costing**: Target costs or target costing is already a part of the information- and decision phase in which target costs form the basis for discussion for price negotiations. Throughout the controlling- and processing-phase, target costing serves to follow the defined costs and to trigger corrective actions as soon as cost targets are exceeded. The target costing method is usually calculated on the basis of predefined prices, acceptable costs and the designated target contribution margin (Fröhling, 1994: p. 71). The target costs are segmented afterwards and are challenged by a function cost analysis[55].

- **Function Cost Analysis**: The function cost analysis calculates products or processes on the basis of a detailed assessment of the main cost drivers and a critical challenging of the necessity of each process step.

Overall, the controlling of costs plays a major part in the controlling of logistics cooperations. Hence, significant effort is invested in defining suitable cost controlling methods.

5.3.2.3 Controlling of Time

The controlling of time and thereby planning efforts can raise the share of deterministic processes which reduces the risk in the logistical processes. This controlling element serves the realistic planning of intermediate dates and deadlines, the efficient monitoring of time schedules and the early introduction of corrective actions.

Furthermore, it is an essential part of service standardisation. Standardised, deterministic process shares are the basis of repetitive secure logistical processes that induce reduced transactional costs throughout the processing- and controlling phase.

5.3.2.4 Auditing

Auditing processes can be divided into unidirectional and bidirectional audits. Bidirectional audits can lead to a higher degree of information exchange. In these

[55] Function Cost Analysis is a method of technical and economic research of the systems for purpose to optimize a parity between system's (as product or service) consumer functions or properties (also known as value) and expenses to achieve those functions or properties. Function Cost Analyses are also known as Activity-Based Costing (ABC) which are mainly used in process- or product value analyses (see also chapter 3.3).

audits, LSPs and shipper are enabled to identify improvement potentials. Bidirectional audits are only useful in complex logistical situations such as 'Partnership'. Auditing causes high initial transactional costs that pay in the longer term, i.e. long-term contracts and partnerships. Unidirectional audits have a higher importance in logistics cooperations. Unidirectional auditing processes are also useful in complex logistical situations in which the shipper disposes of a high power in the logistical relation. The activities are planned, coordinated and monitored by an auditing committee. The auditing process includes the analysis of objectives, specifications of the logistics services and weaknesses in the cooperational organisation. The audit questions the degree of target achievements and the accuracy of exchanged data. Furthermore, the operation and implementation of defined improvement measures are checked, the compliance with agreed standards is reviewed and opportunistic behaviour is guarded against. In the case of a bidirectional audit, the auditing committee consists of management representatives of both logistical partners. For unidirectional audits a team is defined by the outsourcer/ shipper.

Assessed cooperation measures relate, for example, to the compliance with contract details such as non-disclosure agreements and the willingness to perform and to cooperate or to the use of human resources of fixed assets. On the process level, the compliance with contractually defined milestones, cost- and quality standards and the degree of self-organisation of teams is evaluated. Auditing is a very costly and time-consuming controlling element. Therefore, this tool is usually only involved in complex logistical situations such as 'Competition' and 'Partnership'.

5.3.2.5 Benchmarking

Stank *et al.* (1996) define 'benchmarking' as a "management process used to monitor and measure performance against competitors". Hence, it consists of a systematic procedure for identifying the best practice and modifying actual knowledge to achieve superior performance (Bowersox, Closs, 1996: p. 461).

Benchmarking allows organisations, or supply chains, to develop plans on how to adopt best practice, with the aim of increasing defined aspects of performance.

In the context of the controlling of logistics cooperations, benchmarking focuses on the comparison of the performances of the LSP(s) with major competitors and best-of-class competitors for several performance fields. Especially if the LSP performs comparable logistics services for the same company at different geographical places or functions within the company, benchmarking can function as a basis for impartial internal and external discussions and negotiations

Benchmarking cannot only function as a method throughout the controlling- and processing phase but previously in the conceptual phase for the supply chain. Benchmarks can be used to assess time-, cost- and quality-aspects of new logistical concepts. In addition, benchmarks can be used as performance requirements and specifications for concept competitions and budget targets for LSPs in the information- and decision phase. Throughout the controlling- and processing-phase, benchmarks function as a means for comparison. In the case of performance deviations, possible reasons are analysed and corrective actions are defined.

Wildemann distinguishes the assessment of service capabilities via benchmarking according to three types of performance figures (1995a: p. 81).

- Input Measurements,
- Output Measurements and
- Process Measurements.

Process measurements in particular can be related to other competitors and other industries and therefore are able to provide a basis for valid benchmarks. Process benchmarks help to provide the target costing method with empirical data. Hence, the internal acceptance can be raised. Output-oriented benchmarks mainly serve as thought-provoking impulses and for the enhancement of impartial performance transparency (Figge, 2001: p. 241). Benchmarking is not a stand-alone method but an additional tool with which to challenge the performance of the LSP(s). Benchmarking is a suitable tool for all logistical situations.

5.3.2.6 Summary

The elements described above have to be integrated in a comprehensive supply chain collaboration controlling approach. All elements have to be configured in their characteristics according to the logistical typology of logistics cooperations. The specific challenge is to support the cooperation of economically and legally independent organisations and to secure a successful cooperation. This means, that both partners agree on a strategy and the derived aims that have to be secured by a mutual planning- and steering process.

Classical informational tasks are the basis for every controlling approach independent of the logistical situation and the intensity of the logistics cooperation. Unified key performance indicators that have a supply chain- and partner-spanning character (cost-, quality- and time indicators) have to be mutually defined. Mutual targets such as the minimisation of throughput times can be quantified and measured. A prerequisite is to establish a unified process understanding and to identify the critical paths and bottlenecks in the supply chain and the collaboration between LSP and shipper. Throughout the processing phase the supply chain controlling incorporates a transparency function. Cost-, quality- and time information from logistics controlling systems are integrated. All information has to be synchronised.

An intensive interchange of information is required. This leads to the necessity for integrated IT systems. It is obvious that any changes in the IT systems are only useful for recurring logistical interchanges or for in-depth logistics partnership structures. The degree of this integration directly correlates with the intensity of the collaboration. Therefore, company-spanning controlling systems for logistics partnerships situations have to include logistical key performance indicators that are able to visualise the intensity and the quality of the logistics cooperation. Hence, the supply chain controlling also has to be designed according to the overall management approach of LSPs. The guidelines are: first, the consideration of different company strategies which aim at supply chain cooperation; second, the overall possibility to check the efficiency targets from the customer's point of view and third, the enablement of process-oriented thinking and acting in the complete supply chain.

5.4 Adjustment Phase

The adjustment phase is characterised by a constant review of the chosen and embellished management approach. Changes in the influencing factors lead to changes in the logistical demand and supply profile, i.e. the logistical situation that determines the management approach of LSPs.

5.4.1 Triggers of the Adjustment Process

The passage of the adjustment process can be triggered by two cases. First, throughout the processing- and controlling phase the influencing factors on the choice and the design of the management approach have to be updated. The cyclical pattern can be initiated on a continual basis, e.g. at the end of each business year. Second, the characteristics of the design fields have to eventually be adapted to the new initial situation that occurs through the changes in the logistical demand/ supply constellation. This means that the adjustment process can also be triggered by special events or incidents such as changes in the logistical demand situation (changes in the product portfolio, changes in IT technology, new safety regulations) or in the logistical supply situation (M&A in the LSPs market, evolvement of new LSPs, new business connections). Changes can influence all the listed design fields. Adjustments in the management approach of LSPs have to be allocated to the respective phase in the logistics cooperation life cycle:

- **Major changes in the initial logistical situation** lead to a restart of the information- and decision phase. A new LSP has to be identified on the basis of the outlined methods. In addition, changes in the overall situation can lead to a rethinking of the risk management approach.

- **Medium changes** lead to a restart of the agreement phase. The design and the contents of the contracts have to be reworked. A common activity in this context is a renegotiation of the monetary framework. Improvements in the processes, in the IT structure or changes in the quantity structure have to be discussed concerning prices and billing systems. Furthermore, the incentive system can be adapted to changes in the initial situations.
- **Minor changes** can be directly introduced in the framework of existing contracts in the processing- and controlling phase. This is valid for all design fields of the processing- and controlling phase: the information- and communication structure, which quite often occurs due to changes in the IT structure and where the controlling system needs to be continuously improved on the basis of new year-end findings.

This iterative process has to be conducted on a continual basis. The occurrence of this verification process should be linked to the complexity of the logistical situation but also to the overall cost improvement pressure on the company's situation. A holistic check of the logistical situation will result in improvement potentials on the cost as well as the logistical performance side. On the other hand, the holistic check of the logistical demand and the logistical supply situation creates internal costs of information seeking and gathering.

5.4.2 Summary

The above description of the adjustment process outlines a cooperation life cycle phase that is conducted independently from the logistical situation. The assessment of the steadiness of the management approach-defining logistical demand and supply situation has to be conducted on a regular institutionalised basis. According to the modification degree of the influencing factors the adjustment phase starts from different phases in the cooperation life cycle.

5.5 Summary of the Design Fields along the Cooperation Life Cycle

The present chapter described the design fields and their characteristics along the cooperation life cycle between shipper and LSP. This chapter provided a theoretical analysis of the design fields, a conceptual elaboration and a systematisation of the design fields alongside the transaction phases. For each phase, required fields are identified and described. Possible characteristics of the design fields are demonstrated. For the formulation of possible characteristics, the defined and chosen theoretical approaches were used. Thus, the integration deficit identified in chapter 1.1 can be closed. Furthermore, instruments are identified that qualify for the respective consecutive transactional life cycle phases. These instruments are based on the literature review as well as on observations made by the author during his management consulting activities. The analysis of these instruments provided the opportunity to derive statements concerning their use and their mode of action. The result is a practical contribution to the solution of the design problem of a situational management approach of LSPs.

Throughout the information- and decision phase, the focus lies on an initial analysis of the internal and external context of the logistical demand and supply as well as the strategic direction towards logistics outsourcing. Mostly independent from the type of logistical situation, the initial situation has to be identified and detailed. Furthermore, different ways of choosing (a) suitable LSP(s) are outlined. This choice of adequate cooperation partners directly depends from the logistical situation the outsourcer is situated in. The organisational structures are already relevant in the information- and decision phase as well. Depending on the logistical situation, the intensity of the organisational linkages directly influences the success of the later phases throughout the cooperation life cycle. This is also valid for the design of the risk management system that has to be aware of dependency risks and expertise losses, risks of cost increases as well as of performance and hazardous risks.

The agreement phase is dominated by the definition of the design and contents of the contracts. The relevant design fields of the contractual framework, their possible characteristics as well as the contents relative to the logistical situation are outlined in detail. Closely related to the design and the contents of the cooperational contracts, the incentive systems with which involved LSPs can be steered are located. Dependent on the logistical situation, passive, organisational or active approaches are recommended. This transactional phase ends with the signature of the logistics outsourcing contract.

The processing- and controlling phase starts as the basis for the exchange of logistics services. The first step is the definition of the information- and communication structure. Normally, the design of the information- and communication structure has fluent characteristics from the agreement phase. The more complex the logistical situation, the more probable is the ongoing work in a project team constellation. One has to define the collocation structure as well as the occurrence and the intensity of the personnel exchange and the characteristics of the linking information technology. The design of the cooperational controlling style is one of the major success factors of a logistics outsourcing project. One has to define the quality-, cost- and time elements, as well as the auditing structure. The benchmarking ability is a precondition for the design of the controlling system. As a result, supply chain collaboration controlling, dependent on the logistical situation, is elaborated.

The adjustment phase is triggered by three incidents. First, minor changes in the cooperation lead to changes in phase two or three. Second, medium changes lead to a restart of the agreement phase. Third, major changes in either the direct interchange with the LSP (performance, personal disputes) or the overall logistical situation (changes in the logistical demand, e.g. more complex logistical solutions or new markets; changes in the logistical supply, e.g. the appearance of new LSPs or competitive new offers of established ones) lead to a complete new round in the life cycle of a logistics cooperation. All phases are re-passed.

As discussed in chapter 3, the design fields can be assorted to the umbrella terms 'material flow', 'information flow' and 'passage of titles'. Figure 5-3 demonstrates the interdependencies of the design fields and the main elements of the management approach of LSPs.

Effective Direction of the Design Fields / Design Fields	Material Flow	Information Flow	Passage of Titles
Preparation of the Mgmt. Decision	●	●	●
Choice of Suitable LSPs	◐	◐	◐
Organisational Structures	○	●	◐
Risk Management	◐	◐	◐
Design and Contents of Contracts	◐	◐	●
Incentive Systems	○	◐	◐
Information- and Communication Structure	○	●	◐
Controlling Systems	◐	●	◐

No Influence ○ Indirect Influence ◐ Direct Influence ●

Figure 5-3: Effective Direction of the Design Fields

In the information- and decision phase, the initial situation is holistically analysed according to the guideline 'Holistic View of the Management Approach', 'Concentration on Core Competencies', 'Process Orientation' and 'Enhancement of Deterministic Process Shares'. All relevant umbrella design fields are thereby taken into consideration. Throughout the agreement- and the processing- and controlling phase, the material- and information flow is designed according to the logistical situation and thereby according to the defined guideline 'Differentiation of the Relation between Outsourcer/ Shipper and the LSP'. Hence, it can be stated, that the characteristics of the design fields of the situational management approach of LSPs along a cooperation life cycle were designed according to the results of the conceptual framework, respectively the guidelines for the design of the situational management approach of LSPs.

To prepare the elaborated design fields for the empirical analysis, the respective characteristics of the outlined design fields can be gathered in a morphological box. Figure 5-4 shows the design fields and their characteristics along the transaction phases of the logistics cooperation alongside the complete life cycle. This morphological box allows a systematical step-by-step analysis of the empirical basis and enables a comparative assessment of the case studies and their real-life appearance.

LCP	Design Fields	Characteristics of the Design Fields				
I	Preparation of Mgmt. Decision	Internal Analysis	External Analysis	Logistics Strategy		
I	Choice of LSP	Direct Awards	Online Auction	Tendering	Concept Competitions	
I	Organisational Structures	No Organisational Linkages	Interface Models	Team Models		
I	Risk Management	Dependency and Know-how	Cost Increases	Performance and Hazardous Risk		
II	Contractual Framework	Input-oriented Contract Design	Output-oriented Contract Design			
II	Incentive Systems	Passive Approach	Organisational Approach	Active Approach		
III	Information and Communication	Network Design	Transportation Planning	Execution		
III	Controlling	Quality	Costs	Time	Auditing	Bench-marking
IV	Closed Loop Control	Back to Phase III	Back to Phase II	Back to Phase I		

I: Information- and Decision Phase **II: Agreement Phase**

III: Processing- and Controlling Phase **IV: Adjustment Phase**

Figure 5-4: Morphological Box of Design Fields along Cooperation Life Cycle

To summarise, this chapter contributes to the definition and the systemisation of the life cycle of logistics cooperations dependent on the logistical situations, the development and description of the design fields alongside the life cycle and their characteristics as well as in the collection, analysis and further development of tools and methods that support the adequate design of the management approach of LSPs. Thereby, chapter 5 provides the basis for a structured empirical analysis of LSPs' management in the following chapter.

6 Empirical Analysis of the Management of LSPs

Having identified the possible characteristics of the design fields, as well as the relevant tools and methods along the life cycle of logistics cooperation, these will be analysed in this chapter. Thus, the theoretical-deductive assessment of the logistics cooperation is confronted with an empirical-inductive one. This confrontation allows the validation of the developed theoretical model of the logistics cooperation between shippers and LSPs and their characteristics. Furthermore, it allows testing of the practical relevance and implications in business management.

From a management perspective, the empirical analysis of the characteristics of the design fields of the management approach of LSPs serves mostly to identify deficits as well as to demonstrate positive examples. This provides the basis for the derivation of management-relevant guidelines for the design of the management approach. Overall, the empirical analysis of the management approaches of LSPs aims at the following targets:

- **First, the conceptual basis of this project will be challenged** concerning the relevance in business practice. The types of logistical situations identified are verified as well as the described design fields of the management approach. Thereby, the relevance of the identified influencing factors as well as the one of the defined logistical taxonomies is tested. In addition, the possible characteristics of the design fields are analysed.

- **Second, the chosen management approaches are examined in business practice** and the influencing factors on the choice of the management approach are analysed in detail. Thus, the completeness of the identified influencing factors is challenged. Due to the basic assumption of this thesis that the optimum management approaches are designed according to the logistical situation, namely to the logistical demand and the logistical supply portfolio situation, the theoretically identified types of cooperation are a fundamental consideration throughout the analysis.

- **Third, the identification of advantages and disadvantages of the different management approaches** build the basis for the derivation of type-specific design recommendations in chapter 7. The main aim of this procedure is to have a theoretical elaboration as well as to derive practical design recommendations. This aim is mainly achieved by the exemplary analysis of the nine selected case studies.
- **Fourth, as a result of this procedure, the research questions will be answered and the hypothesis will be challenged** according to the hypothesis-testing approach.

The aims of the empirical analysis follow the initial aims of this research as described in chapter 1.3. To accomplish these research aims the concrete characteristics of the empirical analysis are fundamentally important. Hence, in the following section the empirical analysis is described.

6.1 Characteristics of the Empirical Analysis

The empirical research centres on the analysis of nine case studies. The case studies are derived from management consulting projects the author attended personally. All projects aimed either at an increase of the efficiency of existing logistics outsourcing relationships or the assessment of the rollout of logistics outsourcing relationships. Eight projects were based on business and academic projects that have been conducted under the direction of Univ.-Prof. Dr. Dr. h. c. mult. Horst Wildemann at the Transfer Centrum GmbH & Co. KG (TCW) as well as the Chair of Corporate Management, Production and Logistics at the Technical University of Munich (TUM). In addition, one project is based on management consulting experience the author gathered before joining the TCW Transfer Centrum. It was conducted under the guidance of Prof. Dr. Alfred Joepen from University of Applied Sciences Aachen in cooperation with an international LSP.

The gathering of case studies was conducted between 1999 and 2006. Due to the intensive attendance and project management of the author, the author's own insights could be integrated. Additional insights were gained by expert-interviews that were conducted in the course of this research project and were integrated into the description of the case studies. Hence, the relevant data for the empirical analysis was collected through the consulting projects, by detailed interviews with experts in the participating companies and by the in-depth analysis of the project documents. The case studies were selected according to the following guidelines:

- **First, there should be at least one case study representing each identified type of logistical situation:** The first reason for this is that the aim of this dissertation is to develop management guidance for various industries in various logistical surroundings and hence in differing logistical situations. Second, the differences in the characteristics of the logistical demand and the logistical supply situations in combination with their situational approaches of management of LSPs function as a justification for the taxonomy derived in chapter 4.3. Therefore, the empirical background is based on a necessary heterogeneity.
- **Second, the case studies should be, as far as possible, complete in the practical analysis of the design fields:** This guideline relates to the holistic approach of the case study analysis. An analysis of the case studies on the basis of their logistical situation type and the characteristics of the design fields of their management approach of LSPs provides the opportunity to take a holistic look at the logistical situation of the organisation in focus. Implications and results of different management approaches of LSPs can be assessed and critically judged.

There is no standard format for [case study] analysis (Eisenhardt, 1989: p. 540). Hence, in this context, the morphological box as demonstrated in Figure 5-4 provides the structural basis for the analysis of the case studies. The procedure of the empirical analysis is configured along a situation – complication – solution sequence:

- **Situation:** In the framework of an explorative study the case studies are analysed with respect to the influencing factors defined in the theoretical logistics cooperation model (see chapter 4). The influencing factors are assigned to the logistical demand/ logistical supply portfolio. This procedure allows the classification of the case study into one of the four types of logistical situations (see chapter 6.2) and implies the definition of the logistics strategy.
- **Complication:** Each case study is assessed and characterised along the type-specific characteristics of the design fields and the life cycle of a logistics cooperation (see chapter 6.3). Furthermore, the case studies are examined with respect to the tools and methods that were employed throughout their life cycle phases.
- **Solution:** The case studies are analysed concerning the impact of the chosen management approach. This analysis provides the basis for the assessment of the profitability of the chosen characteristics of the design fields according to the defined targets. Through this, the empirical analysis challenges the academic-theoretical derivation of an optimum management approach of LSPs throughout the life cycle of a logistics cooperation and, thereby, challenges the initial hypothesis of this research.

Figure 6-1 illustrates the above procedure of the empirical analysis. This procedure allows a stringent comparison of real-life business practice with the theoretically derived optimum management styles of LSPs.

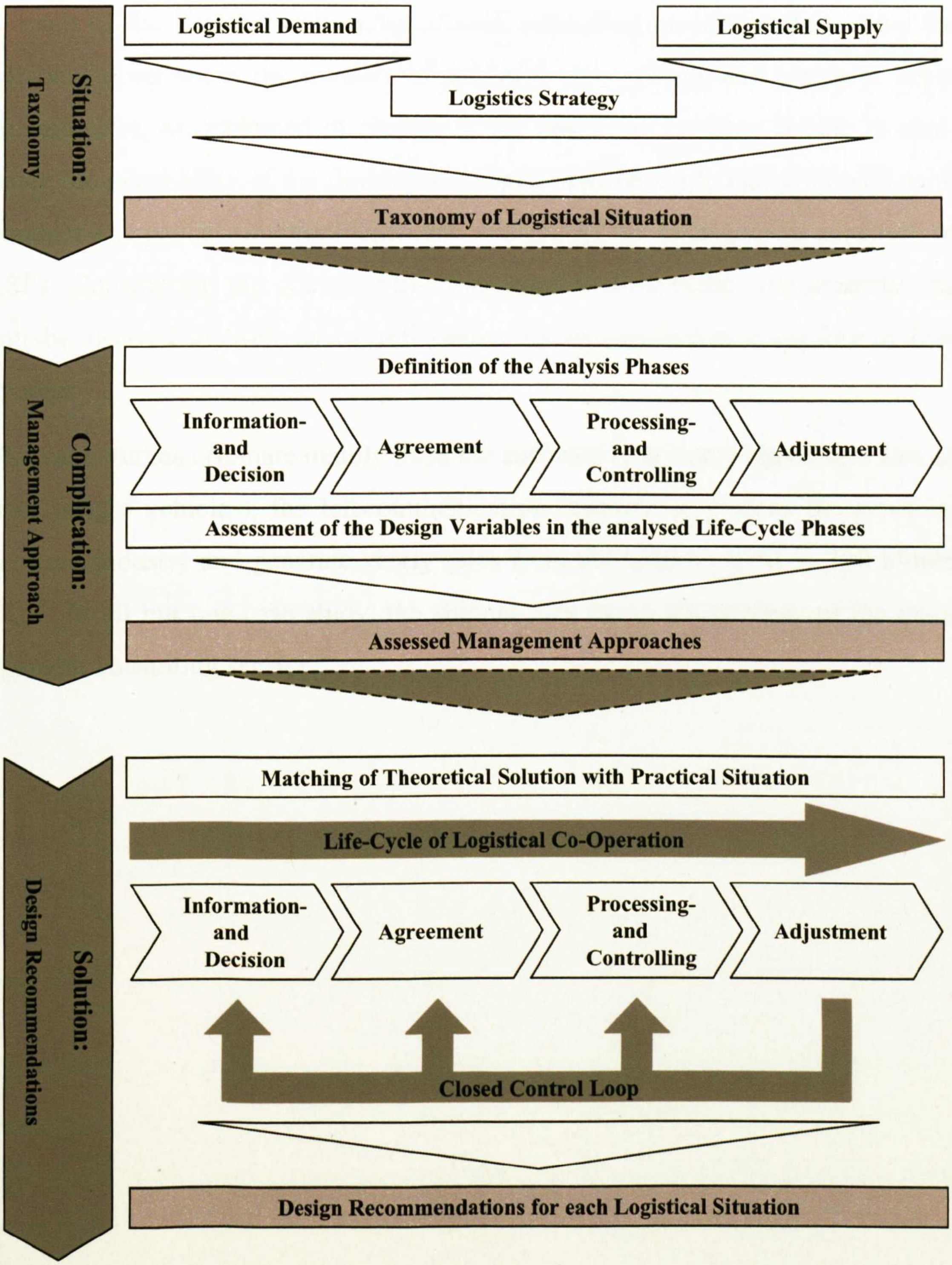

Figure 6-1: Assessment Procedure of the Empirical Analysis

Due to the restricted number of samples, the database used in the present study could not provide universally valid or representative statistical conclusions. The reasons for this are the (volitional) heterogeneity of the analysed case studies, the complexity of the focal area and the reduced number of relevant case studies. As a result of the long-term character of such consulting projects and the need for personal observation the number of analysed case studies has a natural limit. Nevertheless, as explained in chapter 2, the empirical database is able to challenge the plausibility of the developed cooperation life cycle model as well as to conduct a logistical situation-dependent analysis of the management approach of LSPs. Considering the above restrictions, case study-specific recommendations can be derived as well as overall design recommendations consolidated (see chapter 7).

The case studies originate mainly from the automotive industry (passenger cars as well freight vehicles), the telecommunication industry as well as the financial services industry and generate yearly sales from 500 million EUR to 150 billion EUR. In all but one case study, the shipper was the ordering party of the management consulting service.

CS	Industry	Products relevant for Case Study	No. of Employees [T]	Sales [M]	No. of PoS	No. of involved LSPs
1	Tele-communication Service Provider	Reseller of Airtime/ Hard-ware/ Accessories/ Merchandising Material	1.6	0,500	300 Shops	3
2	Automotive OEM	Light Trucks/ Components	19.4	8,300	Not relevant	4
3	Automotive OEM	Light Trucks/ Components	19.4	8,300	Not relevant	3
4	Financial Industry	Annual Reports/ Printing Material	1.9	Funds Volume: 140,000 Sales not published	14,000 PoS (Banking Branches)	1
5	Automotive OEM	Passenger Cars	360.4	151,600	Not relevant	ca. 500 (incl. 52 Sector LSPs)
6	Tele-communication Provider	Airtime/ Hard-ware/ Accessories/ Merchandising Material	5.1	1,584	438 Shops 9,000 other PoS	1
7	Automotive OEM	Light Trucks	19.4	8,300	Not relevant	1
8	Automotive OEM	Car Parts/ Car Components	4.0	0,460	Not relevant	1
9	Automotive Supplier	Car Parts/ Car Components	8.000 (22.000 World)	2,500	Not relevant	1

Figure 6-2: Attributes of the Case Studies

The first case study deals with a telecommunication service provider that operates in the German telecommunication industry as a reseller of airtime, mobile devices and accessories. The necessary logistics services are performed in-house apart from the transport services to the point of sales (PoS) and to the final customers. These transport services were to be assessed concerning their suitability for transfer to an alternative LSP. In addition, the management approach of these LSPs was to be designed.

The company in the second case study is a producer of light and heavy trucks. In this case study, focus was on the production field of light trucks. The company in focus was analysed for different logistics services or, as for case studies three and seven, different logistical situations. In this case study, a logistical concept was to be elaborated for the supply of the final assembly line.

The same automotive OEM of freight vehicles is assessed in case study three. In this case, a distribution concept for different parts than those in case study two, a different region in-between supplier, and the production facilities of the light truck producer was to be elaborated.

The fourth case study deals with a financial services provider in the field of fund management and administration. The aim of the project was to define a logistics outsourcing concept for the printing and storage of funds information material. This included the search for a suitable LSP and the elaboration of a suitable management approach.

The fifth case study represents the biggest German automotive OEM. The main task of the consulting project was the re-evaluation of the logistics strategy, the assessment of logistics activities as well as the definition of the overall management approach of LSPs.

The sixth case study is a telecommunication provider mainly active in the mobile sector that operates with one central LSP working solely for this customer. The LSP has to supply around 400 shops and further indirect PoS. The German subsidiary of an international telecommunication group, as a company, is positioned as a network operator, a provider of mobile services, post-paid- and prepaid-products as well as a provider for internet connections. The aim of this project was the strategic assessment of the supply chain concept and the derivation of optimising measures.

The seventh case study describes a project conducted for the same producer of light trucks discussed in cases three and four. The aim of this consulting project was the elaboration of a comprehensive warehouse solution that should integrate pre-assembly components from 15 suppliers in a warehouse operated by the LSP.

The eighth case study deals with a BOT (build-operate-transfer) model that required to be elaborated for an automotive component supplier in collaboration with a pre-defined LSP. The consulting project aimed at the derivation of a comprehensive outsourcing solution including the definition of the legal and financial interfaces between financing banking institutions, the LSP and the automotive supplier.

The ninth case study describes a consulting project that was conducted in direct cooperation with a LSP and thus provides a different view of the assessed outsourcing challenges. The project also aimed at the derivation of a comprehensive outsourcing concept including a roll-out plan for handing over the responsibilities for the inbound logistics, in-house logistics as well as outbound logistics.

6.2 Analysis of the Influencing Factors

Starting from the defined influencing factors in the system model in chapter 4.2, the case studies can be characterised concerning their logistical demand and their logistical supply situation. The aim of this characterisation is the positioning of the case studies into the overall logistical demand/ logistical supply portfolio, which in turn leads to an allocation to one of the four logistical situation types. With the help of this taxonomy, characteristics within the case studies are compared with the theoretical design recommendations in chapter 4.3. The comparison of these characteristics allows the derivation of general design recommendations for the management approach of LSPs in diverse logistical situations. These general design recommendations help in assessing the real-life design of the management approaches in the case studies at hand.

Throughout the definition of the life cycle of a logistics cooperation between shipper and LSP, the influencing factors were embellished concerning their extremes as well as in intermediate stages. On this basis, a characterisation of the case studies is possible. For each influencing factor a nominal scale between one and five is used. Thereby, intermediate stages can be considered. Aggregation to the main influencing factors of the 'logistical demand structure' (on the basis of the sub factors 'specificity of the logistics service', 'complexity, insecurity and measurability of the logistics service' and the 'extent of damage') as well as the 'logistical supply structure' (on the basis of the sub factors 'market power of the LSP' and the 'competencies and the development potential of the LSP') is conducted by equally weighted averages. The 'vertical range of logistics' is not considered as a main influencing factor for the derivation of cooperation types. As discussed above, a predefinition of the general contact and interaction with LSPs restricts the basis for an optimum definition of situational management approaches of LSPs.

On the basis of the main influencing factors the logistical demand and the logistical supply portfolio is generated. The transfer of the diagram value is conducted according to the generic formula described in chapter 4. Thereby, in the portfolios the factor values of the case studies can be noted. From the combined logistical demand/ logistical supply portfolio, the type of logistical situation can be derived.

6.2.1 Analysis of the Logistical Demand Structure

In the following the influencing factors on the logistical demand structure in the respective case studies will be assessed. Namely, the occurrence probability of the required logistics services (specificity, the complexity, insecurity and measurability of the logistics services) as well as the extent of potential damage induced by the outsourced logistics services.

- **Occurrence probability of logistical problems**: The required logistics services in case study nine to four are clearly specified. This is mainly due to the tangibility of the service definition induced by standard logistics services. The demands on the cooperation with the LSPs are low. All other case studies require solution capacities of the LSPs. Hence, the required specificity of the logistics service is relatively high. The complexity, insecurity and measurability of the required logistics services show a similar picture. The more complex the required logistics solution, the more complex, insecure and measurable the required logistics services are. It is obvious, that especially the automotive industry with their JiT/ JiS requirements demand logistics services with a high occurrence probability of logistical problems.

Figure 6-3 sorts the case studies according to the occurrence probability of problems within logistics services.

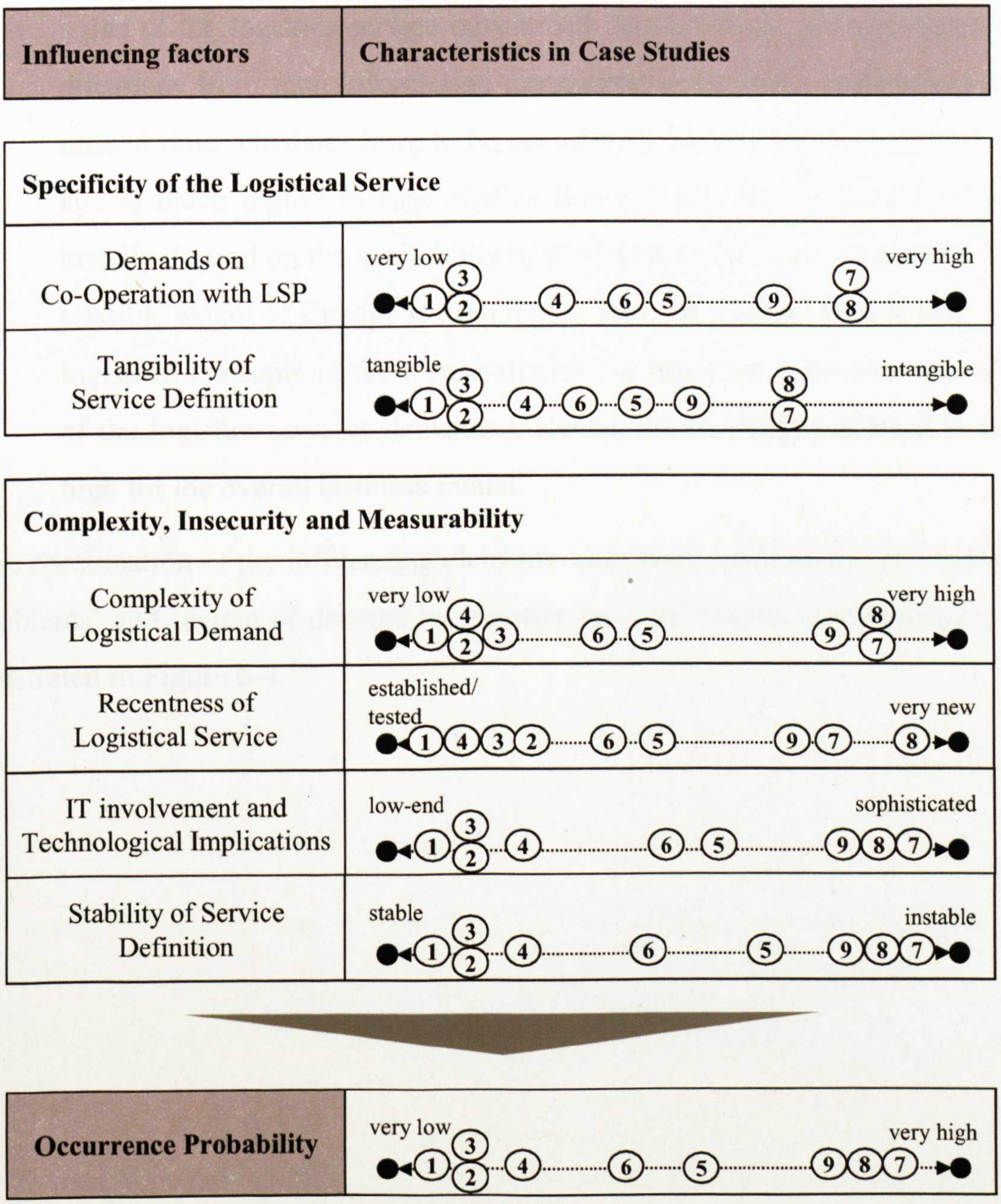

Figure 6-3: Characteristics of the Case Studies: Occurrence Probability of Logistical Problems

- **Extent of damage**: If combined with the extent of the damage, the logistical demand risk can be defined. In case study one, the possible extent of damage is low due to the fast interchangeability of the service providers and decentralised stocks in the shops. The same applies for the case studies two and three, which are based on more standardised, basic services. Case study four also has a low possible extent of damage due to the low value of the logistics service outsourced. Nevertheless, possible legal implications from fund information transported to incorrect destinations and missed time schedules have to be considered. The possible extent of damage is much higher in case studies five and six. Both business models heavily depend on the availability of the logistics services outsourced. The possible extent of damage is even higher for case studies seven to nine. All logistical concepts in these case studies are based on a 100% availability of the logistics services demanded. Hence, the resulting risk level is very high for the overall business model.

The combination of the influencing elements 'occurrence probability of logistical problems' and 'extent of damage by logistics services' results in the portfolio as illustrated in Figure 6-4.

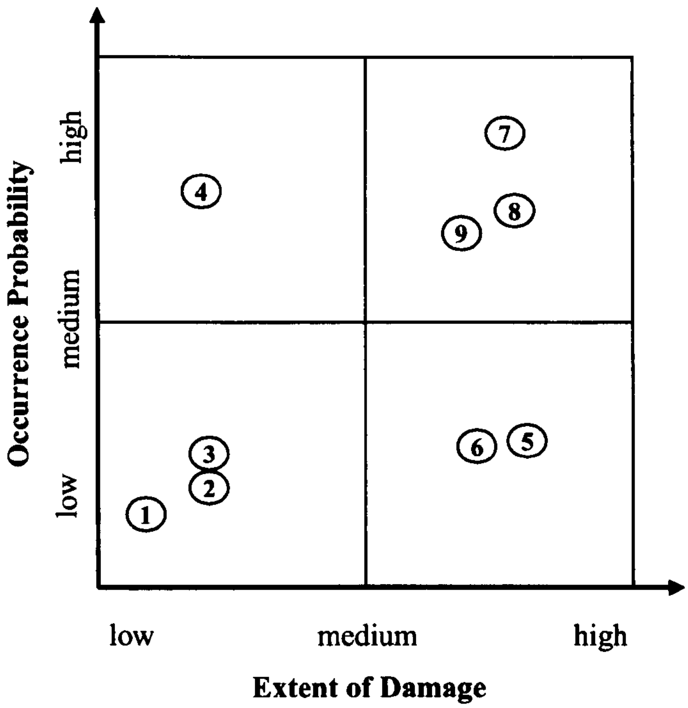

Figure 6-4: Logistical Demand Portfolio of the Case Studies

Figure 6-4 shows the logistical demand position of the case studies. The case studies one, two, and three are positioned as non-critical logistics services. Case study four aligns as an example for bottleneck logistics service. The case studies five and six demand leverage logistics services whereas the case studies seven, eight and nine base their demand on strategic logistics services.

6.2.2 Analysis of the Logistical Supply Structure

To assign the case studies to the logistical supply situation, the market power of the LSP(s) as well as their competencies and their development potential have to be assessed in detail. The characteristics of the influencing factors show significant differences:

- **Market structure:** In the case studies one to five, there are numerous possible LSPs on the market and the market entrance barriers for future additional LSPs is relatively low. Case study six involves a LSP that is specifically developed by the outsourcer to perform its required logistics services. Hence, the potential number of LSPs is slightly restricted. The same goes for the market entrance barriers for potential new LSPs. The case studies seven, eight and nine all involve LSPs that have unique selling propositions (USPs[56]) in their logistics services portfolio and therefore increase their market power by reducing the potential number of LSPs on the market and by raising the market barriers.

- **Specific relation to the LSP:** The case studies seven and six centre on one-on-one logistics relations. This means that the involved LSPs do not have additional customers (buyers of logistics services). Hence, the sales share of the buyer of the logistics services of the overall sales of the LSP is very high. The case studies two and three, four, five, nine, seven and eight are categorised in descending order. The comparison of the activities of the involved LSPs and the in-house capabilities concerning logistics results in the results in the categorisation as shown in the element 'Possibility to produce Logistical Service in-house'. As the final evaluation element, the capacity utilisation of the LSPs were assessed and listed.

Figure 6-5 illustrates the described market power of the LSPs for each case study.

56 The term 'unique selling propositions' is normally situated in marketing theory. In this context, USPs are considered as logistics services or the offering of logistics services that only can be delivered by one specific LSP.

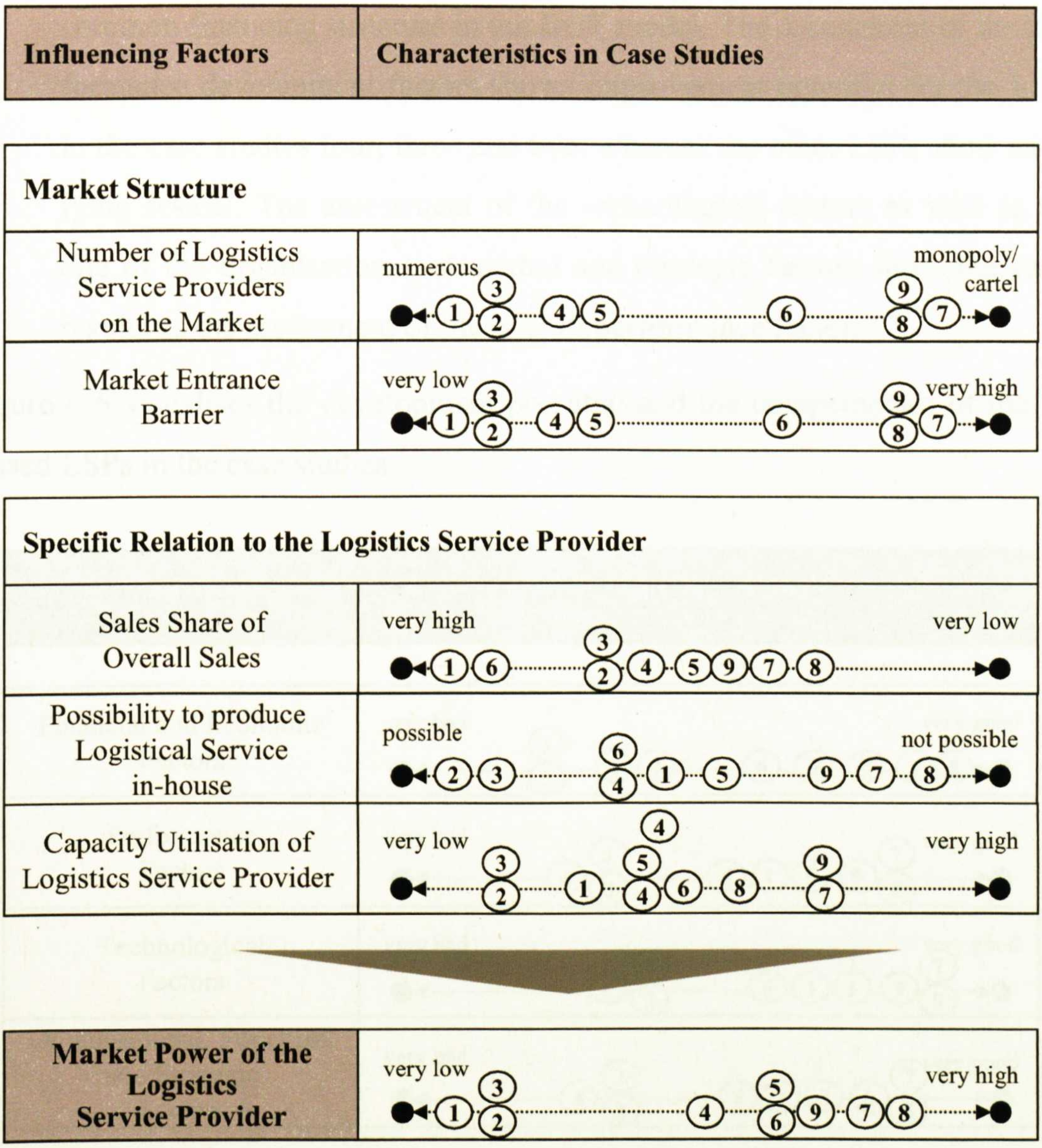

Figure 6-5: Characteristics of the Case Studies: Market Power of the LSPs

To define the logistical supply situation, the development potential and the competencies of the LSPs, and thereby the second axis of the logistical supply, also have to be assessed. In here, the characteristics as well show significant differences in-between the case studies:

- **Development potential of the LSP:** The assessment of the financial situation of the relevant LSPs shows no critical status of any of the LSPs. Nevertheless, to be able to differentiate in-between the economic potentials of the LSPs, the evaluation uses nearly the complete evaluation spectrum. The LSP in case study eight shows the best financial situation due to the common financing structure in the BOT model. The assessment of the performance development factors shows improvement potential for the LSPs in the case studies four, three and two, whereas the other LSPs show satisfying results. The assessment of the technological factors as well as the one of the organisational, structural and strategic factors show the same results as the assessment of the overall performance factors.

Figure 6-6 visualises the development potential and the competencies of the assessed LSPs in the case studies.

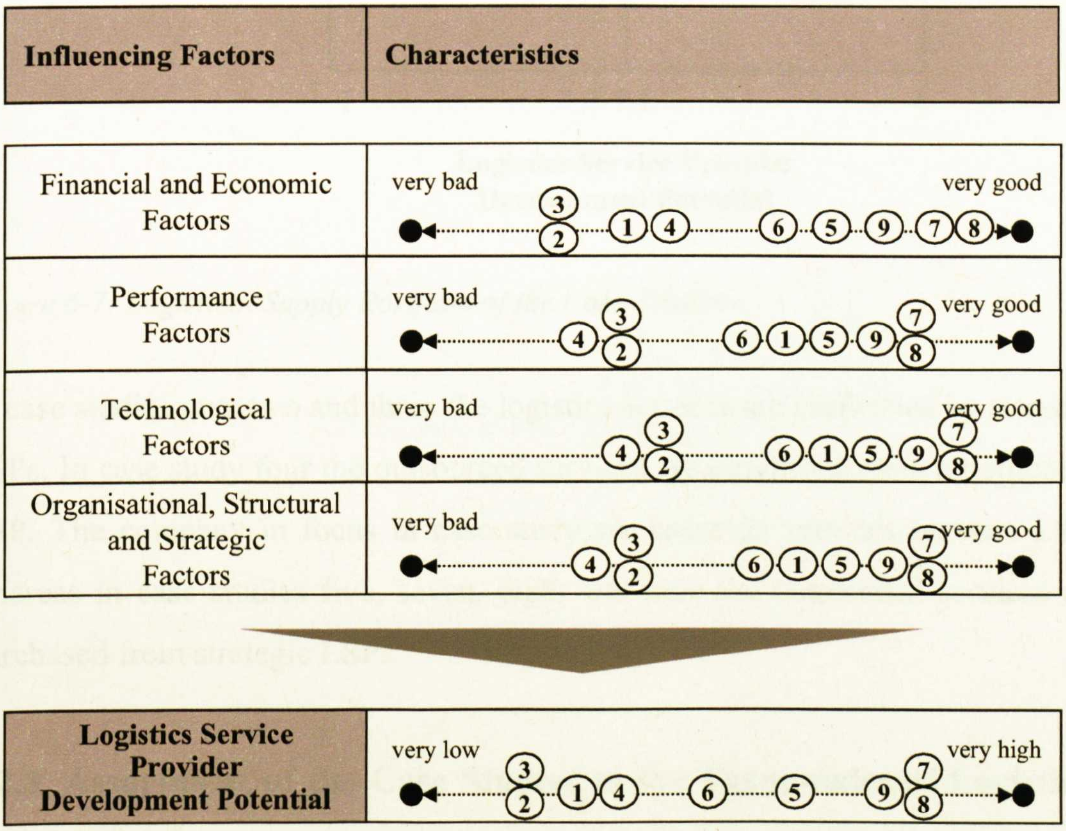

Figure 6-6: Characteristics of the Case Studies: Development Potential of the LSPs

As a result of the assessment of the market power of the LSP as well as the development potential of the LSP, the following logistical supply portfolio can be derived:

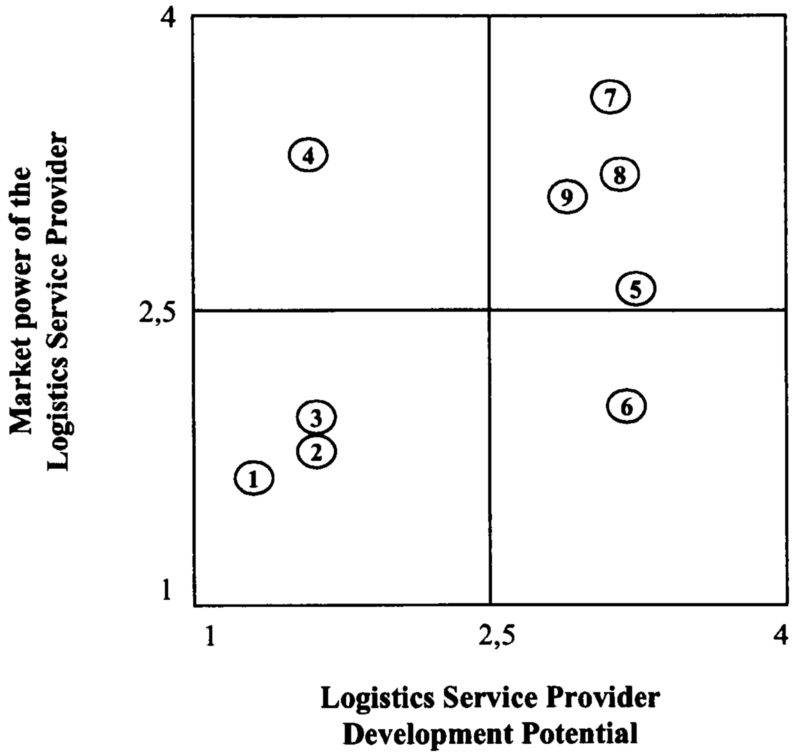

Figure 6-7: Logistical Supply Portfolio of the Case Studies

In case studies one, two and three the logistics services are performed by standard LSPs. In case study four the outsourced services are purchased from a bottleneck LSP. The company in focus in case study six bases its services on core LSPs whereas in case studies five, seven, eight and nine the outsourced services are purchased from strategic LSPs.

6.2.3 Assortment of the Case Studies to the Taxonomies of Logistical Situations

From the above portfolios (Figure 6-4 and Figure 6-7) the logistical demand/ supply portfolio can be derived that allows an alignment of the case studies to the defined taxonomy. The case studies are aligned to the defined logistical situations according to the procedure as explained in chapter 4.3. The respective positions of the case studies in the 2x2 matrices are considered by their assortments to a specific quadrant and not by the mathematical position in the two-dimensional space. Hence, the positioning into a quadrant in the 4x4 matrix is relevant for the further analysis. The respective positioning inside a specific quadrant does not have an influence on the assessment of the logistical situation and the corresponding management approach of the LSPs.

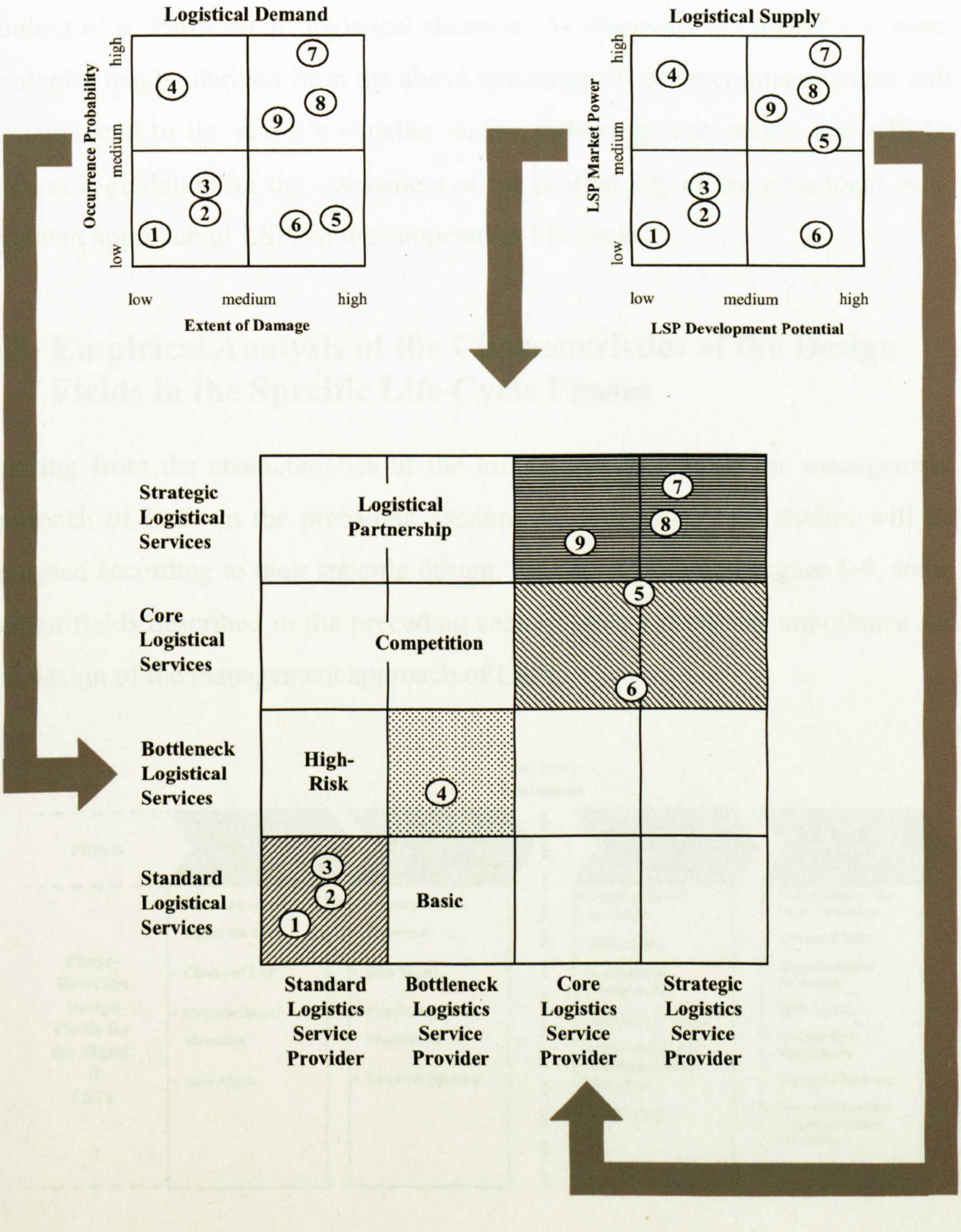

Figure 6-8: Assortment of the Case Studies to the Taxonomy

Figure 6-8 shows the alignment of each case study with a type of logistical situation. The case studies one, two and three are defined as 'Basic' logistical situations. Case study four can be considered as a 'High Risk' logistical situation. Case studies five and six are compared to the norm strategies of 'Competition' logistical situations whereas case studies seven, eight and nine are analysed in the context of a 'Partnership' logistical situation. As discussed in chapter 4.3, norm strategies can be derived from the above taxonomy. These recommendations will be compared to the real-life situation in the following case studies and will be used as a guideline for the assessment of the profitability of the situational management approach of LSPs in the cooperation life cycle.

6.3 Empirical Analysis of the Characteristics of the Design Fields in the Specific Life Cycle Phases

Starting from the characteristics of the influencing factors on the management approach of LSPs in the preceding section, the individual case studies will be analysed according to their specific design. As demonstrated in Figure 6-9, some design fields described in the preceding section have a recurring importance for the design of the management approach of LSPs.

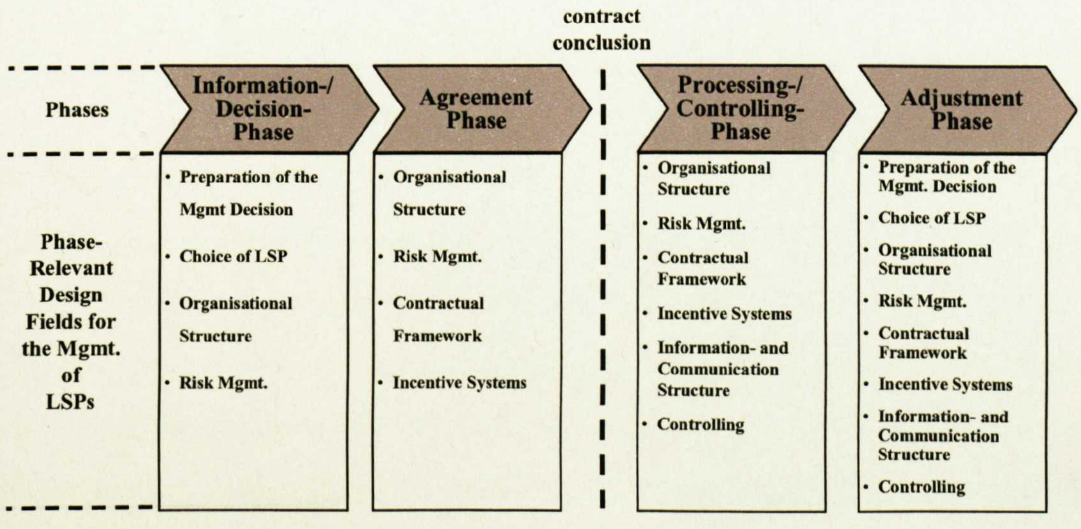

Figure 6-9: Relevant Design Fields of LSP Management throughout the Cooperation life cycle

For example, the risk management has to be adapted and optimised throughout a logistics cooperation life cycle. In the adjustment phase, all relevant design fields have an important influence on the design of the management approach. Due to this effect, the characterisation of the case studies includes a detailed description of the focal phase in which the analysis and the design of the LSP management approach took part.

As demonstrated above, the individual design fields assigned to one life cycle phase are relevant for other phases as well. Therefore, all design fields are assessed for all case studies[57]. Hence, the applicable morphological box of the design fields to be assessed looks as follows:

[57] The design fields are only assessed if enough case study information is available and therefore the database allows detailed statements.

Design Fields	Characteristics of the Design Fields				
Preparation of Mgmt. Decision	Internal Analysis	External Analysis	Logistics Strategy		
Choice of LSP	Direct Awards	Online Auction	Tendering	Concept Competitions	
Organisational Structures	No Organisational Linkages	Interface Models	Team Models		
Risk Management	Dependency and Know-how	Cost Increases	Performance and Hazardous Risk		
Contractual Framework	Input-oriented Contract Design	Output-oriented Contract Design			
Incentive Systems	Passive Approach	Organisational Approach	Active Approach		
Information and Communication	Network Design	Transportation Planning	Execution		
Controlling	Quality	Costs	Time	Auditing	Bench-marking
Closed Loop Control	Back to Phase III	Back to Phase II	Back to Phase I		

Figure 6-10: Morphological Box of the Design Fields to be assessed

In the following section, the case studies will be interpreted within the context of the morphological box. In which cooperation life cycle phase the analysis took part will be indicated and, from this, the relevant design fields will be assessed according to Figure 6-9. Independent of the phases from which the case study data was derived, single design elements from preceding or subsequent cooperational phases are assessed. One example is the organisational structure that is defined in the information- and decision phase which is relevant in each subsequent cooperation phase.

6.3.1 Case Study One: Telecommunication Service Provider – 'Basic' Logistical Situation

Case study one describes a consulting project conducted between 2003 and 2004. The company in focus is a telecommunication service provider that operates as a reseller of telecommunication contracts, accessories and mobile devices to final customers. The telecommunication service provider bases its logistics strategy on an overall aim of product availability in their PoS with a reasonable cost situation. Of importance is the fact that the German telecommunication market reached 100% market saturation and, as such, logistics cost level and product availability are of particular significance.

The initial situation presented in this case study revealed a high vertical range of logistics of the telecommunication service provider. All complex logistics services such as bundling, packaging, warehousing, return processing and repairing are performed in-house. Software-flashing services are outsourced to an external IT provider and the German Parcel Service performs the transport services. The aim of this subproject was an assessment of whether further carriers could be integrated and what the management approach of these LSPs should be.

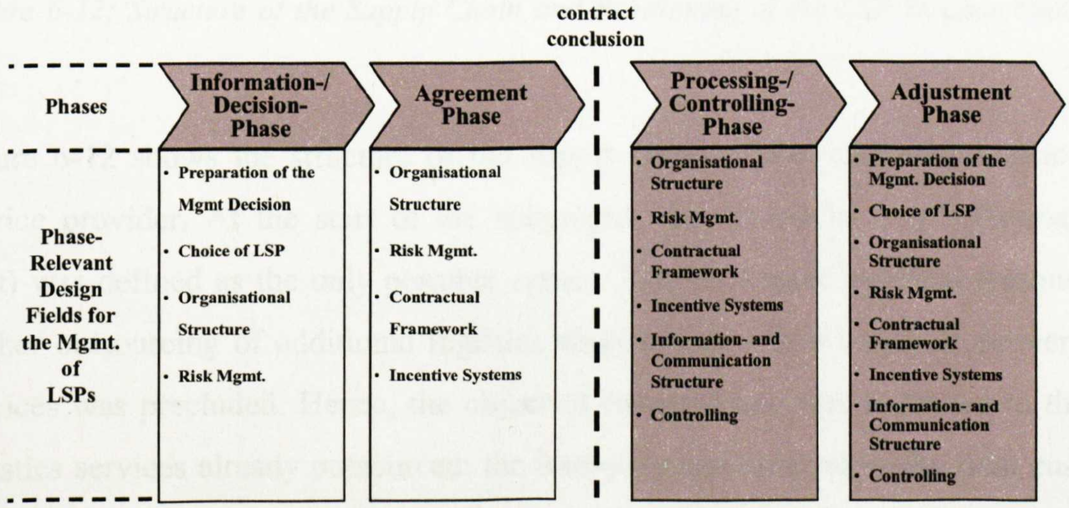

Figure 6-11: Phases in which the Empirical Data of Case Study One was raised

Figure 6-11 shows that empirical data is derived from an existing supply chain structure from which potential new solutions could be assessed. Most logistics services are performed in-house and alternative carriers should be integrated. Throughout the consulting project, data from the processing- and controlling phase as well as from the adjustment phase could be gathered.

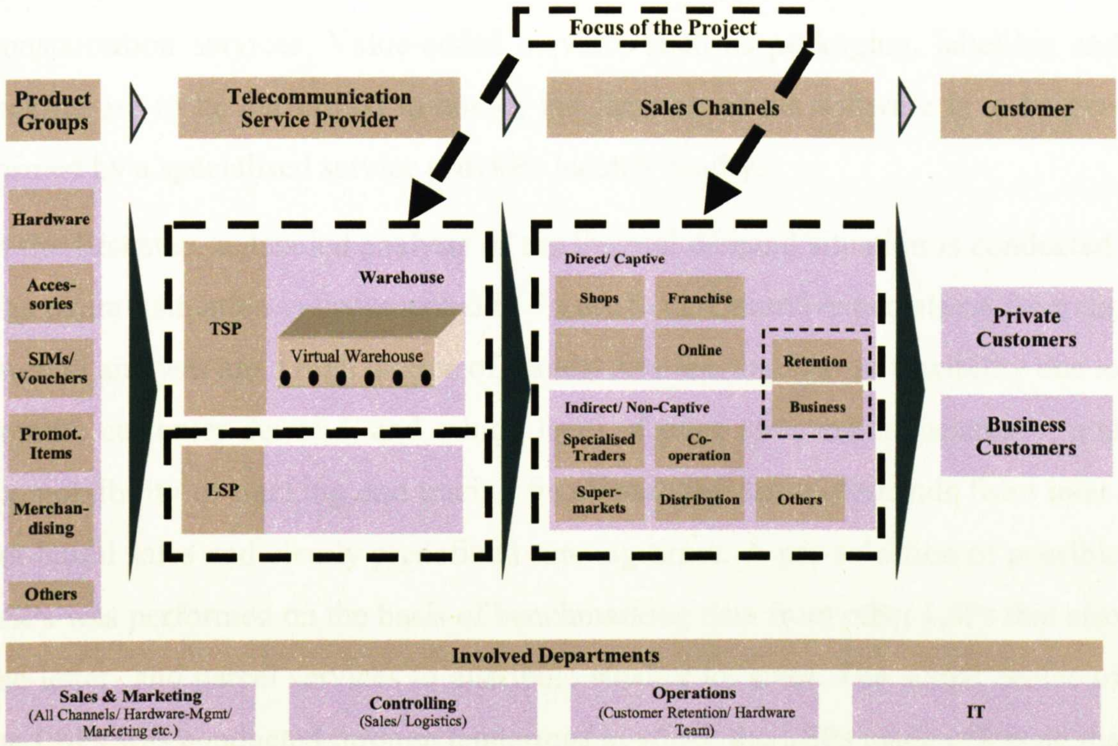

Figure 6-12: Structure of the Supply Chain and Positioning of the LSP in Case Study One

Figure 6-12 shows the structure of the supply chain of the telecommunication service provider. At the start of the subproject, the 'Deutsche Post' (German Post) was defined as the only possible carrier. Due to internal political reasons, further outsourcing of additional logistics services other than transport delivery services was precluded. Hence, the object of investigation was restricted to the logistics services already outsourced: the transportation services to the final customer, including the transportation services that were induced by sales via the online shop and the transportations to their own and franchised PoS.

Hence, in this project, alternatives to the German Post were to be identified an integrated with an aim to spread price risks as well as exploit new saving potentials derived from the deregulation of the German letter and parcel services. These service providers operate on a very integrated level. As system service providers[58] they provide services along the complete transportation chain as well as value-added services. As described above, the project at hand focused the transportation services. Value-added services such as packaging, labelling and picking are to be performed in-house; the flashing of the software is to be performed by a specialised service provider located nearby.

In the first step, a detailed analysis of the internal demand situation is conducted. The overall situation is documented in Figure 6-12. Central expectations from the internal analysis are a high degree of standardisation, significant flexibility due to volatile customer demand, and a high level of price structure transparency, and the possibility of tracking and tracing functionalities due to demands from internet-based sales and clearly predefined running times. A pre-selection of possible LSPs was performed on the basis of benchmarking data from other LSPs that also use letter- and parcel services to distribute smaller lot sizes. The actual choice of the LSPs was conducted through tenderings in which the LSPs made offers on the basis of different quantity scenarios. Finally, two additional LSPs were chosen. Organisational interaction only took part during this bid phase. In later phases, the only interlinkages are defined by yearly re-negotiation cycles. The risk management focuses on the risks of cost increases that are diminished by the direct comparability of the services and the resulting interchangeability of the LSPs. The same applies for performance and hazardous risk.

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[58] 'System service providers', 'third-party logistics service provider' and 'contract logistics' are used as synonyms in this context. These terms are used synonymous throughout the literature (see e.g. Klaus, Kille, 2004: p. 252; Langley, Allen, Dale, 2004: p. 23). Some authors emphasise that 3PLs offer a wider range of services (Wallenburg, 2004: p. 51; van Laarhoven, Berglund, Peters, 2000: p. 426). Nevertheless, practical experience shows an equivalence of the terms.

The contracts were designed on an output-driven basis. Nevertheless, the LSPs have the opportunity to change the actual service production concerning regional solutions or sequences. As a result, improvements in performance and IT structures can be evaluated internally by the LSP and can form part of the yearly re-negotiation phase.

The controlling approach centres on the definition of quality factors (delivery reliability, delivery cycles), cost factors (costs per delivery, costs per return) and time factors (delivery time, return time). The integration of additional service providers with the same service portfolio provided the basis for an ongoing benchmarking systematics.

Overall the 'Basic' logistical situation could be improved. Throughout the choice of the suitable LSP additional standardisation potential of the logistics services in focus could be found, e.g. the standardisation of packaging. Thus, the new LSPs are able to use additional synergies with other orders. The open competitive phase in the choice of the LSP showed all interested parties that ongoing benchmarking processes are possible in future. The risk management could be improved significantly. No risks could be identified in this status. Potential future risks are suspended by the detailed cost controlling approach. Figure 6-13 lists all characteristics of this case study.

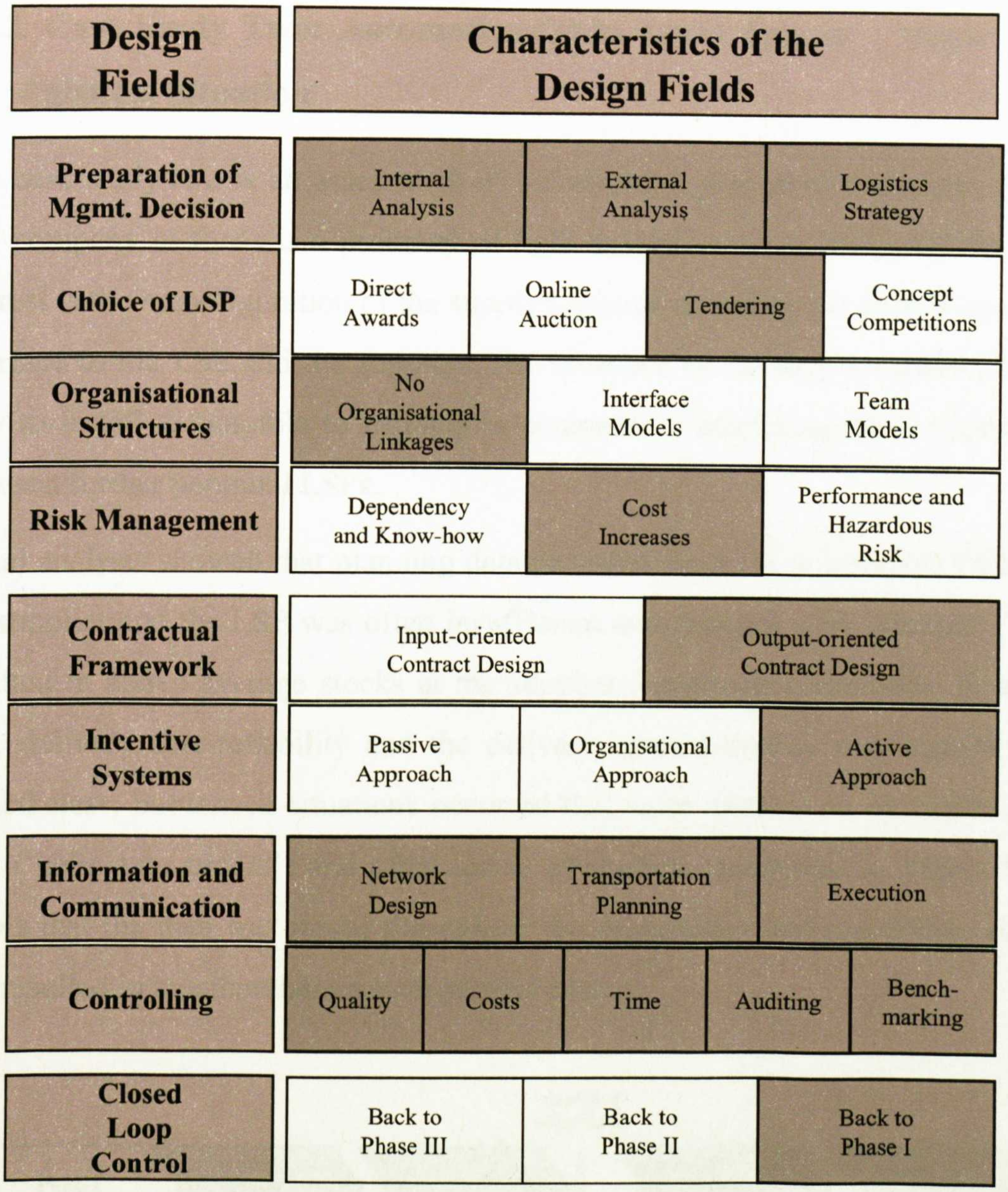

Figure 6-13: Characteristics of the Design Fields in Case Study One

The incentive system is included in the yearly re-negotiation systematics. A yearly workshop is conducted with each of the three LSPs to discuss further improvement potentials in cost, time and quality. These highly standardised logistics services offer potentials in the use of information- and communication structures. Hence, the telecommunication service provider is directly linked to the tracking- and tracing systems of the LSPs and is therefore able to directly track where its products are. This information proved to be highly valuable in the communication with the final customer.

6.3.2 Case Study Two: Automotive OEM Light Trucks – 'Basic' Logistical Situation

The case study two is an assessment of a consulting project conducted in 2003. The company in focus is a producer of light freight vehicles. Here, the field of interest is the reconfiguration of the supply logistics including the definition of an interface to the LSP and the supplier. The interface to the supplier should be as easy to install as possible to maintain a competitive interchangeable market in-between further potential LSPs.

Initial analysis showed that planning data provided from the automotive OEM to the supplier and the LSP was often insufficient and changes were common. This resulted in above average stocks at the suppliers' production facilities. In addition, delivery date-reliability and the delivery amount-quality was insufficient. Nonetheless, bottleneck situations occurred that were worked on by express orders ('helicopter orders') and often led to production interruptions. Figure 6-14 shows that the data was raised throughout the processing- and controlling phase and resulted in a comprehensive adjustment phase.

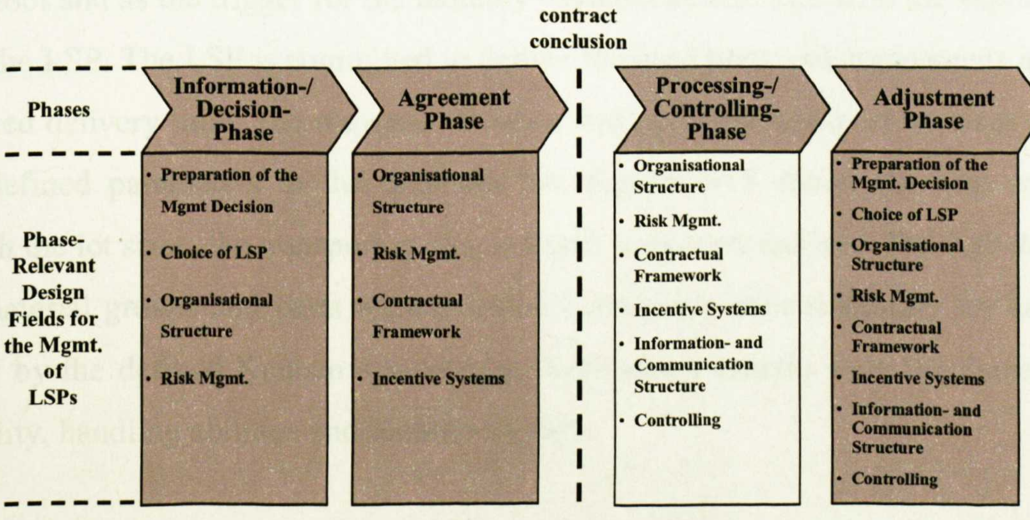

Figure 6-14: Phases in which the Empirical Data of Case Study Two was raised

The above results were conducted in a comprehensive adjustment- as well as in a detailed information- and decision phase. All design recommendations were implemented into a running supply chain concept. Hence, results could be assessed in the agreement phase as well.

The coordination systematics between automotive OEM, the LSP and the supplier was defined as a Kanban systematic. Kanban is a decentralised production steering systematic based on the pull principle. This means that the production of a part or a component is triggered by the usage of a part or component in the preceding production phase. Thus, the starting point for a delivery order is the customer. This management systematic centres on self-management principles of the production functions via clear rules and visual steering elements. Traditionally, Kanban is operated on the basis of information cards. To use the production systematics in the framework of larger distances and a high number of variants IT support was defined. An internet-based interface was developed to follow the above strategy and thus to offer an inexpensive interface to a larger number of potential LSPs and thereby significantly reduce transaction costs. As soon as material is taken out from the Kanban-unit, the supplier and the LSP are informed. This functions on the basis of bar-coding at the Kanban unit. The usage of parts is listed in a daily-actualised database that also functions as the controlling tool and as the trigger for the monthly payment systematics with the supplier and the LSP. The LSP is committed to deliver the used parts and components in a defined delivery time. The transport distance and optimum transport lot sizes are pre-defined parameters in the database list. Figure 6-15 shows the tool with which the lot sizes, the transport cycles and unit sizes were defined. Through this, all material groups and parts were assessed concerning their suitability for handling by the defined Kanban systematics. Assessment criteria were the demand stability, handling abilities and security aspects.

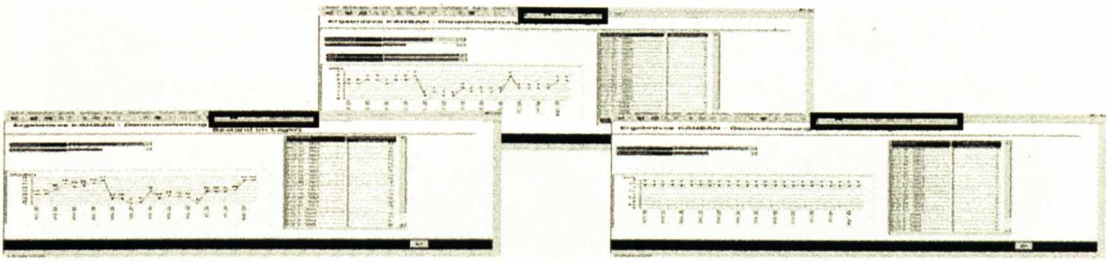

Figure 6-15: Kanban Dimensioning Tool

The delivered units are also scanned. Thereby, direct controlling of delivery dates and delivery amounts becomes possible. The information medium is a configured online portal that holds all relevant data. The organisational structure was oriented towards the ability of the LSPs' personnel to operate the internet-based Kanban management tool. The risk management is thus automated. Over the short- to mid-term, the Kanban tool operates automatically. Management capacities are only required for the re-assessment of the lot sizes or a re-assessment of the suitable material groups and suppliers.

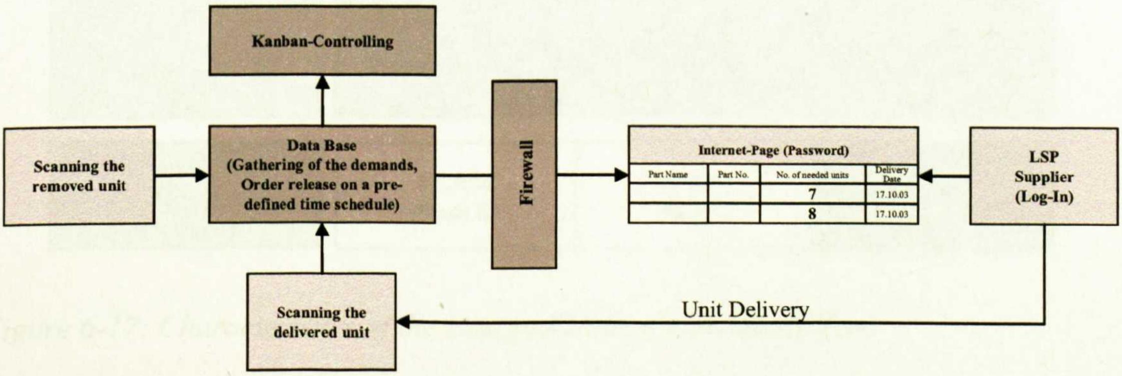

Figure 6-16: Structure of the Kanban-based LSP Management

An output-oriented contractual framework could be designed due to the ease of tracking the logistics services. The contract length is only defined on a mid-term basis and additional competition by further LSPs is allowed. The incentive system for the LSP mainly derives from the development of the IT interface that is transferable to other potential customers and is therefore able to function as a reference project.

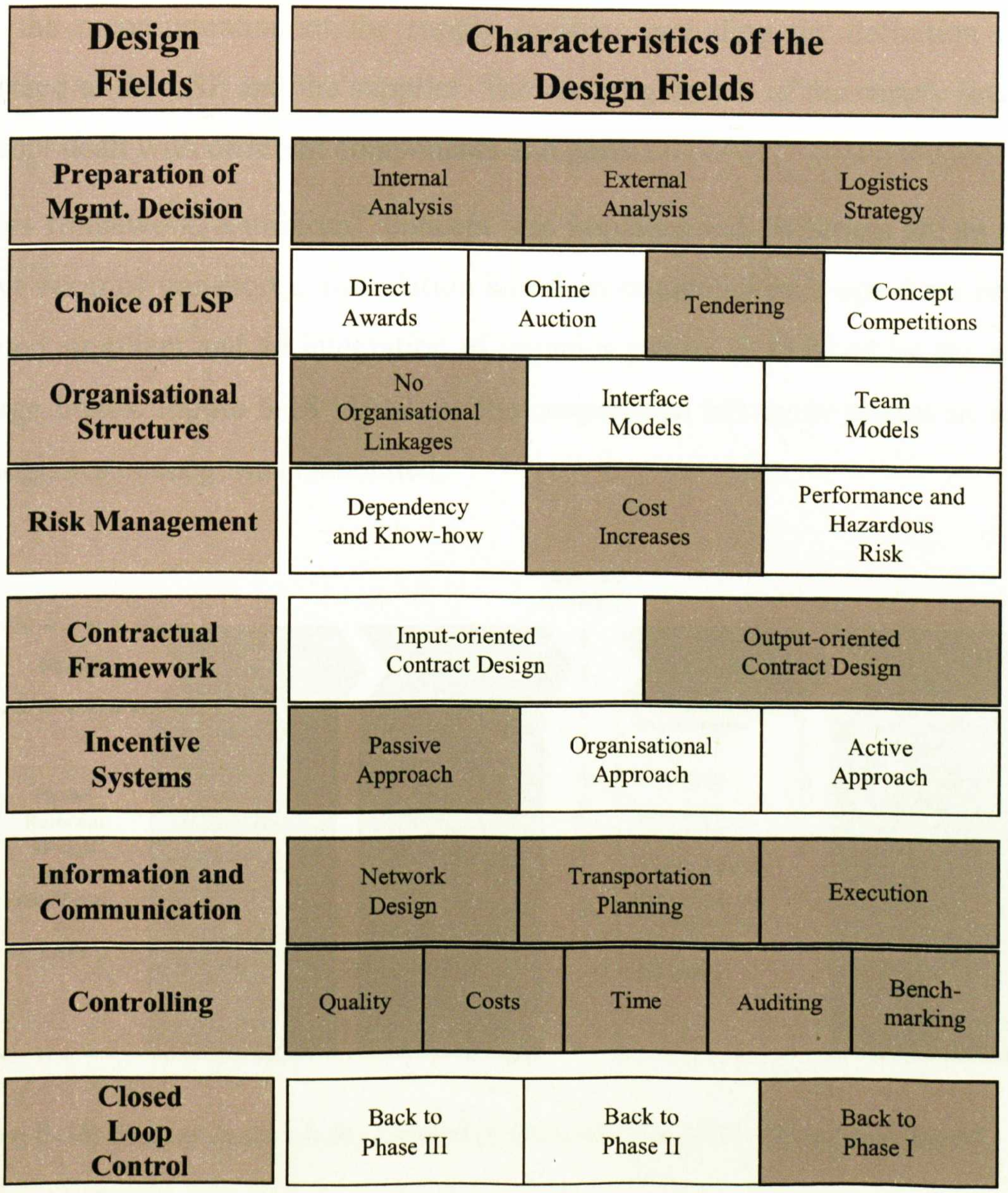

Figure 6-17: Characteristics of the Design Fields in Case Study Two

Figure 6-17 lists the assessed design fields. This 'Basic' logistical situation could be significantly improved by the standardisation of the logistics services in combination with the close controlling approach.

6.3.3 Case Study Three: Automotive OEM Light Trucks – 'Basic' Logistical Situation

Case study three is the assessment of a consulting project also conducted in 2003 for the same producer described in case study two. Here, the field of interest is also the reconfiguration of the supply logistics including the definition of an interface to the LSP and the supplier. The reconfiguration of the supply logistics concept dealt with different components and parts.

In this framework, a milkrun[59] concept was implemented. Milkruns are an alternative form of transport consolidation based on sequential pick-ups from several defined suppliers and an integration of logistics processes induced by the empty storage boxes. Figure 6-18 visualises the cooperation life cycle phases in which the logistics concept was elaborated.

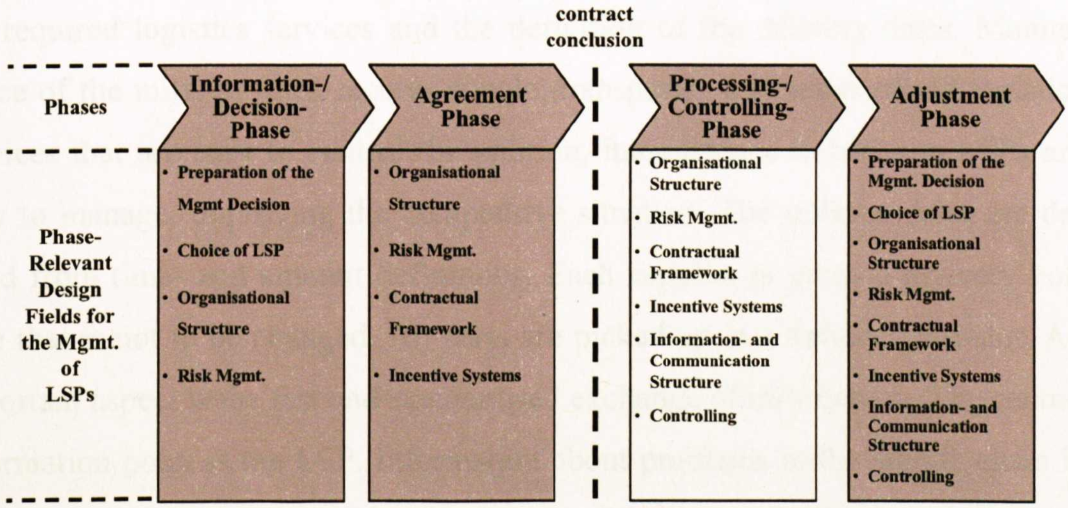

Figure 6-18: Phases in which the Empirical Data of Case Study Three was raised

The initial situation was characterised by a traditional logistical supply concept based on normal consolidation principles. The material flow stemmed from pre-transport, main-transport flow and a decoupled material flow with empty storage boxes. This led to high transportation costs, relatively long transport throughput times (security stocks, several pickings at the consolidation point) and a low delivery reliability. This was due to the definition of sub-optimal delivery dates that were optimised on the basis of the suppliers' needs. The LSP had major

[59] Role model of the milkrun concept is the American milk boy who only delivers milk in the case that he can take away an empty one.

problems due to deficits in the forecast ability of the deliveries. In addition, the LSP was able to define further sub-optimal behaviour in their own transport activities, which required greater efficiency at defined bundling and de-bundling points. Hence, the overall aim of the consulting project was to define a logistics concept that integrates the diverse interests of the involved parties: the automotive OEM, the suppliers and the LSPs in a 'Basic' logistical situation.

The milkrun concept is based on the cancellation of the consolidation point and is characterised by a sequential pick-up from several suppliers and the integration of the empty boxes cycle. Pre-conditions for this concept are the standardisation of the required logistics services and the definition of the delivery dates. Maintenance of the milkrun rules secures simple, transparent and standardised logistics services that are easy to control. In addition, interchanges in-between LSPs are easy to manage, improving the competitive situation. The milkrun rules are derived from time- and amount definitions. Each supplier is given a delivery volume that is not to be changed. All parts are picked up in a defined time-slot. An important aspect is the fast and standardised exchange of information. The central information point is the LSP. Information about problems in the supply chain is to be transferred from the truck driver responsible to a pre-defined counterpart at the OEM's site. Further demands on the LSPs include: the truck size, type of loading of the trucks, transport routes and the ability to keep to the defined pick-up time-slots. The unloading is carried out using cross-docking principles. The components are completely unloaded at an unloading point.

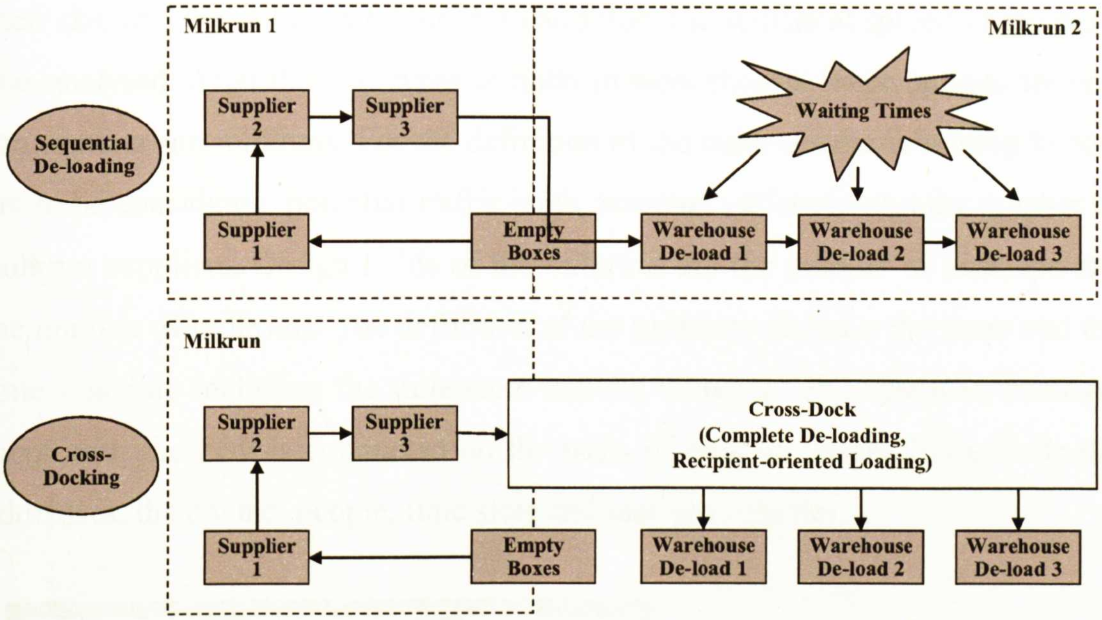

Figure 6-19: Advantages of Cross-Docking

From this point, the components are bundled according to the final points of delivery. This reduces the overall milkrun throughput time. Figure 6-19 shows the basic principle of cross-dockings in comparison to a traditional warehousing. The effort for the cross docking was carefully evaluated with the induced reductions by the milkrun costs. Figure 6-20 visualises the difference from a traditional delivery system to the one managed by milkrun principles.

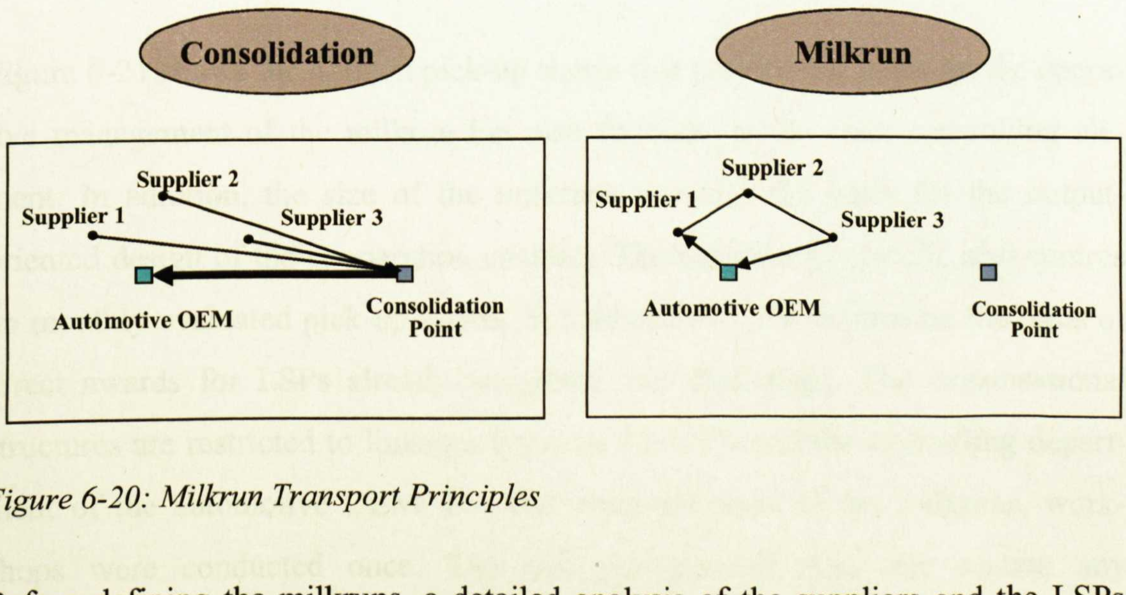

Figure 6-20: Milkrun Transport Principles

Before defining the milkruns, a detailed analysis of the suppliers and the LSPs was conducted. This analysis focused on the regional spread of the components, their size and the volumes required. In addition, the statistical spread of the parts was analysed. After that, the types of milkrun were chosen. Basic options are pre-run or main-run milkruns. For the definition of the milkruns the following factors are to be considered: potential traffic jams, seasonal variations and the number of milkrun suppliers. Design fields of the milkruns are the number of pick-ups and the number of milkruns. The definition of the milkruns includes the route and the time schedule including the time slots and the volumes. The operative management with the LSP is conducted on the basis of pick-up sheets that include the addresses, the contact people, time slots and pick-up volumes.

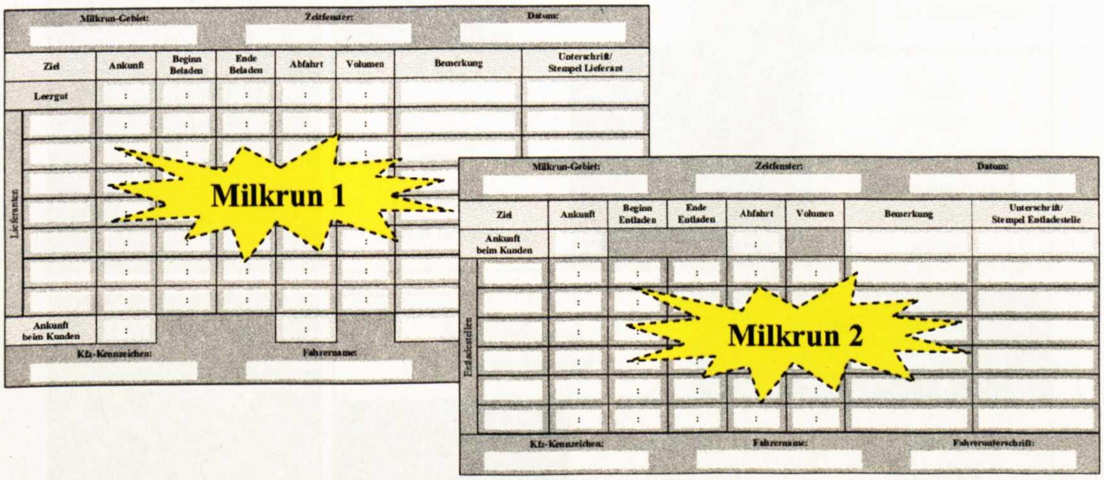

Figure 6-21: IT-based Pick-up Sheets for the Management of Milkruns

Figure 6-21 shows the defined pick-up sheets that provide the basis for the operative management of the milkrun but also function as the main controlling element. In addition, the size of the milkruns provides the basis for the output-oriented design of the cooperation contract. The payment systematic also centres on monthly-evaluated pick-up sheets. Suitable LSPs were defined on the basis of direct awards for LSPs already integrated and tenderings. The organisational structures are restricted to linkages between the LSPs and the controlling department of the automotive OEM. For the implementation of the milkruns, workshops were conducted once. The risk management does not contain any procedures concerning potential dependency risks or risks of expertise losses due to the fact that the management activities are kept in-house. Risks of cost increases are kept at a minimum by the continuous controlling of the IT-based pick-up sheets and the comparability of the logistics services by various interchangeable providers. This also forms the basis for a continuous benchmarking practice.

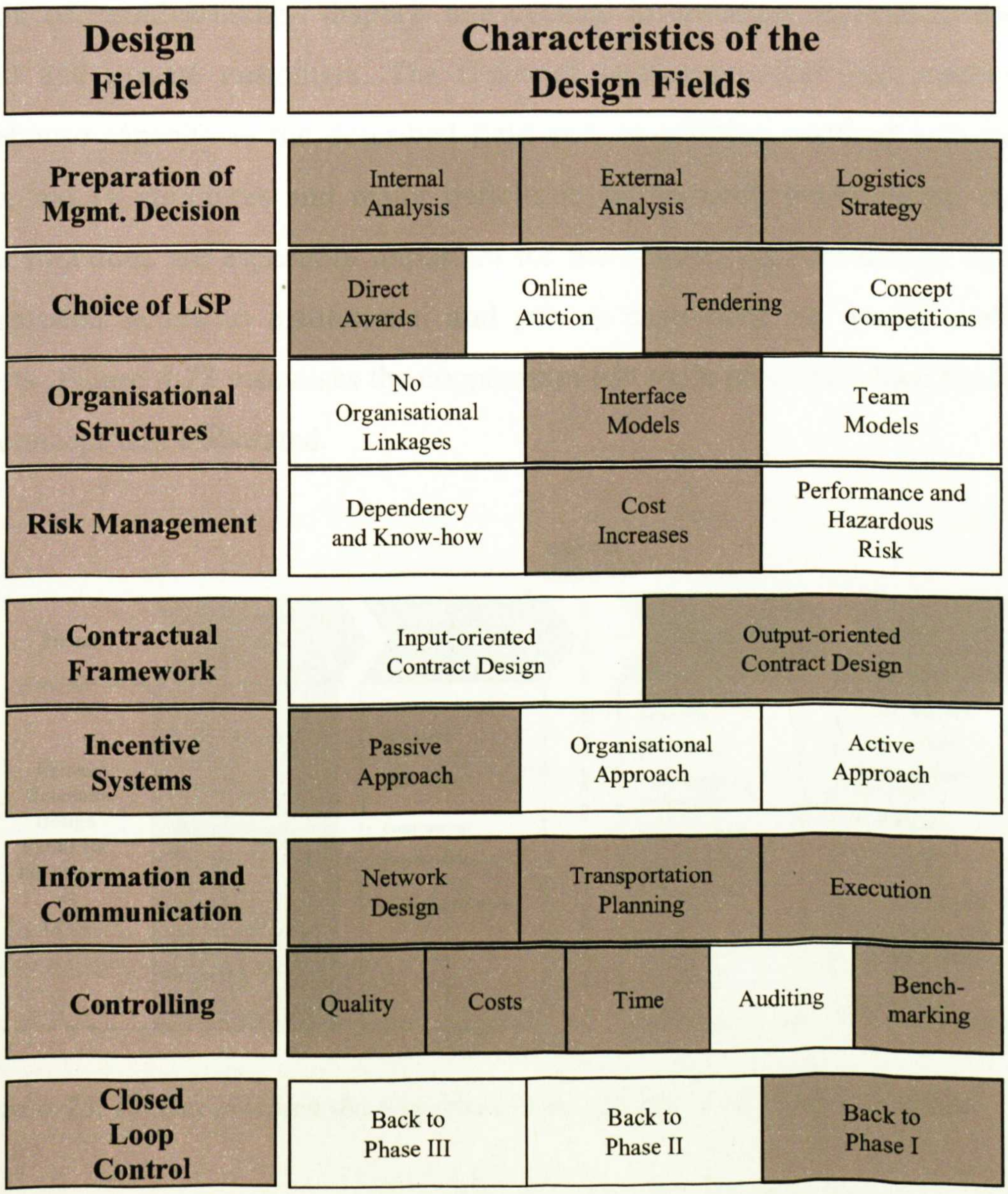

Figure 6-22: Characteristics of the Design Fields in Case Study Three

These milkruns are challenged continually. Possible changes stem from the continuous analysis of KPIs derived from the figures from the pick-up sheets. The underlying control of the milkrun focuses on volumes, weights, sizes and throughput time analyses.

6.3.4 Case Study Four: Financial Services Provider – 'High Risk' Logistical Situation

This case study is a description of a consulting project conducted in 2002 for a financial service provider. Here, the field of interest is the storage and the distribution of its advertising-, display- and cyclical information material to institutional and private customers. The financial service provider had reached its warehouse capacity in the described field and, in addition, worked with inadequate old IT structures and major deficits in the logistics performance. All of these functions are especially important for the delivery of confidential cyclical information letters to institutional and private customers, i.e. yearly portfolio reports. Figure 6-23 visualises the cooperation life cycle phase in which the logistics concept was elaborated.

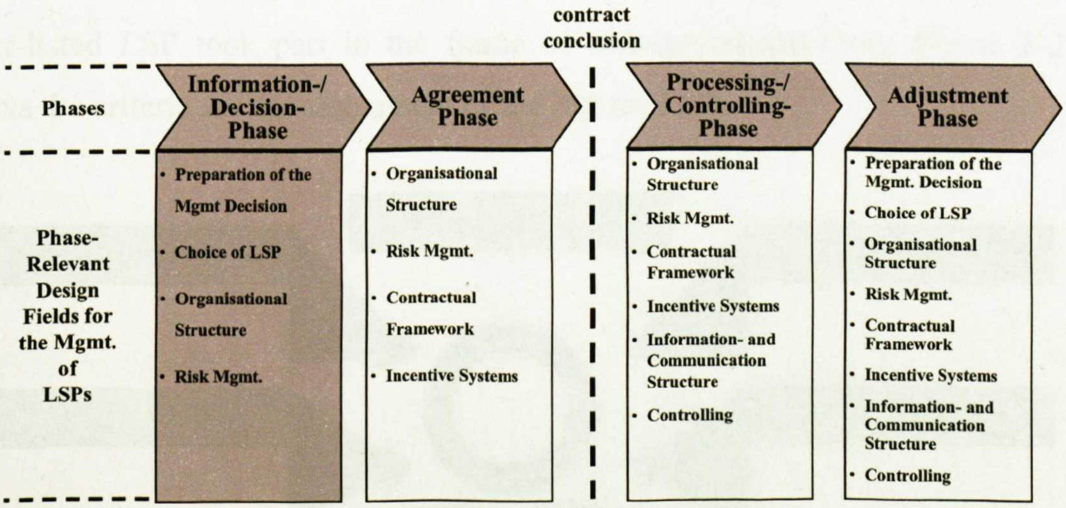

Figure 6-23: Phases in which the Empirical Data of Case Study Four was raised

The project started with a detailed information- and decision phase in which a basic make- or buy decision had to be performed. From this, the vertical range of logistics was derived. The choice of a suitable LSP was conducted using a detailed assessment of the capabilities of the LSPs.

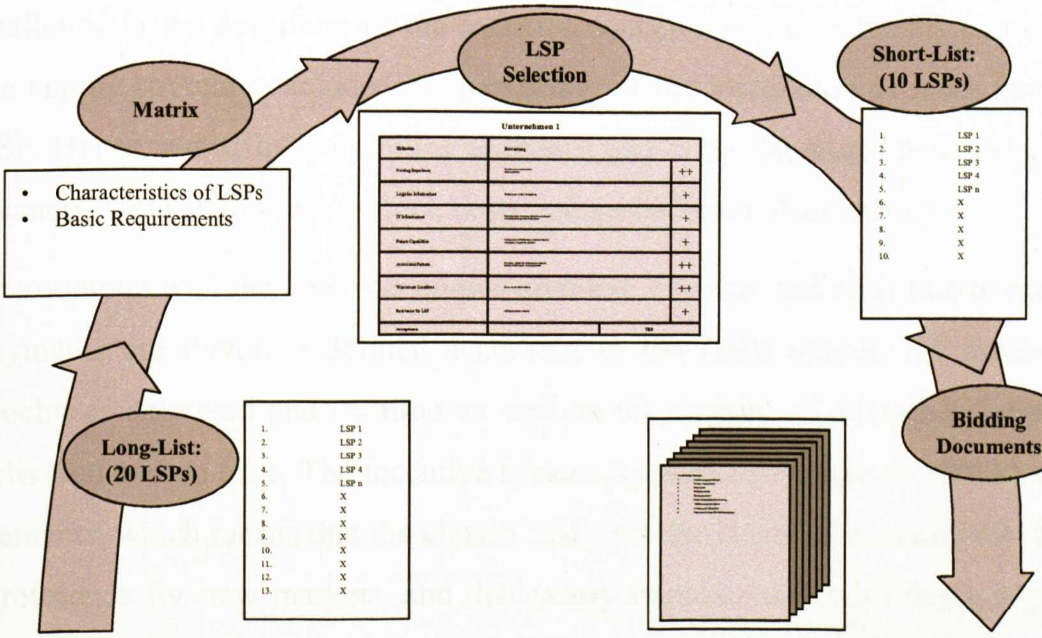

Figure 6-24: Procedure for the Pre-selection of the suitable LSP

Figure 6-24 shows the procedure by which a short-list of LSPs was derived. The short-listed LSP took part in the frame of concept competitions. Figure 6-25 shows the criteria for the assessment of the last ten LSPs.

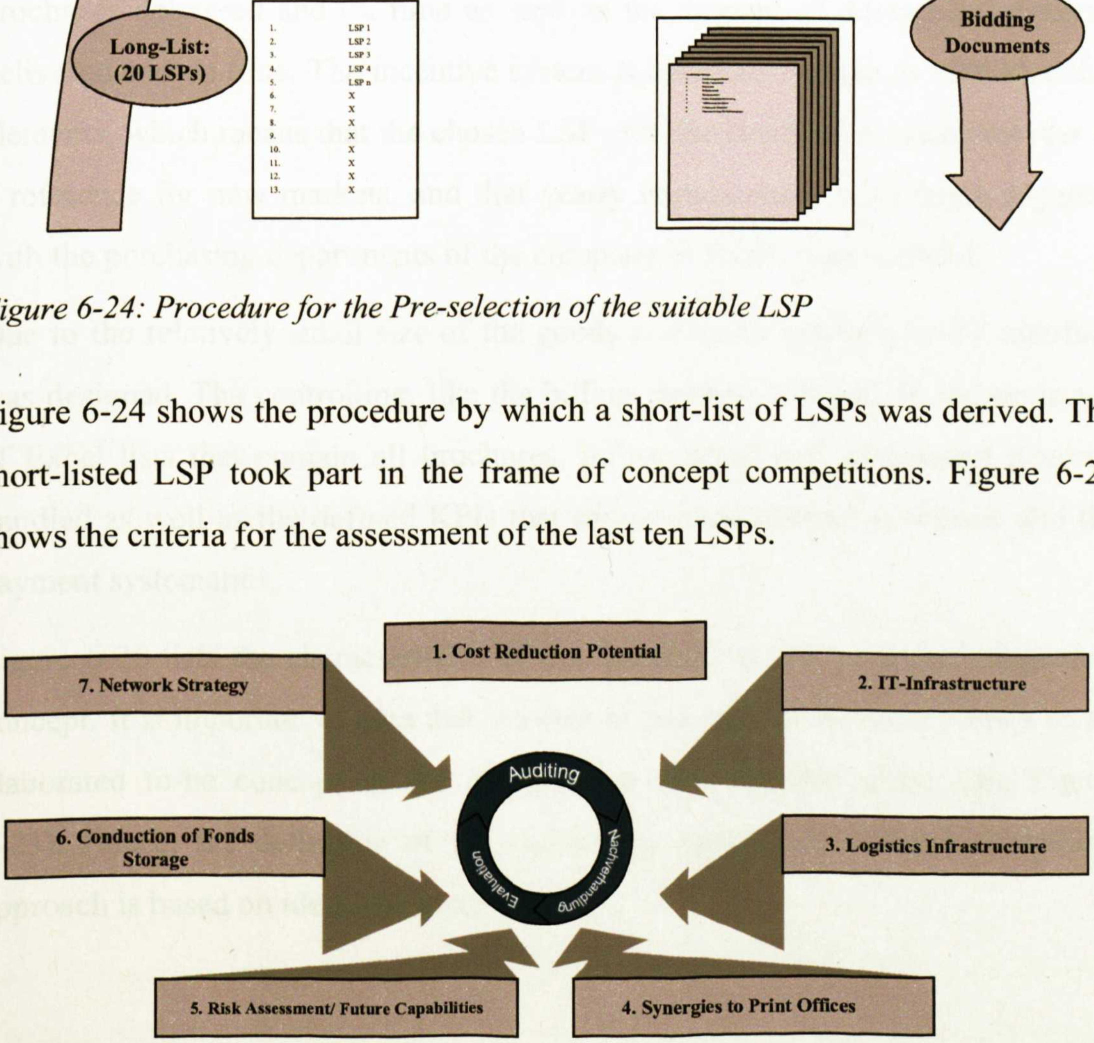

Figure 6-25: Criteria List for the final Choice of the suitable LSP

In the information- and decision phase, the organisational structure was pre-defined in a project organisation, which changed over to a normal controlling interface in the processing- and controlling phase. Hence, no direct organisational interface was defined. The configuration of the risk management was the major challenge in the definition of the logistics concept. The investments required in the supply structure excluded the possibility of the integration of more than one LSP. Hence, a detailed controlling approach had to be elaborated that enables the financial service provider to track cost- and performance developments.

The contract with the LSP was output-oriented. The relevant KPIs that trigger the payments are therefore defined according to the LSPs output: the number of brochures delivered and on time as well as the amount of advertising material delivered and on time. The incentive system is based on passive as well as active elements, which means that the chosen LSP uses the financial service provider as a reference for new markets, and that yearly improvement workshops, together with the purchasing departments of the company in focus, were defined.

Due to the relatively small size of the goods and value handled, no IT interface was designed. The controlling, like the billing, process is based on the exchange of Excel lists that contain all brochures, info-material and advertising material handled as well as the defined KPIs that trigger improvement processes and the payment systematics.

Figure 6-26 lists the characteristics of the financial service provider's logistical concept. It is important to note that the data in this case study mainly bases on an elaborated to-be concept in the information- and decision phase (see Figure 6-23). Hence, the definition of the contractual framework and the controlling approach is based on idealistic assumptions.

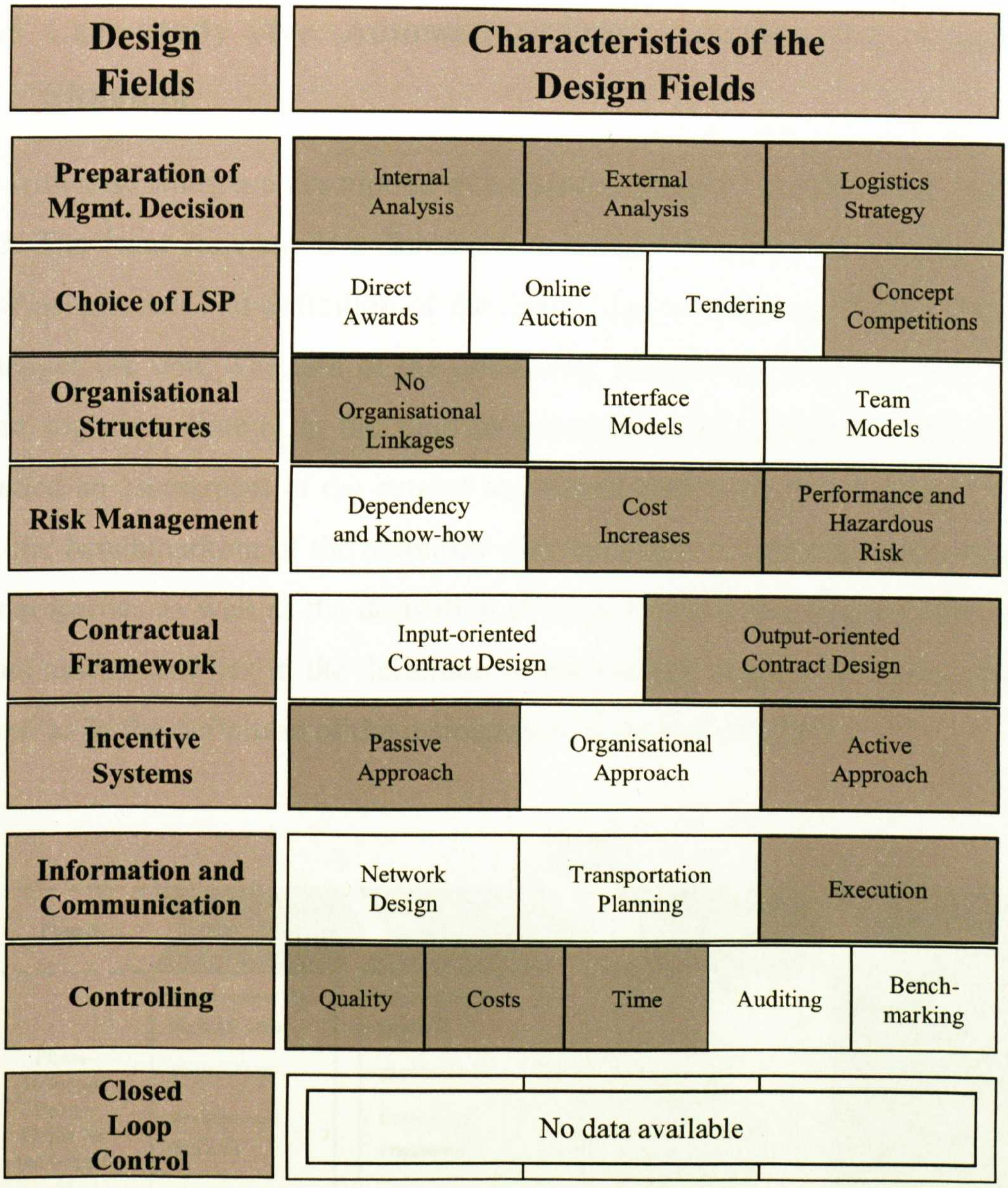

Figure 6-26: Characteristics of the Design Fields in Case Study Four

The case study-specific recommendation therefore is a re-analysis of these management elements after one year in the processing- and controlling phase. Otherwise, there is a substantial risk of cost increases that derive from the fact that the services of the chosen LSP are not standardised and cannot be easily benchmarked with other logistics services inside the financial services providers or externally.

6.3.5 Case Study Five: Automotive OEM – 'Competition' Logistical Situation

The fifth case study is a description of a consulting project conducted in 2002 and 2003. The focal company is a German automotive OEM and the field of interest is the assessment and definition of the future logistics strategy for the complete passenger car unit. The aim of the consulting project was the definition of the future logistics strategy in the field of passenger cars worldwide. The project included an assessment of the current and future challenges in automotive logistics, the benchmarking of the activities with the major competitors and comparable companies as well as the derivation of measures and action plans. The focus in this assessment lies in the definition of the vertical range of logistics strategy as well as in the definition of the management approach of LSPs.

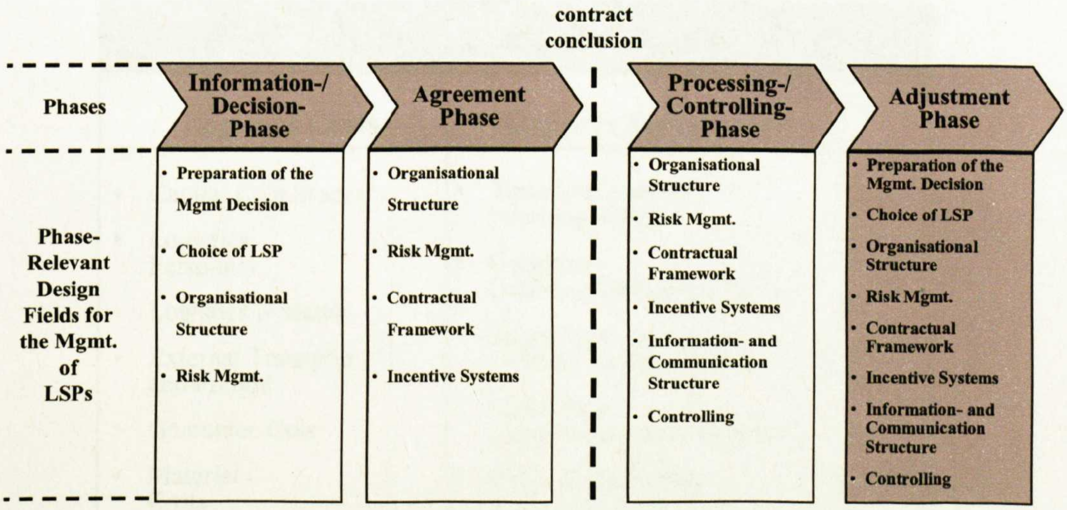

Figure 6-27: Phases in which the empirical Data of Case Study Five was raised

Figure 6-23 shows that in the frame of this logistics strategy all design fields were in discussion. The project started with a detailed assessment of the initial situation of the automotive OEM, the future challenges in logistics and benchmarking with the main competitors. Due to the fact that this automotive OEM cooperates with up to 500 LSPs including more than 50 area LSPs, in this case a basic controlling approach was defined in order to define a basic guideline. All detailed characteristics are to be examined with regard to the overall aims concerning the specific logistical situation in which the relevant part of the automotive OEM is situated (see e.g. case study nine).

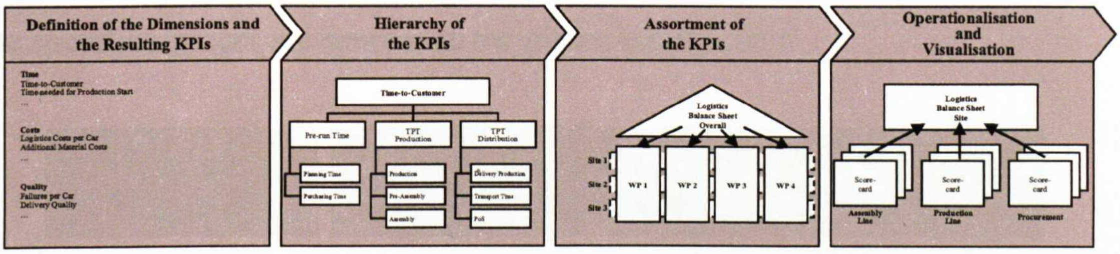

Figure 6-28: Procedure for the Derivation of the Logistics Balance Sheet

Figure 6-32 shows the agreed procedure to derive KPIs with which all logistical processes and worldwide LSPs are to be controlled on the strategic level.

Logistics Balance Sheet			
Logistics Costs		**Logistics Performance**	
• Capital Cost Stocks		• Time-to-Customer [working days]	42
• Logistics Personnel		• Customer-Delivery Reliability [%]	95
• Logistics Systems		• Production-Delivery Reliability [%]	98
• External Transport and Freight		• Flexibility [days before assembly start]	7
• Guarantee Cots		• Order Delivery [%]	98
• Material Costs		• Length of Production Start [Mon.]	4
• Stock Risks		• Technical Changes [working days]	8
• Others		• Wrong Parts [%]	0,8
Sum			

Figure 6-29: Logistics Balance Sheet

Figure 6-29 shows the elaborated logistics balance sheet that functions as the overall controlling tool for the production and logistics management of the automotive OEM. Thereby, a holding-wide benchmarking of the LSP becomes possible. The overall aim of fostering the competitive situation in-between the involved LSP is therefore manageable. On this strategic level, LSPs can be compared and managed independently from the logistical situation from which the specific services are sourced in the global supply chain

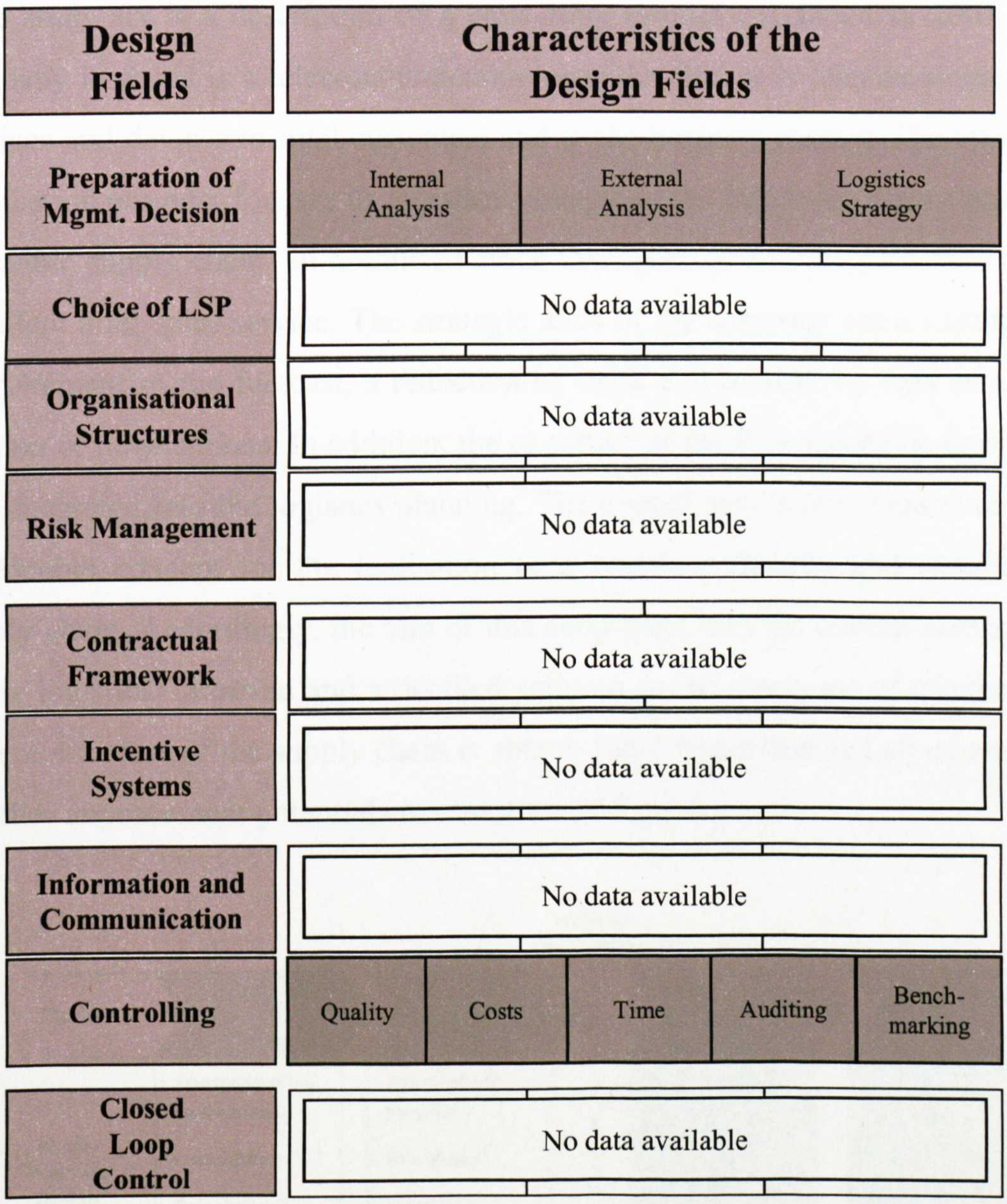

Figure 6-30: Characteristics of the Design Fields in Case Study Five

Figure 6-30 summarises the characteristics of the design fields. In this case study, only the global controlling approach as well as the strategic vertical range of logistics was defined to secure and further improve the competitive logistical situation.

6.3.6 Case Study Six: Telecommunication Provider – 'Competition' Logistical Situation

Case study six is a description of a consulting project conducted in 2005. The company in focus is a telecommunication provider that sells telecommunication services and devices to final customers and to the business market. The telecommunication provider focuses its logistics strategy on the following main elements: a flexible supply chain, an optimised stock management and the provision of an excellent after-sales service. The strategic aims of the company are a sustainable improvement of the forecast, a reduction of stock and returns, as well as a prevention of devaluations. In addition, the expertise of the PoS should be improved and integrated into the logistics planning. The overall aim is the elaboration of a sustainable concept for the realisation of a reactive, flexible and expandable supply chain. Accordingly, the aim of this subproject was the overall assessment of the logistical situation and a detailed solution to the questions of whether the current structure of the supply chain is able to fulfil future demand situations and whether improvement potentials in cost, time and quality exist.

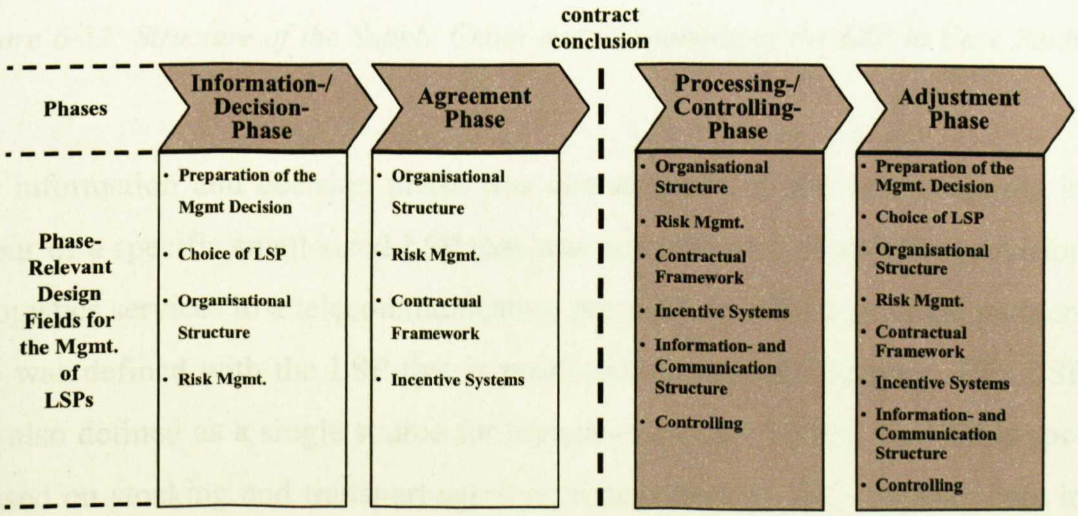

Figure 6-31: Phases in which the Empirical Data of Case Study Six was raised

Figure 6-31 shows that empirical data is derived from ongoing logistics cooperation with a central LSP. Throughout the consulting project, data from the processing- and controlling phase as well as from the adjustment phase could be gathered.

The case study evolved through a redesign of the supply chain, with the integrated LSP as a core element. Figure 6-32 shows the structure of the supply chain of the telecommunication provider in focus.

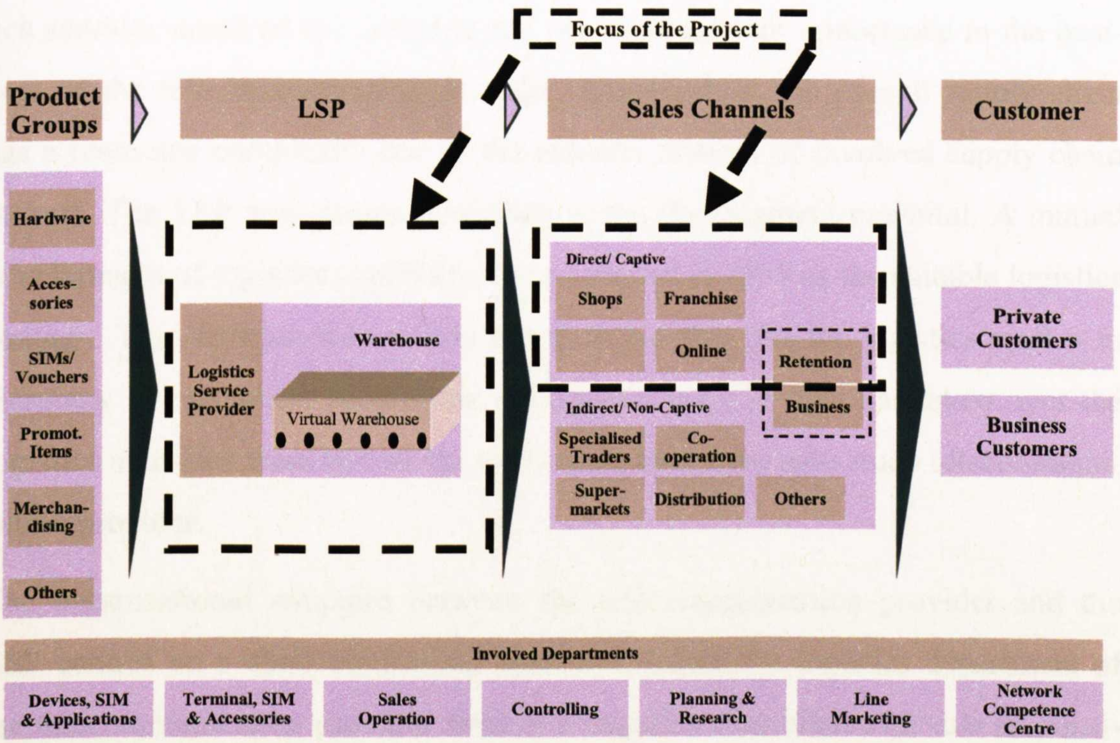

Figure 6-32: Structure of the Supply Chain and Positioning of the LSP in Case Study Six

The information and decision phase was characterised by the early decision in favour of a specific small-sized LSP that was not experienced with the provision of logistics services to a telecommunication provider. In 1998 a strategic partnership was defined with the LSP that is positioned in central Germany. This LSP was also defined as a single source for logistics services. Today, the LSP is specialised on stocking and transport services, repair services and customer care in the telecommunication, IT, entertainment and security markets (TIMES-markets).

The sphere of activity of the LSP is supported by two subsidiaries on an operative level. The first subsidiary is responsible for the complete warehousing, the packaging of the product bundles, and the transport of the products to the end customer or the PoS as well as for the processing of all returns from the end customer or the PoS. The second subsidiary deals with the repair of the mobile phones and the linked after sales logistics. This relates to the exchange of products received from the shops, the traders or the end customer as well as to the reprocessing treatment of returned mobile phones. As a consequence, the logistics services involved are complex and are of significant importance in the business of the telecommunication provider. Nevertheless, the overall supply chain has a restricted complexity due to the reduced number of involved supply chain players. The LSP was chosen according to his development potential. A mutual development of logistics capabilities was selected in 1988 as the suitable logistics strategy. This decision was mainly based on the fact that the logistics market in Germany is very much focused on one specialised LSP that has taken over the logistics activities from two of the main competitors the case study telecommunication provider.

The organisational structure between the telecommunication provider and the LSP centres on a close controlling approach. Inside the logistics department of the telecommunication provider there is a logistics controller with sole responsibility for the monitoring of the LSP's activities. He monitors on a daily basis, the main cost elements, delivery times, the number of dead on arrivals (DoA[60]) and the number of returns. On a recurring basis, employees of the telecommunication provider and employees from the LSPs meet to discuss repeated problems and possibilities for improvement. The forward logistical process is coordinated on a cooperative basis: the internal logistics department coordinates the processes of goods reception, disposition, order management, stock management and stock

[60] 'Dead on Arrival' (DoA) is a term used in telecommunication industry to indicate that a new item was received broken or not fully functional.

securing for the specific PoS. The responsibilities of the LSP comprise the physical reception of goods, the packaging and the pick-up of goods. In addition, the LSP is responsible for the shipment of the goods by external freight carriers. The focus of the risk management is on the day-to-day controlling of the cost and KPI-development. This mainly manages and avoids risks of cost increases and performance decreases. Nevertheless, dependency risks, risks of expertise losses as well as performance and hazardous risks are not touched upon that.

The contractual framework is based on a comprehensive detailed contract that defines all elements of the logistics cooperations. The payment of the LSP is performed on a monthly basis and involves the billing of the goods handled by the LSP. On a quarterly basis, potential savings and performance improvements are mutually assessed in the frame of a supplier workshop. Closely associated with this, the incentive for the LSP mainly lies in the development of additional logistics expertise in the field of telecommunication providers and contextually linked business that they are able to offer separately.

The LSP is directly linked to the online system operated at the PoS and controlled directly by the telecommunication provider's logistics department. This means that the LSP's warehouse is directly linked to the sales system installed in the online shop of the telecommunication provider as well as in the PoS throughout Germany. Figure 6-33 shows the elements of the so-called supply cockpit that links the PoS, the telecommunication provider and the LSP. Within the supply chain, the PoS monitor their day-to-day sales activities, the LSP receives information for the management of his activities, and the telecommunication provider obtains current and future data about sales figures and can therefore improve its purchasing process.

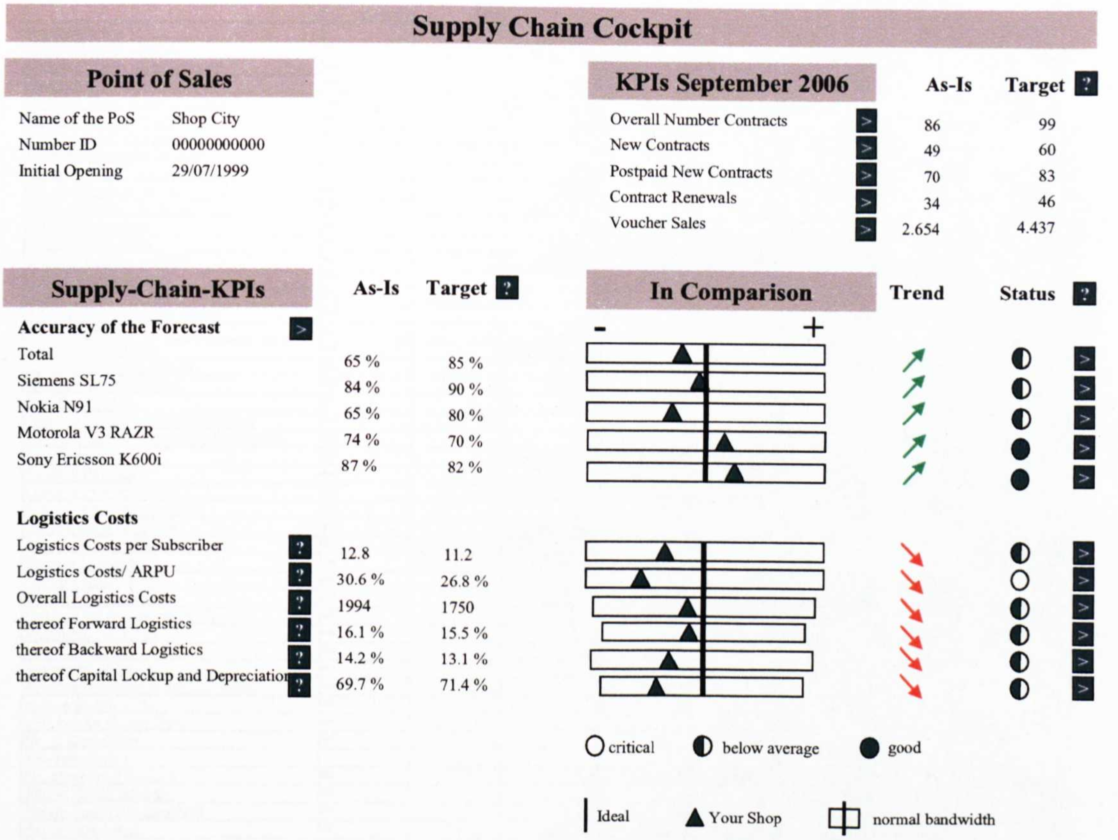

Figure 6-33: Supply Chain Cockpit

The supply chain cockpit allows a very close tracking of the goods and service handled. Figure 6-34 shows the comprehensive list of factors throughout the pre-sales and after-sales process with which the LSP is controlled on a daily basis. These factors are also the basis for the monthly billing and the re-negotiations with the LSPs conducted annually. The controlling factors comprise quality-, cost- and time-related factors. In addition, benchmarking data were drawn throughout the consulting project.

	Indicator	Cmts	Actual	Plan	Forecast	Variance	Variance %	FYTD
Pre-Sales-Prozess								
Goods Receipt Devices			304.470,00	-	-	-	-	863.980,00
Delivery Quality Index Devices			0,83	0,9	0,9	-0,07	-7,78	0,71
Average Stock (No.) Devices			322.947,00	-	-	-	-	303.222,33
Average Stock (Value) Devices			51.774.361,89	-	-	-	-	47.034.553,21
Stock Turnover Devices			0,97	1	1	-0,03	-3	0,9
Warehousing Rate Devices			30,93	30	30	0,93	3,1	34
Einlagerungsquote Geraete			1,09	1	1	0,09	9	1,12
Average Warehouse Utilisation			87,98	100	100	-12,02	-12,02	90,99
No. of Manual Bookings			2.383,00	-	-	-	-	6.646,00
Value of Manual Bookings			-441.089,50	-	-	-	-	-1.254.516,75
No. Of Packagings			114	-	-	-	-	248
Costs of Packaging			79.730,16	63.679,05	70.667,64	16.051,11	25,21	184.099,82
Costs of Packaging FYTD			184.099,82	157.294,20	227.961,84	26.805,62	17,04	-
Error Rate Packagings			3	1	1	2	200	3,41
Quality Index Packaging			0,71	1	1	-0,29	-29	0,7
Average Packaging per Order			4	4	4	0	0	4,6
No. of Orders			74.723,00	62.690,00	61.077,00	12.033,00	19,19	202.119,00
Invoice Value Orders			73.759.611,25	-	-	-	-	194.235.578,79
Cancellation Ratio (Value)			5,64	5	5	0,64	12,8	6,22
Average Orders per Pick			2.770,00	-	-	-	-	2.471,33
Pick Quality Ratio			97,95	100	100	-2,05	-2,05	98,07
Average Duration Order Processing			2,1	2	2	0,1	5	2,25
Average Duration Complaint Processing			4,6	2	2	2,6	130	2,65
No. of Pickings			365.298,00	234.828,62	260.411,34	130.469,38	55,56	908.049,00
Costs of Pickings			681.371,50	500.184,97	554.676,15	181.186,53	36,22	1.647.401,92
Costs of Pickings FYTD			1.647.401,92	1.420.385,12	1.975.061,27	227.016,80	15,98	-
Costs of Pickings per Order			1,87	2,13	2,13	-0,26	-12,21	1,81
Invoice Value Deliveries			71.789.573,33	-	-	-	-	196.828.143,61
Moving Average Value Deliveries			55.618.279,63	-	-	-	-	141.904.733,93
Shipment Devices			309.400,00	-	-	-	-	801.052,00
Delivery Quality Index			93,99	0,95	0,95	93,04	9.793,68	31,95
Costs of the Shipments			1.460.156,63	1.203.406,60	1.306.654,49	256.750,03	21,34	3.601.200,15
Costs of the Shipments FYTD			3.601.200,15	3.205.861,34	4.512.515,83	395.338,81	12,33	6.794.780,91
Shipments per Order			1,72	1,2	1,2	0,52	43,33	1,46
Average Costs per Order			17,79	15,5	15,5	2,29	14,77	15,28
Stockouts/ Backlogs			-	-	-	-	-	-
Average Durchage of the LSP Billing			-	-	-	-	-	-
Invoice Quality Index			-	-	-	-	-	-
LSP Invoice Quality Index			-	-	-	-	-	-
No. of Complaints			-	-	-	-	-	-
After-Sales-Process								
No. of returned Devices			13.857,00	12.274,00	13.598,00	1.583,00	12,9	34.773,00
Return Ration Devices			4,48	5	5	-0,52	-10,43	4,36
Return Ratio RMA Standard			48,16	-	-	-	-	46,56
Return Shipments			7.708,00	5.229,00	5.793,00	2.479,00	47,41	22.610,00
Return Costs Transport			39.175,46	26.143,65	28.963,52	13.031,81	49,85	114.582,24
Return Costs Transport FYTD			114.582,24	69.522,27	98.485,79	45.059,97	64,81	-
Return Costs Handling			74.624,63	70.234,87	76.571,68	4.389,76	6,25	195.286,21
Return Costs Handling FYTD			195.286,21	202.587,79	279.159,47	-7.301,58	-3,6	-
Average Return Duration Overall			15,55	10	10	5,55	55,5	17,63
Average Return Durcation			7,02	5	5	2,02	40,4	8,13
Average Return Durcation LSP			3,25	3	3	0,25	8,33	3
SWAP Devices			19.778,00	16.828,00	18.675,00	2.950,00	17,53	50.677,00
SWAP Costs			291.792,04	264.206,21	293.202,07	27.585,83	10,44	766.613,67
SWAP Costs FYTD			766.613,67	756.214,61	1.049.416,68	10.399,06	1,38	-
Average SWAP Costs per Activity			14,75	15,7	15,7	-0,95	-6,05	15,16
SWAP Ratio			6,72	6,61	6,61	0,11	1,72	6,67
No. of Repairs Devices			2.928,00	2.663,00	2.955,00	265	9,95	7.816,00
Repair Costs			348.628,64	325.456,16	360.076,55	23.172,48	7,12	927.802,66
Repair Costs FYTD			927.802,66	904.671,52	1.264.748,07	23.131,14	2,56	-
Average Repair Costs per Activity			118,07	122,21	121,85	-4,14	-3,39	118,55
Repair Ratio			0,99	1,05	1,05	-0,06	-5,31	1,03
No. of Producers DOA Returns			-	-	-	-	-	-
Value Producers DOA Returns			-	-	-	-	-	-
Damage Ratio at the Time of Delivery			-	0,3	0,3	-	-	-
Damage Value Ratio			-	0,3	0,3	-	-	-
Regress Ratio Retail Markets			-	20	20	-	-	-
Regress Ratio			-	75	75	-	-	-
Average Duration per Damage Activity			39,01	35	35	4,01	11,46	40,48

Figure 6-34: Controlling Factors with LSP

The assessment of this case study displays the following results. The logistical demand structure is complex due to the fact that the logistics services in it are complex and multifaceted. However, the structure of the supply chain is only moderately complex. On the supplier side, about ten different mobile phone suppliers are involved plus a much reduced number of suppliers for SIM-cards, prepaid vouchers, merchandising articles and accessories. The logistical supply structure is a high-risk one due to the single source situation of the LSP and the high dependability of the telecommunication provider's business on the services of the LSP. This results in an unsatisfactory logistical situation. The case-study specific recommendations are the following:

Overall the management approach of the telecommunication provider centres on a very close management approach that spreads the design fields of the management approach of LSPs. Figure 6-35 shows the characteristics of the assessed design fields. The closed management approach is highlighted by the configuration of the contractual framework as well as the controlling approach. This management approach led to a restricted solution-orientation of the LSP.

Furthermore, the single source constellation led to a restricted comparability of the LSP's costs and performance. In addition, the resulting risk situation was insufficient.

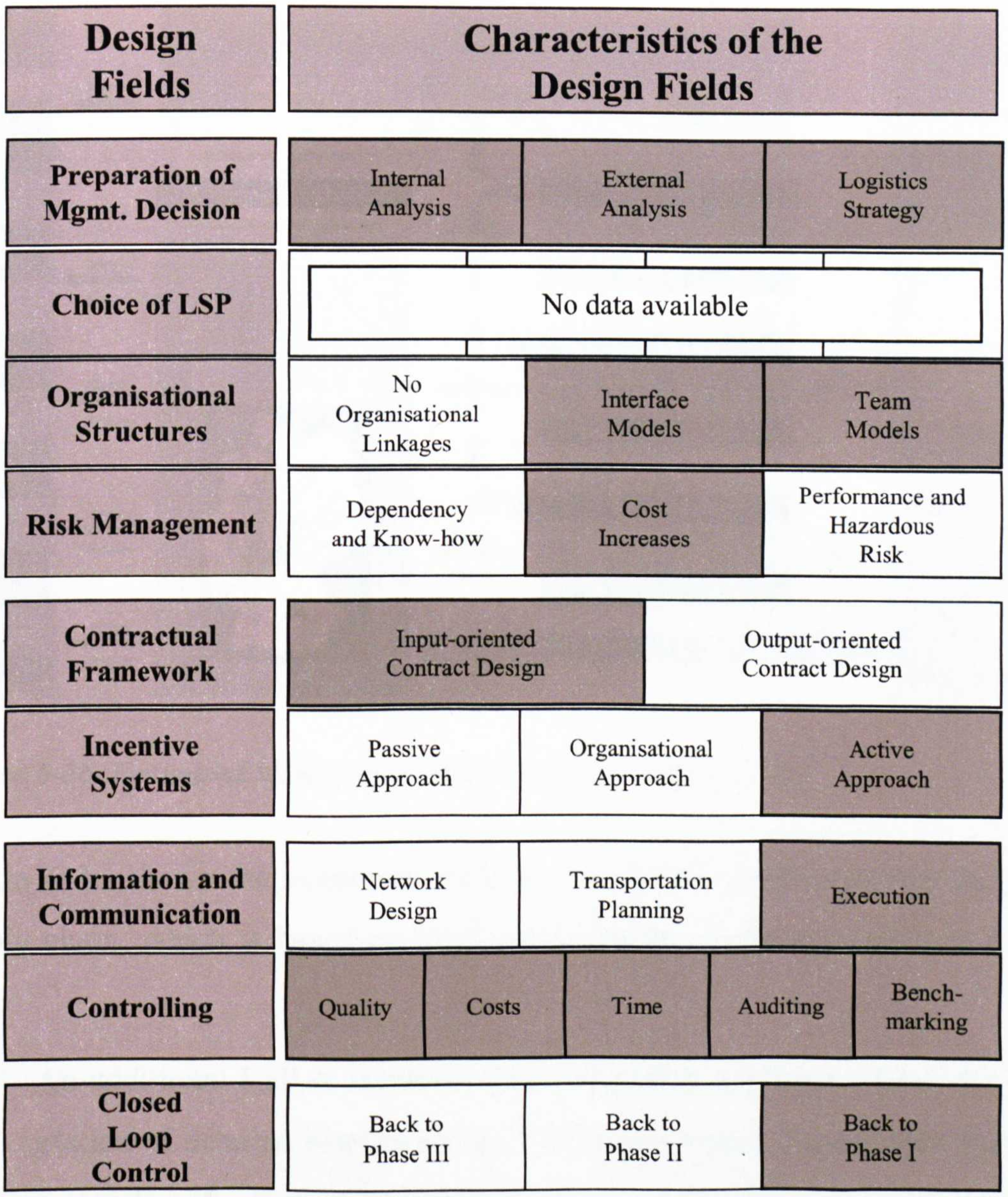

Figure 6-35: Characteristics of the Design Fields in Case Study Six

The above assessment of the case study led to the following case study specific design recommendations which, in turn, resulted in the above changes in the overall supply chain structure.

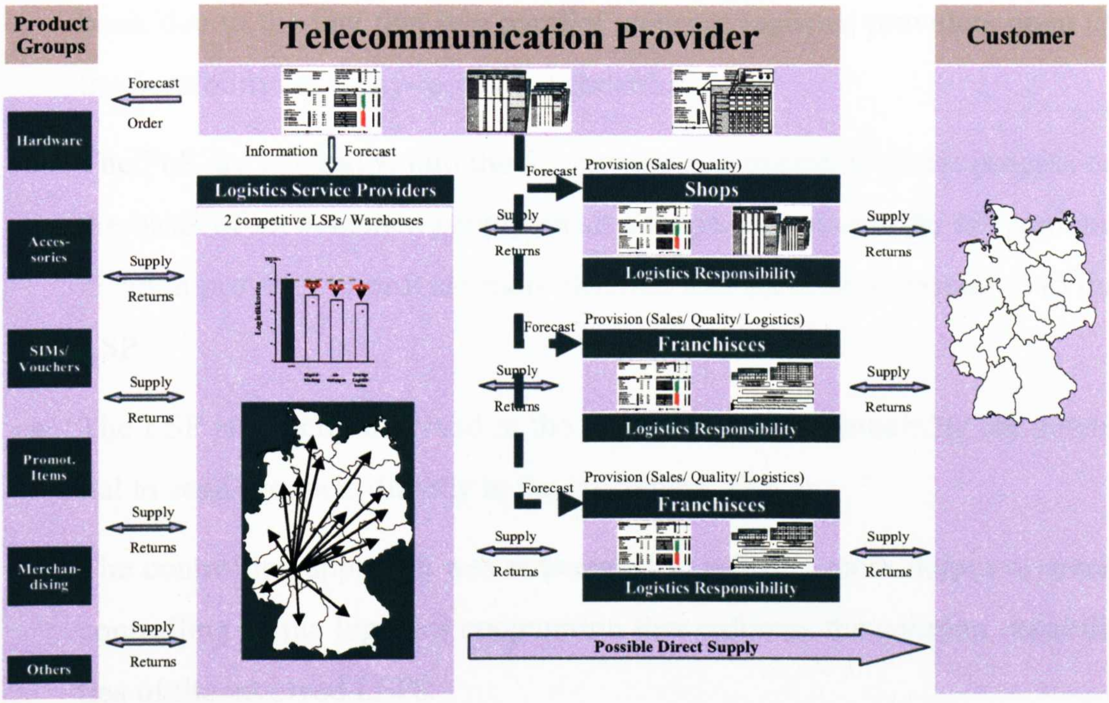

Figure 6-36: Optimised Management Structure of the Supply Chain

Figure 6-36 shows the optimised structure of the telecommunication provider supply chain, which is based on three main changes in the management of the LSP:

- An additional LSP is involved. The controlling approach allows the integration of detailed benchmarking. The single source constellation induced a significantly high risk profile for the overall supply chain of the telecommunication provider. Hence, an audit of the risk management systems of the LSP was conducted as well as the identification of an alternative LSP. In the scenario to be defined, the single source constellation was redesigned based on two involved LSPs. This change in the supply chain structure led to a minimisation of the involved risk. Increases in the transaction costs that were induced by an additional RFQ in the search for a further LSP were more than compensated by lowered prices resulting from an ongoing price competition of the two LSPs involved. Furthermore, the continuous improvement process could be conducted on an improved data basis due to the fact that two parallel working logistics providers open up the possibility for a day-to-day benchmarking.

- The PoS are integrated into the forecasting and overall logistics process on the basis of an extended supply chain cockpit that allows the telecommunication provider to provide more detailed and accurate information to the LSP.
- The LSP is directly involved in the supply of end customers by the potential to send products directly to the customers' homes.
- The controlling approach was redesigned to reflect a more output-oriented controlling of the logistics cooperation that enforces the solution capabilities of the involved LSPs.

To sum up, the aim of this case study was to induce a 'Competition' Logistical Situation that allows the telecommunication provider to improve its risk situation by a second source, to improve the comparability and the benchmarking abilities and to foster the exchange of logistical expertise between the involved partners.

6.3.7 Case Study Seven: Automotive OEM Light Trucks – 'Partnership' Logistical Situation

Case study seven is the description of a consulting project conducted in 2005. The focal company is an automotive OEM in the field of light trucks and vehicles. The company aims at an improvement of its continuous and unbuffered supply of the production. The overall project target is the elaboration of a supply chain concept that allows for production-sequence oriented supply of the production. The consulting project was challenged with the definition of the cooperation concept with the automotive OEM and the definition of the integration approach of the pre-defined LSP.

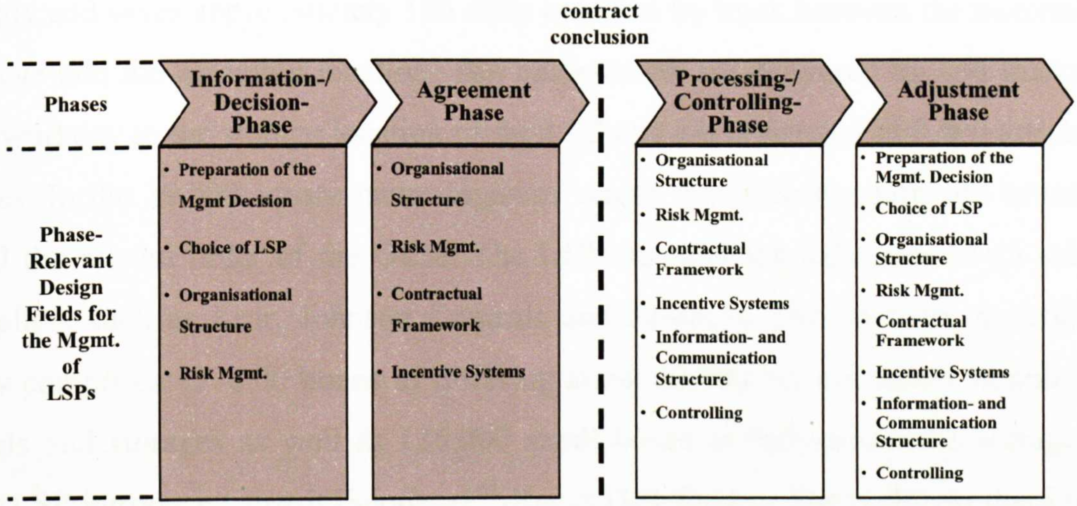

Figure 6-37: Phases in which the Empirical Date of Case Study Seven was raised

Figure 6-37 shows that the empirical data is derived from a case in which an existing concept was optimised and newly configured. Throughout the consulting project data from the information- and decision phase as well as from the agreement phase could be gathered. The case study evolved through a redesign of the supply chain with the pre-defined LSP.

The information- and decision phase was characterised by a pre-definition of the LSP. The LSP has been working for the OEM for 15 years in a partnership constellation. The LSP was integrated in the elaboration as well as in the financing of the new logistics project. The required investment summed up to 40 million euro. Hence, the internal and external analysis was conducted beforehand in which the assessment of existing LSPs resulted in the preference of an experienced LSP that is experienced in the processes of the automotive OEM and for which no new organisational interlinkages had to be defined. The vertical range of logistics strategy is defined for the complete automotive group: logistics is defined as a non-core element. Therefore, there was no need for the evaluation and choice of additional LSPs. The logistics services required were defined precisely: the LSP collects the needed assembly parts (from screws to components) and secures the sequence-oriented transfer of these parts directly into the production line of the OEM via a new bridge. The direct interlinkage allows a weather-independent supply and saves approximately 130 daily transfers by truck between the material storage and the assembly location. The components are delivered by 130 trucks per workday to the storage location of the LSP and are registered in 8,400 article codes. In the 19,000 square metre logistics centre the assembly parts are stored until the release order of the OEM. The LSP manages the deliveries of 15 sub suppliers such as Lear, Johnson Controls and Faurecia. The complex material flow comprises 157,000 boxes of differing sizes: 22,000 big containers in pallet hotels and storages as well as 135,000 small boxes in fully-automatic storage. The LSP introduced Just-in-Sequence[61]-Racks (JIS-Racks). For each part there is a different rack in which the parts and components are commissioned.

The organisational structure between the LSP and the OEM is centred on the organisational interlinkages. It is important to note that the organisational structure operates on the precondition that the LSP functions as a single point of contact with the OEM, which means that he bundles the interlinkages to the first tier suppliers. Every interlinkage works on continuous improvement principles[62] (CIP): at the workers' level, there is a weekly meeting to discuss continuous improvement potentials for the linked processes between LSP and OEM. The risk management activities are based on a comprehensive controlling approach. The activities of the LSP are steered by an open-book policy. This enables the OEM to track all cost developments directly. Quality developments are directly trackable due to the direct interlinkage to the final assembly section of the OEM.

In the agreement phase, the open-book policy was made the fundamental element of the cooperational contract. The major element in this case was the definition of

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[61] 'Just in Sequence (JIS)' is a further progression over Just In Time. Not only are the parts used for production delivered just when they are needed, they are also delivered in the correct order, i.e. in the same sequence as the sequence of the manufacturing orders.

[62] 'Continuous Improvement Process (CIP)' is also known as Kaizen (Japanese for 'change for the better' or 'improvement'. The concept is closely associated with the Toyota Production System. CIP aims to eliminate waste, e.g. activities that add cost but do not add value.

the future IT structure between the LSP and the OEM. Both parties are directly linked via SAP R/3. This system also functions as the single point of contact between the OEM and its integrated sub-suppliers in the logistics centre. The system steers the JIS-Racks that release the parts according to the direct release orders of the OEM. The incentive system relies on two factors: first, this reference project functions as a major marketing tool for the LSP and second, the LSP can take a direct share in the savings of logistics costs.

Assessment of this case study shows that the logistics demand structure is very complex. The logistics services handle the majority of the components required for the final assembly and therefore handle major parts of the value adding of the OEM. In addition, the investments needed in the assets, organisational and IT structures lead to only one LSP being integrated on a long-term basis. Hence, the logistical supply structure is a high-risk one due to this pre-defined single source constellation.

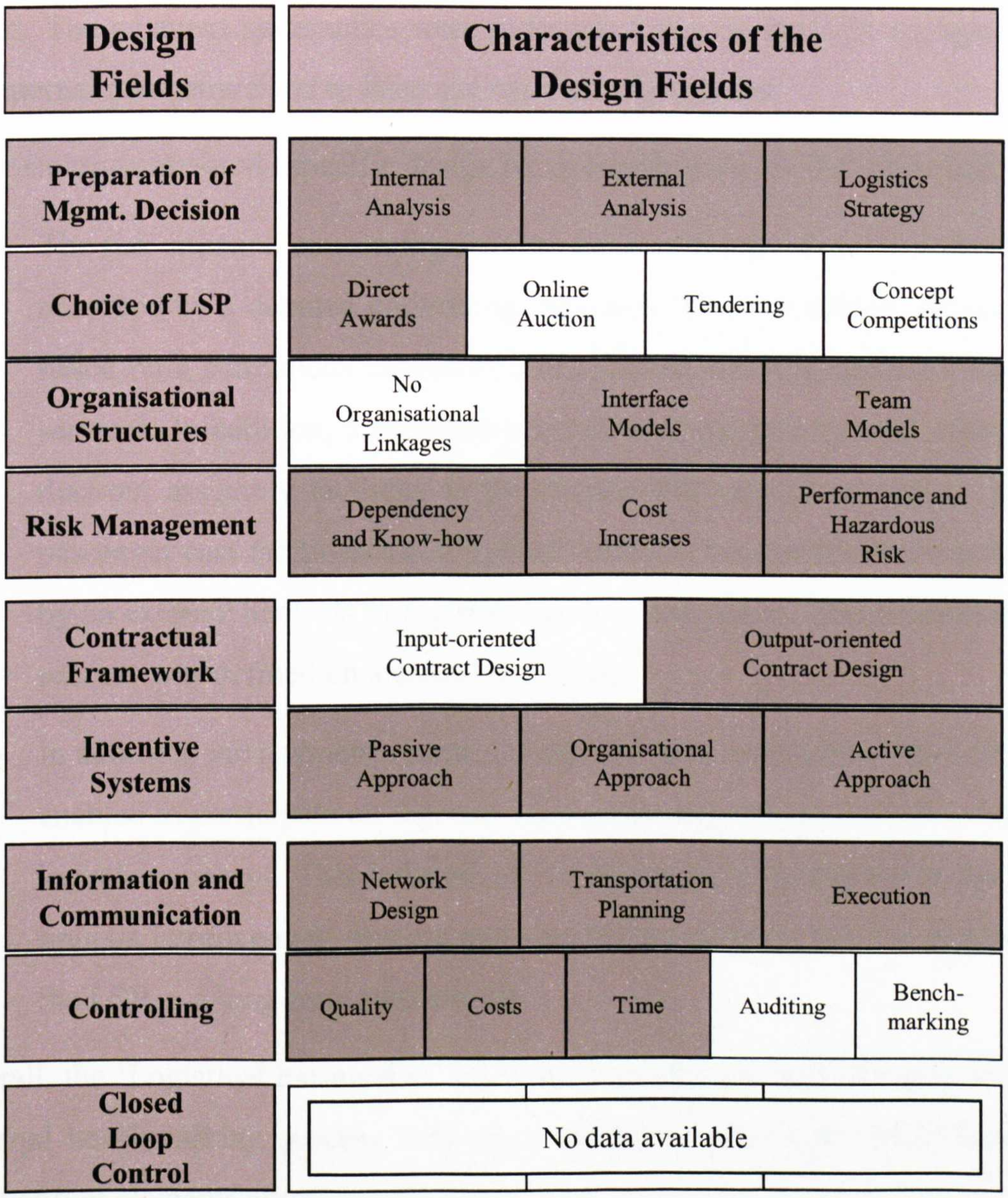

Figure 6-38: Characteristics of the Design Fields in Case Study Seven

As described above, the single source constellation was predefined due to the high investments needed into the infra-structure. In combination with the long-term business relations to the existent LSP and the mutual trust between the co-operational partners the logistics contract was handed out by a direct award.

A specific situation for the risk management was developed due to the fact that there was no exit possibility from the single source constellation. Therefore, a more detailed controlling approach with an output-oriented design was conceptualised. The payment systematics were redesigned to give the LSP enough room for internal manoeuvre and to keep savings partially internal.

The resulting case-study specific design recommendations are the following:

- The risk situation concerning cost increases and dependency risk has to be absorbed by a detailed controlling approach. This controlling approach is based on a continuous comparison of received services and the billing of services. In addition, a continuous benchmarking process with other production/ assembly facilities in the commercial vehicle as well as in the passenger cars facilities was triggered. External benchmarks were gathered by an external analysis of logistics services and prices. This benchmarking process was defined on a continuous basis.
- In addition, the payment system for the LSP was redesigned. The LSP was enabled to participate on logistics savings throughout the overall assembly logistics concept. This induced an improvement participation in the continuous improvement process and secures the problem solving abilities of the LSP in a long-term relationship.

Overall, the 'Logistical Partnership' logistical constellation was strengthened. An external benchmarking process with other company parts of the OEM kept the competition elements alive.

6.3.8 Case Study Eight: Automotive Supplier – 'Partnership' Logistical Situation

Case study eight describes a consulting project conducted in 2002. The company in focus is an automotive supplier in the field of car locking systems. In this case, the ordering parties of the consulting activities were the automotive supplier as well as the pre-defined LSP. Together, a BOT (Build-Operate-Transfer) concept should be elaborated and implemented. The initial situation was determined by an intense cost pressure on the automotive supplier's side and by a need for an improvement in flexibility. In addition, the capital structure should be optimised, i.e.

the balance sheet should be shortened by a reduction or cessation of further investments into fixed assets. Hence, a BOT model should be elaborated that is founded by the automotive supplier, the LSP and involved financial institutes in a separate legal unit. Therefore, the needed investment, the calculatory costs (stock costs or risk costs) can be reduced and the commercial risk can be lowered.

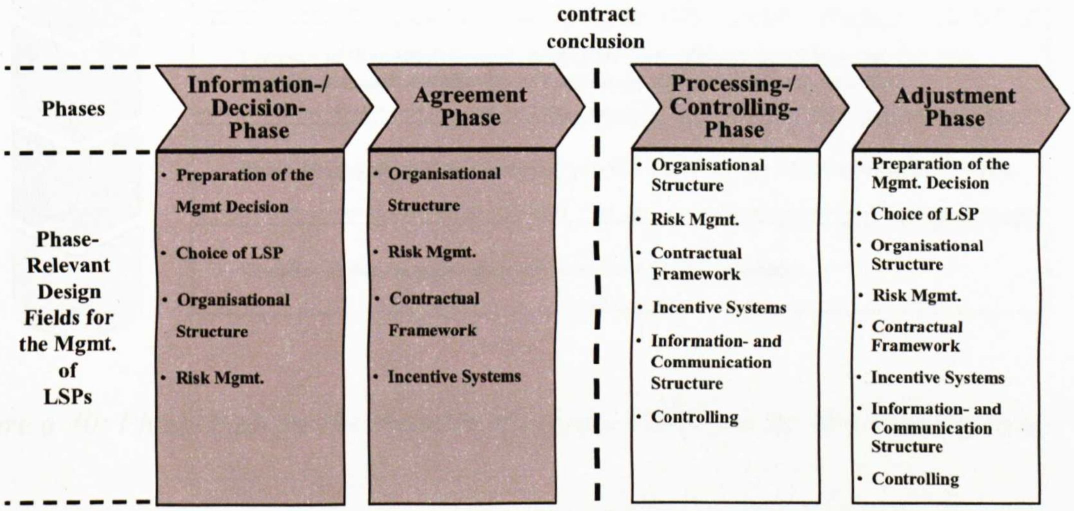

Figure 6-39: Phases in which the Empirical Data of Case Study Eight was raised

Figure 6-39 shows that the empirical data stems from a case study that was newly elaborated on a green field. In a first step the initial situation was assessed by an analysis of the legal, financial and logistical situation. The tier one automotive supplier faced increasing competition and financial-driven targets to reduce the capital lock-up. In addition, the logistical performance demanded from automotive OEMs was so high that in-house logistics services could not cope. The result of the analysis phase was the agreement that a step-by-step set-up of the BOT had to be chosen primarily due to the complexity of the logistical concept and the widespread effects of the concept on the automotive supplier. The set-up of the BOT was designed in a four-phase project plan.

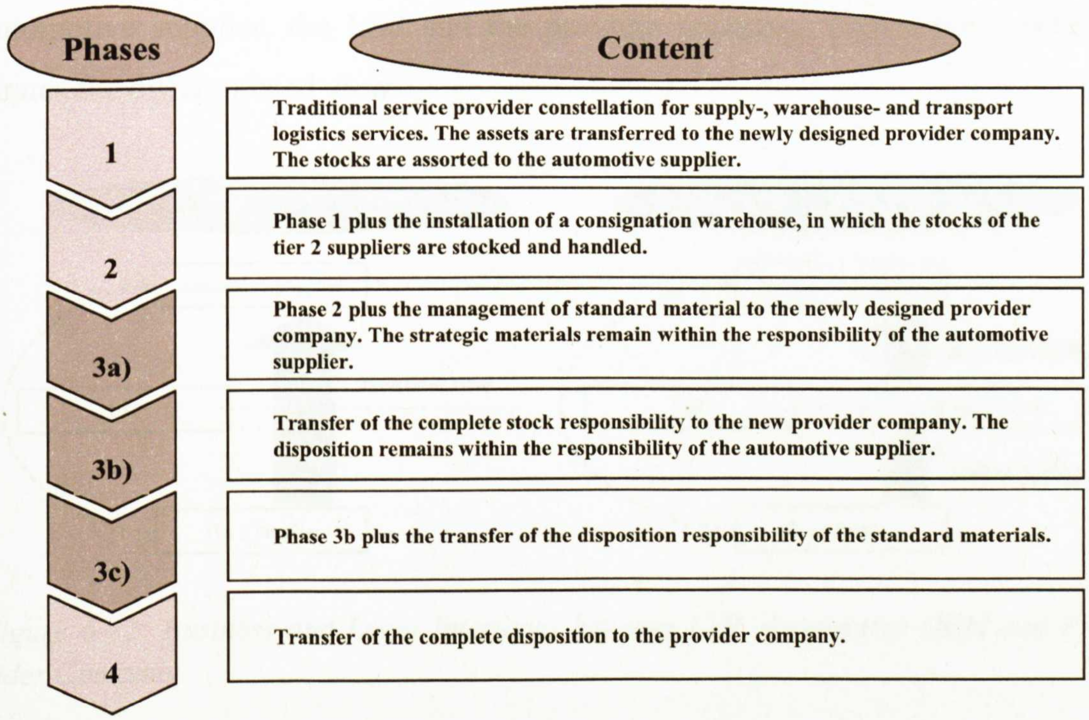

Figure 6-40: Phase-Plan for the Transfer of Responsibilities to the Provider Company

Figure 6-40 shows the agreed phase-plan. In a first step, a new legal entity had to be designed and initiated (called 'Provider Company'). This phase plan included the clear definition of responsibilities and handing-over points.

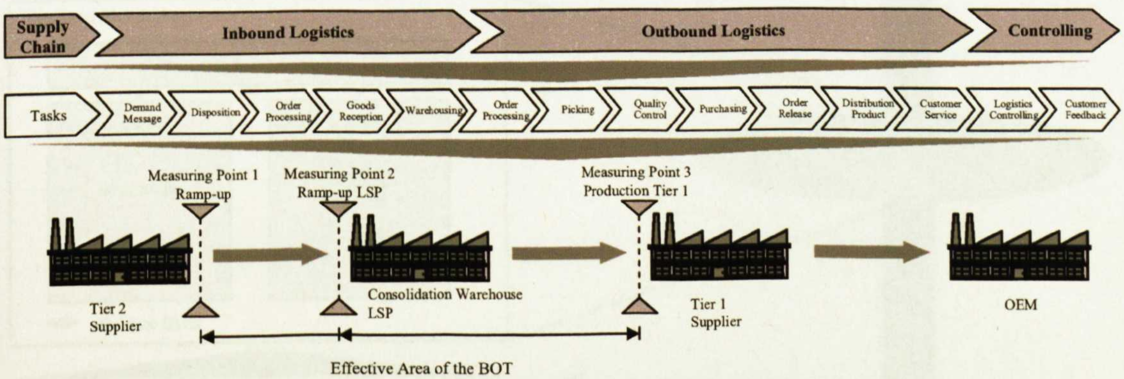

Figure 6-41: Logistics BOT Concept

Figure 6-41 visualises the transfer points and the working area of the newly designed provider company. The creation of the provider company also included the definition of the business interfaces as well as the legal interfaces between the automotive supplier, the LSP and the provider company. Figure 6-42 demonstrates the differentiated view.

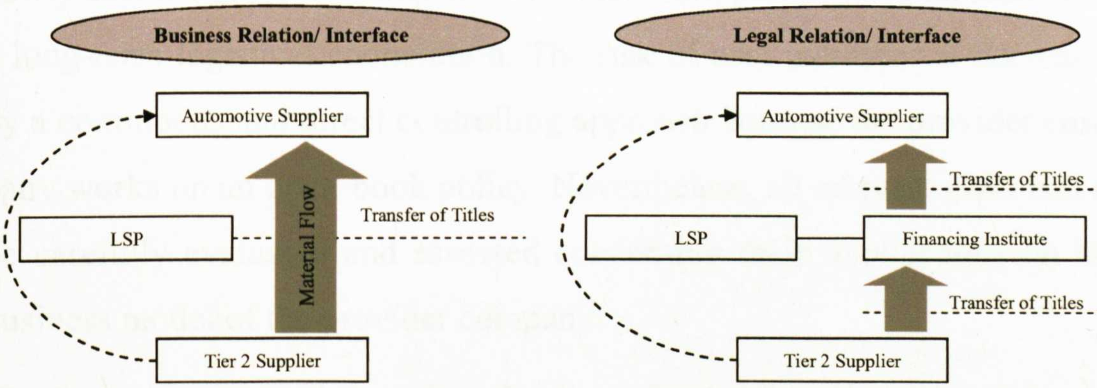

Figure 6-42: Business and Legal Interfaces between LSP, Automotive OEM and Provider Company

Figure 6-43 shows the resulting legal construction of the service company. Hence, a separate legal entity takes over the material from the tier two supplier before handing it over to the automotive supplier.

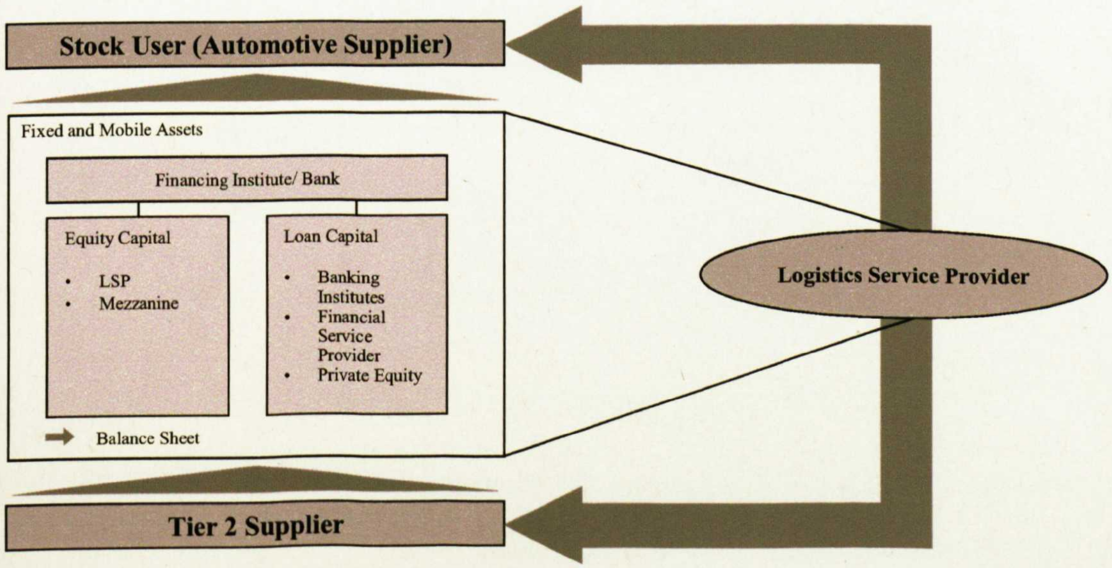

Figure 6-43: Legal Structure of the Logistics BOT

The chosen LSP was defined on the basis of historical experiences. For the creation of the BOT, a team model was installed. For the processing- and controlling phase contact persons within the LSP and the automotive supplier were defined. The risk management in this case derives from the newly defined provider company for which both parties have an interest in a long-term logistical cooperation. The risk of cost increases is decreased by a continuous and direct controlling approach because the provider company works on an open-book policy. Nevertheless, all relevant risks had to be carefully evaluated and assessed concerning their implications on the business model of the provider company.

The incentive system is based on the direct financial and legal involvement of the LSP and a passive approach due to the fact the LSP uses this project as a reference for the acquisition of additional BOTs. Figure 6-44 gives an overview of the characteristics of this partnership constellation.

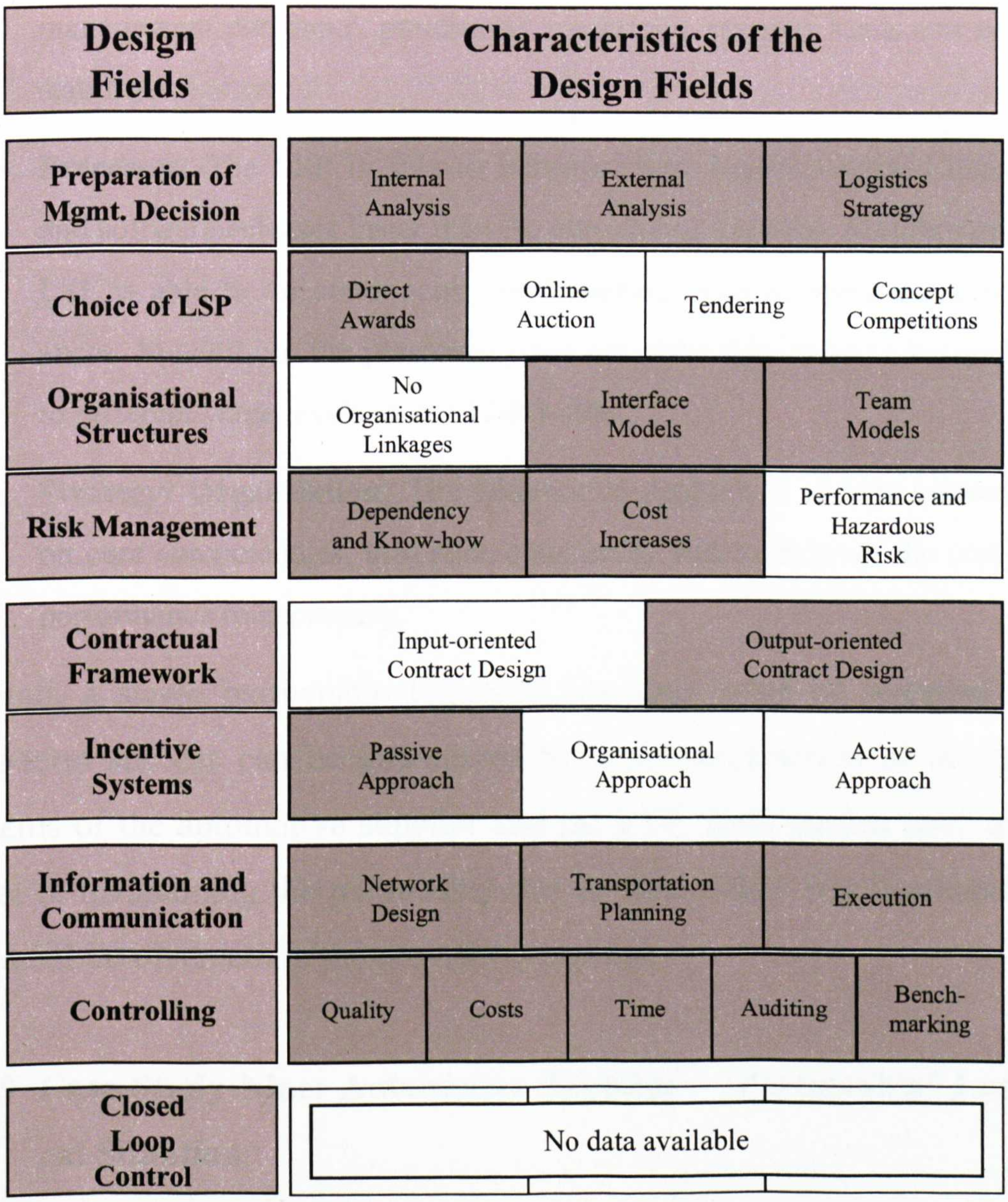

Figure 6-44: Characteristics of the Design Fields in Case Study Eight

The results of the above BOT can be structured into four fields:

- **Finance:** The defined structure of balance sheet external financing of stocks reduces the needed liquidity and thus reduces the loan capital required; tax advantages can be exploited and, in this case, the LSP had cheaper financing sources.
- **Methods and Infrastructure:** The LSP was able to perform required state-of-the-art logistics services on the basis of lower investments. In addition, the LSP is able to work with economies of scale in the fields of

management personnel, purchasing conditions, capacity loads and volume stability.

- **Processes:** The LSP is able to introduce new logistics-related hardware and software-releases faster than the automotive supplier. Furthermore, the LSP is able to do continuous benchmarking with competitors' performances. In addition, the personnel costs could be significantly lowered due to different wage levels on the LSP's side.
- **Strategy/ Organisation:** The automotive supplier is able to concentrate on core competencies, to reduce complexity and to increase the cost- and performance transparency.

Overall, a stable partnership logistical situation could be installed. The long-term success can be guaranteed by a synchronisation of the target systems of the automotive supplier and the LSP. Both parties have an interest in maintaining the partnership due to their direct organisational and financial involvement in the provider company.

6.3.9 Case Study Nine: Automotive Supplier – 'Partnership' Logistical Situation

The final case study is a description of a consulting project conducted in 2000. The company in focus is an automotive supplier working in the field of passenger cars, trucks and light vehicles and specialised in sealing and damping systems. The aim of the project was the definition of a comprehensive outsourcing solution of the in-bound and out-bound logistics. Figure 6-45 shows the phases of the consulting project in which the author was involved.

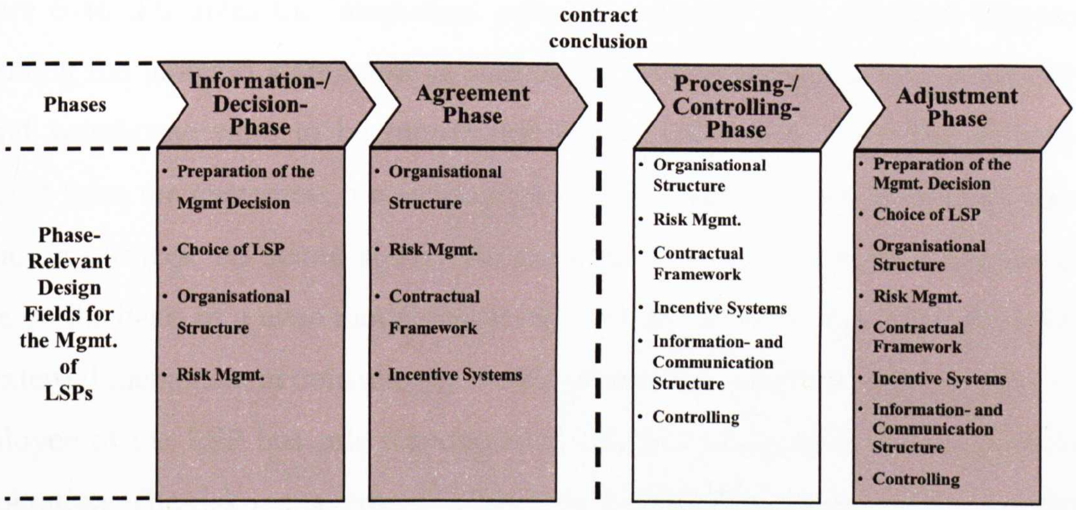

Figure 6-45: Phases in which the Empirical Data of Case Study Nine was raised

The LSP is involved in international transport services of the automotive supplier. On the basis of ongoing performance the job was directly rewarded to the provider. The outsourcing concept could therefore be defined with direct involvement of the LSP. In the first step, the demanded input- and output volumes and delivery cycles were assessed in detail.

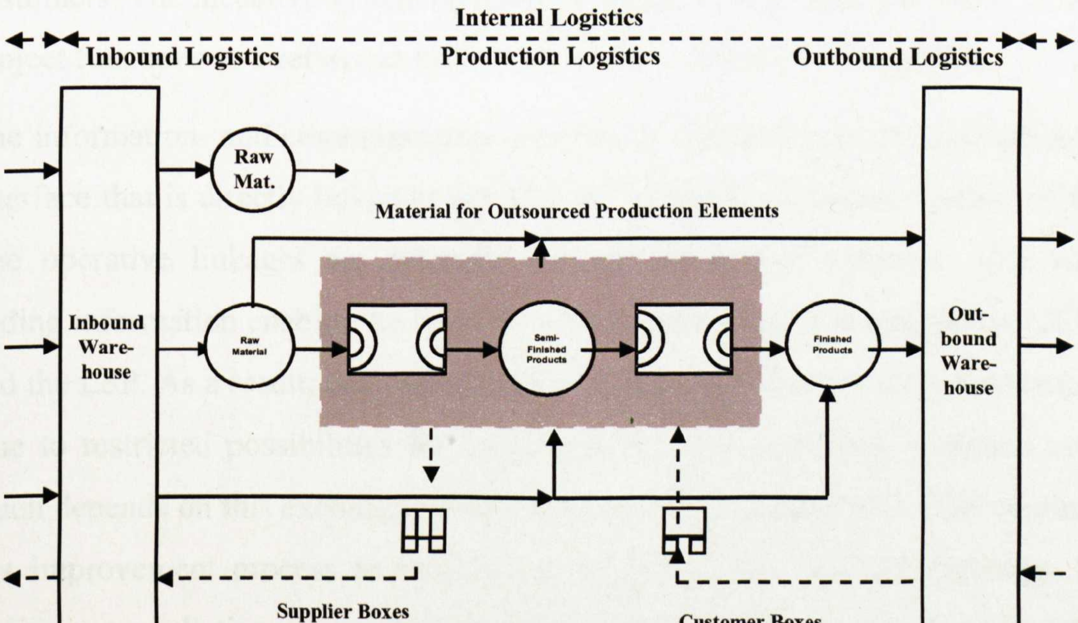

Figure 6-46: Elements to be outsourced

Figure 6-46 illustrates the integration points for the LSP. The inbound logistics including the inbound warehouse as well as the outbound logistics up to the outbound warehouse were to be transferred to the LSP. Area LSPs that are predefined from the customers, i.e. automotive OEMs, carry out the outbound transportation services. As stated above, the elaboration of the logistical concept was done on the basis of a team model involving the LSP, the automotive supplier and an external management consultancy. In the processing- and controlling phase, an employee of the LSP has sole responsibility for the management of the logistics cooperation. The risk management is based on a defined continuous improvement process that is assessed in an annual workshop. The risks of cost increases are monitored by a close controlling approach that provides the basis for a monthly billing of the services.

The contracts of the logistics cooperation are defined as output-oriented. This opens up the opportunity for the LSP to elaborate further internal optimising potentials on a continuous basis. These are, for example, the evaluation of bundling potentials in warehousing, cross docking and transport bundling with other customers. The incentive system operates on a passive approach. For the LSP this project functions as a reference project for a newly defined business area.

The information- and communication structure is based on a newly defined SAP interface that is directly linked to the SAP R/3 platform of the automotive OEM. The operative linkages are achieved through bar-coding scanners. This bar-coding information enables the legal transfer of stocks between automotive OEM and the LSP. As a result, controlling of the logistics services is widely automated. Due to restricted possibilities for benchmarking, the controlling approach very much depends on this exchange of information, on the conduction of the continuous improvement process as well as on defined regular auditing meetings. In addition, cancellation clauses have been defined in the agreement phase already. Figure 6-47 summarises the above described characteristics.

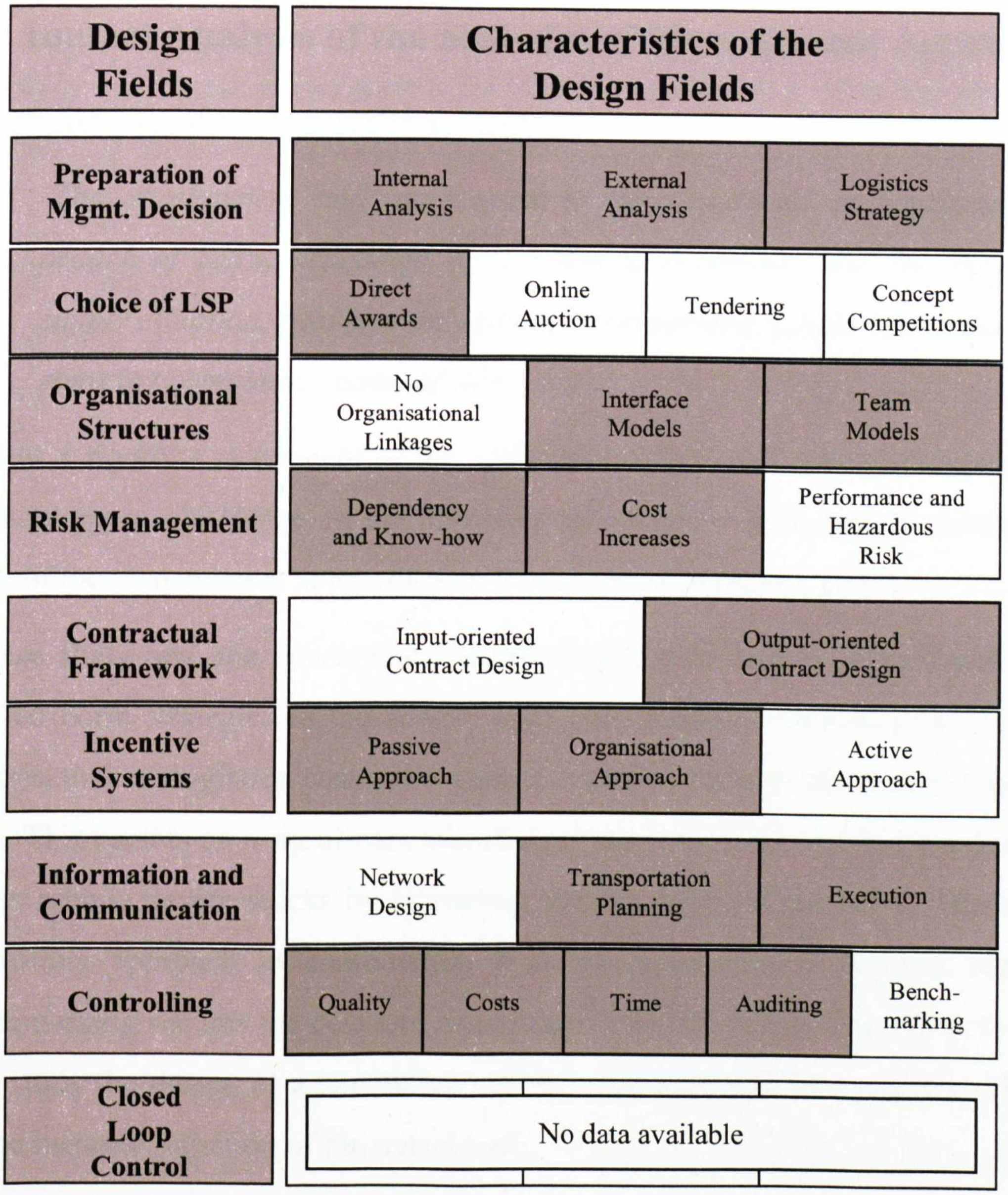

Figure 6-47: Characteristics of the Design Fields in Case Study Nine

The results of the logistical concept were the as follows: the automotive OEM was able to purchase up-to-date logistics services and thereby update his insufficient logistics expertise. The logistics costs could be significantly reduced by synergy effects in transport, warehouse and IT costs. Furthermore, the delivery reliability could be significantly improved due to professional interfaces to the area LSPs in the outbound logistics.

6.4 Impact Analysis of the Situational Management Approach

The challenging of the research hypothesis:

> *'The development and application of the situational management approach of LSPs, dependent on the logistical demand and the logistical supply situation, provides the optimum outsourcing solution from the outsourcing companies' point of view.'*

implies a rigorous assessment of the application impacts of the situational management approach. Hence, in the following an overview of the effects of the rework of the management approaches in the case studies will be given.

In case study one, the management approach could be clearly aligned with the derived norm strategies in the 'Basic' logistical situation. Including an internal optimisation of logistics costs, the overall logistics costs could be lowered by 20%. This centres on a significant reduction of the transport costs and a reduction of the mobile device stocks by increasing the flexibility of the LSPs. The close controlling approach in combination with the possibility to conduct regular benchmarking secures the cost and risk situation for the future. Therefore, in this case study the design of a situational management approach had positive effects on the business situation of the outsourcer.

The result of case study two also showed improvement potential by orienting towards the 'Basic' logistical situation design recommendations. The standardisation of the logistics services and the close controlling approach enabled the outsourcer to lower the stock level, to reduce helicopter orders and still improve the delivery date-reliability and the delivery amount-quality. Overall, the stocks could be lowered by 60%. Thereby, the capital costs could be significantly reduced. In addition, the operative coordination- and transaction costs could be reduced by 75%. This is mainly due to the fact that Kanban on the basis of standardised services only requires a continuous controlling of the lot sizes. Express- (helicopter-) orders nearly vanished. Hence, it can be stated, that the orientation towards a situational management approach as well proved to be successful.

The milkrun concept implemented in case study three was able to reduce the overall transport costs by 26 percent. In addition, the delivery reliability could be significantly improved, the coordinational effort and therefore the transaction costs could be lowered, and the delivery times standardised. Furthermore, the milkrun-concept induces a win-win situation between outsourcer, LSP and supplier. The forecast ability of volumes and order cycles increases for the supplier as well as for the involved LSPs and thereby the supplier can optimise his production cycles and the LSP can optimise his transport routes and assets. In this case as well, the rework of the supply chain concept towards a situational management approach proved to be successful.

In case study four, the application of the situational management approach significantly reduced the logistics risks position and secured the future business position. The overall logistics costs could be reduced by 20% from which almost 90% could be derived from the bidding process in the information- and decision phase and 10% could be derived from the reduction of transaction costs. The dominant competitive position in respect to the LSPs could be fully exploited as the initial norm strategy suggests. Therefore, this case study supports the initial working hypothesis in this research.

Case study five centres on the elaboration of a global controlling approach of LSPs and on the definition of the vertical range of logistics strategy. Reason is the logistical situation-immanent intensive risk position. As the assessment of the strategic importance of logistics proved, logistics gains in importance from the customers' point of view as well as in the coordination of the overall supply chain. The automotive OEM significantly reduced its risk position by becoming aware of its logistical situation and by adapting its logistics strategy to the logistical situation he is situated in. Hence, the situational management approach of LSPs proved to be successful.

In the frame of case study six, the existing supply chain concept was comprehensively reworked. First, the involvement of an additional LSP followed the design recommendation in a 'Competition' logistical situation. The additional detailed controlling and benchmarking tool provides the basis for ongoing benchmarking processes. This significantly reduces the risk position. As stated above, increases in the transaction costs that were induced by an additional RFQ in the search for a further LSP were more than compensated by lowered prices resulting from an ongoing price competition of the two LSPs involved. Logistics costs could be reduced by a lowering of the stock that could be achieved by integrating the PoS into the forecasting process and thereby improving the planning basis for the LSP, by allowing the LSP to directly deliver to the customer and by allowing an interchange of stocks between the PoS. The solution capabilities of the LSPs were fostered by a more output-oriented controlling and contract design of the logistics cooperation. To sum up, the aim of this case study was to induce a 'Competition' logistical situation that allows the telecommunication provider to improve its risk situation by a second source, to improve the comparability and the benchmarking abilities and to foster the exchange of logistical expertise between the involved partners. Hence, in this case study, the situational management approach allowed to develop an optimum outsourcing solution for the telecommunication provider.

Case study seven is the first being situated in the 'Partnership' logistical situation. The risk situation concerning cost increases and dependency risks could be absorbed by a detailed controlling approach and a continuous benchmarking process. The problem-solving abilities of the LSP could be strengthened by the implementation of a continuous improvement process that enables the LSP to participate on logistics costs savings. Hence, the situational management approach that fits the 'Partnership' logistical situation builds the basis for a reduction of the risk position and an improvement of the logistics performance and cost position.

Case study eight centres on the instalment of a BOT concept. The application of the situational management approach in a 'Partnership' logistical situation had several positive effects. As discussed above, the concept reduces the required liquidity and thus reduces the loan capital required. The performance of the LSP could be secured on a long-term basis and the LSP is able to work with high economies of scale. Further logistics costs could be lowered by the lower wage level on the LSP's side. Overall, the situational management approach could substantially improve the logistical situation of the outsourcer.

As stated above, in case study eight, the changes in the logistics concept had several positive effects on the overall logistical situation of the automotive supplier. The quality of the logistics services could be improved and the logistics costs could be significantly reduced by synergy effects in transport, warehouse and IT costs. These cost reductions over-compensated slightly higher transactional costs. In addition, the delivery reliability could be improved. In this case study, as well, the situational management approach proved to have positive effects on the logistical situation of the outsourcer.

Case study nine centres on the elaboration of a detailed outsourcing concept with a predefined LSP. Positive effects were derived first, from the ability to purchase up-to-date logistics services which significantly reduced the risk level in purchasing as well as in distribution logistics, second, from a significant reduction of logistics costs due to reductions in transport, warehouse and IT costs. Furthermore, the labour costs of the LSP were situated beneath the ones of the automotive supplier. Third, the delivery reliability could be improved. Overall, the situational management approach improved the logistical situation of the outsourcer.

Hence, the impacts of the situational management approach showed in the assessment of the target figures in the analysed case studies. Figure 6-48 gives an overview on the results of the impact analysis of the empirical basis and thereby sums up the effects of the situational management approach as described above.

Target Figures / Case Study	Cost	Time	Quality	Risk
One – 'Basic'	●	◐	◐	●
Two – 'Basic'	●	●	●	●
Three – 'Basic'	●	●	●	◐
Four – 'High Risk'	●	○	◐	●
Five – 'Competition'	◐	◐	◐	●
Six – 'Competition'	◐	◐	◐	●
Seven – 'Partnership'	◐	●	●	●
Eight – 'Partnership'	●	◐	●	◐
Nine – 'Partnership'	●	●	●	●

No Positive Effects ○

Medium Positive Effects ◐

Very Positive Effects ●

Figure 6-48: Overview on the Impact Analysis Results

Overall, it is obvious that in all call case studies positive effects from the application of the situational management approach could be identified. Hence, the initial hypothesis of the advantageousness of the adoption of the management of LSPs to the surrounding logistical situation, the logistical demand and supply situation respectively, can be considered as proven. Thereby, this integrated management approach succeeds in defining an optimised outsourcing solution from the outsourcer's point of view. The fact that all case studies deliver positive results concerning the cost-, time-, quality- and risk elements reasons that from the design of the above management approaches of LSPs overall-valid design recommendations of the management approach along transactional life cycles can be derived.

6.5 Summary of the Empirical Analysis

The aim of this chapter was to validate the developed and theoretically differentiated design model of the management approach of LSPs on the basis of an empirically-inductive analysis. Furthermore, from the theoretically developed taxonomy, correlations between case study-specific influencing factor constellations and characteristics of the design fields of the chosen management approaches along the life cycle of logistics cooperations are identified. Consequently, the empirical applicability of the developed life cycle model could be demonstrated, type-specific characteristics could be determined and economic impacts could be proven.

The potential range of characteristics is evident over all case studies. Hence, the first requirement of the empirical analysis "There should be at least one case study representing each identified type of logistical solution" is met. The analysis of the influencing factors demonstrates that the chosen case studies represent a broad spectrum of potential characteristics. Therefore, the aim of heterogeneity of case studies is achieved. All four defined types derived in chapter 4.3 are covered by at least one case study. Hence, the theoretically defined ideal types represent empirically possible characteristics of management approaches of LSPs. This also means that the theoretically developed types qualify for the characterisation of real systems of logistics cooperations. Additionally, the second requirement "The case studies should be mostly complete in the practical analysis of the design fields" could also be fulfilled. Due to restricted running times of the management consulting projects obviously no case study could be assessed throughout the complete life cycle of logistical cooperations. Hence, both prerequisites of the empirical analysis could be met.

First aim of the empirical analysis was the challenging of the conceptual basis. The relevance of the influencing factors as well as the one of the logistical taxonomies could be tested as verified. The same goes for the relevance of the characteristics of the described design fields. Second, the completeness of the identified influencing factors could be proved. The theoretically types of cooperation could be identified in business practice as well. Third, advantages and disadvantages of the different management approaches became visible through the comparison of the initial situation of the case studies and the to-be or already reached situation in the end of the consulting projects. The impact analysis proved the situational management approach to be successful. From this empirical basis, design recommendations can be derived. Fourth, with respect to the characteristics of the design fields throughout the complete life cycle of logistics cooperations, major differences can be identified within the selected case studies. These differences appeared in all analysed design fields. Therefore, major differences in the real-world management approaches of LSPs can be assumed. This diversity of chosen management approaches and the proved positive impact analysis supports the initial hypothesis of the usefulness and the profitability of situational management approaches that are oriented towards the demands of diverse logistical situations. To sum up, it supports the claim for a logistical situation-specific design of the management approach of LSPs. Based on the results of this empirical analysis, in the following chapter design recommendations for the management approach throughout the logistics cooperation life cycle and the inherent tools and methods can be given.

7 Derivation of Design Recommendations for the Management of LSPs

The case study analysis demonstrated that, on the basis of management element characteristics, there are significant differences in the management of LSPs. However, there are also differences in the tools and methods employed. In most aspects, these differences were drawn from variation in the influencing factors on the design model. From these analytical results, generalisations can be made from the empirical data. This distillation of results into design recommendations not only derives from the unidirectional assignment of case studies to the specific logistical situation type but also from the comparison of recommendable management approaches between the different types. Thereby, a consistent holistic design concept for the management of LSPs throughout a cooperation life cycle is described.

The derived design recommendations are structured by the different logistical situation types but also by the consecutive transaction phase in the logistics cooperation life cycle. The design recommendations relate to first, logistical situation-independent influences and second, to the type-specific constellations of the logistical situation. In addition, recommendations for the choice and the applications of tools and methods are given. These recommendations describe the design of the management of LSPs along the transaction phases of the respective design elements. They do not substitute the company-specific analysis of the logistical demand/ supply situation and the individual derivation of the most suitable management approach of LSPs. Nevertheless, they do define the type-specific guidelines.

7.1 Design Recommendations Independent of Logistical Situation

In the information- and decision phase, the preparation of the management decision should be conducted independently from the superficial logistical situation the company thinks that it is in. The goal of the information- and decision phase is to identify the actual logistical situation the company is in and to find the best-in-class providers for the service(s) required. By conducting an internal and external analysis, the shipper's sourcing team gains a solid understanding of the internal logistical demands, the actual capabilities of current and potential LSPs as well as of any recent developments in the service provider's business community. Unfortunately, most companies do not spend enough time and effort on this crucial area. The basic analysis and LSP search becomes more important the more complex the logistical situation is. Shippers tend to gloss over this phase and the identification of potential suppliers by simply compiling a list of the usual suspects (the biggest third-party providers, the specialists in a given industry, the already integrated LSPs). Hence, an in-depth internal analysis of the internal logistical demands as well as a comprehensive analysis of the logistical supply situation is required. For moderately and highly complex logistical situations, logistics and sourcing personnel should research all potential service providers, including all current service providers to the company's industry, and the market leaders in the required service and/ or mode. Other potential candidates should also be identified at this point. This research should be done prior to the company sending out any formal requests for information (RFIs) and requires more than simply asking suppliers about their capabilities. It also should include reference checks with past and present customers of high-interest suppliers. At the same time, companies should research not only the service provider itself but also the provider's business community. By researching the overall industry, supply chain managers may identify factors that could either add or eliminate a potential candidate such as recent start-ups, mergers, divestitures, and companies in financial difficulty. Other issues to be examined include changes in the regulatory environment, legal action involving any potentially suppliers, and any past labour problems.

In the agreement phase, it becomes obvious that the development of the LSPs' capabilities opens up the possibility of defining output-oriented contractual frameworks. This allows the LSPs to optimise their service production continuously. In addition, the case study experience shows that output-oriented contract design fosters the intrinsic motivation of the LSPs.

In the processing- and controlling phase, developments in IT show that the single elements of the information- and communication structure are useful in all logistical situations. In the initial situation, IT-based value analyses were demonstrated to have an impact of the success of the defined logistical concept.

The adjustment process is directly dependent from the logistical situation; the outsourcer is situated in the moment of the changes in the outsourcing cooperation. Hence, the contents and the procedure in the adjustment process depend on the extensiveness of the changes in the logistical situation and do not have to be configured to the initial logistical situation.

In addition, irrespective of which logistics strategy and management approach the company chooses, throughout the cooperation life cycle, especially in the processing- and controlling phase, the company must maintain control of its information. This does not mean that a company should not use a service provider's software or hire a company that uses proprietary software. Rather, this means that in cases where the company does not own the systems, it must either maintain and update its own data files and/ or build a suitable exit strategy into the supplier contracts so that if the relationship is terminated, there will be no interruption in the company's business operations.

7.2 Design Recommendations for 'Basic' Logistical Situations

'Basic' logistical situations are characterised by a relatively low complexity of the logistics services demanded and by the availability of several possible LSPs on the market. This provides the opportunity to shorten the selection process in the information- and decision phase. Direct awards for repetitive purchases of well-known logistics services, online auctions and the tendering of standardised services on auctioning platforms are recommended. This substantially reduces the transaction costs and opens up the possibility for a permanent price benchmarking. As a result, the procurement process of logistics services is simplified and standardised. In direct relation to this, is a further demand for unification and simplification of logistics services. For these experiences from the LSPs and their customers should be used. This unification and geographical bundling provides the possibility to bundle logistics services with other companies. Organisational structures between shipper and logistics cannot be recommended for 'Basic' logistical situations since transaction costs would over-compensate possible positive effects. The risk management is an important factor. In this logistical situation, dependency risks and risks of expertise losses are not relevant. Nevertheless, cost increases, as well as performance risks and hazardous risks, have to be obviated. Therefore, second sources have to be integrated to enable an ongoing competition as well as to be able to react to performance aggravations or hazardous incidents.

In the agreement phase, investment in the definition of the contracts is normally restricted. Due to the standardised character of the logistics services standard contracts can be used in this context. The same applies to incentive systems. The identification of saving potentials from the LSPs' side can be defined in an incentive system. Usually, the effort for this definition over-compensates the benefits. Therefore, recurring price negotiations should be chosen. This includes, at the very least, annual benchmarking of the defined KPIs.

In the processing- and controlling phase, the main emphasis lies on the definition of a lean information system that allows controlling of the material flows as well as a controlling of the time-, cost- and quality performance. This lean information system aims at a minimum involvement of controlling personnel on the buyer's side. Figure 7-1 gives an overview of the described design recommendations for the cooperation life cycle in 'Basic' logistical situations.

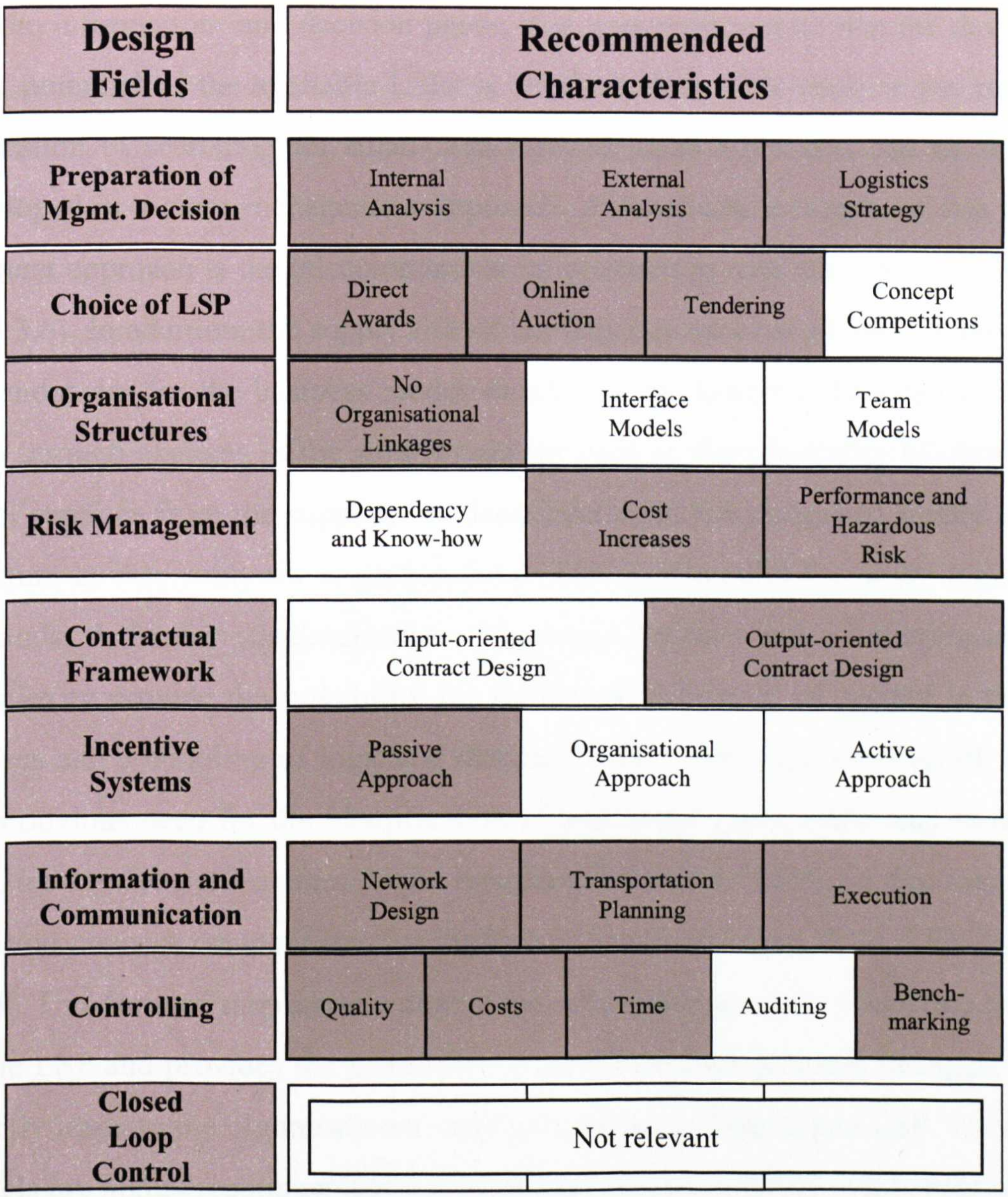

Figure 7-1: Overview on the Design Recommendations for 'Basic' Logistical Situations

7.3 Design Recommendations for 'High Risk' Logistical Situations

As demonstrated in the empirical analysis the 'High Risk' logistical situation is characterised by a relatively low possible impact on the business model and a relatively high service-specific risk. The main aim of the design of the management approach in 'High Risk' logistical situations is the safeguarding of availability.

For the information- and decision phase, it is important to note that the development potential of the available LSPs is relatively low. This leads to the recommendation of searching for small- and medium-sized LSPs that can be further developed in a close management approach. A successful example of this management approach is the telecommunication provider in case study six (see chapter 6.3.6). In addition, the supply risk of the logistics services should be lowered. Dependencies for the business model should also be lowered. This can be managed through changes in the supply concept such as the possibility of obtaining direct supplies from the suppliers as demonstrated in the optimised supply chain structure in case study six in section 6.3.6. This is also valid for future logistical demands. A further standardisation of logistics services and a lowering of the complexity provide the possibility for further identification of second logistical sources and a bundling of logistical demands with other shippers. Overall, there is an obvious need for the identification of additional LSPs, additional in-house logistics service performance or the development of new LSPs. In this logistical situation concept competitions are highly recommended even if the LSP base is small. This form of supplier selection allows examination of the dissolving power of the LSP and provides the possibility to establish close personal linkages. This directly leads to the organisational structures between shipper and LSP. Interface models are highly recommended due to the need for an ongoing assessment of the development potential of the supplier. The risk management should focus on the dependency risks and performance risks elements. This is due to the single source constellations in this logistical situation. On a long-term basis additional LSPs have to be identified and integrated.

If the collaborative approach towards a logistics partnership is chosen the incentive system has to be designed towards a long-term motivation of cost-, time- and quality-improvements. A continuous improvement process (CIP) has to be triggered. Therefore, the incentive system must be closely connected to the controlling system in the processing- and controlling phase.

In the processing- and controlling phase, mutual investments in the IT structure for all elements, network design, transportation planning and execution are recommended. The controlling approach has to be designed very close due to the high risk characteristics of the logistical demand. Figure 7-2 gives an overview of the described design recommendations for the cooperation life cycle in 'High Risk' logistical situations.

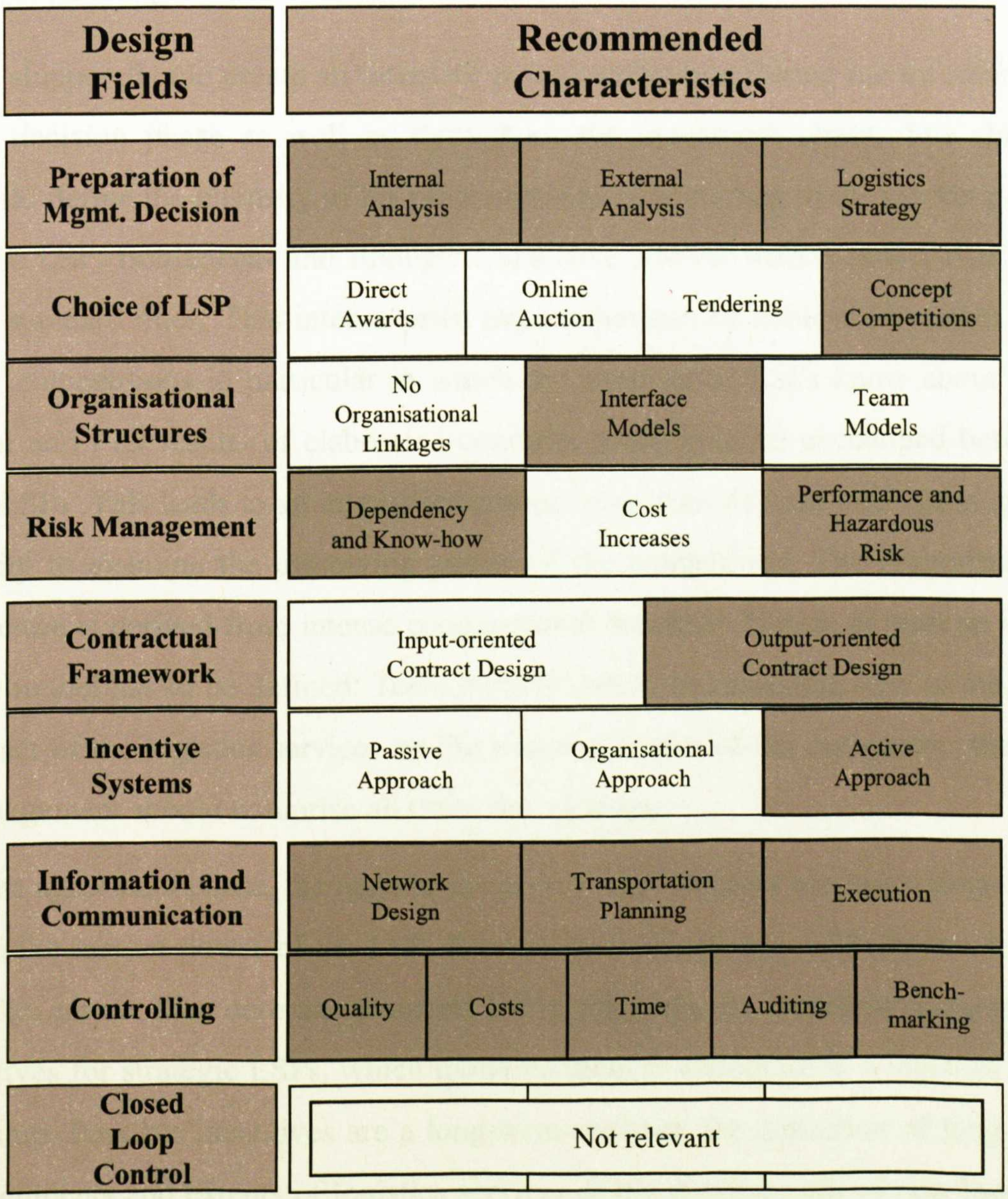

Figure 7-2: Overview on the Design Recommendations for 'High Risk' Logistical Situations

7.4 Design Recommendations for 'Competition' Logistical Situations

In the 'Competition' logistical situation the high impact on the business model of the logistics services builds the basis for high leverage effects for improvements in the management of LSPs. The LSPs show development potential to innovate in logistics cooperations. The aims of the cooperation should be directed towards mutual benefits.

The shipper should create an intensive price-competition during the information- and decision phase as well as throughout the agreement phase. The shipper should define the intensity of his price negotiation according to the market power of the LSP. Bottleneck- and strategic LSPs have a lower market power than core and standard ones. This intense price negotiation can be achieved by open concept competitions in particular in which the short-listed LSPs know about each other and first results of elaborated concepts could even be exchanged between the LSPs. This leads to an intensified competition from day one and opens up the ability to examine the dissolving power of the competitors. The organisational structure is derived from intense cooperational demands. Hence, at least an interface model has to be defined. Team models should be preferred. Due to the high impact of the logistics services on the business model of the outsourcer, the risk management should comprise all three risk elements.

In the agreement phase, the negotiation power of the shipper correlates negatively with the market power of the LSP. Bottleneck- and strategic LSPs have a higher market power than core and standard LSPs. Shippers are forced to integrate incentives for strategic LSPs, which motivate them to cooperate in a logistics partnership. Possible incentives are a long-term contract, the definition of long-term assignments and extents of logistics services or the development of new logistics services in cooperation with the LSP. The logistical situation 'Competition' operates with a relatively low logistical risk. This can be used to bring down the prices by an initial price competition. The LSP benefits from the ability to offer these new services to other customers. If possible, in the agreement phase more than one LSP should be assigned to perform the required logistics services. Through this, the competitive effect, that positively influences the prices of the logistics services as well as the overall risk level of the supply chain concept, is kept alive.

Throughout the processing- and controlling phase mutual activities to increase efficiency should be tackled. This relates to the information- and communication structure as well as to the ongoing analysis of the supply chain concept. In most cases, the LSPs have no exclusive contract with the shipper. Therefore, new experiences and expertise from other industries or even competitors should be used for an ongoing benchmarking and CIP. Throughout the transaction life cycle, cooperational activities are initiated to develop the LSP potential. Figure 7-3 gives an overview of the described design recommendations for the cooperation life cycle in 'Competition' logistical situations.

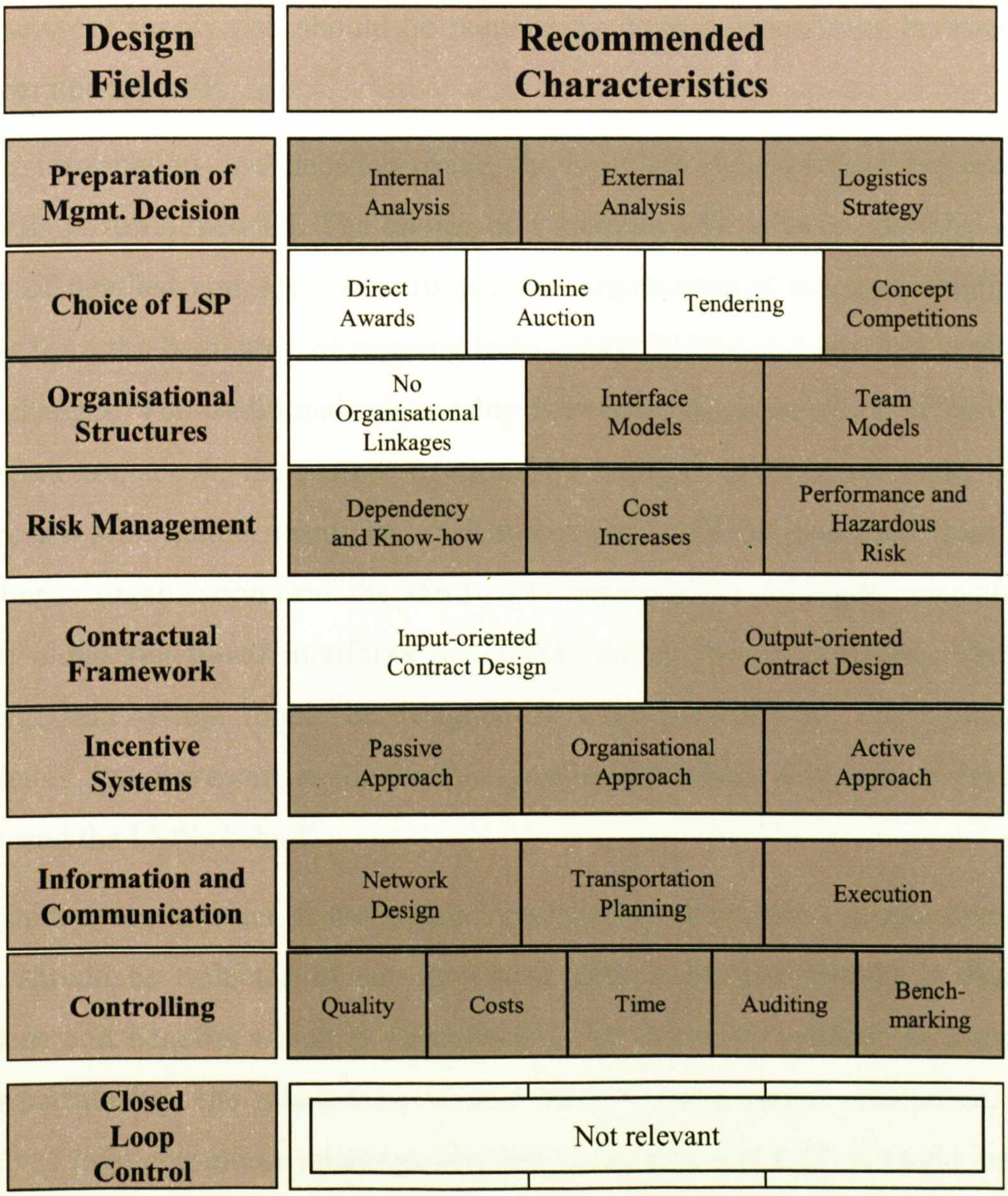

Figure 7-3: Overview on the Design Recommendations for 'Competition' Logistical Situations

7.5 Design Recommendations for 'Partnership' Logistical Situations

If the risks associated with the demand logistics services are higher than in the 'Competition' logistical situation, the 'Partnership' management approach is recommended. This approach considers a higher safety level. The external logistics services supply risk should be reduced by mutual dependency between the shipper and the LSP.

In the information- and decision phase, the most laborious internal and external analysis is recommended. The choice of a suitable LSP is only possible on the basis of detailed concept competitions. The organisational structure should develop from the beginning of ongoing team constellations and possible personnel interchanges. The traditional relationship between outsourcer and LSP has been the sales contact. In the partner relationship, multiple contacts are more likely. There are joint quality teams and task forces that combine personnel from both the buyer organisation and the third-party organisation. Multiple contacts are made along functional interfaces and levels within the organisation. The risk management system should be designed on a mutual platform. The mutual dependency that characterises the logistics partnership makes demands on the shipper's and the LSP's behalf.

The underlying mindset of the logistics partnership should be a cooperative one. This should be reflected in the agreement phase contracts through a share of burdens and benefits which is formalised in the incentive systems. In a longer-term partnership, the relationship should have a strong future orientation. This involves joint committee meetings between outsourcer and LSP. It might include a buyer sharing their future vision of its business with the third-party supplier. In any case, the relationship has to move away from traditional day-to-day operating relationship and extend over some future time horizon.

In the processing- and controlling phase, there should be an element of mutual trust resident in a partnership, which prompts the open exchange of information between partners. The information exchange may be operating data on current and projected product movement. It could be technical information, which influences the quality and/ or effectiveness of product movement in the logistical system. There is a two-way flow and openness of information sharing between outsourcer and LSP in the true partner relationship. Throughout the processing-and controlling phase, the controlling of the logistics partnership should be used to identify improvement potential in the supply chain concept. Through this, the supply risks of the logistics services should be reduced and efficiency improvements along the complete supply chain should be realised.

The controlling approach should be output-oriented. Nonetheless, it should consider all relevant time-, cost- and quality elements. Mutual audits can foster the partnership approach. Benchmarking becomes more difficult due to the complex character of the logistics services. Nonetheless, on the basis of the value chain map of the information- and decision phase, single elements of the supply chain are accessible for ongoing benchmarks. Figure 7-4 gives an overview of the described design recommendations for the cooperation life cycle in 'Partnership' logistical situations.

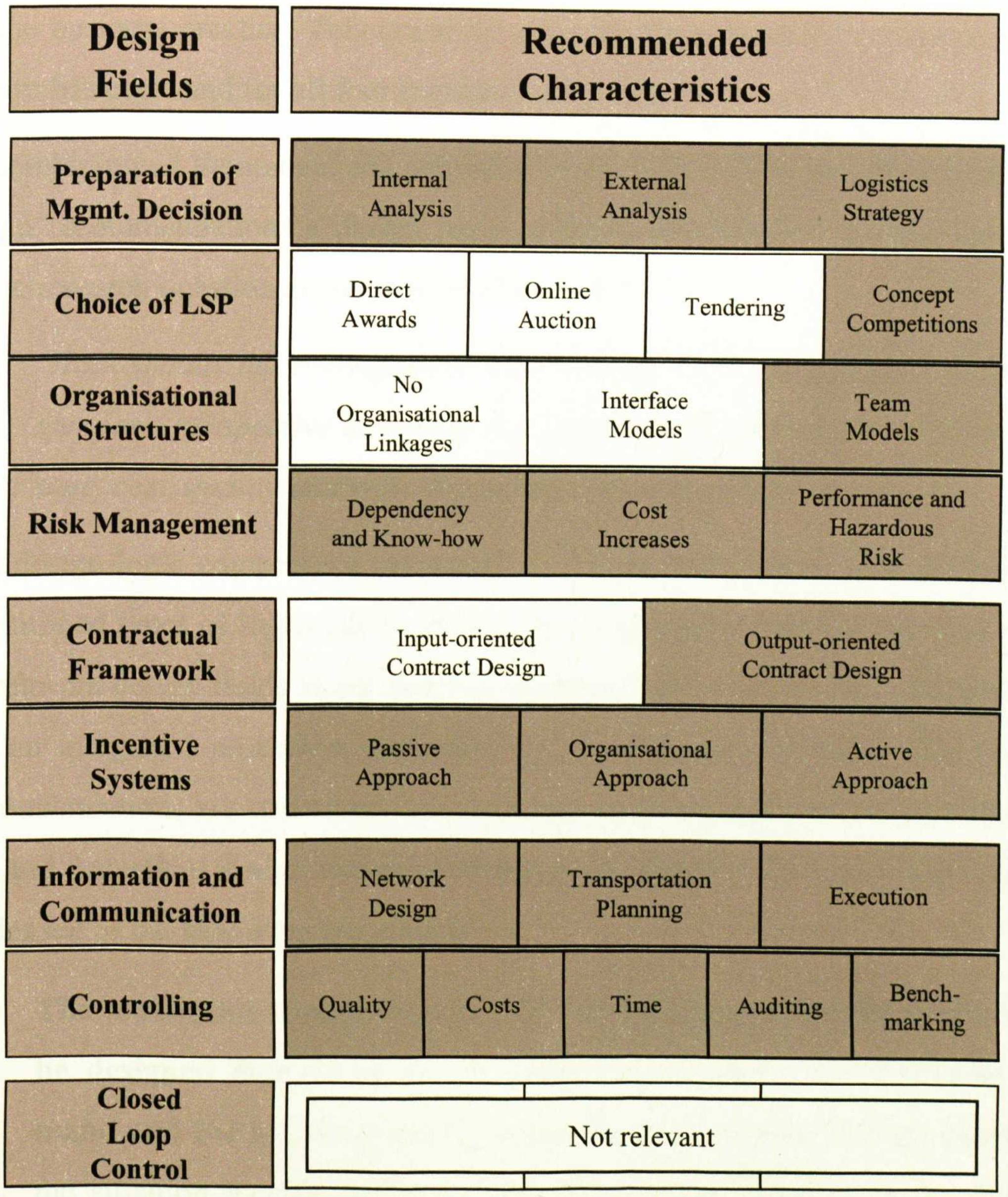

Figure 7-4: Overview on the Design Recommendations for 'Partnership' Logistical Situations

7.6 Summary of the Design Recommendations

From the empirical analysis of the characteristics of the design fields along cooperation life cycles between outsourcer and LSP differentiated situational design recommendations for the four types of logistical situations could be given. Aim was to condense the empirical findings to be able to derive applicable expertise for the business practice. This could be achieved throughout the complete cooperation life cycle and for all four logistical situations.

By combining all theoretical and empirical findings as well as the already defined design recommendations a design logic emerges that answers the primary academic research question as outlined in chapter 1.2:

> *'How should the management approach of LSPs be designed from the shipper's perspective to realise the improvement potential in the elements time, cost, quality and risks dependent on the logistical situation?'*

This design logic comprises a taxonomy of logistical situations with the help of the outlined types of logistical situations, the description of the characteristics of the relevant design fields along each transactional life cycle and the consolidation into an integrated procedure dependent on the logistical situation. The design recommendations are structured into logistical situation independent (see chapter 7.1) and dependent design recommendations (see chapters 7.2 to 7.5) and can be condensed to the following ten guidelines:

- **The management approach of LSPs along cooperation life cycles is to be designed dependent on the logistical situation, the logistical demand and the logistical supply situation respectively.** Starting point for the situation-specific design of the management approach is the assessment of the logistical demand and supply situation. By evaluating the defined influencing factors, the risk situation of the logistics demand (occurrence probability of logistical problems multiplied by the extent of the damage on the business concept of the outsourcer) and the supply situation (the market power of the LSPs multiplied by the competencies and the development potential of the LSPs) can be assessed in detail. This assessment allows an assignment to one of the four logistical types 'Basic', 'High Risk', 'Competition' or 'Partnership' logistical situations (see chapter 4.3). The significance of these influencing factors could be proved by the analysis of the above nine case studies.

- **The preparation of the management decision should be conducted independently from the logistical situation the outsourcer is situated in.** The goal of the information- and decision phase is to identify the current logistical situation and to find the best-in-class provider(s) for the service(s) required. This research should be done prior to the company sending out any RFIs. The definition of the vertical range of logistics strategy should be defined in an iterative process around the assessment of the logistical situation and the definition of the optimum outsourcing solution.

- **The risk management has to be designed according to the logistical situation.** Risks in logistics outsourcing cooperations can be reduced, abolished or managed. The detailed design of the risk management strategies depends heavily on the logistical situation in which the logistics services are bought. The adequate design of the risk management system is the major prerequisite to prevent from risks in shipper-LSP relationships.

- **The contractual framework should be always defined as output-oriented as possible.** The overall guideline for the definition of logistics cooperations is oriented towards a very detailed description of the contract design elements without restricting the flexibility of both contractual partners to react to surrounding conditions and without restricting the expertise and the problem-solving ability of the LSP. Output-oriented outsourcing contracts foster the problem-solution abilities of the LSP. They allow the LSPs to optimise their service production continuously. The intrinsic motivation of the LSPs rise. Therefore, the controlling approach should be output-oriented as well.

- **The definition of incentive systems is important for the long-term success of logistics cooperations.** The analysis of the case studies demonstrated a strong constellation of adequate incentive systems and the long-term satisfaction of the shipper with the outsourcing concept. The design of the incentive system should be closely connected to the definition of the contract constellation as well as to the controlling structure in the processing- and controlling phase.

- **Continuous improvement processes are triggered by an adequate definition of the controlling approach.** The controlling and monitoring of the logistics cooperation has to be designed according to the overall management approach of the LSP. The guidelines for the design of the controlling approach are: first, the consideration of different shipper strategies that aim at a supply chain cooperation,; second, the overall possibility to check the efficiency targets from the outsourcer's point of view and third, the enablement of process-oriented thinking and acting in all supply chain partners.

- **The outsourcer must maintain control of its information.** The outsourcer should maintain and update its own data files and/ or build a suitable exit strategy into the LSP contracts so that if the relationship is terminated, there will be no interruption in the company's business operations.

- **Outsourced logistics services must be designed as unified, simplified and standardised as possible.** The standardisation of logistics services provides the possibility to bundle the demand with other companies, to change providers relatively fast, to increase the number of RFIs and RFPs, to use standard contracts and IT systems, to integrate second sources into the logistical concept and to benchmark the bought services on a continuous basis.

- **In the long- to mid-term 'Competition' logistical situations often have to be developed to 'Partnership' logistical situations.** As an outsourcing company one has to evaluate carefully the pros and cons of the ongoing ability to let two or more LSPs compete against each vs. the possible positive effects of an intensified logistical partnership such as the possibility to invest in sophisticated IT systems or economies of scale as well as in the long-term the build up of mutual trust that helps in reducing the transaction costs throughout the processing- and controlling phase.

- **The characteristics of the design fields of the management approach are always oriented towards an optimisation of the total costs of ownership of logistics services along the complete life cycle of logistics cooperations.** As demonstrated in chapter 3.3 the optimisation of the management approach has to be oriented towards an optimisation of the transaction costs as well towards an optimisation of the price of the logistics services. This includes the assessment of all relevant elements, be it time-, quality-, risk- or cost considerations. Hence, the design recommendations always consider the trade-off between the reduction of transaction costs and respectively a more loose management approach and the needs for a more close management approach, be it for reasons of the logistical demand situation (potential extent of damage to the business concept of the outsourcer) or for reasons of the logistical supply situation (market power of the LSP or the reduced development potential of the LSP). These considerations have to be retained throughout the cooperation life cycle.

8 Conclusion and Future Research

The design of the management approach of LSPs along cooperation life cycles is an up-to-date challenge in theory and business practice. To date, many optimisation attempts of the cooperation with LSPs failed due to their nonobservance of the influence of the logistical situation to the design of the management approach. Selective optimisations failed due to the conflicts in-between the target variables of the logistics system. The research at hand succeeded in defining a situational management approach of LSPs along a cooperation life cycle dependent on the influences from the logistical demand and the logistical supply situation.

The initial research aims of this thesis are outlined in chapter 1.3. In the following, the elaborated results are outlined:

- **First aim was to position the management of LSPs into a strategic, comprehensive and integrated frame of reference, from which design recommendations for the practical management of LSPs throughout a cooperation life cycle can be derived.** To be able to set up the conceptual framework, first, the research methodology was analysed and defined in detail. The iterative triangulation configured around case study analysis and research basing on a taxonomy allowed to approach a new field of research and to combine practical experience with the theoretical development of a comprehensive model. The conceptual framework could be configured and was put into a complete and consistent managerial model. The initial framework was described by reviewing the relevant literature in logistics outsourcing, situational buyer-supplier relationships and life cycle management of logistics cooperations. From this, analogies to supplier management could be demonstrated, single influencing factors on the management of LSPs could be identified and several management elements of the management approach could be described. The theoretical approaches for the assessment of the optimum management of LSPs were distilled and described by assessing and further developing traditional, strategic and modern approaches. The main aim in the management of LSPs, the optimisation of the total costs of ownerships of logistics services, could be developed. This overall goal provides the basis for the assessment of the case studies in the empirical analysis and the derivation of design recommendations. Furthermore, a system model for the derivation of a taxonomy of logistical situations was defined. From this, design recommendations could be identified that were verified later on in the empirical analysis.

- **Second aim was to investigate the design elements of possible management approaches and management styles of LSPs**. The conceptual framework was animated along the cooperation life cycle between outsourcer and LSP. The characteristics were embellished according to the theoretical attributes and demands of the logistical situation types. This examination centred on a further analysis of relevant literature as well as on the author's personal expertise from conducted management consulting projects. Best practice approaches in theory and practice were identified and structured along the cooperation life cycle.
- **Third aim was to identify and clarify implications and the results of the companies that have outsourced logistics services in diverse logistical situations**. This examination was conducted in the frame of the empirical analysis as well as in the impact analysis that proved the profitability of the situational management approach along a cooperation life cycle. The empirical analysis centres on nine case studies that were described and analysed from the author's personnel experience, derived from documentations of consulting projects.

The fulfilment of the above research aims comprises the answering of the secondary research questions as listed in chapter 1.2. This leads to the review if the primary research question could be answered and hence to the validation of the research hypothesis. In the following section, the main results of the dissertation at hand will be listed and their ability to answer the research questions will be outlined. In addition recommendations for future research in the field of logistics outsourcing and the management of LSPs are given.

8.1 Answers to the Research Questions and Validation of the Research Hypothesis

The present study aimed at answering the research questions as defined in chapter 1.3 and discussed above. Through this, the basic hypothesis of the usefulness of a situational management approach of LSPs is challenged. The underlying primary research question is defined as:

> *'How should the management approach of LSPs be designed from the shipper's perspective to realise the improvement potential in the elements time, cost, quality and risks dependent on the logistical situation?'*

The chosen research strategy was structured along answering secondary research questions that together give an answer to the above primary research question. The influencing variables on the definition of a specific management approach were analysed by separating them into their effects on the logistical demand and the logistical supply situation. The relevant dimensions were defined as first, the supply risk of the logistical demand which is in turn determined, first, by the possible extent of damage induced by the logistics service and second, by the occurrence probability which, again, is determined by the characteristics of the logistics services. The second relevant dimension is determined by the LSP market which, again, is characterised by the supply power of the LSP as well as the LSP development potential. By combining these dimensions in a logistical demand/ logistical supply portfolio, a taxonomy of logistical situations could be derived and verified in the frame of the empirical analysis. Four types of logistical situations could be identified and described that differ significantly concerning the logistical demand and logistical supply situation: the 'Basic', 'High Risk', 'Competition' and 'Partnership' logistical situation. This portfolio taxonomy was used to derive norm strategies in the form of guidelines for the assessment of these specific shipper-LSP cooperational constellations.

The design elements of the management approach were extensively analysed and embellished according to the demands of logistical situations. The relevant design elements are: 'Preparation of the Management Decision', 'Choice of suitable LSPs', 'Organisational Structures between Shipper and LSP', 'Risk Management', 'Contractual Framework of Logistics Cooperations', 'Incentive Systems', the 'Information- and Communication Structure', 'Controlling of the Outsourcing Relationship' as well as the 'Triggers and the Design of the Adjustment Phase'. In addition, the design fields are explored along the cooperation life cycle. The life cycle of logistics cooperations is divided into the phases 'Information- and Decision Phase', 'Agreement Phase', 'Processing- and Controlling Phase' and 'Adjustment Phase'. These design elements along the cooperation life cycle phases provided the basis for the assessment of the case studies in the empirical analysis. The relevance of the design elements is demonstrated in the analysis of the design fields in itself but also in the analysis of the case studies and the linked derivation of design recommendations for future cooperations between shipper and LSPs.

The analysed case studies cover a broad range of logistics outsourcing constellations. Outsourcing companies with 1,600 to 360,400 employees and annual sales from 0.5 Million to 151,600 Million Euro were assessed from telecommunication, automotive and financial industry. Hence, the product and supply chain structure differed significantly as well. Nevertheless, the defined guidelines for the selection of the case studies could be met: First, there is at least one case study representing each of the above type of logistical situation and, second, the case studies are complete in the practical analysis of the design fields along the cooperation life cycle.

The assessment of the success of different management approaches of LSPs was conducted in the framework of the empirical analysis, the assessment of the chosen management approaches and, finally, in the impact analysis of the situational management approach. Hence, it can be stated that the initial research question is answered in detail, holistically and in a way, that gives useful guidance for researchers as well as practitioners.

By the answering of the above primary and secondary research questions, the management approach of LSPs along a cooperation life cycle could be developed and described. The empirical and the impact analysis of nine case studies proved this situational management approach to be profitable. Thereby, the hypothesis of this research

> *'The development and application of the situational management approach of LSPs dependent on the logistical situation provides the optimum logistics outsourcing solution from the outsourcer's point of view.'*

is corroborated. The research at hand demonstrates the usefulness of situational management approaches of LSPs along cooperation life cycles dependent on the logistical demand and supply, namely the logistical situation. By the definition of the management approaches, in accordance with the procedure and the guidelines demonstrated in this research, the potentials in costs-, time-, quality- and risk situation can be exploited.

8.2 Summary and Recommendations for Future Research

This research has pursued the notion that, for efficiency and success, a fit must exist between logistical situations and the design of management approaches of LSPs. That fit would enable the shipper to use potentials in cost savings and service improvements from the integration of LSPs and the increasing focus on his core competencies. As such, this research represents a cross-functional and interdisciplinary approach to logistics management, supplier management, life cycle theory, and situational management strategies. In that pursuit, this research makes a number of relevant contributions, yet simultaneously it has some limitations.

This study is the first to derive a stringent taxonomy from diverse logistical demand and supply situations and to define the relationship between these logistical situations and the suitable management approach of LSPs. Numerous studies have considered LSP management as one-dimensional and static; however, this study addresses the management approach as continuous and multidimensional along a cooperation life cycle. This research did not find prior studies that have addressed either the situative approach in LSP management or the development of the management approach along a cooperation life cycle. This study, then, suggests and defines the relationship of the design fields of the outlined management approach and the influencing factors, those of the logistical demand and the logistical situation.

This study does, however, have several notable limitations. Of course, this work has focused on the model building, the derivation and dimensionalisation of the design fields of the management approach of LSPs and the testing of both on the basis of practical case studies. The number of case studies could have been widened to emphasise relationships between the characteristics of logistical situations and the characteristics of management approach as a reaction towards them. In addition, further research in supplemental industries and situations could reveal new and similarly advanced management approaches of LSPs. Comparison with other companies could identify differences, which could be explained by company-specific factors, such as company size, technology, differently structured customer bases, networks position and organisational culture. However, widening the scope of the study would have meant referring to case studies that the author had not directly worked on. This would have induced serious restrictions concerning the demand for a holistic assessment of the case studies.

Another significant limitation of this study is that the author has focused on the shipper's/ outsourcer's perspective. Obviously, dyadic data would present a richer picture, although there would be almost insurmountable problems identifying the perceptions of corresponding LSPs. More importantly, the author has made a deliberate and argued choice for choosing such a perspective. Limitation to the shipper's perspective is justified by the main object of the research at hand: to describe and explain a managerial situative management approach of LSPs that enables the shipper to identify and realise potentials in costs, time, risk level and quality. This does not mean that the LSP's perspective is neglected in this study. On the contrary, it means that the author has included the shipper's perceptions regarding the LSP. Assessing shipper's perceptions is the most meaningful way to measure variables, since purchasing decisions of logistics services are actually made on the shipper's perceptions of the relevant conditions. To conclude, in line with the objectives and the perspective of the overall study, it was most sensible to measure perceptions from the shipper's perspective.

This study is an example of a cross-disciplinary and cross-functional analysis that is relevant to the increasingly dynamic and integrated environment of global business. It establishes the foundations for numerous future conceptual and empirical research efforts. First, the empirical relevance of the influencing factors towards the design of the management approach of LSPs should be challenged on the basis of long-term surveys along cooperation life cycles. This study was conducted under the restriction of each case study being analysed over a restricted time in the cooperation life cycle. Long-term studies could help to identify other influencing factors that increase in importance when assessing a complete cooperation life cycle. Second, the situative management approach should be challenged concerning its application to other buyer-supplier cooperations. Based on the checklist provided, a transfer of the consolidated findings should enable this assessment to any interaction between entities along cooperation life cycles.

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Declaration

London, Munich 26th of September 2007

Declaration

I hereby declare that I wrote this PhD dissertation without the help of a third party. No other than the given literature has been used. No other intellectual property has been used in this document than those cited.

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Erklärung

Ich erkläre hiermit, die vorgelegte PhD Dissertation/ Doktorarbeit ohne fremde Hilfe verfasst zu haben. Ich habe keine andere als die angegebene Literatur verwendet. Alle wörtlichen oder gedanklichen Übernahmen sind zitiert.

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