Designing contract logistics service bundles

–

An exploratory analysis

D I S S E R T A T I O N
of the University of St.Gallen,
School of Management,
Economics, Law, Social Sciences
and International Affairs
to obtain the title of
Doctor of Philosophy in Management

submitted by

Christoph Wilhelm Tyssen

from

Germany

Approved on the application of

Prof. Dr. Wolfgang Stölzle

and

Prof. Dr. Günter Prockl

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Vorwort

Die vorliegende Dissertation entstand während meiner Tätigkeit am Lehrstuhl für Logistikmanagement der Universität St.Gallen (LOG-HSG). Die Motivation sich dieser Thematik zu widmen, erwuchs aus der tiefgehenden Forschungstradition des LOG-HSG und der langjährigen Kooperation mit Logistikdienstleistern und der verladenden Wirtschaft. Die Arbeit richtet sich an Forscher wie auch Praktiker, die sich für die Konzipierung von Kontraktlogistikdienstleistungsbündeln interessieren.

Das Vorwort möchte ich nutzen, um all denjenigen zu danken, die grundlegend am Entstehungsprozess dieser Arbeit beteiligt waren.

An erster Stelle möchte ich meinem akademischen Lehrer, Prof. Dr. Wolfang Stölzle danken, der den Dissertationsprozess persönlich begleitet und zahlreiche Impulse zur Thematik gegeben hat. Er hat mich stets angespornt an die Grenzen zu gehen und mir so eine steile Lernkurve am LOG-HSG ermöglicht. Meinem Zweitgutachter Prof. Dr. Günter Prockl danke ich sehr herzlich für seine konstruktiven Hinweise und ehrlichen Ratschläge.

Grossen Dank richte ich auch an Dr. Thorsten Klaas-Wissing für seinen Zeiteinsatz und die kritische und ausgiebige Diskussion der gesamten Forschungsthematik. Weiterhin danke ich meinen Kollegen, die durch ihre unterschiedlichen Charaktere die Arbeit am Lehrstuhl interessant und belebend gestaltet haben. Namentlich hervorheben möchte ich Julia Bendul, Philip Wessely, Felix Reiche, Randi Oldach, Florian Hofer, Nils Peters und Elias Halsband. Ihnen wie auch den anderen Kollegen danke ich für ihr offenes Ohr und den beruflichen und privaten Austausch. Dank gilt zudem den Praxispartnern, durch deren Diskussionsbeiträge und wertvolle Praxiseinblicke die vorliegende Forschung gewonnen hat.

Besonderer Dank gilt meiner Familie, meinen Eltern Elisabeth und Egon Tyssen sowie meinem Bruder Matthias, die mich zeitlebens mit bedingungsloser Unterstützung und Liebe beschenkt haben. Der familiäre Rückhalt sowie die Freiheit, mit der ich meine Entscheidungen treffen durfte, lassen mich auf eine lehrreiche Zeit zurückschauen, mit der ich mich für die weiteren, kommenden beruflichen Herausforderungen gewappnet sehe. Den grössten Dank richte ich an meine Partnerin Eva Steinbacher, die eine unglaubliche Stütze insbesondere in der Endphase der Dissertation war und durch ihre wertvollen Korrekturvorschläge, den grossen Zeiteinsatz sowie den privaten Ausgleich

erst einen erfolgreichen Abschluss dieser Arbeit ermöglicht hat. Euch vieren, liebe Eva, lieber Matthias, liebe Eltern, sei diese Arbeit gewidmet! Danke, dass ihr für mich da seid!

St. Gallen, Juni 2011 Christoph Tyssen

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List of abbreviations

ACAP	Absorptive capacity
AIM	Additional incentive mechanism
cf.	Confare / Compare
EDI	Electronic data interchange
Ed(s).	Editor(s)
ed.	Edition
e.g.	Exemplum grata
et al.	et alli, lat.: 'and others'
i.e.	Id est
IT	Information technology
LSP	Logistics service provider
m.	Million
ME	Monitoring expenditures
MRO	Maintenance, repair and operations
n/a	Not applicable
OL	Organizational learning
PACAP	Potential absorptive capacity
R	Remuneration
RACAP	Realised absorptive capacity
RBV	Resource based view
RfP	Request for proposal
RQ	Research question
SC	Supply chain
SCM	Supply chain management
SLA	Service level agreement
s.t.	Subject to
q.v.	Which see
VANs	Value added networks

Summary

Contract logistics has received considerable attention in both research and practice over the past decades. Concentration on core competencies and cost-saving objectives in commerce and industry are the drivers for intensified collaboration with contract logistics service providers (LSP). LSPs in turn are seeking long-term contracts and higher margins on comprehensive services compared to the price-driven transportation business. In order to reduce managerial efforts, various services are shifted to a limited number of service providers, resulting in comprehensive service bundles being outsourced. As these service bundles are complex and involve specific investments, creating dependency, long-term relationships between the customer – the shipper – and the LSP are established. Hence contract logistics requires profound knowledge and skills of both the LSP and the shipper to successfully establish satisfactory relationships. The design of appropriate service bundles is particularly challenging. The decisions made in this phase form the basis for the relationship of the involved parties. Contract logistics service bundles need to be designed in a way that satisfies both partners in order to guarantee successful contract logistics in the sense of a long-term, stable relationship. However, research has not satisfactory focused on this topic. This dissertation discusses factors that influence successful service bundle design and identifies significant contributors in order to conceptualise the design of contract logistics service bundles and provide guidance for service bundle design based on literature review and empirical investigation.

The research at hand focuses on three cornerstones of successful contract logistics service bundle design. First, the resources of LSPs are analysed with respect to their relevance for the design of contract logistics service bundles. Second, the understanding and transfer of shipper needs into the designed service bundles is examined. Finally, the choice of the appropriate remuneration model in the design of contract logistics service bundles is addressed.

Zusammenfassung

Kontraktlogistik hat sich in den letzten Jahren zu einem in der Praxis und der Logistikforschung viel beachteten Thema entwickelt. Die Konzentration auf Kernkompetenzen und die Notwendigkeit zur Realisierung von Kosteneinsparungspotentialen bei Industrie- und Handelsunternehmen führen zu verstärkter Zusammenarbeit mit Logistikdienstleistern. Diese beabsichtigen im Gegenzug von grösserer Stabilität der Geschäftsbeziehungen und höheren Margen durch langfristige Verträge und Zusatzleistungen zu profitieren. Zur Reduktion von Schnittstellen und Abstimmungsaufwänden werden zahlreiche Dienstleistungen an wenige Logistikdienstleister vergeben. Diese Konzentration einer Vielzahl von Dienstleistungen auf wenige Anbieter führt zu umfangreichen und individuellen, sogenannten Dienstleistungsbündeln, die ein Logistikdienstleister für einen Verlader erbringt. Im Rahmen der Konzipierung werden die Dienstleistungsbündel entsprechend der Kundenanforderungen entwickelt, erarbeitet und zusammengestellt. Die Entscheidungen, die in dieser Phase getroffen werden, bilden die Grundlage für die zukünftige Geschäftsbeziehung der beteiligten Unternehmen und müssen den Ansprüchen und Möglichkeiten beider Unternehmen gerecht werden. Die vorliegende Dissertation untersucht auf Basis theoretischer Erkenntnisse und empirischer Daten Einflussfaktoren einer erfolgreichen Konzipierung von Dienstleistungsbündeln und leitet daraus Handlungsempfehlungen für Unternehmen ab.

Zur theoretischen Betrachtung wurde ein Bezugsrahmen erarbeitet, der die Konzipierung vor dem Hintergrund der individuellen Leistungsbündel betrachtet. In drei Schritten behandelt die Arbeit zentrale Elemente der erfolgreichen Konzipierung von Kontraktlogistikdienstleistungsbündeln. Zunächst werden auf der Basis einer konzeptionellen Betrachtung zweier unterschiedlicher Kontraktlogistikstrategien diejenigen Ressourcen von Dienstleistern erarbeitet, die für die jeweilige Konzipierung erfolgsbestimmend sind. Zweitens werden die Prozesse zum Verstehen und Umsetzen der Kundenanforderungen im Kontext der Konzipierung betrachtet. Dazu wird auf Basis der Theorie der Absorptive Capacity ein Bezugsrahmen entwickelt und durch Case Studies angereichert. In einem letzten Schritt wird die Gestaltung des Vergütungsmodels und der zusätzlichen Anreize, die im Zuge der Konzipierung vereinbart werden, konzeptionalisiert, empirisch untersucht und entsprechende Handlungsempfehlungen abgeleitet.

1 Contract logistics – a challenging business area

The research at hand addresses the design of contract logistics service bundles. Specific design prerequisites and activities fundamentally contributing to a stable, long-term partnership are selected and discussed based on empirical data in order to provide guidance for practitioners from both logistics service providers (LSPs) and shipping companies – so-called shippers. Chapter 1 is dedicated to the relevance of contract logistics, particularly the design phase (Chapter 1.1). It also outlines the objectives of this research and the respective research questions (Chapter 1.2).

1.1 Background and relevance of the research

Contract logistics has received growing attention during the last decades not only in practice but also in academia. Recent developments in economics have contributed to the increased attention. Ongoing globalisation and the continuing focus on core competencies have led to a rising demand for outsourcing of logistics and logistics-related services (Gunasekaran *et al.*, 2008; Lewin & Peeters, 2006; Prahalad & Hamel, 1990; Rao & Young, 1994). Accordingly, the professionalisation of processes and the range of services outsourced to LSPs has increased significantly over the past years (Bjurstrom, 2008; Kim *et al.*, 2008; Sink *et al.*, 1996). This applies in particular to the novel and somewhat indistinct area of contract logistics, also referred to as third-party logistics. Contract logistics has developed rapidly in recent years in almost all industries, yet has potential for further development (Klaus & Kille, 2008; Langley & Capgemini, 2007; Langley & Capgemini, 2009). Market estimates assume 15-20% growth rates in the United States and Western Europe for the years 2009 to 2010 (Deepen *et al.*, 2008).

In order to avoid costly efforts for the coordination of multiple partners, the shippers tend to limit their outsourcing ambitions to a restricted number of providers, resulting in the outsourcing of a large number of services to a particular LSP who, based on the customer's requirements, designs service bundles that are uniquely tailored to the customer's needs. These service bundles comprise all services the LSP performs for a given shipper. A growing scope of outsourcing activities also caters to LSPs as value-added steps in addition to the frequently outsourced but low-margin transportation business may be undertaken by the LSP (Stein, 2008). In order to take advantage of these opportunities, close collaboration in an intense relationship between both parties

is essential (Bolumole, 2001). Relationship orientation is also considered a means by which to overcome shipper risks attached to contract logistics, including their dependency on a limited number of service providers, hidden costs, evaluation and monitoring problems, cultural challenges, information asymmetry or inefficient management (Wang & Regan, 2003). A long-term, stable partnership therefore seems a significant lever for successful contract logistics in general.

The augmented number of individual services in contract logistics leads to more complex outsourcing projects with more comprehensive, customised contract logistics service bundles (Klaus, 2008; Langley & Capgemini, 2007). These service bundles require a structured ramp-up (Schmidt *et al.*, 2007). The positive effects of contract logistics arrangements can thus rarely be achieved without difficulties (House & Stank, 2001) and "[i]mpediments are likely to be encountered in all the different phases of relationship development" (Marasco, 2008, p. 136). One major challenge in establishing long-term, stable relationships as a basis for successful contract logistics is the design of customised bundles of services, often characterised as a specific phase in the establishment of contract logistics service bundles. In the design phase a concept for the dedicated service bundles and their contract details is developed. LSPs, often in collaboration with the shipper, have to design an appropriate service bundle concept by identifying, composing and providing the right set of services tailored to the shipper's requirements and needs. In the past, these demands have not always been met. The survey by Langley and Capgemini (2007) concluded that many shippers are not fully satisfied with the provider’s service. LSPs seem to fail especially in delivering the expected cost reduction, establishing trustworthy relationships and meeting the increased need for advanced IT capabilities, as well as in their project-management skills (Langley & Capgemini, 2007; Langley & Capgemini, 2009). This often leads to dissolutions, as reported by trade and academic publications (Ackerman, 1996; Foster, 1999). One potential cause of dissatisfaction is the design of contract logistics service bundles, as in this phase the basis for the future success of the contract logistics relationship is laid. Within this stage all relevant content of the service bundle concept is specified. LSPs that fail to meet the distinct demands of the shipper have to cope with unsatisfactory relationship outcomes as the consequence.

Though the design of contract logistics service bundles strongly influences the evolving relationship between LSP and shipper and thus contract logistics success, neither practice nor academia have addressed this issue to a satisfactory degree. In the past, research barely touched the design of contract logistics service bundles and

primarily focused on topics like the phenomenon of contract logistics as a whole or the outsourcing decision in general (e.g. Daugherty & Dröge, 1997; Daugherty *et al.*, 1996; Rao & Young, 1994; van Damme & van Amstel, 1996), the selection of an appropriate LSP (e.g. Bagchi & Virum, 1996; LaLonde & Maltz, 1992; McGinnis *et al.*, 1995; van Laarhoven & Sharman, 1994), the marketing of contract logistics services (e.g. Berglund *et al.*, 1999; Engelsleben, 1999; Large, 2008; Zimmermann, 2004), service offerings and their application (e.g. Ashenbaum *et al.*, 2005; Bhatnagar *et al.*, 1999; Lieb & Kendrick, 2003; Lieb *et al.*, 1993; Murphy & Poist, 2000; Sankaran *et al.*, 2002; Sohail & Sohal; Wilding & Juriado, 2004)[1] and the strategic positioning of LSPs in contract logistics (e.g. Bagchi & Virum, 1996; Baofeng *et al.*, 2008; Bask, 2001; Frohn, 2006; Hertz & Alfredsson, 2003).[2] Although the literature mainly discusses the shipper's perspective, an increasing number of publications have shifted their focus to the relationship perspective of the shipper and LSP (e.g. Baofeng *et al.*, 2008; Bask, 2001; Boyson *et al.*, 1999; Gadde & Hulthén, 2009; Halldorsson & Skjott-Larsen, 2004; Huiskonen & Pirttilä, 2002; Knemeyer & Murphy, 2004; Panayides, 2007a; Panayides & So, 2004; Skjoett-Larsen, 2000). The design of contract logistics service bundles has also gained some attention in the literature. A small number of authors have addressed the problems associated with the design of contract logistics service bundles. In particular, the lack of understanding of customer needs, the lack of appropriate expertise in products and markets, unrealistic customer expectations, the inadequate description of services and service levels, lack of cost awareness and insufficient innovative power of LSPs are cited in the literature (Ackerman, 1996; Ellram & Cooper, 1990; Selviaridis & Spring, 2007; Wilding & Juriado, 2004).

The existing literature provides general advice for building partnerships and defining the scope of services but does not shed light on how service bundles can be designed successfully. This thesis seeks to examine how LSPs, in collaboration with the shipper, successfully design contract logistics service bundles. Fig. 1-1 provides a consolidated overview on the theoretical and practical relevance of this research on the design of contract logistics service bundles.

[1] Though not addressed in scientific contract logistics literature, publications concerning 'ramp-up management' must be mentioned. The topic was viewed from a practical point of view in the study of Schmidt *et al.* (2007) and in a book section by Prockl & Rudpolph (2007). This dissertation distinguishes the design phase from the implementation phase considered in ramp-up management. Accordingly, ramp up management of contract logistics services is not part of this dissertation.

[2] Researchers' efforts to establish and manage contract logistics arrangements also resulted in multiple contributions addressing issues of activities of the development process, such as partner selection, contract design, coordination, communication and information integration (Marasco, 2008).

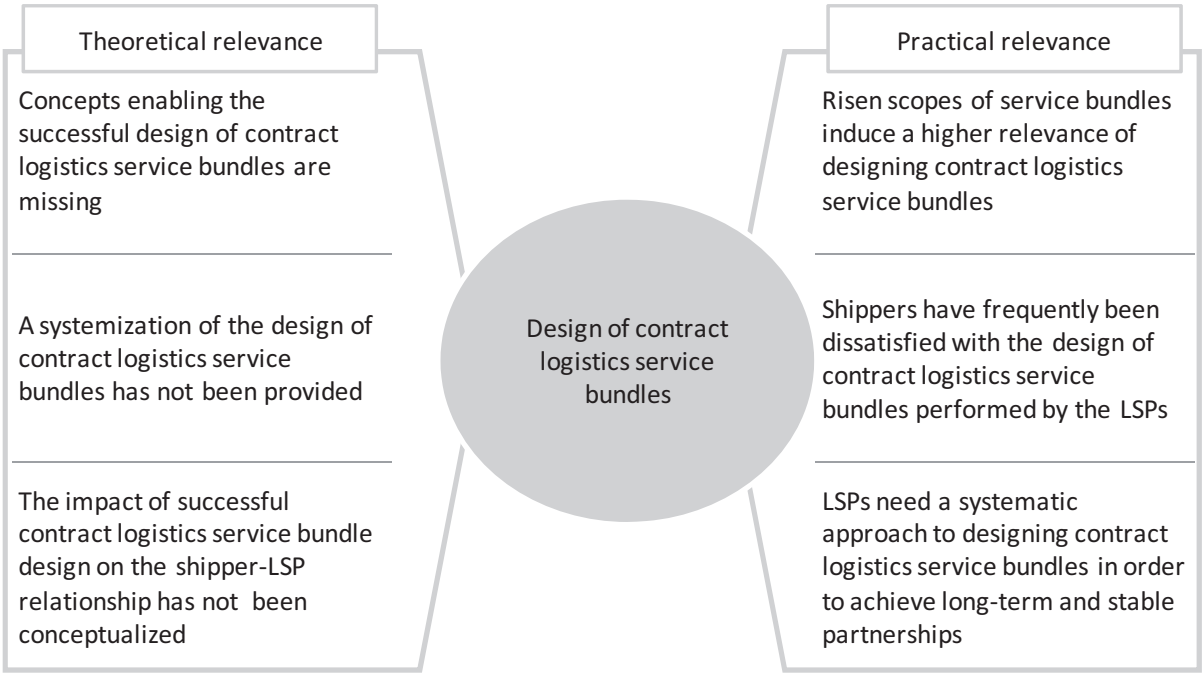

Fig. 1-1: Theoretical and practical relevance of the design of contract logistics service bundles

1.2 Objectives and research questions

The cornerstones of successful service bundle design in contract logistics are addressed in this research in order to fill the theoretical gap and provide managerial advice. Existing research is incorporated in the analysis and supplemented by examining the design of contract logistics service bundles that currently lack conceptual and empirical investigation in the literature. The design phase is viewed through the eyes of the LSP, while also considering the interaction and relationship with the shipper. As stated by Murphy & Poist (2000), a mismatch between the provider's and the shipper's perspectives may be observed in the contract logistics literature. A large number of publications focus on the demand side. Even information sharing, a crucial element of the pre-design and strongly influenced by the interaction of the involved parties, is addressed only from the shipper's perspective (Bienstock, 2002).

This thesis primarily seeks to analyse cornerstones of the successful design of contract logistics service bundles, with the establishment of long-term, stable relationships based on the satisfaction of the involved parties. In the first step, the internal premises of an LSP affecting the design of contract logistics service bundles need to be analysed. Depending on these premises the resources necessary for the design and

capabilities may vary. In the second step, the actual design of specific contract logistics service bundles is addressed.

The objective of this research is consistent with call for research in the literature (Selviaridis & Spring, 2007) indicating the need for further research in the design and implementation of contract logistics services. Researchers are encouraged to address how logistics services are defined and designed within specific shipper-LSP relationships. Consequently, more empirical research on *how* services are defined in contract logistics is required. Another issue addressed is the need for empirical research concerning contract content (*what*) (Selviaridis & Spring, 2007). The existing literature regarding the contractual content is mainly conceptual in nature. Hence "empirical evidence is needed about the type of contracts, charging mechanisms and fee structures applied, […] and the extent of inclusion of penalty/incentive clauses" (Selviaridis & Spring, 2007, p. 140).

Due to the ongoing growth of contract logistics with an increased scope of services driving complexity, successful service bundle design becomes a key challenge for many LSPs. Yet, practitioners do not adequately cope with this challenge. So far, the literature does not provide sufficient guidance on how to design contract logistics service bundles successfully. In response to this deficiency in the literature, this research investigates cornerstones of successful service bundle design and offers advice for practitioners. In order to guide this research and ensure that the objective is met, the following research questions are formulated:

RQ_0: *How can contract logistics service bundles be designed successfully?*

Contract logistics service bundles are designed successfully when both the LSP and the shipper are satisfied with the designed service bundles, resulting in a long-term, stable relationship (compare Fig. 1-2). This perception of successful contract logistics design in the sense of enabling long-term and stable relationships based on satisfaction with the designed service bundles is supported by numerous authors (Blancero & Ellram, 1997; Bolton, 1998; Lambert *et al.*, 1999). Furthermore, long-term and stable relationships are an indicator of successful design because if the relationship was uneconomical or somehow unsatisfactory, in the long run, one of the partners would end the relationship. In order to answer the main research question, three subordinate research questions are derived and subsequently addressed.

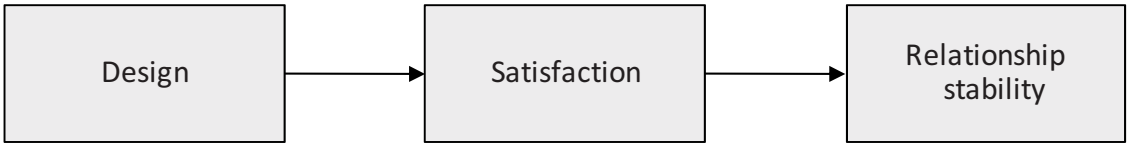

Fig. 1-2: Design as an antecedent of relationship stability

The first subordinate research question (RQ_1) takes the LSP's perspective in the design of service bundles into account. In order to design contract logistics service bundles successfully, LSPs need distinct resources. These resources, as an elementary prerequisite for the design of contract logistics service bundles, may be arranged in specific ways. The research at hand therefore aims to examine the specific resources a LSP needs to design contract logistics service bundles successfully.

> ***RQ$_1$***: *Which resources do logistics service providers need to design contract logistics service bundles successfully?*

The second subordinate research question (RQ_2) covers another fundamental basis of successful service bundle design, namely, the shipper's satisfaction with the service bundle. Adequate service bundles are achieved when shipper needs are understood and transferred in the design of contract logistics service bundles. This process of integrating shipper needs is frequently impaired when service providers lack an understanding of their client's supply-chain demands, or when services are under-specified (Ackerman, 1996; Ellram & Cooper, 1990; Wilding & Juriado, 2004). Only if the LSP understands the shipper's needs and is able to transfer those needs into a concept, as the dedicated result of the design, will the relationship persist over time.

> ***RQ$_2$***: *How is the understanding and transfer of customer needs shaped successfully within the design process?*

The third research question (RQ_3) tackles shipper and LSP satisfaction with the content defined in the design of contract logistics service bundles. Successful service bundle design in the sense of a long-term and stable relationship is dependent on both partners' satisfaction with the designed concept's content. As the LSP offers services to the shipper and intends to generate revenues as well as secure the survival of the company, the satisfaction of the LSP is primarily bound to the financial returns it receives from the shipper. The survival of the LSP is also essential for the long-term relationship from the shipper's perspective in order to avoid costly provider switches.

Furthermore, the shipper's outsourcing decision is driven by the prospects of cost reduction (Makukha & Gray, 2004). An appropriate financial compensation is consequently also in the shipper's interest. In the design phase of contract logistics service bundles, a remuneration model providing a framework for the LSP's compensation is agreed on. We therefore need to investigate how remuneration models affect the successful design of contract logistics service bundles in the sense of establishing a long-term, stable relationship:

> ***RQ$_3$**: How is the remuneration model shaped in the design phase in order to secure long-term cooperation?*

The research questions will be answered on the basis of theory and empirical investigation. Answers to these questions indicate how to approach three important cornerstones of successful service bundle design in the sense of long-term, stable relationships (see Fig. 1-3).

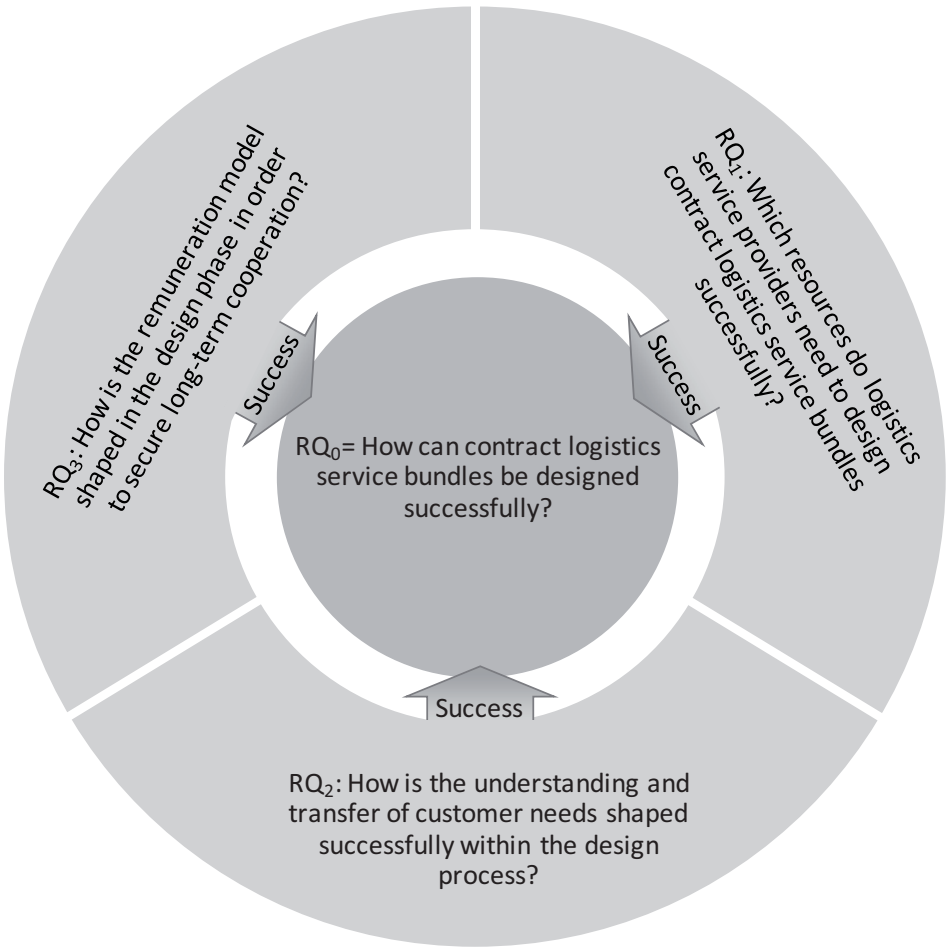

Fig. 1-3: Three subordinate research questions contribute to answering the main research question

2 Positioning within scientific theory and clarifying the research design

This chapter gives an overview of scientific theory and clarifies this research's scientific-theoretical position, which is appropriate for answering the stated research questions. The positioning helps to classify the research at hand and provides guidance for the further analysis. Moreover, an outline of the dissertation is presented.

2.1 Positioning the research in scientific theory

The dissertation is based on the perception of business administration as applied social sciences, combining a theoretical and pragmatic approach to the research object (Raffée, 1995). In this sense, business administration is understood as a management science dedicated to the design, control and development of social systems (Ulrich, 1984). The positioning of this work in scientific research may assist practitioners as well as other researchers in relating this work to existing research on third-party logistics, contract logistics and organisational relationships in general.

According to Hofmann (2004), three levels of scientific research – namely, meta-methodological, methodological and theoretical – can be distinguished. Each level addresses specific aspects of research and states propositions for the subordinate level, making these levels interlinked (see Fig. 2-1). In the following, these levels are discussed individually in order to perform a stepwise classification of the research conducted in this dissertation.

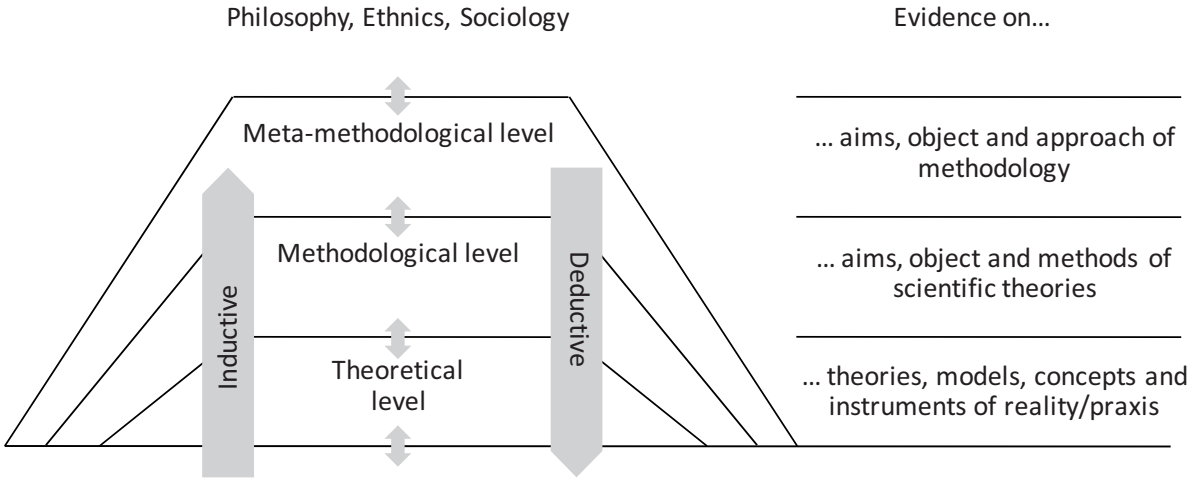

Fig. 2-1: Levels of scientific research (based on Hofmann 2004, p. 11)

The **meta-methodological level** represents the highest level of abstraction in research. Before researchers begin to approach certain phenomena by asking questions like 'what' to research and 'how' to research, the question of 'why' to research needs to be answered. Meta-methodology can thus be seen as the starting point and the basis of any research. The question of 'why' to research is intertwined with assumptions of the interrelated concepts of ontology, epistemology and human nature (Holden & Lynch, 2004); see Fig. 2-2.

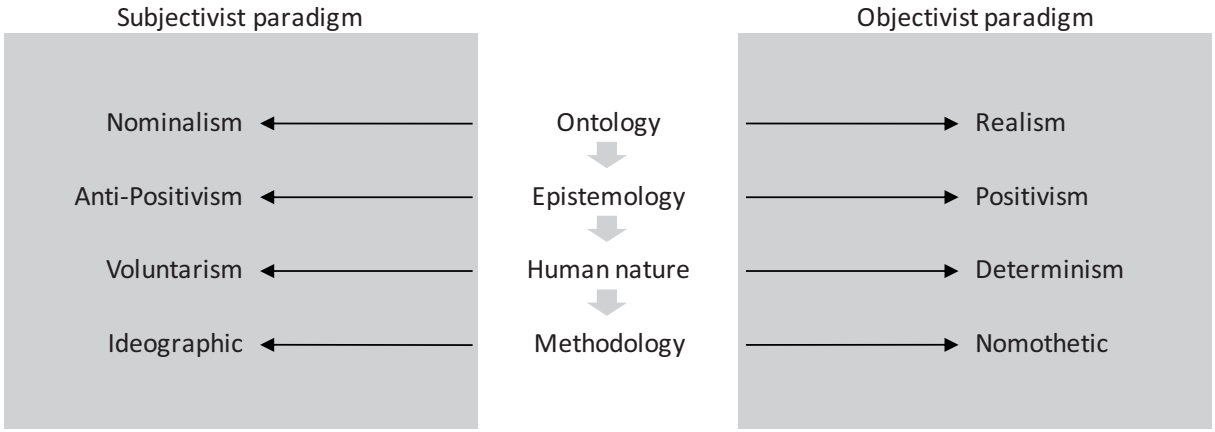

Fig. 2-2: The subjectivist-objectivist paradigm of research (inspired by Burrell & Morgan, 1979; Holden & Lynch, 2004, p. 399)

Regardless of the researcher's position in these dimensions, the view of ontology will affect the epistemological belief, which in turn influences the view of human nature and hence the choice of methodology (Kirst, 2008). The diametrically opposed assumptions for each dimension are known as the subjectivism and objectivism paradigms. Diverse philosophical positions can be found within the spectrum of each assumption.

Ontology literally means 'investigating that which is.' It can be considered as the study of being and existence in general, while the nature of being is the object of investigation in metaphysics (Valore, 2006). One extreme pole of ontology is 'nominalism,' which assumes that universals and ideas are names that do not fundamentally correspond to reality. The perception of nominalism is driven by the idea that reality is a mental abstraction and has been formed by an act of creative imagination "and of dubious intersubjective status" (Morgan & Smircich, 1980, p. 494). By contrast, 'realism' is perceived as the belief that reality is external to the individual and hence objective in nature (Kirst, 2008). Consequently, the social world is a 'thing' that exists and affects the human being in multiple ways (Morgan & Smircich, 1980).

Epistemology is concerned with the foundation of knowledge. Again, two diametrically opposed perspectives exist. 'Positivism' aims to explain and predict real-world processes. It is rather similar to nominalism, as it views the world as socially constructed and subjective. Conversely, 'anti-positivism' describes the real world as relativistic and considers the researcher inseparably bound to the researched objects or investigated phenomena. The anti-positivist perspective exclusively considers the view of individuals integrated in the activities that are subject to research. Cause and effect are not distinguished (Hirschmann, 1986). Positivists, by contrast, intend to investigate causal dependencies or regularities between the elements (Holden & Lynch, 2004).

Two other popular opposites in epistemological discussion are 'radical constructivism' and 'critical rationalism.' Radical constructivism represents normative research and argues that there is no objective reality but everything is subject to the observer's individual perception and interpretation. By contrast, critical rationalism assumes that an objective reality independent of pragmatic reasoning exists and researchers are able to discover it (Popper, 1965).

Human nature is described as another dimension influencing the meta-methodical level and therefore the research method. It reflects the influence of the nature of humans on the environment and vice versa, discussing the researcher either as controlled or as controller (Holden & Lynch, 2004). Again, two opposed perceptions of human nature can be distinguished. 'Voluntarism,' on the one hand, characterises man as a conscious being who decides autonomously and is able to influence his environment. 'Determinism,' on the other hand, postulates that the human being is determined by external factors, the environment (Holden & Lynch, 2004).

The **methodological level** describes the 'intermediate level' between the meta-methodological and the theoretical levels. It is generally perceived as the 'science of methods,' attempting to understand the logic of techniques, procedures and rules (Hofmann, 2004). Two distinct and focal objectives of scientific intentions are distinguished: the theoretical and the pragmatic objectives of science. These two objectives cannot be viewed separately, as they determine each other. Pragmatic objectives will not be realised without theoretical foundation, while merely theoretical research results are obsolete and inadequate for practice in the applied sciences. Following these objectives, two methods of gaining findings can be identified: the inductive approach and the deductive approach.

The *inductive approach* intends to derive rules or relations by investigating single phenomena and making inferences from the particular to the general (Eisenhardt,

1989; Lingnau, 1995). It can thus be applied to develop theories (Morgan & Smircich, 1980). Researchers make use of single observations of a phenomenon in an attempt to find fundamental links and thus generate a theory (Lingnau, 1995). Observations in a specific sample are assumed to be transferable to other samples. In the inductive approach, research commonly works with qualitative methods in order to gain deep insights and be able to establish and explain links and rules, without the anticipation of models describing the real world beforehand (Morgan & Smircich, 1980). *Qualitative methods* produce descriptive data about individuals seen as part of a whole and not as isolated variables (Lamnek, 2005). They aim to identify correlations and inner structures of the object of research (Lamnek, 2005) and attempt to detect intentions, objectives and the basis of human actions without *ex-ante* anticipation of theoretical models (Flick, 1995). Hence qualitative research is characterised by descriptive and interpretive procedures. This requires profound contextual knowledge of the researcher in order to interpret and judge the observed facts and circumstances (Charmaz, 2006). In order to guarantee the adequacy of the research, Mayring (2002) asks researchers to meet certain quality criteria in qualitative research, namely, documentation of proceedings, argumentative hedging of interpretations, rule-directedness (adherence to systematic analytical procedure), proximity to the object of research, communicative validation and triangulation.

Qualitative methods provide certain advantages for the researcher. They permit the unstructured gathering of data, allowing new fields of research to be explored. Thus the researcher is able to adapt the process of data gathering to new insights and results, thereby augmenting the chance of novel findings. The disadvantages of qualitative methods are almost equivalent to the advantages of quantitative methods. Qualitative methods are harder to track because of the frequently unstructured procedures, not directly measurable results and interviewer influence. The results of the research can rarely be reproduced by other researchers and thus do not meet objectivity criteria. Another drawback of this approach is the assumption that the results of single observations can be discarded by the next observation (Martin, 1989).

Conversely, the *deductive approach* aims to confirm theories by testing *ex-ante* formulated hypotheses of relations. Inductive observations may assist in developing a theory, which may then be tested and confirmed with the help of the deductive approach. Observations are made on the basis of a pre-formulated hypothesis. Most commonly, *quantitative methods* are applied in order to derive results from the general to the particular and intend to falsify incorrect hypotheses and theories (Popper, 2004).

This approach is dedicated to isolating causes and effects, operationalising theoretical interrelations and measuring research phenomena to verify or falsify models or hypotheses developed with the help of theory-driven conceptualisations (Holden & Lynch, 2004; Kromrey, 2006; Mayntz, 1985). It therefore follows critical rationalism (Lamnek, 2005; Mayring, 2002).

Quantitative methods afford certain advantages. The method of data-gathering is standardised and relatively objective (Schnell *et al.*, 2008). Furthermore, the narrow focus allows quantified results providing statistical significance (Atteslander, 2006). Of course these advantages are accompanied by disadvantages. For example, it is absolutely possible to derive void deductive conclusions, with errors detectable by pure logical reasoning (Martin, 1989). Moreover, universal declarations are hardly possible in business science (Schneider, 1981), making general business theories impossible to develop. Inherent to the research design of testing *ex-ante* hypotheses, this method strongly relies on the knowledge of the researcher and hence the assumption that causal-relationships systems can be described as well as explained in general principles (Konegen & Sondergeld, 1985). Therefore quantitative methods are not recommended for all areas of the social sciences and research in business administration (Flick, 1995).

The **theoretical level** is concerned with specific characteristics of scientific theories[3]. Scientific theories may be interpreted as conjunct and consistent hypotheses.[4] At this level, the researcher needs to choose between single- and multiple-theory approaches. Multiple-theory approaches are further divided into pluralistic and eclectic approaches (Lechner & Müller-Stewens, 1999). An eclectic approach unites different theories to coherent systems of declarations (Singh & Kundu, 2002). By contrast, a pluralistic approach uses multiple theoretical assumptions, applying each theory in its original form (Kirsch, 1990).

The research at hand applies the notion of business administration research as an applied science (Hill & Ulrich, 1979), as stated at the beginning of this chapter. Businesses are perceived as complex social systems that are not fully controllable

[3] In addition to theories, models, concepts and instruments can be identified on the theoretical level (Osterloh & Grand, 1994). Models are a formalised image of a complex problem of reality whereby declarations to real problems can be made (Schneider, 1981). By contrast, concepts are usually systematic interpretations of practical knowledge with an inductive approach resulting in recommendations (Stölzle, 1999). Instruments refer to a process-oriented approach with certain steps by the use of physical means (Stölzle, 1999).

[4] Theories need to be based on regularities and logical structures, without any contradictions (Stölzle, 1999).

(Raffée, 1989). This circumstance prompts researchers to detect and analyse causal interrelations between single processes. The design of contract logistics service bundles can be perceived as such a complex social system as multiple interrelations between individuals and the environment, as well as among individuals affect this design. Enterprises involved in contract logistics, especially LSPs, are highly dependent on external input and constantly interact with their social environment.

According to the challenges of the theoretical problem and the research understanding of the University of St.Gallen, this dissertation is positioned at an intermediate stance between the diametrical positions displayed in Fig. 2-2. This positioning on the one hand stresses the existence of a reality, namely, designing real contract logistics service bundles. On the other hand it incorporates the relativity of our knowledge, which is always theory-dependent. This agrees with Aastrup & Halldórsson (2008), who discussed critical realism. The design of contract logistics service bundles is thus considered a concept in business research that deals with the establishment of social systems. Human nature as the third dimension of the meta-methodological level influences, besides ontology and epistemology, the research method to be applied in this dissertation. With human nature distinguishing between the perception of man being the controlled or the controller (Holden & Lynch, 2004), this specific work may be classified as occupying an intermediate position between voluntarism and determinism, as the research on the design of contract logistics service bundles perceives man as an actor making decisions while being influenced by their environment.

Concerning the methodological level, both inductive and deductive approaches are deployed with respect to contract logistics service bundle design. It is almost impossible for a researcher to follow solely one approach. Hence a first approach to this research, originating from the phenomena and challenges observed in practice, is an in-depth literature review and analysis that helps to develop a framework and structure the topic. This procedure enables the researcher to develop a distinct pre-perception of the subject of study and generate specific questions that need to be investigated in practice. Thus a deductive approach was chosen. The approach may be used to examine real-world examples of designing contract logistics service bundles. The researcher may seek patterns that help to derive theoretical implications that are transferable to managerial implications useful to practice (compare Fig. 2-3).

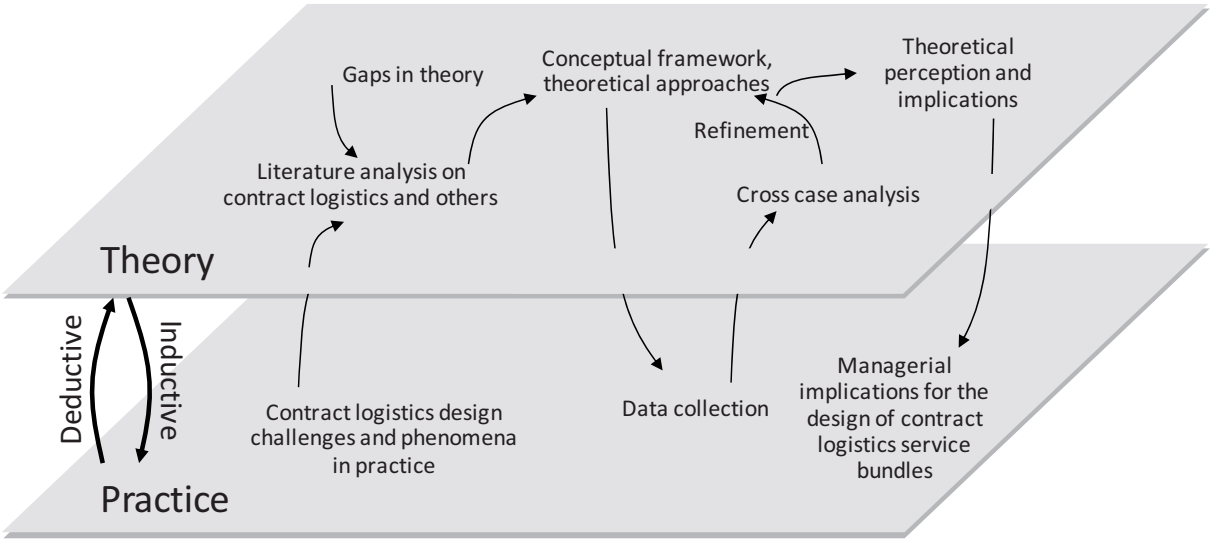

Fig. 2-3: The iterative process of research on the design of contract logistics service bundles

In choosing between qualitative and quantitative methods, it is important to note that research on the design of contract logistics service bundles is still rather rudimentary and designing contract logistics service bundles reflects a set of various interlinked elements, influenced by social interaction mechanisms that are currently not fully understood. As there are multiple variables influencing the design of contract logistics, this field of research exceeds the capabilities of quantitative research. Instead, this research calls for exploratory research methods, analysing phenomena in depth. In order to gather the most relevant and fruitful results, empirical observations are gathered with the help of a multiple-case-study design. The practical qualitative input was generated in a research project that the author conducted during the second half of 2009 at the Chair of Logistics Management at the University of St.Gallen. A holistic view of the unit of analysis is estimated to provide in-depth data for the identification of relations between phenomena and allows the formulation of propositions. Thirteen in-depth case studies were executed.[5] As the intention of this research is to examine crucial elements of successful service bundle design, shippers and LSPs were interviewed with respect to a specific project and the respective service bundle, as well as the relationship. In order to be able to evaluate the success of the specific contract logistics service bundles design in the specific contract logistics project, a central precondition was an implemented and stable contract logistics relationship between the two firms. Only case studies with comprehensive data on all relevant areas of interest

[5] The number of case studies is considered sufficient, as publications with similar objectives have applied between 1 and 10 cases; e.g. (Dekker, 2004; Halldorsson & Skjott-Larsen, 2006; Knoppen & Christiaanse, 2007; Kuo *et al.*, 1999; Mortensen & Lemoine, 2008; Ryals, 2006). According to Ellram (1996, p. 95), "the case study method generally emphasizes qualitative, in-depth study of one or a small number of cases."

were included in the analysis.[6] Therefore two case studies were excluded from further consideration. The choice of the specific case studies and the data collection process are described in the individual context of Papers 2 and 3, which can be found in Appendices B and C.[7]

In order to build frameworks for data collection and analysis, the theoretical level distinguishing between one single or a combination of multiple theories needs to be considered. The design of contract logistics service bundles is influenced by multiple factors. These factors of influence vary fundamentally. Since the researcher addresses three specific factors of influence (see research questions) it is impossible to apply only one theory and leads to the choice of a multiple theory approach. In order to use the most applicable theory for each section of this dissertation, a pluralistic approach rather than an eclectic approach is suitable for the research at hand. Each theory serves as a guideline for the analysis of phenomena found in practice and interrelations indicated by the theory can be transferred to the real world. The derived frameworks are developed in order to develop theories with testable propositions (Kubicek, 1977).

Multiple theories appear to be suitable to explain cornerstones of the design of contract logistics service bundles. The superior research question is thus split into smaller units, which are then discussed with respect to the most appropriate theory. Though the design of service bundles is an inter-organisational topic, the first research question is concerned with LSP internal premises, namely, resources for designing contract logistics service bundles. Engaging in contract logistics is a strategic decision requiring dedicated resources. The strategic origin of the resource-based view (RBV) appears reasonable, as contract logistics requires, apart from the basic logistics core competencies, novel and growing resources and capabilities for successfully designing and performing contract logistics service bundles. Furthermore, the internal perspective of the RBV supports the discussion of LSP internal premises, i.e. resources (Barney, 2001; Freiling, 2001). By contrast, theories like the market-based view do not entail such a perspective. In addition, inter-organisational theories like the relational view or approaches of the new institutional theory are not appropriate, as the research question considers an early stage of research. Hence resources must first be identified before problems in relationship design can be considered.

With the understanding and transfer of customer needs to the design the second research question covers an inter-organisational issue. As this question addresses the

[6] The researcher ensured to meet all quality criteria for qualitative research required by Mayring (2002).

[7] Paper I is a conceptual paper with two case examples for illustration. Hence no case study selection and analysis was conducted for this paper.

examination of an information flow and hence a learning process between the shipper and the LSP, absorptive capacity theory (ACAP) is chosen as theoretical support to answer this question. Unlike other organisational learning theories, ACAP explicitly considers an external perspective, as it covers a firm's ability to integrate and apply external knowledge. Additionally, ACAP takes up a processual perspective suitable for analysing the process of understanding and integrating shipper needs (Zahra & George, 2002). Other theories like the transaction cost theory could be applied to partial aspects of the research question, such as the institutional arrangement (Stölzle, 1999), e.g. the extent of outsourced services, but would not cover the holistic perspective required here. Further applicable theories in the inter-organisational context are the network theory and interactional approaches. These theories would be suitable if the research objective and framework had a behavioural scientific orientation (Magnus, 2007; Stölzle, 1999).

Concerning the third research question, addressing the remuneration role in successful contract logistics service bundle design, agency theory is particularly applicable because it incorporates incentives and goal alignment between two organisations. It is one approach of the new institutional theory and it considers the inter-organisational relationships. Agency theory in general provides advice for the contract design between a principal (shipper) and the agent (LSP) (Jensen & Meckling, 1976). As the remuneration model is a fundamental part of contract design, implications from agency theory serve as valuable input for the appropriate choice of remuneration models. Agency theory helps to address the third research question, particularly with regard to the effect of incentives as a means of reducing goal conflicts and information asymmetries. By contrast, transaction cost theory is not applicable here. Though integrating specificity as well as uncertainty, which are factors to consider in remuneration models of contract logistics, transaction cost theory is not able to explain incentive mechanisms for the inter-organisational contract design.

Summing up, the three research questions and objectives are considered with theoretical input from the resource-based view (RQ_1), absorptive capacity (RQ_2) and agency theory (RQ_3).

2.2 Structure of the dissertation

Having set the foundations of this research, and having discussed the research objectives and their positioning in scientific research, an outline of the dissertation is

presented. The dissertation is structured in six chapters. Fig. 2-4 provides a graphical illustration of the dissertation's structure.

After the introduction and the positioning in scientific theory in Chapters 1 and 2, Chapter 3 discusses the conceptual background of this research and provides the fundamentals for the subsequent discussion. Chapter 3.1 addresses the rather indefinite definitions of contract logistics found in the literature. Chapters 3.2 to 3.4 address specific characteristics of contract logistics, such as service bundles, relationships and design activities, to gain a sound understanding of contract logistics. Chapter 3.5 closes with a brief summary of the conceptual background.

Chapter 4 is devoted to the development and description of the conceptual framework that the research is based upon. Firstly, the design phase is fitted into the varying phase models frequently used in contract logistics. In the second step, potential perspectives of the design of contract logistics service bundles are discussed (Chapter 4.2). Chapter 4.3 describes the conceptual research framework for the design of contract logistics service bundles.

Chapter 5 summarises the key findings of this research. The chapter provides an overview on the three scientific papers in the appendix. Each scientific paper addresses one research question. Chapter 5.1 subsumes the results of the first paper, which discusses the competitive advantages through specific resources for LSPs in designing contract logistics service bundles based on the resource-based view. The second paper, summarised in Chapter 5.2, tackles the understanding of the shipper's needs and requirements and their transfer into a sustainable design concept for the service bundles. Chapter 5.3 describes the key findings of the third paper, which addresses remuneration models applied in contract logistics relationships as one contract element fundamentally affecting satisfaction of the involved parties and thus determining the success of the design of contract logistics service bundles.

Chapter 6 summarises the contributions to research made by this thesis. It outlines the research objectives (Chapter 6.1) and tackles scientific (Chapter 6.2) as well as managerial (Chapter 6.3) implications of this dissertation. Chapter 6.4 discusses the limitations of the research and provides concluding remarks. The dissertation closes with recommendations for further research (Chapter 6.5).

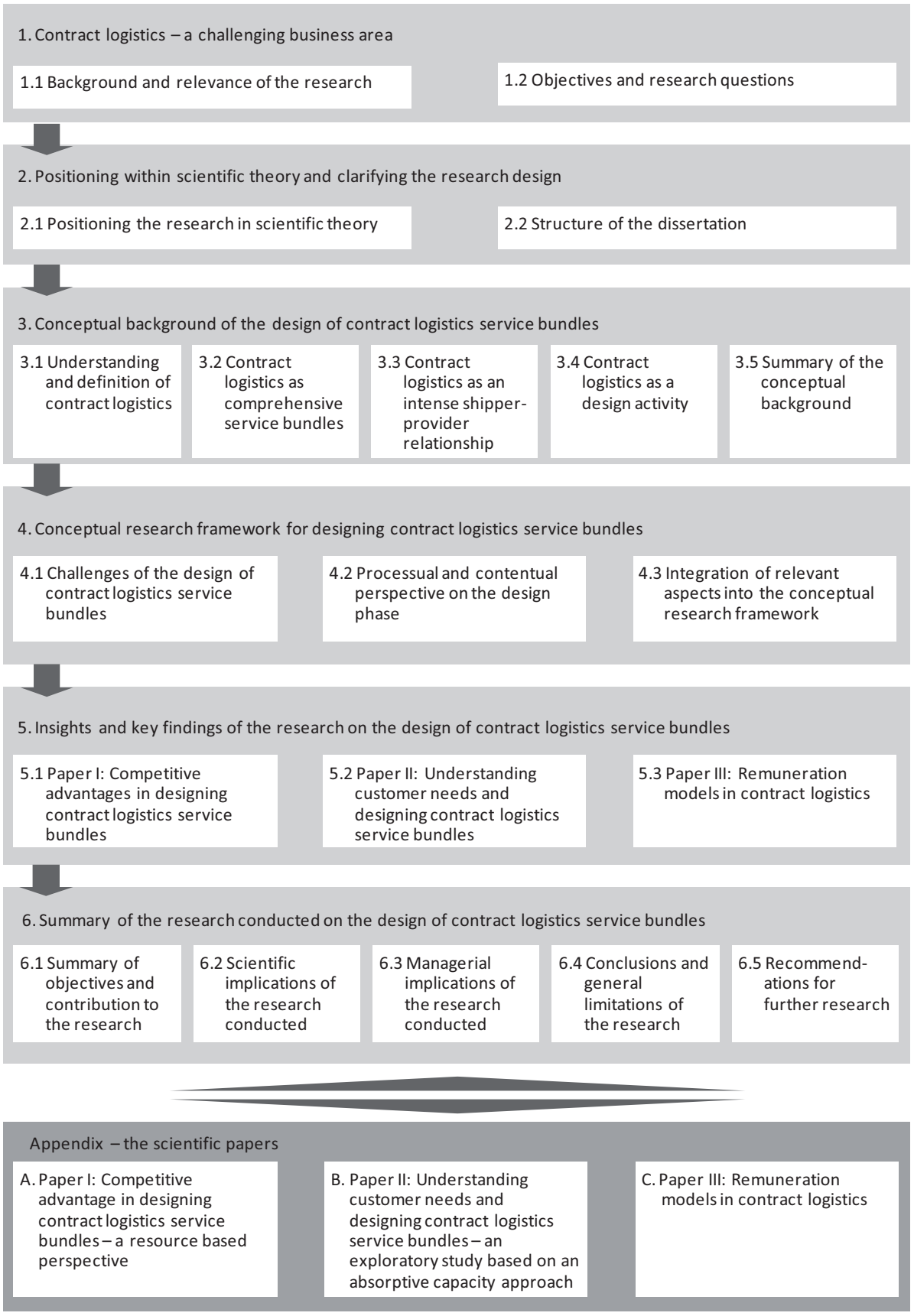

Fig. 2-4: Structure of the dissertation

3 Conceptual background of the design of contract logistics service bundles

Having outlined the research objectives and presented the dissertation's structure, the following chapter provides a general overview of the research conducted in the field of contract logistics, and lays the groundwork for the conceptual framework of this dissertation. In order to achieve a common understanding of contract logistics, different perceptions of contract logistics in research are discussed. Derived from these definitions, contract logistics is defined for this dissertation as comprehensive service bundles, which call for an intense shipper-provider relationship and are designed with dedicated customisation to the shipper's needs. In order to gain a deeper understanding of the research topic and build a conceptual framework for the analysis of cornerstones of successful design, the elements of this contract logistics definition are discussed in this chapter. After outlining the understanding and definition, contract logistics is addressed as complex service bundles, as an intense shipper-provider relationship and, finally, as a design activity.

3.1 Understanding and definition of contract logistics

The quick expansion and widespread discussion of contract logistics is one explanation for the absence of a single prevalent definition of contract logistics and synonymously used notions. As examples of these notions, "third-party logistics" (e.g. Lieb *et al.*, 1993, p. 29), "logistics alliance" (e.g. Bagchi & Virum, 1996, p. 93), "logistics outsourcing" (e.g. Knemeyer *et al.*, 2003), "lead logistics" (e.g. Engelsleben, 1999) or "contract distribution" (e.g. Selviaridis *et al.*, 2008, p. 381) may be quoted. Equivalent to the manifold terms, contract logistics is described by many definitions and interpretations referring to the same action of contracting out some or all of a shipper's logistics services to an LSP (Knemeyer & Murphy, 2005a; Knemeyer & Murphy, 2005b; Marasco, 2008, p. 128; Weber *et al.*, 2007). While in the U.S. the notion of 'third-party logistics' is used extensively, the German literature applies the term 'contract logistics' instead.[8] The definitions vary not only in their concepts, but also in their content. The literature offers a classification of these definitions using the

[8] The research at hand uses the notion of contract logistics because it is commonly accepted in European literature. Other notions, like 'third-party logistics' (3PL), refer to the same phenomenon. For the following, the notion contract logistics is also applied to literature sources using the notion "third-party logistics" or comparable terms.

distinction 'narrow' and 'broad' (e.g. Halldorsson & Skjott-Larsen, 2004; Marasco, 2008), but not in a consistent manner. Definitions of contract logistics are not only manifold; a large portion is also quite blurred (Cui *et al.*, 2009). U.S. definitions are often perceived as broader, because they describe the phenomenon as, for example, "the use of external companies to perform logistics functions that have traditionally been performed within an organisation. The functions performed by the third party can encompass the entire logistics process or selected activities within that process" (Lieb, 1992, p. 29). Coyle *et al.* (2003, p. 425) similarly describe third-party logistics as an external organisation "that performs all or part of a company's logistics functions." These definitions are perceived as broad because the outsourcing of any logistics activity formerly performed in-house is considered contract logistics (Marasco, 2008).

European and especially German definitions usually paint a more distinctive picture than U.S. definitions (Halldorsson & Skjott-Larsen, 2004).[9] The definitions are perceived as narrower, because the term 'contract logistics' does not refer to any outsourcing activity, but rather an outsourcing activity with very specific functional or inter-organisational features (Marasco, 2008). The scope of services and the evolution of alliances, which have grown steadily over the past years, support a definition of contract logistics with stronger integration of LSP and shipper and partnership focus (van Laarhoven & Sharman, 1994). Berglund *et al.* (1999), for example, emphasise the management support in contract logistics and the complex nature of service bundles by defining contract logistics as "activities carried out by a logistics service provider on behalf of a shipper and consisting of **at least** management and execution of transportation and warehousing [...]. In addition, other activities can be included, for example inventory management, information-related activities, such as tracking and tracing, value-added activities, such as secondary assembly and installation of products, or even supply-chain management. Also, we require the contract to contain some management, analytical or design activities and the length of the cooperation between shipper and provider to be at least one year, to distinguish [contract] logistics from traditional 'arm's length' sourcing of transportation and/or warehousing" (Berglund *et al.*, 1999, p. 59).[10] This notion demonstrates the narrow scope of European definitions of contract logistics, defining contract logistics as a form of

[9] The research at hand draws no clear line between U.S. and European definitions, as there are also U.S. definitions, especially more recent ones, highlighting specific aspects of the relationship within their definitions.

[10] Emphasis present in original text.

outsourcing with specific characteristics.[11] These definitions emphasise that the services involved in contract logistics do not only consist of standard, traditional logistics services, but also of non-logistics, value-added, services making service bundles more comprehensive.

Murphy and Poist (1998) emphasise the duration and potential win-win character of contract logistics relationships accompanied by a broader scope of services. Bagchi and Virum (1996) also differentiate between simple outsourcing of logistics activities and so-called logistics alliances, which they describe as a "long-term formal or informal relationship between a shipper and a logistics service provider, rendering all or a considerable number of logistics activities for the shipper. The shipper and the logistics service provider consider themselves long-term partners in these arrangements. Although these alliances may start with a narrow range of activities, there is a potential for a much broader set of value-added services, including simple fabrication, assemblies, repackaging and supply-chain integration" (p. 193). Weber *et al.* (2007) have a similar perception of the notion of contract logistics and define it using attributes like 'integrated service bundles' with varying and comprehensive logistics services, supplementable by additional services that are repeatedly produced by an LSP for another party over a longer period of time. This definition integrates central aspects that can be found among most of the narrower contract logistics definitions. Ideally these relationships are "mutually beneficial" (Murphy & Poist, 2000, p. 121) (Blancero & Ellram, 1997; Bolumole *et al.*, 2007; Boyson *et al.*, 1999; Hofer *et al.*, 2009; Sinkovics & Roath, 2004).

Based on the definitions so far discussed, the following attributes of contract logistics are considered characteristic for contract logistics in the following research:

Contract logistics refers to

- comprehensive service bundles of standard services supplemented with non-logistics services,
- promoting a long-term, stable relationship,
- by customisation of the service bundles to shipper requirements and needs (in course of the design).

[11] This definition is also consistent with the definition of Evangelista & Sweeny (2006), which is related to the Italian logistics service market.

The three characteristics are used in the following to discuss contract logistics in detail.[12] First, the comprehensive service bundles are considered. These service bundles require an intense shipper-LSP relationship, which is considered afterwards. The customisation of the service bundles to the shipper's needs is realised in the design phase, which is described in Chapter 3.4.

3.2 Contract logistics as comprehensive service bundles

According to the derived definition of contract logistics, the outsourced service bundles, consisting of comprehensive services with logistics and non-logistics functions, are characteristic for contract logistics. In order to provide advice on how to design contract logistics service bundles successfully, it is necessary to address this characteristic. The term 'service bundles' describes a package of services varying in number and kind of services that an LSP individually designs and renders for a shipper based on the latter's requirements. Comprehensive service bundles are characterised by a certain scope of services. The scope of services defines the number of services and the depth of the integration of the LSP into the shipper's value chain that the shipper requires, while the service bundles describe the concerted and integrated concept of services that the LSP individually designs for the shipper. The scope of services is defined by shipper requirements and may be extended over time. Comprehensive service bundles entail a certain complexity. Complexity in contract logistics primarily means the rendering of numerous, difficult tasks that are included in a service bundle.[13]

The services provided in contract logistics are highly individual to each shipper. The combination of individual services results in a specific service bundle, designed for a specific shipper-LSP relationship (Andersson & Norrman, 2002; van Laarhoven *et al.*, 2000). A distinct scientifically reliable specification and clear definition including kinds and scopes of services rendered in contract logistics relationships therefore seems impossible. Yet, the development from traditional logistics services like transportation to contract logistics can be observed and characterised. The distinction of traditional logistics services from contract logistics services is displayed in Fig. 3-1.

[12] The first paper (see appendix) provides an in-depth analysis of contract logistics definitions. The definition described in this paper subdivides the relationship dimension of the above contract logistics definition into *long-term relationship* and *intense relationships*.

[13] The structure of a given system is considered complex if it consists of multiple units that are interlinked by several operations and relations (Simon, 1977). This makes it impossible to predict the system's behaviour (Prockl, 2007). Complex service bundles in contract logistics are therefore characterised by the number and kind of elements as well as by the relations and number and kind of connections (Patzak, 1982).

From an analytical perspective, the service bundles can vary along horizontal and vertical dimension. The vertical dimension refers to the number, kind and variety of logistics and non-logistics services. The horizontal dimension specifies the extent of perceived phases of task fulfillment (planning, control and execution) of a service (Engelsleben, 1999).[14] This variance in the services included in a service bundle further drives complexity (Andersson & Norrman, 2002). In contrast to traditional logistics services, not only the number but also the kind of services drives complexity. Traditional services are characterised by 'tangible requirements,' like transport services from A to B, while contract logistics services are characterised by 'outcome requirements,' like securing a service of a certain level. Moreover, contract logistics includes value-adding rather than handling services.[15] In line with the increased scope and tasks of services, management duties tend to engender the mere execution of activities. Finally, a contract logistics service is characterised by the development and reengineering of a solution, while traditional logistics services are based on a stable service definition. This differentiation provides a deeper understanding of characteristics of contract logistics and highlights the increased complexity induced by comprehensive contract logistics service bundles, which makes their design particularly challenging and critical.

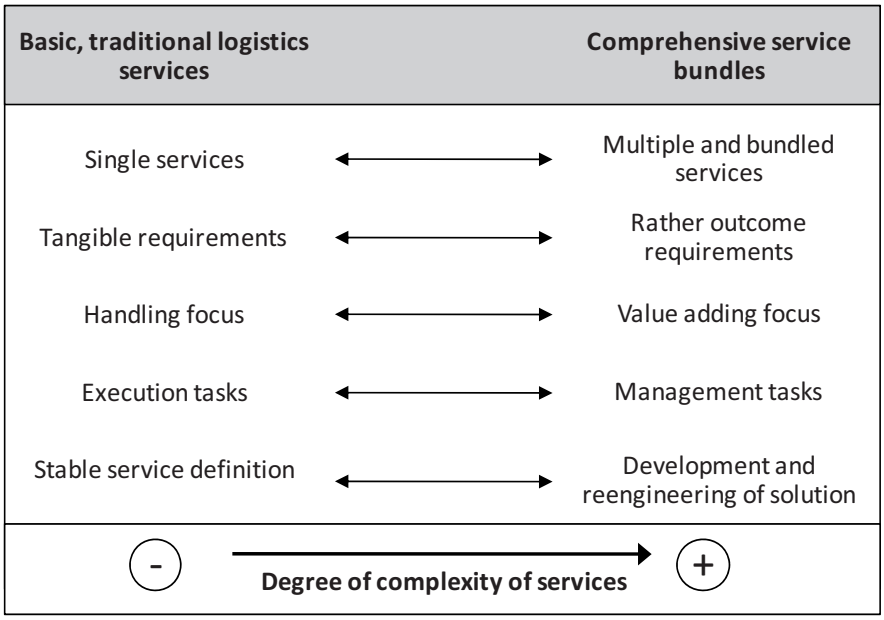

Fig. 3-1: Comprehensive service bundles compared to traditional logistics services (adapted from Andersson & Norrman, 2002, p. 4)

[14] For further clarifications concerning vertical and horizontal dimensions see Engelsleben (1999).

[15] Value-added services are frequently described as services that are not part of traditional logistics, like transportation, handling and warehousing (Frohn, 2006). They are characterised, for example, "as value-added activities, such as secondary assembly and installation of products, or even supply-chain management" (Berglund *et al.*, 1999, p. 59).

As with the plurality of contract logistics definitions, there is no widely accepted description of which services constitute contract logistics service bundles. A review of the literature neither shows a common picture of classic contract logistics services nor confines contract logistics services to a certain scope. In order to provide some understanding of the scope of service bundles and the potential service components, an analysis of contract logistics literature with respect to service bundle characteristics was conducted (for the results, see Fig. 3-2).[16]

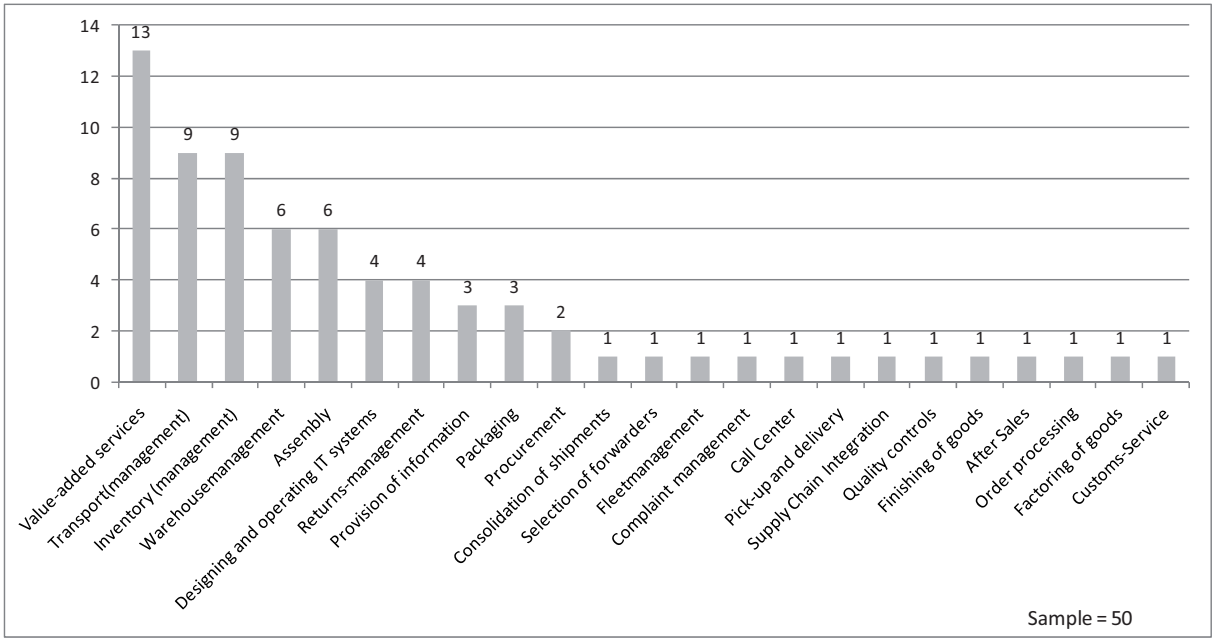

Fig. 3-2: Analysis of service bundle elements[17]

Even though value-added services outsourced in the context of contract logistics, comprising all non-logistics services, account for a large proportion of the service bundles, classic logistics tasks like transportation and warehousing are still the core of the service bundles. However, contract logistics cannot be limited to a particular scope of services. Instead, it seems that traditional logistics services can be supplemented with almost any kind of conceivable service. According to the general service provider credo "customer is king" (Horsefield, 2006; Large, 2007b, p. 115), LSPs seem to take over and establish almost any kind of service the shipper demands or potentially needs. Specific service bundles consequently consist of any service that the customer requires

[16] The sources of the definitions and notions of contract logistics service bundles can be found in the appendix of Paper I.

[17] For the analysis of the components of service bundles, single items mentioned in contract logistics definitions was examined and counted. Hence subsets of value-added services like assembly or packaging are also named. In order to paint a picture of all named items in the definitions, the subsets were not counted to value-added services.

and that the LSP is able to provide. Further to the above literature review results, Sink *et al.* (1996) provide a structure of services performed in practice based on their study of the U.S. contract logistics market (see Fig. 3-3).[18]

Logistics function	Activities
Transportation	Shipping Forwarding (De)consolidation Contract delivery Freight bill payment/audit Household goods relocation Load tendering Brokering
Warehousing	Storage Receiving Assembly Return goods Marking/labelling Kitting
Inventory management	Forecasting Location analysis Network consulting Slotting/layout design
Order processing	Order entry/fulfilment
Information systems	EDI/VANS Routeing/scheduling Artificial intelligence Expert systems
Packaging	Design Recycling

Fig. 3-3: Activities associated with contract logistics in the USA (Sink *et al.* 1996, p. 41)[19]

An investigation of these findings again supports the claim that traditional logistics activities still constitute the core of the examined service bundles and are accompanied

[18] The official wording of Sink *et al.* is 'U.S. third-party logistics market.' For the purpose of unification for this context the word 'contract logistics' is applied (cf. footnote 8).

[19] EDI and VANS are means of electronic data interchange between two firms. EDI "is generally defined as the computer-to-computer exchange of intercompany business documents and information through standard interfaces which requires hardware, software and communications technology that permit those computers to transfer the data electronically (such as purchase orders, invoices, medical claims and price lists)" (Threlkel & Kavan, 1999, p. 348). "VANs are dedicated, private or third-party proprietary communications companies that provide for multiprotocol connectivity. […]It provides other services such as electronic mailboxes and various translation tools that can be used to transform the data to or from a trading partner's application-specific format into a standard format" (Threlkel & Kavan, 1999, p. 348).

by any kind of value-added services.[20] Gudehus (2005) also provides a classification of logistics services. He differentiates logistics services into transportation, handling, warehousing and value-added services. Each category is again split into operative and dispositive tasks.[21] This is consistent with Weber (1996), who distinguishes between the management system and execution system in logistics, an operative component and a dispositive component.[22] In accordance with these authors and Engelbrecht (2003), the services performed in contract logistics service bundles are distinguished with respect to dispositive and operative tasks, as illustrated in Fig. 3-4. According to this structure, operative tasks consist of traditional transportation, handling and warehousing services accompanied by supporting tasks like maintenance and order processing. The dispositive dimension includes the efficient and effective conception and management of operative tasks as well as the analysis and optimisation of interfaces and interdependencies, but mainly serves to structure processes with respect to the shipper's logistics needs. Halldorsson & Skjøtt-Larsen (2004) state that "[M]anagement support [that] can range from simple inventory management to advanced consultancy about re-alignment of supply-chain management" (Halldorsson & Skjott-Larsen, 2004, p. 193).

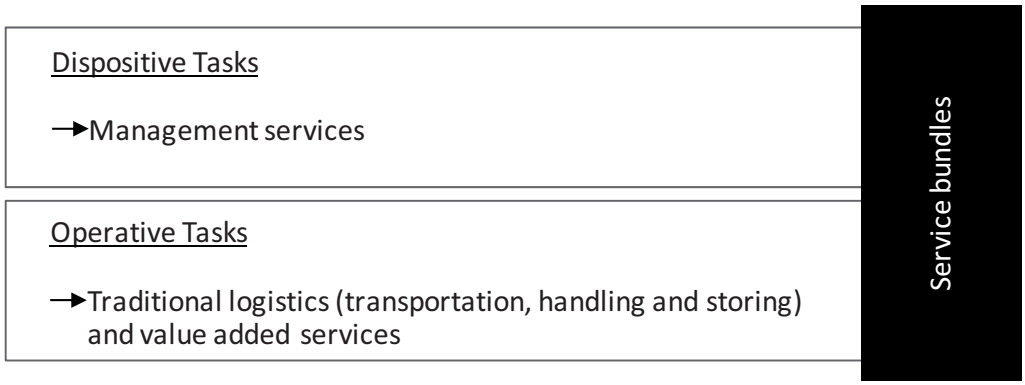

Fig. 3-4: Structuring of tasks involved in contract logistics service bundles[23]

[20] In order to give an example from practice, the contract logistics services of "Supply the Sky" by the Kuehne+Nagel Group (K+N) are described briefly. K+N offers life-cycle-based logistics services for the aviation industry. Services include aircraft production (aviation warehousing, production feeding, pre-assembly support, folio management), supplier management (logistics based on assembly dates, fulfillment, order management, consulting), spare-parts management (MRO support, driving cost, time and quality, purchase order traceability, door-to-door services, order management, repair cycle management, spare-parts warehousing) and specialised aerospace services (incident management / hotlines, aircraft engine movements, in-flight services, airport retail) (Kuehne+Nagel, 2010).

[21] Gudehus applies the German terms 'operativ' and 'administrativ.'

[22] The original wording in the German source of Weber (1996) is 'Führungs- und Ausführungssystem' and was translated into the English language for consistency purposes.

[23] Operative tasks mostly refer to activities of actually moving goods. In German these services are often called TUL (Transport, Umschlag, Lagern), which has in parts also found its way into English literature and translations.

According to the above discussion, contract logistics services are not limited to a specific industry, branch or kind of shipper. The services may instead be performed for any kind of shipper in any kind of branch, be it commerce or industry. Yet, as each branch is characterised by individual goods, services and production processes, potential services in contract logistics can vary widely in practice. This also applies to the peculiarities of dispositive and operative tasks in each service bundle.

3.3 Contract logistics as an intense shipper-provider relationship

As a consequence of the increased scope of services included in contract logistics service bundles, which originates from the focus on core competencies and the concentration on only a few providers, the scope of individual contract logistics service bundles has grown steadily (Klaus, 2008; Klaus *et al.*, 2009). This scope influences the relationship between the shipper and the LSP in two different ways (see Fig. 3-5). In addition to increased dependence of the involved parties, which requires a long-term relationship, intense collaboration is required in order to manage the service coordination (Raubenheimer, 2010).[24] Both of these challenges resulting from comprehensive service bundles are seen as drivers of intense shipper-provider relationships in contract logistics. These relationships have frequently been discussed in the scientific as well as the practical literature.[25]

[24] When considering the type of relationship, different mechanisms of integration, namely cooperation, coordination and collaboration (3 Cs) are reasonable. In the literature these notions are used rather interchangeably. Keast *et al.* (2007) offer a distinction of these notions. Hence *cooperation* refers to short-term, informal relations, in which people basically share information. In cooperative relations the organisations retain individual autonomy and resource independence (Mulford & Rogers, 1982). *Coordination* occurs if specialisation is required and the need to align is given (Litterer, 1973). The efforts do not only require information sharing, but also joint funding and joint planning (Cigler, 2001). *Collaboration* is perceived as the highest degree of integration and as the most stable and long-term kind of agreement (Keast *et al.*, 2007). Members in collaboration consider themselves as interdependent but sharing resources and aligned activities. For more information, see Keast *et al.* (2007).

[25] Both perspectives, LSP and shipper, have been applied in discussing contract logistics relationships. Knemeyer *et al.* (Knemeyer *et al.*, 2003), for example, consider the customer's perspective, while Bolumole (2003; 2001) or Leahy *et al.* (Leahy *et al.*, 1995) take on the LSP view instead. Relationships between the two participating companies are examined with respect to knowledge sharing and learning aspects (Halldorsson & Skjott-Larsen, 2004; Panayides, 2007a; Panayides, 2006; Panayides, 2007b; Panayides & So, 2004) and the interaction aiming to improve logistics outsourcing (Gadde & Hulthén, 2009) is discussed. Moreover, the success factors of relationships in logistics and supply chains are a matter of discussion in the literature. Lambert *et al.* (1999; 1996), for example, classify relationships and propose a partnership model. Logan (2000) applies agency theory to the context of designing successful relationships and Tate (1996) addresses the elements of successful logistics relationships, namely, compatibility between both companies, understanding of business needs, open communication, mutual commitment, flexibility, fairness and trust.

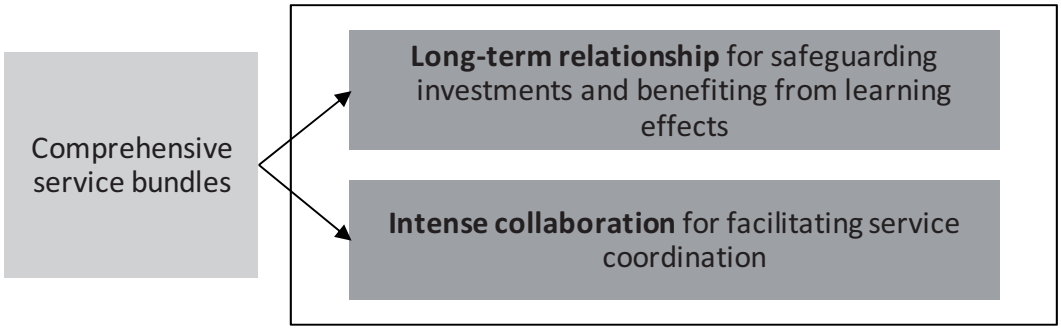

Fig. 3-5: Comprehensive service bundles influencing the relationship[26]

As shippers intend to reduce the number of interfaces with suppliers and service providers and rely on one-stop shopping (Lieb & Bentz, 2005b; Semeijn & Vellenga, 1995), the dependency between the two parties increases (Bretzke, 1998). Due to the comprehensive and customised services involved in contract logistics, specific investments of the LSPs are necessary in each contract logistics relationship, further driving dependency. In order to safeguard these investments, long-term agreements, as the basis of a long-term shipper-LSP relationship, are necessary (Gleißner & Femerling, 2008; Männel, 1997). The service bundles hence determine the *ex-ante* defined (minimum) duration of the relationship between shipper and LSP. Shippers intend to minimise the risks involved in one-stop shopping[27], while LSPs intend to establish long-term relationships, which guarantee higher predictability and reduced variability in service production (Hauptmann, 2007). The shipper moreover benefits from a long-term relationship, as the LSP is likely to experience learning effects and produce a stable quality at an appropriate price. Besides reducing the risks of one-stop shopping, long-term relationships allow the shipper to take advantage of concentrating on a limited number of LSPs (Tripp, 2004) with reduced transaction costs or the avoidance of costly and complex switching processes (Skjoett-Larsen, 2007). Consequently, long-term relationships are a means of reducing potential risks resulting from comprehensive service bundles by establishing mutually beneficial relationships between the companies (Halldorsson & Skjott-Larsen, 2004).

[26] The categorisation of relationships into term and cooperation type was adapted from Diller & Kusterer (1988) and Zellner (2003), who classify business relationships.

[27] The notion of one-stop shopping describes the process by which services are procured from a single source (Bonnemeier *et al.*, 2009). "The term one-stop shopping, to describe total logistics service packages, found usage in trade journals and carrier sales literature during the 1980s" (Semeijn & Vellenga, 1995, p. 27). LaLonde (1991, p. 1) describes one-stop shopping as "the concept that allows the buyer of transportation services to buy multimodal requirements (ocean, surface and air) from one carrier. Multifunction services would also be available from the same carrier and might include warehousing, international information or other services."

Moreover, the outsourcing of interwoven operative and dispositive tasks involved in comprehensive[28] contract logistics service bundles requires more intense collaboration than simple logistics services like transportation (Bretzke, 1998). In order efficiently to manage comprehensive service bundles requiring both operative and sophisticated dispositive tasks, perpetual information sharing between the shipper and the LSP is essential; effective information sharing in turn requires an intense relationship with intense collaboration (Krass, 1983). The demand for successful absorption of customer requirements further drives the need for intense collaboration. Consequently, the relationship orientation of shipper and LSP is gaining importance with the rising complexity of services (Bask, 2001; Bensaou, 1999). The relationship between shipper and LSP in contract logistics is thus characterised by a high intensity of collaboration.

Summing up, intense shipper-provider relationships are an important element in contract logistics. The consequent collaboration is characterised by inter-organisational relationships with broadly aligned interests, whereby both economically and legally autonomous entities are connected by long-term and stable interactions (Freichel, 1992; Krass, 1983). The need for an intense shipper-LSP relationship based on long-term and intense collaboration arises with comprehensive service bundles.

3.4 Contract logistics as a design activity

As mentioned in Chapter 3.1, the comprehensive service bundles in contract logistics are customised to each shipper. The actual customisation is pursued within the design activities. In order to provide a successful service bundle design, the LSP needs to ensure a contract logistics concept that is uniquely tailored to the shipper's requirements. The scope of services included in the service bundles therefore has a distinct influence on how the design is realised. The comprehensive service components make the design a challenging task, with dedicated design activities and management tasks. The design of complex service bundles and the manifold tasks in contract logistics requires sufficient preparation and planning in order to ensure stable service production quality to a certain point in time. Thus, the establishment of contract logistics service bundles for a single shipper is usually perceived and organised as a project (Hauptmann, 2007). Accordingly, practice and literature, especially European literature, refer to contract logistics as 'projects.' Projects are generally characterised as one-off, cross-divisional endeavours that are limited in time,

[28] Bretzke applies the term 'complex service bundles' (in German "komplexe Leistungsbündel"). Service bundles are considered complex when they include a large number of comprehensive services. For the definition of 'complex' and complex service bundles, please refer to footnote 13.

interdisciplinary, important, critical and urgent. Specific organisational arrangements like the setting up of project teams are characteristic (Kuster *et al.*, 2008). Accordingly, contract logistics projects are perceived as the activity of individually designing and implementing comprehensive service bundles.

Like projects in general, contract logistics outsourcing is usually divided into ideal-typical sequences. These sequences are mostly based on observations in practice but have found their way into the literature and provide an attempt to structure contract logistics with respect to project-phase-specific challenges and tasks (Hauptmann, 2007; Krupp, 2006; Zimmermann, 2004). The literature provides various approaches to defining different phases (compare Fig. 3-6).

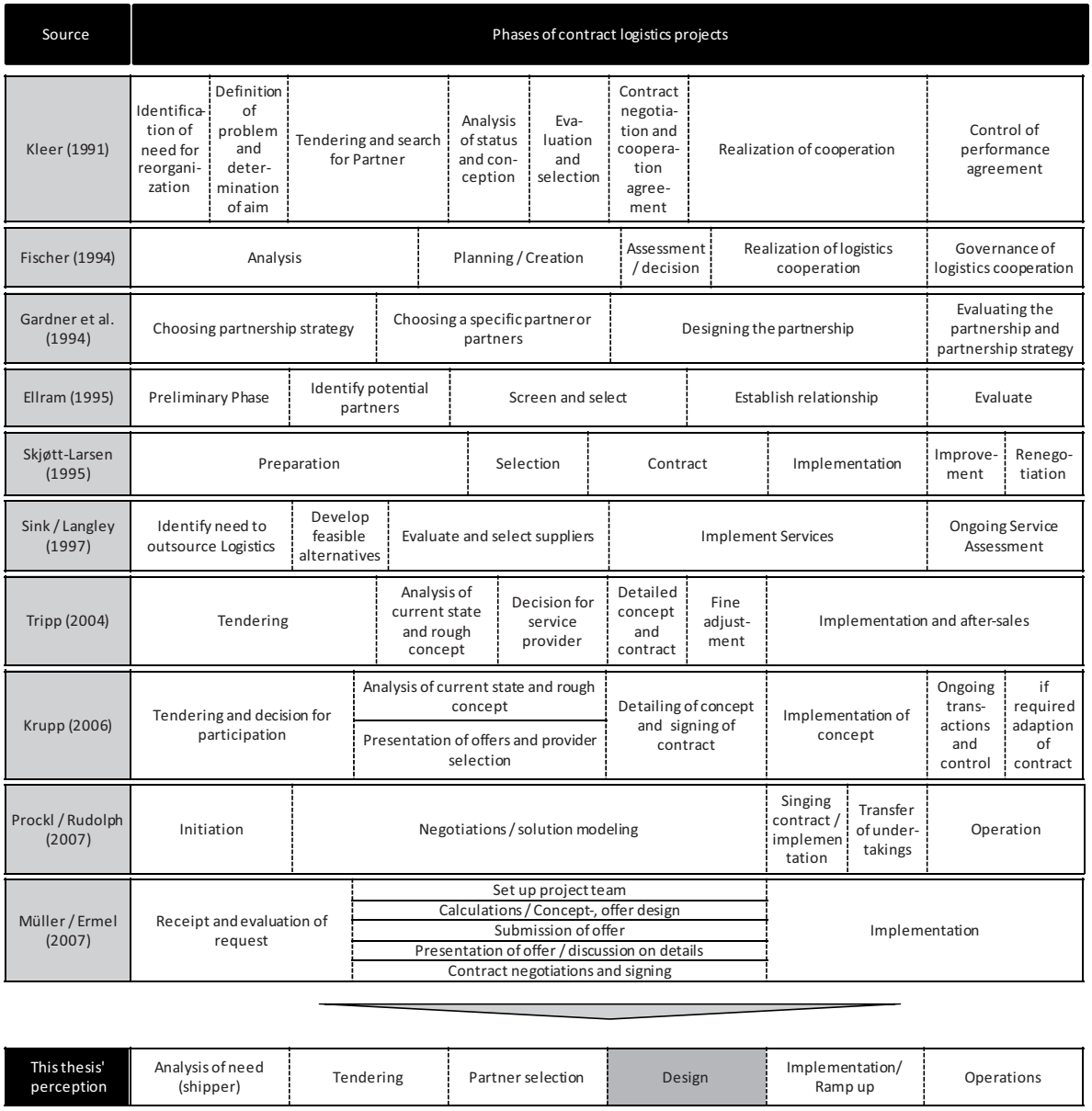

Fig. 3-6: Deriving ideal-typical phases of contract logistics projects based on the literature[29]

As Fig. 3-6 illustrates, no common notion of specific phases has become prevalent, as each project is subject to specific demands and varying scopes of services. Nevertheless, certain shared elements of contract logistics project phases can be identified and are defined as ideal-typical for this dissertation (compare also Fig. 3-6). After identifying the need for outsourcing and specifying the scope of services (analysis of need), the shipper usually prepares tender documents addressing potential service providers (tendering). The scope of services that the shipper wishes to outsource are communicated by the shipper with the respective tender documents. The LSP(s) may respond according to their capacities and capabilities. Based on these

[29] In order to ensure comparability, the project phase structuring in German literature was translated to English by the author. The phase of 'dissolution' was not considered in this literature review.

responses the shipper usually selects one LSP (partner selection). The selected LSP then designs a service bundle concept that includes the required services as well as terms and conditions. As for the dissertation at hand, the design phase is interpreted as the development of a concept involving the definition of the involved service bundle and contract content (design). Having agreed on a contract, the LSP implements and carries out the services agreed upon in the contract. Usually, following a dedicated project plan, the new services are ramped up (implementation) to ongoing service provision (operations).

The analysed need and the individual scope of services determine what needs to be designed. Based on the definition of the services that the shipper wishes to outsource, the LSP needs to develop a service bundle concept. These definitions can be provided with varying degrees of specification. Four guiding principles for service definition can be identified (Axelsson & Wynstra, 2002):

1. Function-describing definition
2. Activity-describing definition
3. Performance- or service-level definition
4. Competence definition

These principles indicate how the requirements can be defined by the shipper, leaving different degrees of freedom for the design of the LSP. The *function-describing definition* refers to features and functionalities that the designed service bundles will have to fulfil in the operating phase. These features need to be specified in the design phase. The *activity-describing definition* requires the description of actions and operations that the service bundles need to perform, which implies that the shippers providing this activity-describing definition have to know exactly how these services are rendered. Moreover, specific *performance or service levels* can be specified by defining performance and cost changes in addition to the functions that the service bundles need to fulfil. Finally, if a *competence definition* is pursued, the capabilities the LSP needs to provide are addressed. This definition is characterised by the shipper not exactly knowing what he is going to buy, but believing that the LSP will have the competencies and resources to support him. The latter accords the highest degree of freedom in the design to the LSP. Resulting from the varying degrees of freedom for the LSPs in the design of contract logistics service bundles, different integration points of the LSP in the design can be identified.

Generally, the design of contract logistics service bundles requires the interaction between LSP and shipper. However, this interaction depends on how the shipper

defined the outsourced services. In their publication on new product development, Handfield *et al.* (1999) offer a structuring approach for the integration of the provider, once again based on a phase model. As for the dissertation at hand, their model is transferred to the context of contract logistics (compare Fig. 3-7). The design comprises different activities performed by the LSP, depending on the point of LSP integration that the shipper requires or allows. Fig. 3-7 illustrates that it is a question of *when* rather than a question of *whether* the LSP and the shipper jointly work on the design.

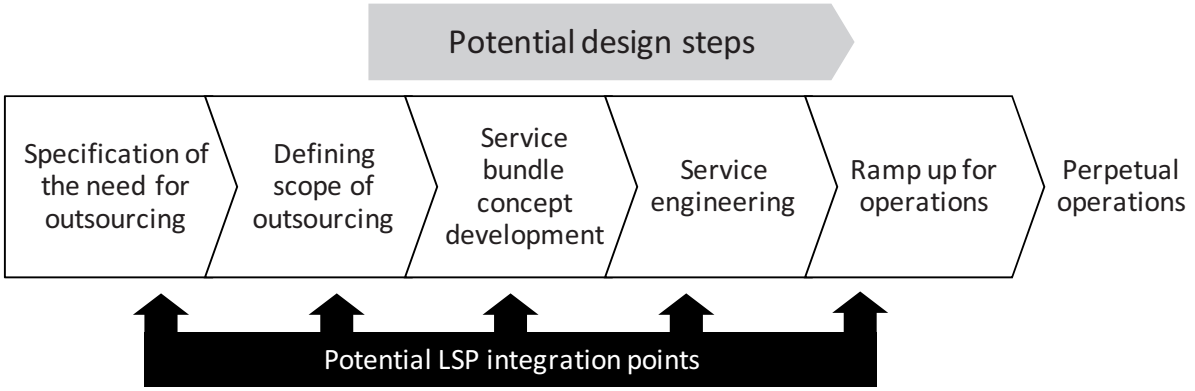

Fig. 3-7: Potential LSP integration points in service design (adapted from Handfield *et al.*, 1999)

According to the illustration, potential integration points of the LSP can be found along the entire design process. The LSP may, for example, be called in to specify the general need for outsourcing, as he knows which services are possible and which are not (referring to the competence definition). Due to this knowledge, he may also be involved in defining the scope of the outsourced services. Moreover, a contribution of the LSP to the service bundle concept development and the engineering and specific design of service bundles is likely. Even if the shipper is capable of performing all the preceding phases of outsourcing autonomously, the LSP needs to be involved at the latest in ramping up the services for perpetual operations (referring to the activity describing definition). Since there is an ongoing trend of shippers expecting comprehensive solutions rather than the mere execution of tasks (Andersson & Norrman, 2002), for this dissertation an integration of the LSP from the development of a service bundle concept is assumed. In order to clarify the requirements and tasks, the shipper and LSP need to collaborate at one point in the design phase.[30] The design of contract logistics service bundles is thus considered an interactive process between the shipper and LSP, with varying levels of involvement of the LSP.

[30] In any case, the LSP will need to perform its own design and resource-allocation process, as they need to dispatch the services into their general logistics system (Andersson & Norrman, 2002).

3.5 Summary of the conceptual background

The conceptual background presented in this chapter addresses central elements of this dissertation's contract logistics definition derived from the literature. Contract logistics is characterised by comprehensive service bundles resulting from an ongoing focus on core competencies and limitation of outsourcing activities to a few LSPs. These comprehensive service bundles require an intense shipper-LSP relationship in the sense of a long-term, intense collaboration. Finally, contract logistics need to be regarded as a design activity that determines what to design and who designs. What to design is derived from the service definition that the shipper provides, which also determines possible integration points of the LSP in the design (who designs).

4 Conceptual research framework for designing contract logistics service bundles

Having outlined the theoretical background of the design of contract logistics service bundles, this chapter is devoted to establishing and characterising a conceptual framework structure for the research process by identifying the relevant constructs and relations involved in the design of contract logistics service bundles. The framework integrates and positions the three scientific papers in the appendix. In order to clarify the research direction of each paper, the tasks and challenges of contract logistics service bundle design, as well as two analytical perspectives of designing contract logistics service bundles, are discussed. These aspects and the theoretical background presented in Chapter 3 are the basis for the conceptual framework guiding the research of the three papers. The framework is displayed in Fig. 4-4.

4.1 Challenges of the design of contract logistics service bundles

As discussed in Chapter 3.4, contract logistics projects consist of different phases. The design of contract logistics service bundles is of particular importance in contract logistics as it is linked to the most essential drivers of satisfaction, namely well-defined demands, procedures and systems (Andersson & Norrman, 2002; Bagchi & Virum, 1998; van Laarhoven & Sharman, 1994). Well-defined demands, procedures and systems refer to, for example, the appropriate specification of "delivery service levels, material flows, approaches to inventory control" (van Laarhoven & Sharman, 1994, p. 46) and definitions of computer systems, shipping volume, industries served, geographic areas and nature as well as level of services (Bagchi & Virum, 1998). As all of these specifications are made in this phase, the design of contract logistics service bundles is particularly challenging. Hence a successful design has a considerable influence on the relationship between shipper and LSP, as the groundwork for the future cooperation is set. Decisions made in this phase affect all subsequent stages of the project. The fundamental goal of the design is to obtain a satisfactory, efficient and implementable (design-)concept of contract logistics service bundles, meaning the specification of the services themselves as well as contractual regulations. A comprehensive and correct description of the services and their anchoring in the underlying contract enable a satisfactory performance of the LSP. The contractual regulations commonly specify the general conditions and terms of

collaboration and are necessary for the management and control of the relationship (Selviaridis & Spring, 2007).

In addition to its importance, the design phase poses various challenges to the parties involved, as developing logistics service bundles that are customised to the shipper's needs is frequently the hardest step (Sink & Langley, 1997). The design phase is particularly challenging, as it is usually the first time the two firms work together in a partnership (Gadde & Hulthén, 2009). Different company cultures and communication and working styles may impede the cooperation. Frequently cited difficulties in the design of contract logistics service bundles include the lack of understanding of the shipper's demands, unrealistic customer expectations or an inadequate description of services and the desired service levels, and the lack of logistics cost awareness by the client (Ackerman, 1996; Ellram & Cooper, 1990; Selviaridis & Spring, 2007; Wilding & Juriado, 2004). Compared to the simple outsourcing of traditional logistics services, such as the one-off purchase of transportation services, the design of contract logistics service bundles requires more profound competencies (Andersson & Norrman, 2002). "The increasingly more bundled and complex services some companies try to outsource lead to an increased need for specification of the service, something which the companies are not used to" (Andersson & Norrman, 2002, p. 9). Moreover, the complexity of the services, combined with the collaboration with a potentially unknown partner, demand an increased interaction and partnership orientation.

As the central research subject, the design of contract logistics service bundles forms the basic element of the research framework. The challenges involved in this design may be considered from two perspectives, which will be considered in the following subchapters.

4.2 Processual and contentual perspective of the design phase

Conceptually, any topic can be addressed from two fundamental analytical perspectives, the processual and the contentual perspective (Levis, 1996). This dichotomy of process and content research has proven to be advantageous in varying fields of research.[31] The processual perspective covers the activities and tasks that are necessary to pursue a goal. The contentual perspective describes the outcome of these

[31] For example, this distinction is considered advantageous in the strategic management literature (Lechner & Müller-Stewens, 1999). Furthermore, research on organisations as well as management provides a similar distinction between functional and institutional perspective. The functional perspective describes the tasks of, for example, management and organisations, while the institutional perceptive characterises the persons and functions in, for example, management and organisations (Steinmann & Schreyögg, 1997).

activities and tasks. This analytical distinction is made for the design of contract logistics service bundles in order to structure the topic and address the research questions adequately. Just like any other contentual perspective considered in the literature, the contentual perspective of the design of contract logistics service bundles refers to the content of the designed service bundle concept. Equivalently, following from the processual perspective used in the literature, the processual perspective of the design of contract logistics service bundles is concerned with activities and tasks in contract logistics service bundle design. In order to sketch a holistic picture of contract logistics service bundle design, the design phase is discussed from the two analytical perspectives, considering *how* to design and *what* to design. First, the definition of service bundles and contract content, be it contract details or service descriptions, requires a contentual perspective. Second, the process of defining these service bundles and the contract content suggest a processual perspective.

These perspectives have been applied in the contract logistics literature before.[32] In the following subsections both dimensions are clarified for their application in the design of contract logistics service bundles in this specific research.

Processual perspective (how to design)

When discussing the design of contract logistics service bundles from a processual perspective, consecutive tasks and actions executed within the design phase are of interest. From a processual perspective, the design phase starts with the absorption[33] of shipper requirements and needs followed by the LSP's internal processing of the received information and transfer of the information into a service bundle concept. The extent to which the demand is specified varies widely, from very detailed forms to rough descriptions of expectations (van Laarhoven & Sharman, 1994).[34] The successful absorption of these requirements and needs is essential to provide an appropriate service bundle concept (Wrobel & Klaus, 2009). The absorption of requirements and needs as well as the processing of this information within the LSP's organisation in order to receive an appropriate concept of service bundles consist of

[32] In their review of 28 articles concerning the status of contract logistics in the U.S., Europe and Mexico, Arroyo *et al.* (2006) point out the application of both contentual and processual perspectives in the literature. One category of papers addresses the content of contract logistics relationships, while another category considers "the processual side of [contract logistics] […] rather than its content, i.e. they focus on the *how* rather than the *what*" (Arroyo *et al.*, 2006, p. 643).

[33] The term 'absorption' is applied to the process of understanding the shipper, as it is later used for the second scientific paper.

[34] Compare also Chapter 3.4.

distinct process steps. These superordinate processes in the design will be referred to 'understand' and 'conceptualise,'[35] and may be further detailed to the consecutive process steps of 'identify,' 'analyse,' 'assess,' 'define' and 'document.'[36] In practice, these generic process steps include an indefinite number of actions. Schmidt *et al.* (2007), for example describe the following processes involved in the design: identify customer demands, analyse quantities, costs and required personnel, assess need for space and techniques, define (business) processes, define IT-structure, calculate prices and costs, define controlling and monitoring instruments and write concept and contract. The nature of the tasks depends on which services the service bundles are designed for. Exemplary actions, which can be found in the contract logistics literature, are illustrated in Fig. 4-1.

The following figure illustrates the design process with its two central processes (understand and conceptualise) and the respective sub-processes. Examples of specific activities included in these processes are provided.

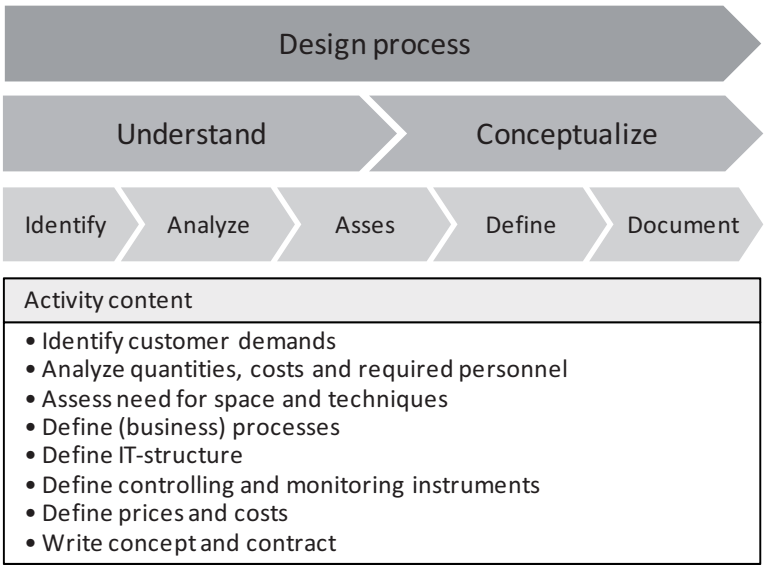

Fig. 4-1: Proccessual perspective of the design of contract logistics service bundles

Contentual perspective (what to design)

The contentual perspective of the design of contract logistics service bundles is concerned with the characteristics of the developed contract logistics service bundle concept. This content is individual to a given contract logistics project as different

[35] Compare (e.g. Tyssen *et al.*, 2010).
[36] The classification was taken from the literature and the processes quoted there (e.g. Schmidt *et al.*, 2007; Tripp, 2004).

service bundles require the specification of different details. Depending on the specific project, the service bundle concept may include information regarding channel structure, i.e. which/how many intermediaries to use, and network structure, i.e. the number and location of supplying and producing units, warehouses and terminals. It also comprises decisions about processes within the logistics system, i.e. warehouse design and operations or transportation management (Andersson & Norrman, 2002, p. 10). Accordingly, from a contentual perspective, the design of contract logistics service bundles typically includes the specification of all or some of the following details (Andersson & Norrman, 2002; Boyson *et al.*, 1999; Logan, 2000; Selviaridis & Spring, 2007; Tripp, 2004):

- services and activities;
- service-level agreements;
- information and communication systems structure;
- costs per activity and remuneration model;
- incentive system (e.g. bonus and penalty systems);
- organisational structure (i.e. roles and responsibilities);
- eventual transfer of personal and personnel requirements;
- timeframe and project team;
- risk and insurance costs;
- duration of contract;
- contract termination clauses.

These contentual details can be distinguished into transaction-oriented and governance-oriented elements (Buriánek, 2009).[37] Transaction-oriented elements comprise all content concerning the scope of services and aims of the relationship, duties, tasks and resource input. The governance-oriented elements comprise the specification of all details regulating the performance of the agreed contract, including communication duties, measurement of performance, decision and monitoring rights, bonus and penalty agreements and remuneration (Buriánek, 2009). The distinction is illustrated in Fig. 4-2.

[37] The original wording in the sources Buriánek builds on ((Blumberg, 1998) and (Furlotti, 2007)) is 'transactional' and 'procedural.'

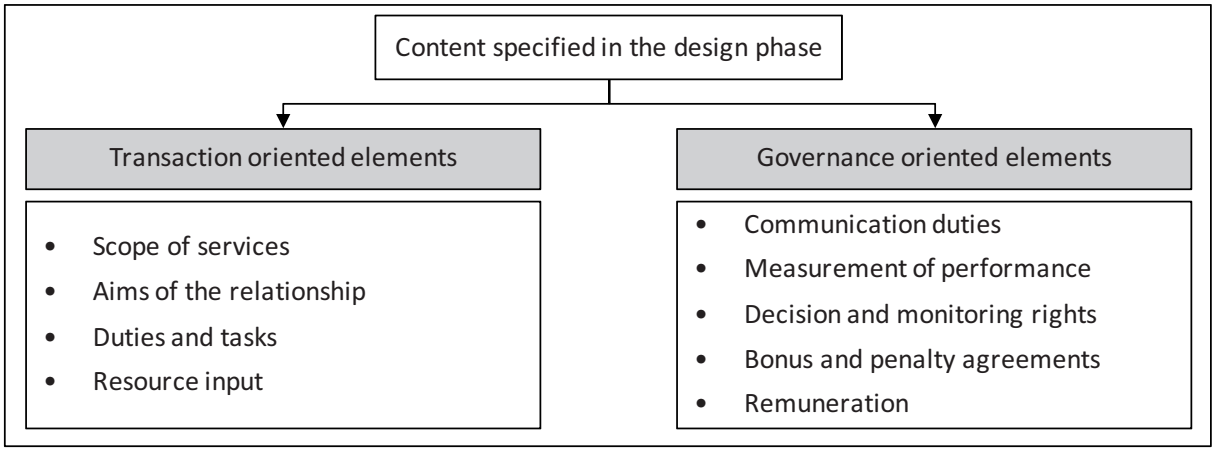

Fig. 4-2: Transaction- and process-oriented elements as components of service bundle concepts[38] (inspired by Buriánek, 2009)

The content of contract logistics service bundle concepts specified in the design phase varies with the character of the involved service bundle. [39] Furthermore, it is subject to customer requirements and internal as well as external premises. External premises include competitive strategy and resource base (de Martino & Morvillo, 2008; Hertz & Alfredsson, 2003; Lambert *et al.*, 1996), whereas internal premises comprise shipper guidelines, degree of shipper involvement and different demands resulting from first-time outsourcing or replacement of another LSP. Next to the specification of a service bundle concept, the way of compensating the LSP plays a major role in the design of the content. The compensation is fixed in the remuneration model, which, together with additional incentive mechanisms like bonus and penalties, forms the remuneration set. This remuneration set is seen as a major influence of successful contract logistics service bundle design (Lukassen & Wallenburg, 2010).

Fig. 4-3 illustrates the design process as a means for determining a service bundle concept by specifying both transaction- and governance-oriented details. Both perspectives are central subject areas for the framework, following in the next chapter, and are addressed in a single paper each.

[38] Due to the industry- and context-specific aspects of each contract logistics service bundle, elements displayed in this figure can only be stated exemplarily.

[39] The literature regarding the design phase from a contentual perspective uses different approaches for the concept's content. Logan (2000), for example, discusses the logic of agency theory in specifying contract content in order to create a trustful, satisfying relationship. Chen (2001) proposes a model for analysing warehousing contract content with space commitments and adjusting options.

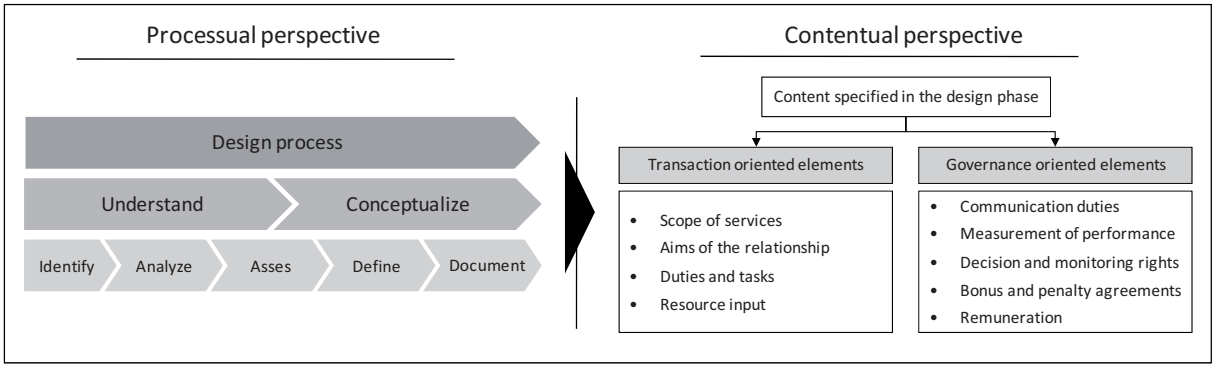

Fig. 4-3: Design content as the result of the design process

4.3 Integration of relevant aspects into the conceptual research framework

A conceptual research framework helps to delimit the scope of research to the most relevant action parameters and the applicable restrictions (Grochla, 1978). It is especially concerned with the search for new relevant dimensions and propositions about potential relations between single dimensions (Grochla, 1978). The conceptual framework of this dissertation aims to systematise the relevant factors influencing the design of contract logistics service bundles and the crucial elements of successful service bundle design. It therefore helps understand and evaluate the essential terms and concepts of the subject area. As discussed, successful service bundle design refers to ensuring long-term, stable relationships. An illustration of the framework is provided in Fig. 4-4.

Influencing factors of successful service bundle design

The design of contract logistics service bundles is influenced by the services included in the service bundle. In particular, the tasks involved affect service bundle design. Moreover, the specific resources that a supplier possesses prior to the design of contract logistics service bundles have an impact on the design. The first paper, therefore, addresses the appropriate resources for successful service bundle design.

LSP resources as a cornerstone of successful service bundle design

Before even considering a particular contract logistics project, each LSP needs distinct resources in order to be able to design contract logistics service bundles for potential customers. Derived from the strategy literature, the firm is seen as a bundle of resources including capabilities (Amit & Schoemaker, 1993). These resources may

depend on the LSP's business strategy. Before considering a particular contract logistics project, each LSP requires distinct resources in order to be able to render contract logistics projects. Dependent upon this strategy, an LSP may utilise existing resources in the design phase to their capacity, while another LSP may establish additional resources for the design of contract logistics service bundles. Consequently, the first cornerstone of successful service bundle design is represented by these LSP resources, whose relevance for successful service bundle design needs to be evaluated and is thus addressed in the first scientific paper of this research.

Understanding and transfer of customer needs as a cornerstone of successful service bundle design

In addition to discussing the necessary resources for the design of contract logistics service bundles, this research attempts to shed light on processes applied in the design of contract logistics service bundles (processual perspective). As the absorption of shipper requirements and needs is important for shipper satisfaction and thus crucial for a long-term, stable relationship, implying successful service bundle design, the absorption of shipper requirements is addressed (Andersson & Norrman, 2002). Ideally defined service bundle concepts, in the sense of meeting customer requirements, are the fundamental basis of satisfaction and thus of a long-term, stable relationship. In case an LSP defines and designs inappropriate service bundles for a shipper, the shipper is more likely to end the relationship and switch to another provider or prompt the present one to undertake comprehensive and costly enhancements and changes.[40] In order to secure well-defined service bundles, the LSP needs to understand and transfer the shipper's needs and requirements into a concept of service bundles (Wrobel & Klaus, 2009). In order to absorb these requirements and needs, processes have to be defined in order to support knowledge flow from the shipper to the LSP.[41] Thus, organisational learning and integration aspects played a prominent role in contract logistics research agendas (Fabbe-Costes *et al.*, 2009; Lambert *et al.*, 1996; Mortensen & Lemoine, 2008; Panayides, 2007a; Panayides, 2006; Panayides, 2007b; Panayides & So, 2004). As a subset of organisational learning but with a dedicated external perspective of other firms, the theory of absorptive capacity incorporates fundamental dimensions of knowledge absorption and

[40] In supplier switching, it must be kept in mind that switching deeply integrated suppliers and providers is a costly and challenging endeavour (Kirst, 2008).

[41] As information is codified knowledge, the term flow of knowledge and flow of information are used interchangeably in this dissertation.

transfer (Zahra & George, 2002). This theory offers an appropriate approach with which to tackle this topic for research purposes and for deriving managerial advice for processes applied in the design of contract logistics service bundles.[42] Consequently, the second paper addresses the understanding and transfer of customer needs.

Design of remuneration models as a cornerstone for successful service bundle design

Finally, contentual guidance for the design of contract logistics service bundles will be provided based on this research. Potential content details were named in Chapter 4.2. Similar to the process of understanding and transfer of customer requirements in the design of contract logistics service bundles, the specification of concept content is crucial for shipper and LSP satisfaction and thus contributes to contract logistics design success in the sense of establishing a long-term, stable relationship. In particular, a fair and adequate remuneration model needs to be developed. Satisfied customers and long-term profitability ensure a firm's survival in logistics, and in the case of contract logistics projects leads to long-term relationships (Mentzer *et al.*, 2004). Adequate remuneration, especially in long-term arrangements like contract logistics, set the path for relational development as well as success (Lieb & Bentz, 2005a).[43] Therefore, choosing an appropriate remuneration model is relevant for both shipper and LSP satisfaction and thus crucial to the success of contract logistics service bundle design. The third paper of this research is thus concerned with remuneration models and provides guidance on which remuneration model to choose for specific service bundle characteristics.[44]

[42] For an in-depth clarification of the chosen approach, please refer to Paper II in the appendix.

[43] By contrast, inappropriate remuneration models may impede the continuation of the relationship, as the LSP might only undertake the most necessary improvements and changes to the services and desist from making further specific investments that are potentially beneficial for the shipper (Lukassen & Wallenburg, 2010).

[44] For further explanation, please see Paper III in the appendix.

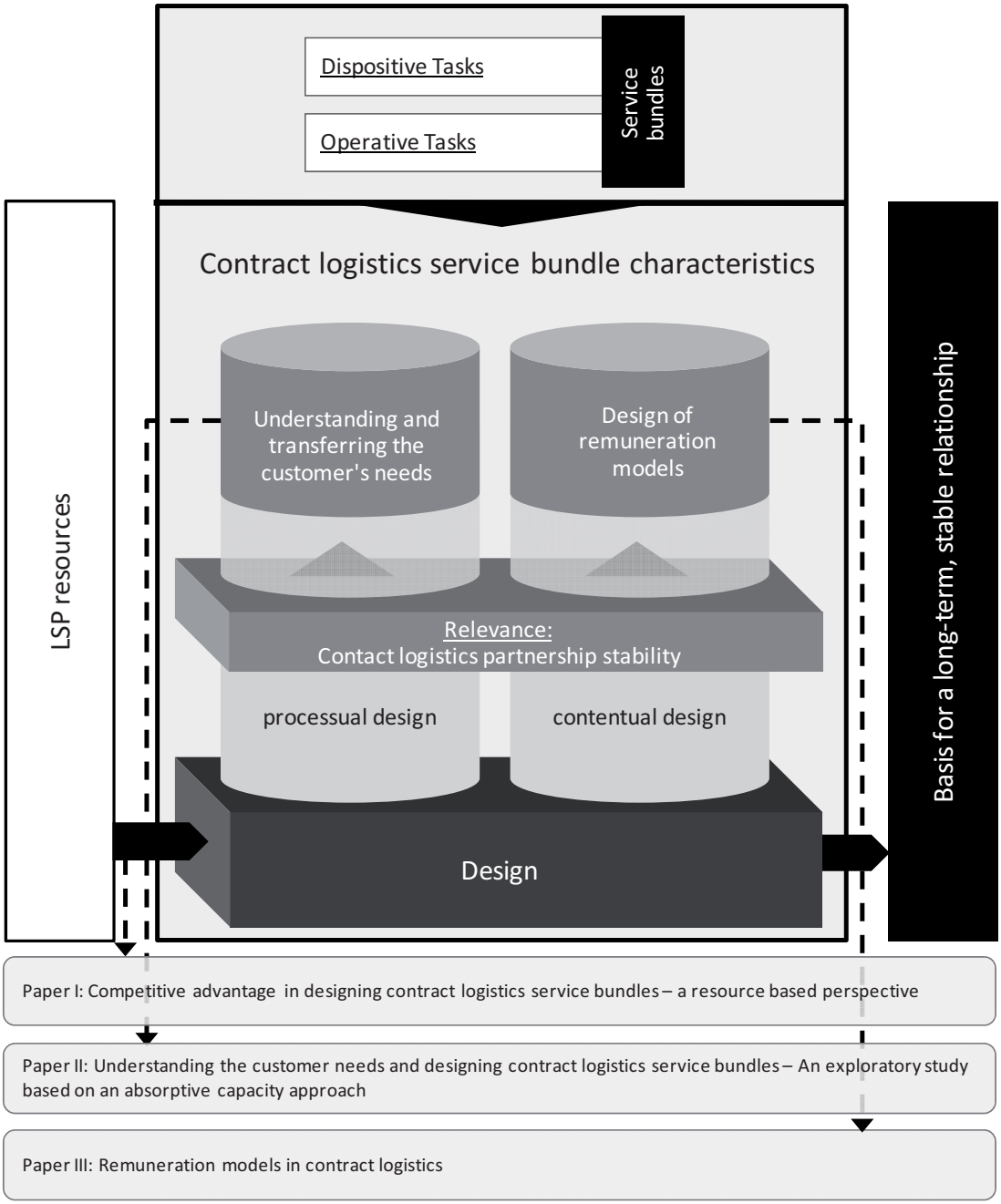

Fig. 4-4: The conceptual research framework

Summing up, the framework's central element is the design of contract logistics service bundles, which is influenced by LSP resources and service bundle characteristics. The design of service bundles is perceived as successful if a long-term, stable relationship results from the design because both parties are satisfied with the service bundles. The framework thus includes the cornerstones of successful service bundle design from a processual and a contentual perspective (compare Fig. 4-4). The framework is used to guide the analysis and locate the three papers. All in all, the successful design of service bundles provides a solid basis for a successful contract logistics relationship.

5 Insights and key findings of the research on the design of contract logistic service bundles

As outlined in Chapter 2, the central objective of this dissertation is to provide managerial advice for and theoretical contribution to the design of contract logistics service bundles. In order to meet these objectives, three cornerstones of successful design of contract logistics service bundles are discussed in three papers, with each paper addressing one particular cornerstone. Having considered the fundamentals of the design of service bundles and having built the conceptual framework, attention will now be dedicated to the three scientific papers (their thematic positioning is displayed in Fig. 4-4). The following section gives an overview of the content of the papers and indicates how they support and contribute to the main objective of the dissertation at hand.

5.1 Paper I: Competitive advantages in designing contract logistics service bundles – a resource based perspective

The first paper will be submitted to "International Journal of Logistics Research and Applications."[45]

Tyssen, C. W.; Klaas-Wissing, T.: Competitive advantages in designing contract logistics service bundles (to be submitted)

This conceptual paper discusses competitive advantages through an LSP's specific portfolio of resources in designing contract logistics service bundles. By applying the resource-based view, the article identifies specific resources that are relevant to the design of contract logistics service bundles. Due to the rather indistinct definition of contract logistics, and in order to elaborate a sound understanding of contract logistics, the paper starts with the analysis of 50 definitions and notions of contract logistics in the literature. Based on a quantitative counting of definition attributes, a common perception of contract logistics and its characteristics is elaborated. The constituent characteristics, namely, 'service scope,' 'customisation,' 'relationship duration' and 'relationship intensity,' were identified and further researched with respect to applied strategies. As a means of analysis, two diametrically opposed strategies are derived

[45] The journal's homepage can be found at: http://www.tandf.co.uk/journals/titles/13675567.asp

and applied to discuss specific challenges in designing contract logistics service bundles. We generally distinguish between a differentiation strategy and a cost leadership strategy (based on e.g. Porter, 1998 and others) and examine the effects of each strategy on the design phase in terms of required resources. Each strategy is characterised by distinct features. Depending on the strategy different resources are required for the design of contract logistics service bundles. These categories are derived from Yew Wong and Karia (2009). In the design phase, the differentiation-oriented strategy requires relational, knowledge and human resources rather than physical resources, as resources are determined by the customer's specific requirements, while less physical ant IT resources are needed in the design phase. By contrast, the cost-leadership-oriented strategy builds on physical and information resources and attempts to utilise existing capacity to the maximum. Relationship resources are less relevant for the cost leader. Drawing on these results, the paper lays the groundwork for subsequent research.

The first paper tackles the following elements of the conceptual research framework (compare Fig. 5-1):

- LSP resources
- contract logistics service bundles characteristics, and
- design of service bundles.

Fig. 5-1: Elements of the conceptual research framework addressed in Paper I (see Appendix A)

5.2 Paper II: Understanding customer needs and designing contract logistics service bundles – An exploratory study based on an absorptive capacity approach

The second paper will be submitted to the "Journal of Business Logistics."[46]

Tyssen, C. W.; Prockl, G.: Understanding customer needs and designing contract logistics service bundles - An exploratory study based on an absorptive capacity approach (to be submitted)

Having indicated the need for knowledge absorption in the design of contract logistics service bundles in the first paper, the second paper specifically addresses these knowledge-absorption procedures in the context of designing contract logistics service bundles. The paper is based on the notion that a successful knowledge flow from the shipper to the LSP builds a sound basis for suitable service bundles. Furthermore, the adequate processing of the absorbed knowledge, in order to incorporate this knowledge in the service bundle concept, is included in this paper. The research design is based on the analysis of eleven case studies of specific LSP-shipper relationships. As a means of analysing the case studies, the concept of absorptive capacity (ACAP) (Cohen & Levinthal, 1990; Zahra & George, 2002) is applied to the specific project context. As contract logistics projects vary widely, a moderating variable incorporating service bundle characteristics is introduced. These service bundle characteristics are operationalised using service bundle complexity, as complexity is assumed to have significant influence on the process of knowledge absorption. This is the first time a structure for evaluating the complexity of contract logistics service bundles is proposed, following the call of Large (2007a). The research is consequently based on the following framework (Fig. 5-2). For a detailed explanation of the framework see appendix B.

[46] The journal's homepage can be found at: http://cscmp.org/memberonly/jbl.asp

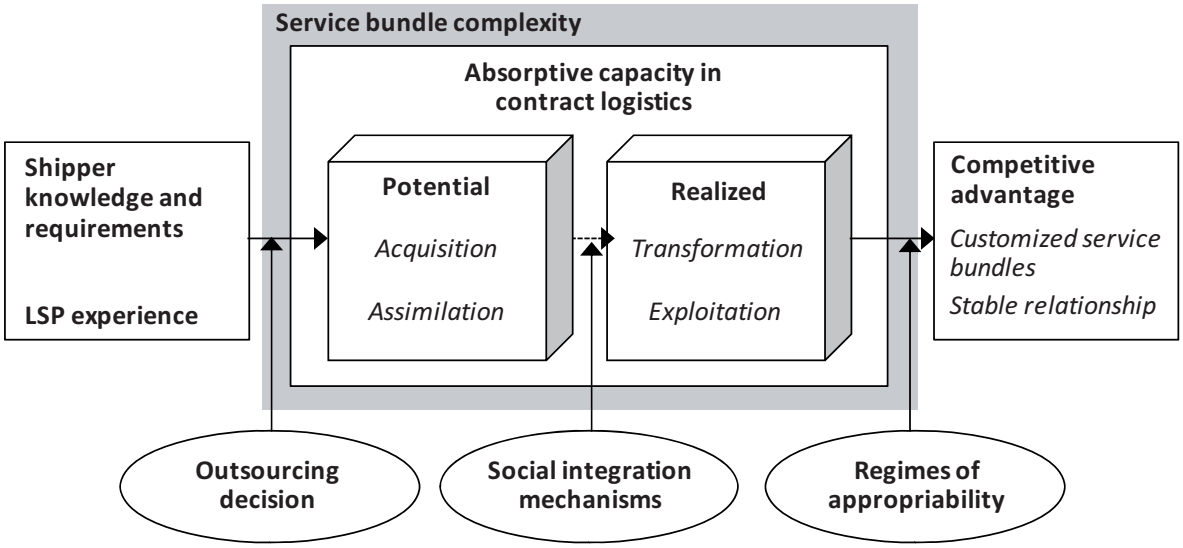

Fig. 5-2: Research framework of Paper II

The observations show that service bundle complexity has an effect on the procedures of knowledge absorption and integration in the design phase, though the applied procedures vary widely. Nevertheless, experience in contract logistics *per se* or the shipper's business is identified as a facilitator in reducing design challenges. Additionally, the involvement of the appropriate employees, valid data on sizes and throughput as well as checking understood requirements and needs with the shipper seem to be factors that support successful design. Based on these results, five propositions are postulated.

The paper contributes to research by transferring the concept of ACAP to contract logistics and additionally putting it in a specific project and dyadic context. By postulating the propositions, the article sets the ground for further research on knowledge absorption in the design process. Furthermore, the paper contributes to contract logistics practice. Specific procedures for the absorption and transformation of shipper knowledge are recommended in dependence of the initially known complexity of the service bundles.

The second paper addresses the following elements of the conceptual research framework Fig. 5-3:

- Design of service bundles, with respect to
- contract logistics service bundle characteristics from a
- processual perspective.

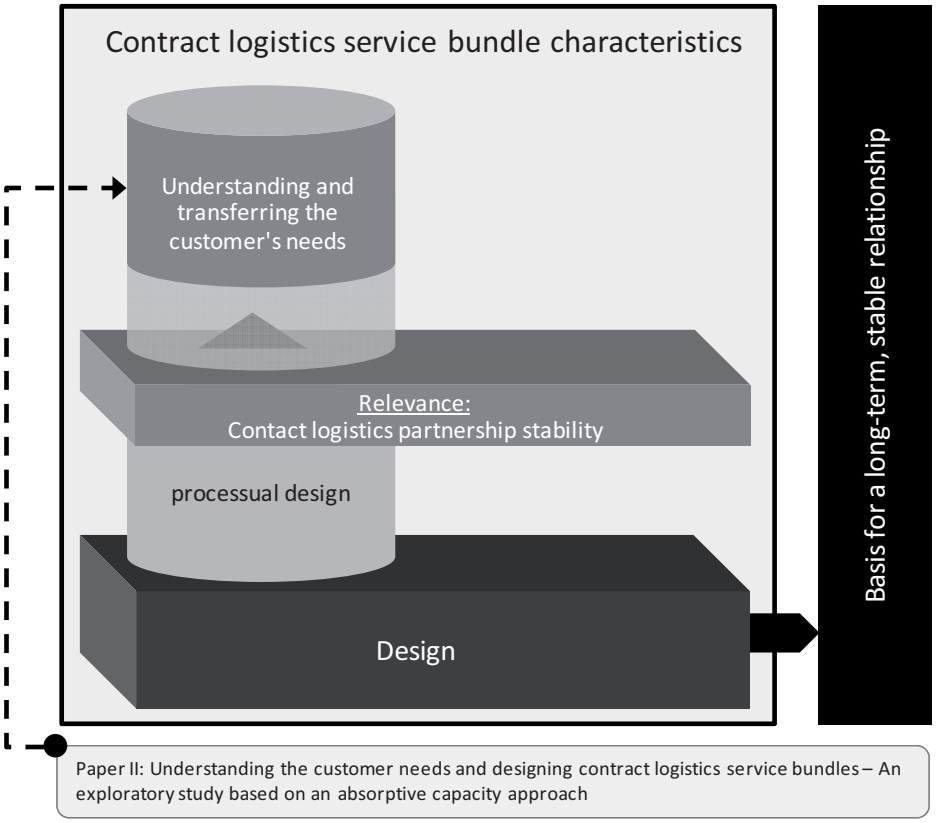

Fig. 5-3: Elements of conceptual research framework addressed in Paper II(see Appendix B)

5.3 Paper III: Remuneration models in contract logistics

The third paper will be submitted to "Transportation Research Part E: Logistics and Transportation Review."[47]

Tyssen, C. W.: Remuneration models in contract logistics (to be submitted)

While the second paper tackles the processual perspective of designing contract logistics service bundles, the third paper addresses the contentual perspective. It primarily focuses on remuneration models and incentive setting in contract logistics contracts. The adequate remuneration model is seen as the main contentual factor influencing successful service bundle design. Agency theory applies ideally for providing theoretical foundation to remuneration models. Based on a brief agency discussion and service bundle characteristics, a framework for the analysis is developed. The analysis is again based on eleven case studies. The framework

[47] The journal's homepage can be found at: http://www.sciencedirect.com/science/journal/13665545.

incorporates the scope of services as well as product range and heterogeneity as influencing factors in the choice of remuneration models. The theoretical discussion allows the differentiation of effort-based and outcome-based remuneration, which can both be supplemented by additional incentive mechanisms. The research framework is displayed in Fig. 5-4. A detailed discussion of the framework can be found in appendix C.

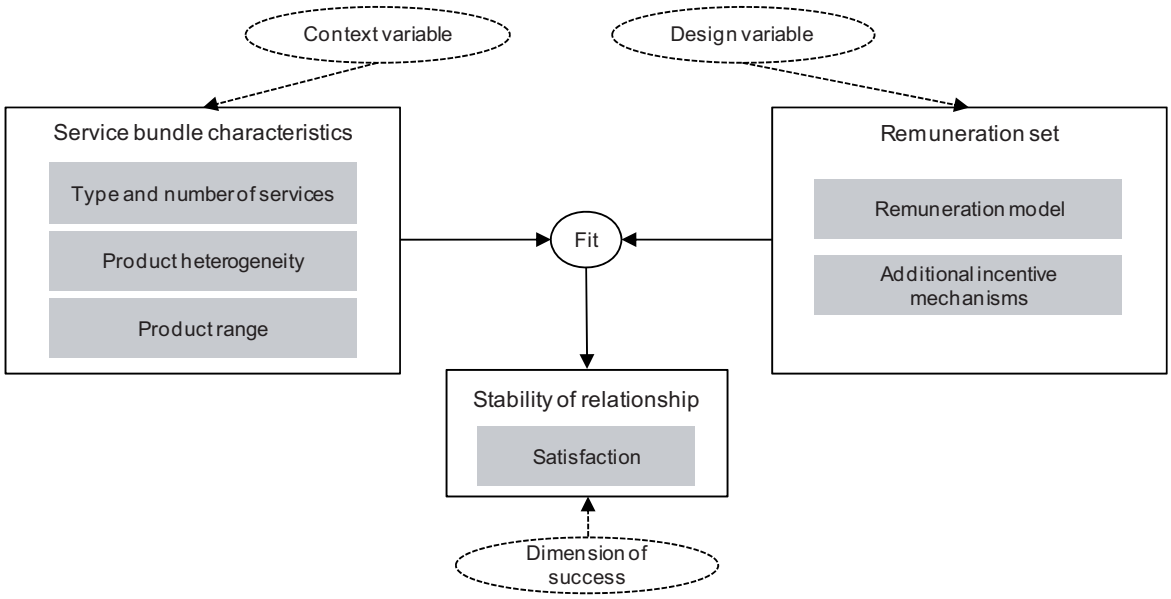

Fig. 5-4: Research framework of Paper III

The fundamental models are discussed with respect to the three dimensions of incentive setting, risk sharing and monitoring expenditures. This discussion facilitates the combination of remuneration models with specific service characteristics in a given contract logistics project. Multiple services for heterogeneous and numerous products are remunerated on an effort basis, while easily reproducible services for less complex product spectra may be remunerated on an outcome basis. Apart from theoretically possible hybrid remuneration models, featuring the characteristics of both effort-based and outcome-based remuneration, the analysis of 11 case studies showed another hybrid form that based remuneration on applied processes. This remuneration model has distinct incentives for the LSP and provides fairer risk sharing. Furthermore, the article offers a novel structure for additional incentive mechanisms, which, from a theoretical perspective, are applied to level out the disadvantages of the selected remuneration model. However, the case study analysis showed that these additional incentive mechanisms are not selected systematically, but rather upon personal experience and preferences and are subject to highly individual arrangements.

The results of the paper add another remuneration model to theory that may be further discussed and examined in future research. Furthermore, the article provides a structure for additional incentive mechanisms. As for managers, the results of the paper assist in choosing the most suitable remuneration model for given service bundle characteristics. It also provides support in finding appropriate additional incentive mechanism.

The third paper considers the following elements of the conceptual research framework Fig. 5-4:

- Design of service bundles, with respect to
- contract logistics service bundle characteristics from a
- contentual perspective.

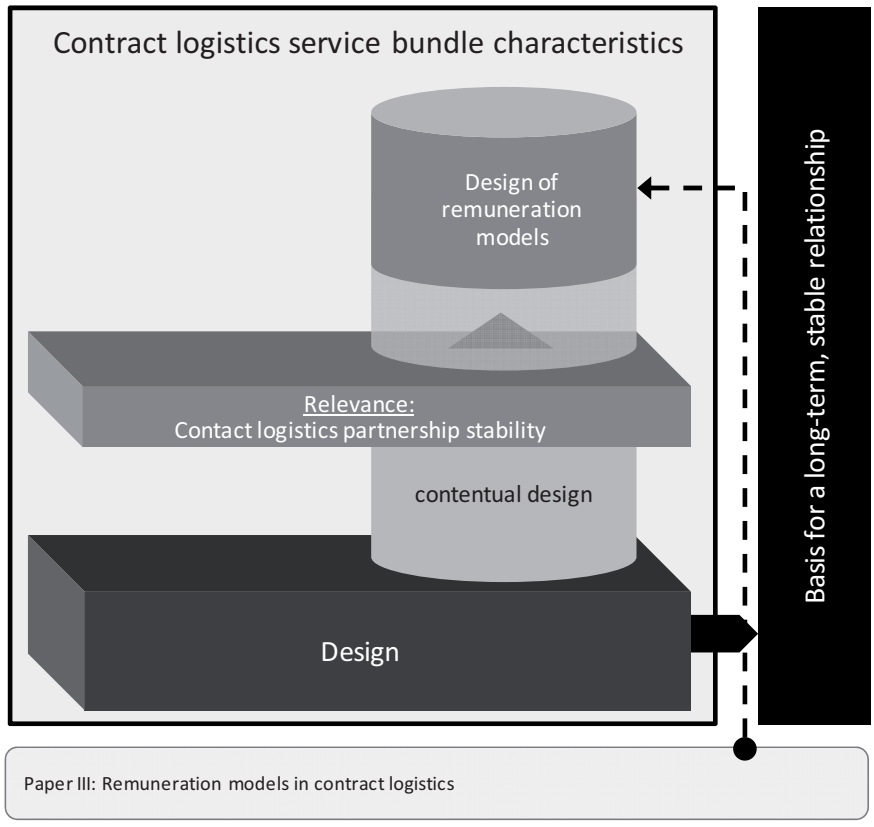

Fig. 5-5: Elements of conceptual research framework addressed in Paper III(see Appendix C)

6 Summary of research conducted on the design of contract logistics service bundles

Chapter 6 provides a summary of the research conducted. First, the initial research objectives as well as the contribution to research (Chapter 6.1) are presented, leading over to a summary of scientific (Chapter 6.2) and managerial (Chapter 6.3) implications. The final subchapters provide conclusions and general limitations of the research (Chapter 6.4), as well as recommendations for further research (Chapter 6.5).

6.1 Summary of objectives and contribution of the research

The results are intended to support the management of LPSs in decision making in the design phase. As the research involved the relationship between LSP and shipper, the findings can also be helpful to the management of shippers. The structuring of the topic and development of advice creates awareness for the challenge of designing contract logistics service bundles and provides practical guidance on how to tackle this challenge.

The successful design of contract logistics service bundles represents a major lever for the satisfaction of both the LSP and the shipper, and thereby sets the basis for a long-term and stable relationship. The research at hand discusses individual, consecutive factors of influence on the design. As a paramount component influencing the successful design of contract logistics service bundles, the LSP's resource setup in the design phase is covered. Thereafter, two central perspectives, the processual perspective, tackling the absorption of shipper requirements and needs, and the contentual perspective, addressing the remuneration model to assure mutual financial satisfaction, were approached. For each of the three dimensions design recommendations are provided.

6.2 Scientific implications of the research conducted

From a scientific point of view, this dissertation contributes to the research of contract logistics, as multiple areas of interest in the design of contract logistics service bundles not yet addressed are structured and systematised. This dissertation is the first of its kind dealing with the design of contract logistics service bundles in depth and taking multiple factors of influence into account. In order to respond to the superordinate

research question (***RQ_0:*** *How can contract logistics service bundles be designed successfully?),* the subordinate research questions will be answered next.

RQ_1: *Which resources do logistics service providers need to design contract logistics service bundles successfully?*

As shown in the first paper, LSPs need to provide specific resources for the design of the required service bundles. Depending on specific competitive strategies in contract logistics, which were derived from the literature, the resources needed for designing service bundles differ. The competitive strategies not only determine the LSP's position in the market, but also the resources and capabilities available. LSPs with cost-efficiency-driven strategies deploy resources in assets (i.e. physical resources and information resources), like warehouses, hubs, trucks, or information systems which they combine or slightly extend when they are approached by a shipper or actively approach the shipper. They do not aim for intense collaboration and highly customised services. By contrast, a differentiation-oriented LSP requires intense relational and knowledge resources and capabilities, mainly in the form of adequate employees. The required resources are human, knowledge and relational resources. In order to differentiate from competitors, LSPs following this strategy provide highly customised solutions for the shipper with newly developed services. By linking required resources for the design of contract logistics service bundles to the LSP´s competitive strategy, this dissertation offers a systematisation of one factor influencing the successful design of contract logistics service bundles. One concept enabling successful service bundle design, namely, appropriate resource deployment, is presented in detail.

RQ_2: *How is the understanding and transfer of customer needs shaped successfully within the design process?*

The second research question was addressed in the second paper and is concerned with the understanding and transfer of shipper requirement and needs in the design of contract logistics service bundles. The understanding and transfer process refers to the flow of information between shipper and LSP and the LSP's application of this information in the design of contract logistics service bundles. In order to operationalise the knowledge flow, the theory of ACAP was chosen as a lens for

research. The ACAP theory was earlier applied in dyadic contexts and in the logistics and supply chain area. The research at hand applied the theory to the dyadic contract logistics context of specific projects based on 11 case studies. Complexity was introduced as a moderating variable on the information flow between shipper and LSP. Relations between complexity and potential ACAP and realised ACAP in the contract logistics design context are presented, as the design of highly complex service bundles requires more elaborate potential and realised ACAP than the design of simple service bundles. The research also found that LSPs and shippers apply numerous, but rather unstructured, procedures for sharing knowledge and communicating demands. Furthermore, the findings indicate that showing commitment by close interaction and the application of means of knowledge sharing increase shipper trust. Finally, the application of the ACAP theory in this context opens the discussion of the theory commonly understood as a general capability of the firm towards an understanding of the theory as information absorption in specific contexts, taking multiple factors of influence into account. Experience in contract logistics and the shipper's industry were identified as factors of influence on the interaction of both players in the design of contract logistics service bundles. Common means of transferring knowledge and shaping interaction between shipper and LSP were identified and may provide a basis for further research.

Summing up, a systematisation of the understanding and transfer of shipper needs as a factor influencing successful contract logistics service bundle design is offered. The identified procedures for information transfer could serve as constructs for a subsequent quantitative analysis of the proposed relations. One concept enabling successful service bundle design, namely, the understanding and transfer of shipper needs, is discussed in depth, taking us another step closer to a comprehensive concept of successful service bundle design.

***RQ$_3$**: How is the remuneration model shaped within the design phase in order to secure long-term cooperation?*

The third research question of this dissertation addressed in the third research paper tackles the contentual perspective of designing contract logistics service bundles. Using an exploratory approach, again 11 case studies were used to examine remuneration models as a crucial content specified in the design phase with respect to project success. Theoretical discussions, founded on agency theory, were transferred to

the contract logistics realm. Agency theory had been applied in logistics research before, but without providing further structuring for remuneration models. Three possible remuneration models were derived from theory, namely, effort-based, hybrid, and outcome-based remuneration. The theoretical discussion revealed a relation between service bundle characteristics and the chosen remuneration model. The applied research framework shows that complex service bundles and products are better suited for effort-based remuneration because of higher monitoring expenditures for outcome-based remuneration. By contrast, replicable services for simple products in contract logistics service bundles may be remunerated by outcome, thereby setting higher performance incentives for the providers. Process-based remuneration was identified as a certain type of hybrid remuneration. Additional inventive mechanisms, usually applied to level out drawbacks of the applied remuneration models, do not seem to follow a distinct structure. However, a structure for additional incentive mechanisms with respect to incentive target and incentive direction was developed. Accordingly, a systematisation of remuneration models as one concept influencing successful service bundle design is offered in the third paper.

Summing up, the dissertation at hand offers a profound concept enabling the successful design of contract logistics service bundles based on the systematisation of three cornerstones of successful service bundle design. Research showed that appropriate resource deployment, absorption and transfer of customer needs as well as the selection and specification of an appropriate remuneration model are crucial to the success of contract logistics service bundle design in the sense of a long-term, stable relationship based on satisfaction of the involved parties. By enabling a long-term, stable relationship, successful service bundle design enhances overall project success. The thesis thus contributes to scientific research by developing a concept which may be tested in quantitative analyses.

6.3 Managerial implications of the research conducted

Companies – LSPs as well as shippers – engaged or planning to engage in contract logistic projects may draw on the results of this thesis, as it discusses relevant management levers in the design of contract logistics service bundles.

LSP resources and capabilities as a factor of influence in successful contract logistics service bundle design

The findings of this dissertation concerning the LSP's resources and capabilities relevant for the design may assist both the LSP and shipper. Depending on their competitive strategy, LSPs need different resources for the design of contract logistics service bundles. Therefore, LSPs engaging in contract logistics need to evaluate their competitive strategies, namely, cost leadership or differentiation, in order to make decisions regarding the allocation of resources to tasks of designing contract logistics service bundles. A differentiation strategy aiming at innovation and customisation requires intangible resources like relational and knowledge resources (inherent in human resources) in order to satisfy the shipper's needs in the design and justify higher prices. By contrast, cost-leadership-oriented LSPs need to design standardised services in advance and offer those services to numerous shippers in order to exploit capacity and realise economies of scale. Considering this rationale the other way around, LSPs providing a certain portfolio of resources and capabilities and aiming to enter the contract logistics market, may evaluate their existing resources towards the aforementioned strategies and develop their service offerings in the according strategic direction. Deciding on the appropriate number and type of resources that are dedicated to tasks of the design of contract logistics is one element of a systematic approach to the design of contract logistics service bundles still lacking in practice. The thesis provides guidance for the management of LSPs on how to allocate these resources in order to design contract logistics service bundles successfully.

Shippers can draw on the results, as they may help address the appropriate LSPs in their tender. A shipper who is unclear on which scope and kind of services he requires may consider only those LSPs promising individual solutions and providing relational, knowledge and human resources which enable the customization of services to the shipper's needs. Reference projects can serve as a 'selection' guide. Shippers mainly interested in cost savings while not requiring special services may consider cost-efficient LSPs, e.g. LSPs providing a general cargo network that they need to use to capacity, accompanied by light individual services at low prices. Hence, besides providing guidance for LSPs for appropriate resource deployment to the design of contract logistics service bundles, the research gives advice to shippers for LSP selection.

Understanding and transferring shipper needs as a factor of influence in successful contract logistics service bundle design

In specific contract logistics projects, LSPs need to understand the shipper requirements and incorporate this knowledge into the process of designing. In the past, this process has been rather dissatisfying as LSPs frequently failed to meet the shipper's needs.[48] Considering the understanding of the shipper as a learning process may help the LSP in interpreting the shipper's requirements correctly, thereby setting the basis for a sustainable design concept. Based on the scope of services, the LSP and the shipper may establish appropriate learning mechanisms. In the case of outsourcing multiple services for challenging services and products, and thus with higher complexity,[49] the means of knowledge exchange need to be more sophisticated than in cases with less complexity. These means of knowledge exchange include intense workshops, top management attention, written information and discussions. Site inspections, frequent interaction, glossaries and evaluation of the knowledge absorption have also been found to be successfully applicable in the design of contract logistics service bundles. The case studies showed that the successful design of simpler contract logistics services does not necessarily require intense collaboration between LSP and shipper, whereas the management of information flow is essential in projects involving complex service bundles.

Besides successful information absorption, experience was identified as a lever in the design of contract logistics. When a shipper has profound experience in contracting out services and has exact knowledge of the specification of the desired services, the means of knowledge exchange and hence the interaction with the LSP may be reduced. Nevertheless, comprehensive and well-elaborated tender documents are of utmost relevance for the successful contracting out of these services. When neither the LSP nor the shipper have experience in contract logistics,[50] a higher involvement may help to develop a customised and sustainable design concept. Increased interaction initiated by the LSP in order to signal commitment and competence can help in building reputation and trust at the shipper's side. As quoted above, shippers have frequently been dissatisfied with the designed service bundles in contract logistics, as the requirements were insufficiently incorporated. The results of this dissertation provide guidance on how to understand and transfer shipper requirements and needs into the

[48] Compare Chapter 1.
[49] For the applied dimensions of complexity, please see Paper II in the appendix.
[50] This applies particularly to industries in which contract logistics have so far played a minor role.

design of contract logistics service bundles, thus better meeting shipper needs as one element of a systematic approach to designing contract logistics service bundles.

Contract logistics remuneration models as a factor of influence in successful contract logistics service bundle design

In the third paper, the thesis at hand provides advice to managers based on the discussion of specific contract logistics content defined in the design phase, namely, remuneration sets. Again the characteristics of services need to be taken into account when deciding on the remuneration model and additional incentive mechanisms (building together the remuneration set). When multiple services, including managerial tasks and heterogeneous as well as numerous products are contracted out, the choice of an effort-based remuneration should be considered, as the monitoring expenditures are lower compared to outcome-based remuneration. Furthermore, certain incentive effects involved in the choice of the remuneration model need to be considered. With respect to performance incentives, remunerating the LSP on an outcome basis seems favourable for the shipper. In this case the LSP is financially responsible for their performance. Yet, this remuneration model is only favourable for reproducible and comparable services with homogenous products in terms of monitoring expenditures. An interesting option for fair remuneration can be the identified process-based remuneration, where the shipper compensates each process step performed by the LSP. Capacity risks remain with the shipper, while performance risks are transferred to the LSP. In order to level out the drawbacks of each remuneration model, incentive mechanisms should be applied according to their individual effective direction and incentive target. Performance-related incentives like 'bonus and penalty' help to attain the pre-defined objectives, while 'competition' aims to generate unexpected improvements. Cost-related incentives for meeting pre-defined objectives are 'flat price reductions' while 'savings' again aim to incite unexpected improvements. These guiding principles concerning the choice of the appropriate remuneration model are one more element of a systematic approach to the design of contract logistics service bundles.

In summary, the thesis at hand provides guidance for LSPs and shippers in order to respond efficiently to increased challenges in the design of contract logistics service bundles resulting from higher complexity. Implications for essential elements of a systematic approach to the design of contract logistics service bundles, so far lacking in practice, are offered with the results of this dissertation.

6.4 Conclusions and general limitations of the research

The presented research offers managerial advice for the successful design of contract logistics service bundles. By applying three theories, implications are generated for LSP resources, understanding and transferring customer needs and selecting an appropriate remuneration set. As no publication has so far dealt with the design of contract logistics service bundles to this extent, this thesis may serve as a starting point for further research. Limitations and emerging research questions will be highlighted at this point. Limitations are discussed with respect to conceptual and empirical constraints.

The conceptual limitations of this research are two-fold. On the one hand, the general framework guiding the research and on the other hand the frameworks developed for each research question need to be examined critically. As the thesis addresses a rather new topic in research, the design of service bundles is approached in a fairly broad manner. Specific issues were then examined in detail, forcing the researcher to leave out other aspects. The issues addressed were chosen with respect to their impact on design success in the sense of partnership stability. Hence, the general research framework may not include all cornerstones of successful contract logistics service bundle design, especially when defining success in a different way. Furthermore, the research considers the LSP as the main contributor to the design, though it may be reasonable to expect that experienced shippers could provide a similar or even better design, leaving the LSP merely to operate the contract logistics services.

The discussion of cornerstones of successful service bundle design in this dissertation is limited to three central aspects. The frameworks developed to address these factors of influence are also subject to limitations. The applied frameworks were considered most suitable for the specific research context. Nevertheless, other frameworks or theories may be applicable as well, and may return other results. Limitations appear, for example, in the first research question on resources required for the design. The competitive strategies considered are sometimes hard to identify in practice. Hybrid forms of strategies may exist and return other results. Depending on specific shipper-LSP constellations, differing factors of influence like experience and personal preferences may affect the relevant resources for the design. Concerning the theory and framework applied for understanding and the transfer of customer requirements, ACAP theory and the assumed dependency on service bundle complexity need to be considered critically. Other theories of knowledge exchange may return different results. Additionally, the applied research setting did not include what kind of

interaction between both companies is suitable or which persons should be involved. As for the third research question discussing remuneration sets as an influential factor in successful service bundle design in the sense of a long-term, stable relationship, the satisfaction of the involved parties guided the discussion. However, the consideration of bargaining power of single players was not considered.

Concerning the empirical constraints, the qualitative research method and exploratory character of the dissertation do not allow universally valid results. Being the first work in designing contact logistics, a research design based on case studies was suitable in order to generate initial explanations, systematisations, implications and recommendations. However, general causal relationships between the discussed factors of influence and contract logistics relationship stability must be proven by quantitative research.

6.5 Recommendations for further research

Since a researcher's time and scope are limited, research projects are rarely final and usually suggest areas for further research. The broad scope of this research and the heterogeneous case studies generally allow these results to be applied to any kind of contract logistics project. Due to the open research design, the results are also usable for any kind of industry. Though contributing to science and management by systematising the design of contract logistics service bundles, discussing concepts enabling successful design and offering guidance for a systematic approach to the design, the research at hand leaves room for onward development and further research. As the research presented emerged from an ongoing process of several years, the continuous progress revealed further questions and thus constitutes the basis for other perspectives. This chapter intends to provide ideas and point out fields of research considered valuable and relevant for science and management.

This dissertation structured the design of contract logistics service bundles and discussed relevant factors of influence. Plausible definitions and advice were elaborated. Based on the discussion, additional fields of research were identified. The topic itself and the chosen research method offer opportunities for further research. Due to the exploratory approach and qualitative research setting, no conclusions may be drawn concerning causal relationships between the activities and deductions provided for the design of contract logistics service bundles. In order to address this shortcoming, future research could build on the exploratory results and apply quantitative research methods to derive generally accepted relations between the

discussed dimensions and validate the propositions. Eventually, document studies as another research method may provide another approach for the analysis of contract logistics design in practice. Based on tender documents, i.e. the request for proposal (RFP), the response to the RFP could provide more information on how LSPs incorporate shipper requirements and needs. Project plan and contract studies could provide further data on how the service bundles were designed and implemented and which party was in charge. The questions on responsibilities for certain contract content or processes seem particularly promising. In this context, research on how the decisions are made and which basis of data is needed would also provide fruitful advice for the shippers and LSPs. Next to absorbing and applying shipper knowledge, successful procedures in project management of contract logistics could serve both the shipper and the LSP. The change of the design concept over time could also afford interesting insights on how service bundles develop and how LSPs could benefit from proposing yet unconsidered services in a dyadic relationship.

Finally, further research may also be suggested to draw an even more elaborate picture for the specific research questions of this dissertation. Concerning the relevant resources, other strategies or a combination of multiple strategies for LSPs may be examined towards their implications for design-relevant resources. The discussion of the transfer of requirements and needs into the design of contract logistics service bundles considered service bundle complexity as the relevant factor of influence. The framework therefore applies a rather general approach to the knowledge-absorption procedures. Further interesting dimensions for analysis could be a separation of discussion of the most relevant factors, i.e. those driving complexity. If these are completely known in advance, sound advice could be derived for managers designing contract logistics service bundles.

Combining results from research questions 1 and 2 could open another facet of service bundle design. Certain strategies may affect the knowledge-absorption process and the procedures applied in the interaction between the two parties. For example, efficiency-driven strategies may induce less will for interaction and learning than differentiation-driven strategies. Concerning the choice of remuneration models, other factors of influence, apart from service bundle characteristics, could be worth examining. Industry, company-size or tradition-related contracting may open another discussion on the choice of remuneration sets. As the research at hand is primarily based on agency theory and hence assumes opportunistic individuals, the relationship and trust literature open another approach to appropriate remuneration.

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Appendix

Appendix A

A. Competitive advantage in designing contract logistics service bundles – a resource based perspective

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A 1. Contract logistics – an attractive business with high requirements in service bundle design

Over the past decades, contract logistics has received increased attention not only in practice but also in scientific research. The trend for outsourcing continues and multiple studies predict further growth in contract logistics (Klaus *et al.*, 2009; Langley & Capgemini, 2009; Stölzle *et al.*, 2010). These studies also emphasise the ongoing tendency towards contracting out more comprehensive services to a limited number of logistics service providers (LSP), which implies that each LSP is in charge of a growing number of increasingly comprehensive services, making the performance of contract logistics services considerably complex. The LSPs are deeply integrated into the value chain of their customers – the shippers – and perform more and more non-logistics services in addition to their traditional business (Weber *et al.*, 2007a). Since the number and type of services included in contract logistics service bundles vary widely, contract logistics is a rather indistinct business area (Marasco, 2008). The comprehensive services require novel management skills of the LSPs in order successfully to design appropriate service bundles for the shippers and perform them satisfactorily (Halldorsson & Skjott-Larsen, 2004). Service bundles describe the entirety of the customised, concerted services that an LSP renders for a given shipper. Based on the shipper's requirements, the LSP develops a contract logistics service bundle concept outlining the provided services and conditions in the design phase. The design phase is particularly important in contract logistics, as both the shipper's and

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the LSP's satisfaction depend on a suitable design (Bolton, 1998; Gibson *et al.*, 2002). Similar to any business initiative, the design of the service bundles is subject to the LSP's strategic alignment and requires certain resources which vary according to the strategic setup. Concerning LSP's strategic setups, the literature has primarily used a market-based perspective (Fabbe-Costes *et al.*, 2009; Bolumole, 2003; Hertz & Alfredsson, 2003) and developed competition-based strategies. They give advice on how LSPs may position themselves in the contract logistics market and hence focus on an outside perspective. For example, Hertz and Alfredsson (2003) state, that the way LSPs manage the relationship "will be of basic importance for their strategic edge on the market" (p. 139) and derive four strategies, the "service developer", the "customer developer" as well as "standard TPL provider" and "customer adapter". Their differentiation dimensions, namely problems solving ability and customer adaption, indicates, that not only the outside perspective but also an inside perspective is strategically relevant. The internal and thereby resources based perspective may hence offer new insights for the strategic positioning in designing contract logistics services. To this date, the internal perspective of an LSP, especially concerning the design-relevant resources that may lead to a competitive advantage, have not been addressed. While fundamental associations between LSP strategy and LSP resources have been discussed by Lynch *et al*. (2000), literature has not been concerned with the particular relevance of LSP resources in the design of contract logistics service bundles and their link to the LSP's strategy. Basically this paper takes up the pre-work of Hertz and Alfredsson (2003), Bolumole (2003) and Fabbe-Costes et al. (2009) and shifts the focus from a market-based to a resource-based perspective. The resource-based view of the firm (RBV) serves as a theoretical foundation for identifying design-relevant resources and analysing the strategic relevance of these resources with respect to the LSP's strategic setup. Hence, this paper aims at conceptually deriving resources LSPs need for the design of contract logistics service bundles based on the RBV. By considering two different strategies, this paper will identify different sets of resources relevant for the design of contract logistics service bundles and will consequently be the first of its kind by describing these strategy depended resource categories. The paper is structured as follows. The next chapter opens the analysis with an attempt to define contract logistics, the context of this research. The characteristics of contract logistics are derived from a literature analysis and two poles of contract logistics strategies are presented. Section 3 describes the idea and argumentative logic of the RBV. Finally, section 4 argues which resources may provide competitive advantage

for a given LSP strategy. Section 5 closes with implications for management and research.

A 2. Understanding of contract logistics

Characteristics of contract logistics

The notion of contract logistics – which, in practice, appears to be well understood – seems less distinct when considering the relevant literature. A large number of terms are applied to characterise the same phenomenon. These terms include, for example, 'third-party logistics (3PL)' (Lieb, 1992), 'logistics alliance' (Bagchi & Virum, 1996), 'lead logistics provider' (Vaidyanathan, 2005), 'logistics system provider' (Engelsleben, 1999) or 'system service provider' (Gudehus, 2004), and 'contract logistics' (Engelsleben, 1999; Giesa & Kopfer, 2000; Weber *et al.*, 2007a). Moreover, definitions of contract logistics vary. While some authors consider any kind of logistics outsourcing contract logistics, other authors link contract logistics to specific services or functions (Marasco, 2008).

In order to establish a common understanding of contract logistics, 50 definitions of contract logistics found in the literature were analysed systematically. The central characteristics 'scope of services', 'customisation', 'duration of relationship' and 'intensity of relationship' were identified.

Scope of services

The scope of services comprises the entirety of services that an LSP performs for a given shipper. In contract logistics the scope of services is considered 'significant' (Weber *et al.*, 2007a) or a "comprehensive package" (Sum & Teo, 1999, p. 589) of services (Africk & Calkins, 1994; Berglund *et al.*, 1999). Transportation and warehousing is still perceived as the core of these service bundles, yet the supplementation with non-logistics services is characteristic. The concerted services resulting from a deeper integration into the shipper's value chain are perceived as complex service bundles.

Customisation

Customisation refers to rendered services, which are individually tailored to the shipper's requirements. Since value chains differ, the degree of customisation rises with the LSP's integration into the shipper's dedicated value chain. The larger the scope of services, the deeper is the integration and the higher is commonly the degree

of customisation. The degree of customisation can range from customer-specific expansion of traditional logistics services to individual design of services for specific customers.

Duration of relationship

In order to safeguard specific investments resulting from customisation of services and to take advantage of the benefits of close collaboration, a long duration of LSP-shipper relationships is characteristic for contract logistics (e.g. Hauptmann, 2007). However, statements on precise durations vary. For example, while Wallenburg (2008) describes minimum contract periods of one to three years, Hauptmann (2007) names a minimum duration of five years. This difference most likely results from the individuality of contract logistics services, which in turn asks for individual contract terms.

Intensity of relationship

Contract logistics is generally perceived as an intense relationship between shipper and LSP (Africk & Calkins, 1994; Bask, 2001; Berglund *et al.*, 1999). The wide scope of services and the concentration on few providers augment the dependencies and corresponding risks between shippers and LSPs. Intense collaboration helps delimit these risks or allows, for example, the early detection of opportunistic behaviour (Eisenkopf, 2005).

Contract logistics service bundle design between the poles of complex routine and dedicated customisation

Since contract logistics is a dynamic, multifaceted business area, there are multiple ways of performing contract logistics services and consequently different LSPs follow different strategic approaches. Two fundamental strategies are sketched in the following by drawing on a literature review of LSP typologies. Hertz and Alfredsson (2003) offer a typology with the dimensions 'problem solving ability' and 'customer adaption'. With the help of these two dimensions they delimit contract logistics service providers from traditional service providers and furthermore describe four types of contract logistics (or TPL) service providers. They discuss how the network of relationships influences LSPs to move in one or the other category of their typology. They find that over time LSPs tend to develop to providers of more complex and customized service functions and illustrate their findings by examples. Fabbe and Costes (2009) examine LSPs in the context of supply chain integration and discuss three types: the LSP without supply chain integration, LSPs as resource providers and

LSPs as supply chain designers. Bolumole (2003) also discusses different supply chain roles of LSPs depending on e.g. the extend of outsourcing and the client's perception of the LSP's capabilities in terms of rather cost or resource capabilities. Engelsleben (1999) also distinguishes different strategies based on the degree of customisation of services (standardisation vs. individualisation). Rümenapp (2002) applies the criteria of type of task (complex routine vs. innovation) as well as leading theme (integration vs. innovation). Prockl and Pflaum (2007) refine this classification by empirically verifying the existence of the so-called 'contract logistics factory,' rendering efficient processes, and 'contract logistics learnshop', providing know-how and innovation impulses. In the conceptual part of their study, Wanke *et al.* (2007) also distinguish between LSPs aiming to combine standards and LSPs providing individualisation. Moreover, Lai (2004) distinguishes between cost-oriented and performance-oriented LSPs. The depicted strategies are closely related to Porter's (1985) competitive strategies of 'cost leadership' and 'differentiation'. Summing up the pre-work, has identified different strategies, which allow to identify LSP types. Porter's (1985) two fundamental strategies will be applied to the specific context of designing contract logistics service bundles in order to identify design-relevant resources based on LSPs' strategic setup. A peculiar description of the two strategies is provided in the following section and two notations for these based on Porter's competitive strategies are introduced. The LSP aiming for standardisation and cost leadership is named 'Contract logistics cost-leadership-oriented LSP' (CCLO). Conversely, the LSP aiming for innovation and differentiation is referred to as 'Contract logistics differentiation-oriented LSP' (CDO).

Both strategies are specified based on the contract logistics characteristics derived in Chapter A 2, while the details for the specification are taken from the above consulted literature. This article thus enriches the yet published typologies by discussing fundamental typologies along structured characteristics.

Characterisation of the Contract logistics Cost-Leadership-Oriented LSP (CCLO)

The CCLO aims for a cost-efficient service performance, similar to Porter's cost leadership strategy (Porter, 1998). By passing this financial benefit on to the shipper, the CCLO intends to attract price-oriented customers (Rümenapp, 2002) and gain a competitive advantage over his competitor. In order to achieve this advantage, strategies like the CCLO's are characterised by combining or expanding standardised service components to individual service bundles (Prockl & Pflaum, 2007) and

offering those to a large number of shippers demanding similar service bundles. This is necessary to realise economies of scale and provide reasonable prices (Porter, 1998).

Using the characteristics of contract logistics (scope of services, customisation, duration and intensity of the relationship) we are able to sketch a distinct picture of the CCLO. For reasons of market-conformable sales potential, the CCLO's *scope of services*, meaning his service portfolio, is limited, as the services need to match multiple shippers. As a result of offering similar services for multiple shippers, only a minor integration into each shipper's value chain is possible. Since the same services are offered to multiple shippers with similar demand, *customisation of service* bundles is limited. Though the shippers perceive the services as customised, the LSP renders similar services for multiple shippers, resulting in low customisation efforts. This calls for a homogenous client structure requiring similar services (Rümenapp, 2002). These services are then designed under stipulation of efficiency. Due to the less integrated services and the minor investments in a specific relationship, the *duration of each relationship* may be medium-termed, nevertheless offering the option of prolongation. From the shipper's perspective, the LSP is easier to replace than in cases of more customised and integrated service bundles. Dependency is low. Consequently, the *intensity of relationship* between shipper and LSP is also lower compared to highly customised service bundles. Since integration into the shipper's value chain with little specific investments and low dependencies and risks is smaller, a high degree of relationship intensity is neither needed to safeguard investments nor to prevent opportunistic behaviour.

This strategic line-up of the CCLO has an impact on the service bundle design. First of all, the CCLO needs to define its service portfolio prior to a specific shipper contact. As the services are based on standardisation and economies of scale, the resources need to be established before actually rendering a shipper-specific contract logistics service bundle. This kind of service bundle requires a separation from the shipper's systems and separated domains with a limited number of interfaces (Prockl & Pflaum, 2007). In order successfully to apply this strategy, the CCLO needs to anticipate and standardise the services potentially demanded. Hence, as indicated by the scope of services, the CCLO needs to identify and acquire shippers with similar demands. The shippers demanding similar services and contracting them out to the CCLO enable the CCLO to realise economies of scale and consequently the reasonable costs as well as prices pursued by the cost-leadership-oriented strategy.

Characterisation of the Contract logistics Differentiation Oriented LSP (CDO)

The CDO is characterised by highly customised service bundles that are individually designed for a specific shipper. By aiming for customisation and differentiation, the CDO pursues the competitive strategy of differentiation. Following Wanke *et al.*'s (2007) differentiation of service types, the CDO is a "provider[…] offering more comprehensive solutions, involving a variety of services managed for customers in an integrated way" (Wanke *et al.*, 2007 p. 545). The LSP aims to add value through intense customisation and performance enhancement. This is also the CDO's promise of value and marketing basis. The shipper's value is the optimisation and enhancement of the outsourced services rather than the dedicated cost-efficient service performance (Engelsleben, 1999).

Concerning the characteristics of contract logistics (scope of services, customisation, duration and intensity of the relationship) we also sketch a picture of the CDO. The CDO offers a high *scope of services* based on a widespread portfolio of services that is individually tailored to each shipper. Consequently the LSP does not need to plan these services in advance; instead, the LSP needs to evaluate the shipper's requirements and develop an individual, value-adding service bundle concept for each shipper. Accordingly, the LSP needs to provide know-how on a large number of different services and is able to procure and develop these according to each shipper's requirements. The high scope of services individually rendered for a specific shipper requires a deep integration of the LSP into the shipper's value chain. Due to this deep integration the services need to be explicitly *customised* and designed in collaboration with the shipper (Prockl & Pflaum, 2007). Because of the wide spectrum of services, the CDO is not bound to a specific client circle. He is instead able to adapt to each shipper. In order to safeguard the investments, which are inevitable for high scopes of customised services, the *duration of the relationship* is rather long. The high scope of customised services increases the dependencies of both parties and reduces replaceability. In order to deal with the dependencies and the corresponding risks, and in order to co-ordinate the service bundles, the *intensity of the relationship* is perceived as high (Persson & Virum, 2001). High relationship intensity is also required to analyse and solve the shipper's problems and meet his requirements. The relationship between the two parties is characterised by reimbursement of costs and participation in enhancements (Prockl & Pflaum, 2007). The relationships the CDO engages in are consequently opposed to the cost-focused relationships sought by the CCLO.

Concerning the design challenges, the CDO plays out his strength in customer adaptation. Therefore he needs to absorb the shipper's requirements individually for each service bundle design. Consequently, the design process does not start until after the shipper is contacted by the LSP or the shipper invites the LSP to submit an offer. Due to the variety of potential services, the CDO is open to any kind of shipper and industry for which the know-how is available. The CDO does not aim to use pre-defined services to capacity like the CCLO does. Table A-1 shows a brief overview of the two types of strategies.

Strategy attribute	Contract logistics cost-leadership-oriented LSP	Contract logistics differentiation-oriented LSP
Scope of services	Low scope of services Minor integration in shipper's value chain	High scope of services Deep integration in shipper's value chain
Customization	Similar services for all clients Homogenous client structure	Customer-specific development of services Differentiated client structure
Duration of relationship	Medium-term relationship possible Easy substitutivity	Long-term relationship necessary Aggravated substitutivity
Intensity of relationship	Low interaction (due to individually adapted standard services)	High interaction (intense coordination for solving customer's problems)
Basis: Porter's competitive strategies	Cost leadership as strategy Aiming at economies of scale Marketing by reasonable price	Differentiation as strategy Value added by innovation and performance enhancement Marketing by performance enhancement

Table A-1: CCLO vs. CDO

With their fundamentally opposed way of designing contract logistics service bundles, both strategies require different design-relevant resources. In the following chapter, these strategy-dependent, design-relevant resources are discussed from an RBV perspective.

A 3. Characterizing competitive advantage from a resource-based perspective

The RBV is considered one of the central theoretical constructs in strategic management research (Runyan *et al.*, 2007). The concept intends to explain the causes of success of particular firms and derive advice for the strategic management of firms (Barney, 2001; Freiling, 2001; Wernerfelt, 1984). The RBV perceives firms as an aggregation of specific resources. Next to classic resources like tangible and intangible

assets, intangible[3] capabilities are also considered in the argumentative logic of the RBV. Capabilities are perceived as a particular form of firm-specific resources, emerging from complex interaction patterns between personal capabilities, inter-subjective routines and tangible assets (Rasche, 1994). The central assumption is that firms differ with respect to their specific resource set and consequently feature heterogeneous resource configurations. As Fig. A-1 illustrates, superior returns result from the individual competitive advantage of a firm that is associated with the existence, possession and protection of unique configurations of relevant resources, so-called 'strategic resources' (Rasche, 1994).[4]

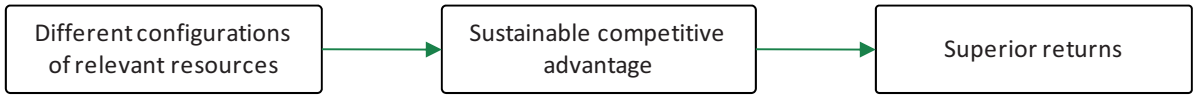

Fig. A-1: Core idea of the RBV

Against this background, strategic management is concerned with the question of which resources and configurations of resources have to be built and protected against competitors in order to receive a sustainable competitive advantage and enduring returns (Stölzle & Heusler, 2005).

In order to protect a competitive advantage, the resource-based view calls for so-called isolation mechanisms (Bamberger & Wrona, 1996a) for strategic resources (Stölzle & Heusler, 2005). These mechanisms explain how a firm may shelter its competitive advantage induced by strategic resources against the access of competitors (Bamberger & Wrona, 1996b; Stölzle & Heusler, 2005). Mechanisms of isolation serve to counter the competitors' effort of acquisition, imitation and replacement of a firm's strategic resources (Stölzle & Heusler, 2005). According to Barney (1997), four criteria are relevant for deflecting this thread. A resource delivers a potential, strategic and sustainable competitive advantage if it is valuable, rare, imperfectly imitable and hard to substitute or non-substitutable.[5] These criteria are supplemented by durability and transferability (Grant, 1991).[6] Lack of transferability can be reached by geographical immobility and the firm specificity of resources, as well as deficient information of the competitors and the immobility of capabilities (Grant, 1991). The slower the resources

[3] Further explanations for firm resources can be found in Amit & Shoemaker (1993), S. 35; Bamberger & Wrona (1996b); Bharadwaj *et al*. (1993); Grant (1991); Rasche (1994); Wernerfelt (1984).
[4] Cf. Rasche (1994), p. 35 ff and the literature listed there.
[5] Cf. for a deeper characterisation of isolation mechanisms: Bamberger & Wrona (1996b); Bamberger & Wrona (1996a); Barney (1991); Grant (1991).
[6] Grant additionally quotes replicability and transparency, which are similar to the above mentioned four criteria by Barney.

are wearing out, the more sustainable the competitive advantage is. Hence the durability of a resource is characterised by its specific constitution. Opposed to the regular deterioration of tangible resources, intangible resources like firm reputation or knowledge can become even more valuable when using it (Grant, 1991).

With its focus on different resource configurations, the RBV provides a sound basis for the investigation of strategic resources in designing contract logistics service bundles, which may lead to a competitive advantage and thus superior returns. The RBV does not exclude the firm's positioning in the market. By postulating that a competitive advantage results from a firm's resource configuration in comparison to other market players, the RBV indirectly includes a perspective on the market (Peteraf & Barney, 2003).

A 4. Strategic resources in designing contract logistics service bundles

Strategy-dependent resources in the design

In the design of contract logistics service bundles, shipper requirements need to be absorbed and integrated in a service bundle concept (Fabbe-Costes *et al.*, 2009; Hsu *et al.*, 2008). For this purpose both tangible and intangible resources are required. However, the design of contract logistics service bundles and thus the required resources differ for each contract logistics strategy (CCLO and CDO).

In order to address design-relevant resources, this research builds on a preliminary work of Yew Wong & Karia (2009), which is the first paper to discuss strategic resources in the context of logistics. The paper provides an initial structuring for resources in contract logistics, leaving room for interpretations. We primarily use their structure for resources, derived from general categorisations of the RBV, and apply it to the context of contract logistics service bundle design. Therefore the five resource categories 'physical resources', 'information resources', 'human resources', 'knowledge resources' and 'relational resources' are briefly outlined in the following. In logistics and contract logistics terms, *physical resources* are, for example, vehicles, warehouses or logistics hubs.

Further tangible resources are *information resources*, mainly information technology (IT), which is rated as a strategic resource in contract logistics by numerous authors (Alshawi, 2001; Bienstock *et al.*, 2008; Brah & Lim, 2006; Chiu, 1995; Gunasekaran

& Ngai, 2003; Myers *et al.*, 2004; Sanders & Premus, 2005). By deploying IT, shippers and LSPs, especially in contract logistics relationships, aim for the fast exchange of information, reduction of information-sharing costs and better customer service (Chiu, 1995; Hammant, 1995). IT resources can constitute a strategic resource, as they may be hard to imitate and replace, particularly if they are customised (Mata *et al.*, 1995).

Human resources are also perceived as critical resources, as logistics in general is considered a 'people's business' (Novack *et al.*, 1992; Zineldin, 2004). In the literature the composition of human resources is seen as a potential source of competitive advantage (Wright *et al.*, 1994). In addition to a qualified workforce, knowledge and competence are often considered specific resources (Yew Wong & Karia, 2009).

Knowledge is intangible and is primarily firm-specific, as it is rooted in the corresponding human capital and organisational routines (Grant, 1996a; Grant, 1996b; Teece, 1998). Knowledge and competence in particular are perceived as sources of competitive advantage (Prahalad & Hamel, 1990). This is supported by Büyüközkan *et al*. (2008), who claim that technical expert knowledge, market knowledge and management experience are essential criteria for choosing an LSP. Knowledge resources are moreover considered as the capability of gaining access to valuable and rare resources that are then successfully combined, making these resources inimitable and not replaceable (Yew Wong & Karia, 2009).

Furthermore, *relational resources* are seen as core factors of success of LSPs. Against the background of increasing discussions on inter-organisational cooperation in supply chain management, this appears reasonable (de Martino & Morvillo, 2008; Gunasekarana & Ngai, 2005; Stölzle & Heusler, 2005). Relationships and their resources are considered a cornerstone of competitive advantage (Langley & Capgemini, 2007). Relationships allow the exchange of complementary resources between supply chain (SC) partners (Amit & Schoemaker, 1993; Dyer & Singh, 1998). Relational resources consequently influence the LSP's business success (Panayides, 2007a; Panayides, 2007b; Panayides & So, 2005). They additionally support a joint understanding between shipper and LSP, as they align the planning and execution of activities.

Resource category	Examples in logistics	Mechanisms for isolation
Physical Resources	Warehouses, means of transport, property, buildings	Hard to imitate for high capital investments or specific arrangement
Information Resources	Track-and-Trace-systems, invoicing-systems, information-systems, customs documentation and reporting	In-house developments or customized adaptations are hard to imitate
Human Resources	Transportation manager, warehouse manager, information systems manager, customer service manager	Not to imitate due to firm-specific composition
Knowledge Resources	Supply Chain Management knowledge, abilities to optimise logistics systems, apply logistics technology, client and industry knowledge	Not to imitate due to firm-specific composition
Relational Resources	Client relations, horizontal alliances	Not to imitate due to firm-specific composition

Table A-2: Resource categories for logistics and mechanisms for isolation

Table A-2 provides an overview of the resource categories and logistics examples, as well as of the respective mechanisms for isolation. The sketched categories of resources do not necessarily have to be considered individually as different categories are linked either directly or indirectly (Yew Wong & Karia, 2009).

Design-relevant resources derived from distinct strategies

Having outlined the fundamental contract logistics strategies and the potentially strategic resources leading to competitive advantages in the design of contract logistics service bundles, we now discuss these resources' relevance in the design of service bundles. The sketched categories of resources serve as a basis for analysing the two depicted LSP contract logistics strategies towards the design-relevant resources (see Fig. A-2). As both contract logistics strategies are based on fundamentally different goals and characteristics, the strategies influence the design activities for specific contract logistics service bundles and thus require appropriate resources and capabilities in the design. The following distinction concerning relevant resources is related to the design of a contract logistics service bundle for a specific shipper.

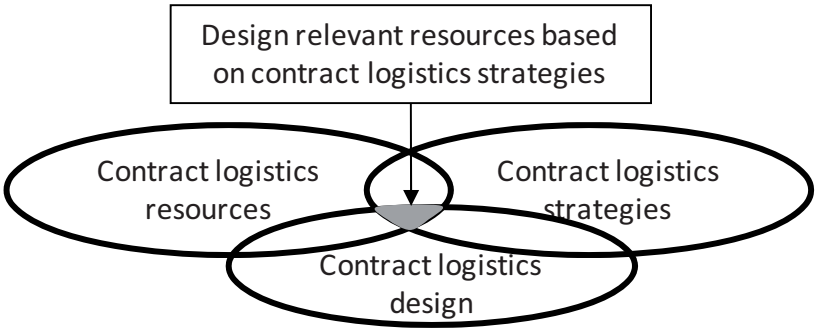

Fig. A-2: Design-relevant resources based on distinct contract logistics strategies

The LSP's strategy determines the specific point in time at which service bundle design occurs. In contrast to the CDO's single-stage service bundle design, the design of the CCLO has two stages. The primary design takes place *before* receiving the individual shipper requirements by setting up market-conform service components. The secondary design takes place when the *ex-ante* designed service components are compiled for a specific shipper. This being the case, the CCLO needs to aim for the maximum capacity utilisation of his *ex-ante* designed service components, in order to provide low-cost services. To pursue this objective, an appropriate client circle needs to be identified, which requires a sound knowledge of the potential market and the required services (cf. Chapter A 2).

Resources of the CCLO

The CCLO needs to provide well-marked *physical resources*, as many service components need to be kept available before designing individual service bundles. Based on the employees' market knowledge and the potentially marketable services, these components are determined *ex-ante* and thus already exist as a running system before a given shipper contact. An example is an LSP providing parcel services operating on established processing systems enriched by further services. These processing systems are defined in advance and are identical for each shipper. A similar picture results for the CCLO's *information resources*. In order to interface with a given shipper, the CCLO keeps IT resources for the defined service components ready. These are standard interfaces or quickly-specified interfaces that can easily be adapted to the shipper (Rümenapp, 2002).

Concerning the *human resources*, the CCLO does not require extensive resources for actually designing the service bundles. Instead of providing particular persons in specifically set up project teams, the CCLO focuses on combining the already designed service components and fixing a price. Nevertheless, for the preceding *ex-ante* design, capable human resources with knowledge of marketable services are

required. Furthermore, in order to provide reasonable prices for the services, the CCLO needs to dispose of personnel that is able to optimise the existing physical and IT resources. The CCLO's *knowledge resources* in particular are bound to the capabilities of physical and IT resource allocation and providing efficient processes. Compared to designing highly customised contract logistics service bundles, less knowledge is required. There is no need to know and apply specialised service features, when striving for economies of scale requires standardised contract logistics services. *Relational resources* are also less important for the CCLO. Shipper demands have to be absorbed, but a joint development and specification of service bundles does not happen (Prockl & Pflaum, 2007). Instead, the shipper's demands must match the offered services.

To conclude, the CCLO aims to provide and develop service bundles for a homogeneous client base. The design-oriented resources of the CCLO are thus focused on efficient physical and information resources and the anticipation and knowledge of market demands (see Table A-3).

Resources of the CDO

The CDO may also be characterised with the help of the different design-relevant resources. The CDO designs and develops service bundles only after a specific shipper contact. He designs precisely fitting solutions aligned with the shipper's needs. Therefore, the CDO needs to signal his competencies to potential customers (Prockl & Pflaum, 2007).

Concerning *physical resources,* the CDO does not require sophisticated logistics systems in advance. As the CDO individually designs services for each shipper, no predefined logistics resources are required. In order to provide contract logistics services, the CDO needs to procure the service components on (factor) markets for each shipper in the course of the design. The CDO's *information resources* are less frequently characterised by a standardised and efficient yet existing IT; instead, interfaces for affiliating with the shipper are individually adapted or developed. In order to signal customer orientation, the CDO may even take over the shipper's entire IT. Also, the *human resources* of the CDO need to reflect the customer orientation. The respective personnel need to be able to develop specialised solutions and hence provide experience in designing contract logistics service bundles. In order to be able to transfer shipper requirements into the service bundle design, the personnel also need to be experienced in dealing with shippers. This customer orientation requires an according education. To understand the shipper's needs, the personnel know the

shipper's language and vocabulary. The CDO's *knowledge resources* are also important in order to achieve a customised service bundle. The CDO needs to provide comprehensive knowledge of available technologies in order to be able to integrate those in the service bundle design. Furthermore, as for catering the shipper's demands, the CDO needs to have problem-solving capabilities (Klose, 2008). As Andersson & Norrman (2002, p. 10) put it, "...[problem solving] capabilities are becoming more important as the clients are asking for a long-term relationship where the provider proactively should develop a solution that is best in class. One way of making it more tangible and defining the human assets, is to ask for people with certain profiles." *Relational resources* are important for the CDO and need to be developed in order to pursue the differentiation strategy. To absorb the shipper's demands and develop customised solutions, the CDO needs to understand and learn from the shipper by interaction. Therefore, relational resources are essential. An intense and trustful relationship between LSP and shipper is required for individual solution development (Chase, 1978). If an LSP does not provide relational resources, the interaction and demand absorption can be impeded, due to a lack of understanding of the shipper. In the design phase, the relationship between shipper and LSP is influenced by joint solution finding and regular coordination meetings.

According to the presented resource profile, the CDO is especially characterised by the objective of defining customised shipper solutions. This objective is primarily achieved by intangible resources in form of knowledge and relational resources in order to provide the customised problem solutions. Both are inherent to human resources. Tangible resources play a subordinate role for the design of the CDOs.

Table A-3 provides an overview of the two resource profiles.

Resource categories	CCLO	CDO
Physical resources	Determination ex-ante Held ready and simple to adapt to each customer	Determination ex-post Customized and individually purchased when required
Information Resources	Standard IT-systems Held ready	Customized or adapted IT Individually developed
Human Resources	Experienced in general shipper demands Educated for optimizing physical- and IT- resources	Experienced in customized design of service bundles Educated for meeting the shipper demands
Knowledge resources	Knowledge on efficient logistics Physical- and IT-resource allocation abilities	Knowledge on available technologies Problem solving abilities
Relational resources	Anticipation of general shipper demands Limited interaction with a given shipper	Catering to individual shipper demands High interaction with the given shipper

Table A-3: Design-relevant resources of CCLO and CDO

Illustration of the two resource profiles based on two example cases

In order to substantiate the conceptually derived design-relevant resources, the resource profiles of both strategies are illustrated with two example cases.

The CCLO is illustrated by the 'beverage case.' In the course of this contract logistics relationship, a small trading company works with a medium-sized LSP. The LSP is accountable for the import of premium beverages on behalf of the trading company. The services comprise transport coordination from the country of origin (mostly the U.S.) to German-speaking countries, as well as customs clearance and warehousing. Additionally, the LSP develops and applies the country-specific labels. This customisation is important in order to comply with the local statutory provisions. For this particular service the LSP provides a labelling machine, which may serve multiple shippers from the beverage industry. The LSP builds on its standard services for transportation and customs clearance as well as labelling service, which were all designed beforehand and only slightly adapted to the new shipper.

Hence, concerning the required *physical resources* in the design of contract logistics service bundles, the LSP provided the majority of service components before the actual contact to the trading company. With the help of a flexible warehouse and established transportation routes from the U.S. to Europe as well as standardised customs services, the LSP was able comparatively easily to dispatch the required services without intense customisation. Since the LSP indented to perform efficient services at low costs with its strategy, no extensive customisation of services was provided; the maximum utilisation of existing, predefined capacities was aimed for instead. The LSP therefore needed to design the provided service components in such a way as to ensure flexibility and cost efficiency. The services performed for the trading company contributed to a higher degree of utilisation and hence economies of scale. The primarily standardised service components show the efficiency-driven focus of the LSP's strategy. This flexibility and efficiency of the CCLO is also reflected by the *human resources* required for the design. Only the CEO and one other employee were needed to design the trading company's service bundles.

As for *information resources,* the LSP provided IT resources that were easily adaptable to the shipper's needs. Before collaborating with the beverage trading company, the LSP had a web-browser-based IT solution, which matched the requirements of the shipper. Through track-and-trace functionalities, the shipper was able to check the status of his shipments. *Knowledge resources* in this case were required to optimise the relatively standardised service components. Design activities

and associated knowledge requirements were limited, as only existing service components were combined to an individual service bundle.

Similarly to the knowledge resources, the *relational resources* necessary for service bundle design were rather limited. The trading company announced the required services, while the LSP was independently in charge of designing the service bundles. Relational resources were thus obsolete for the design. The shipper was additionally not interested in a deeper relationship with the LSP. He was primarily interested in the delivery of the beverages at a reasonable price. Hence, low relational resources proved to be sufficient for the LSP. Considering the design-relevant resources in this case, the required profile primarily focused on tangible resources, such as the physical and information resources that the shipper's requirements needed to fit to. The LSP was able to provide efficient services at a low price and aimed to gain a competitive advantage by providing tangible resources, which could be used for more shippers until maximum capacity utilisation is reached. The beverage case thus represents a CCLO.

In contrast to the cost-leadership-oriented beverage LSP, we consider the case of 'engines' as an example for the CDO strategy and design-relevant resource portfolio. In this example case, the LSP designed a comprehensive service bundle for a shipper uniquely tailored to this shipper's requirements. The services consisted of production supply, warehousing of engine parts and distribution of finished engines. During the course of the design, the LSP purchased a site near the shipper and built a customised warehouse. In addition to tailoring the premises, the design activities comprised the material flow system as well as the respective process definition according to the shipper's individual requirements. These requirements comprised specific warehousing equipment for engine parts and finished engines as well as a specifically developed material flow system. Because of the dedicated services, the warehouse was not and could not be used for any other shippers.

The *physical resources* of the LSP in the design of the service bundles were not relevant until the design was completed. All required physical resources were exclusively procured for the shipper. Similarly, another tangible resource, the *information resources,* did not exist prior to the shipper contact. Instead, a warehouse management system (WMS) was designed and implemented, specifically developed to the shipper's warehouse and service requirements. The LSP needed the capabilities to develop such a WMS, providing an advantage over LSPs with standardised IT services. Hence, for the customised developments within the design, multiple

employees (*human resources*) were involved. The challenging tasks called for specialised and educated personnel. In this case, the education and creativity of the personal rather than the sheer number of involved persons were relevant. This importance is highlighted by the deployment of dedicated and educated design and implementation teams. The specific constellation of these teams led to a competitive advantage of this LSP. Closely bound to these human resources are the human-inherent *knowledge resources*. The LSP's employees provided experience and profound knowledge of contract logistics design, as they were permanently engaged in similar projects. In this specific case the provision of knowledge resources was crucial, as the shipper had extensive and individual requirements. Therefore the LSP provided personnel with experience in the shipper's business but also in contract logistics design. In order to develop the customised and complex service bundles, the integration of the shipper in the design process was inevitable. The shipper's integration was pursued through intense collaboration between the two parties. The relations and bonds between the two firms were intense, making the LSP's *relational resources* crucial. The LSP was able to define and design the service bundles together with the shipper in multiple workshops. These workshops were also pursued in the operating phase.

The example case 'engines' shows a set of design-relevant resources devoted to intangible factors like knowledge and relations rather than tangible resources. The competitive advantage for such an LSP is achieved through intangible resources.

In conclusion, the two LSPs applying opposing strategies may have a competitive advantage resulting from their specific sets of resources. While the LSP in the 'beverage' case focuses on the tangible resources that are aligned to perform cost-efficient services, the LSP in the 'engines' case focuses on customer-specific developments and hence relational and knowledge resources. Both companies had a competitive advantage resulting from their unique resource portfolios, which are set up according to their aspired competitive strategy. The competitive advantage is primarily characterised by maintaining existing relationships and being able to approach other shippers appropriately.

A 5. Implications

Summary and limitations

The research at hand showed that LSPs may obtain a competitive advantage by configuring their resource portfolios based on a specific competitive strategy. We developed a common understanding of contract logistics by considering the variety of notions found in the literature. Based on the derived constituent characteristics, two central competitive strategies for contract logistics were characterised. These strategies were conceptually examined with respect to their required resource portfolios for the design of contract logistics service bundles. The relevant resources were found to depend on the fundamental strategic alignment. Cost-leadership-oriented LSPs primarily require tangible resources, like physical and information resources, to design service bundles for a given shipper. Existing services need to fit to the majority of the required services in the market and can then be combined according to the customer's requirements. By contrast, differentiation-oriented LSPs primarily require intangible resources, like human, knowledge and relational resources, in order to secure a customised design by integrating the shipper and solving his problems.

These findings need to be considered critically. One limitation of this research is the ideal-typical deduction of the results. In order to approve these conclusions, a quantitative analysis is pending. From a conceptual point of view, limitations are present in the analysis applying the opposed strategies, which in practice may not be so distinct and clear. Furthermore, only resources relevant for the design phase were considered, leaving out other tasks and resources that may lead to a competitive advantage in other phases of contract logistics that are independent of the design. However, these limitations do not affect certain implications for management and research.

Management implications

The research is the first of its kind to elaborate design-relevant resources, link them to LSP strategies and provide implications for the management of both LSPs and shippers. In order to realise a competitive advantage, LSPs need to configure a resource portfolio for the design of contract logistics service bundles on the basis of their fundamental strategic alignment. Hence LSPs following a cost leadership strategy may develop their tangible resources to utilise them efficiently, while differentiation-

oriented LSPs need to develop their intangible resources in order to design customised solutions for the shippers.

The paper also provides guidance for LSPs intending to enter the contract logistics market. In dependence of their existing resource setup, LSPs may derive an appropriate contract logistics strategy. For example, a parcel service provider with highly efficient tangible resources may, on the basis of our results, aim for a cost-leadership-oriented strategy by adding simpler service components to the existing resources. In contrast, an LSP experienced in logistics but without comprehensive assets – such as fourth-party logistics providers – could aim for a differentiation strategy and develop the required intangible resources. The results may be particularly interesting for SME-LSPs trying to enter the contract logistics business. By establishing profound knowledge and relational resources in a certain industry or sector, a differentiation advantage can be achieved that in turn can result in a competitive advantage and superior returns.

This paper also supports shippers considering outsourcing to LSPs. The results indicate that a shipper interested in obtaining a low price needs to be flexible in terms of services, as the LSP may not be able to fulfil specific requirements due to the need to use existing capacities to the maximum. In contrast, a shipper requiring comprehensive and individual service bundles needs to accept a higher price for the services, as all resources are individually procured and composed. Based on this knowledge, an appropriate LSP can be approached.

Research implications

The paper presented design-relevant resources for contract logistics service bundles. Based on general competitive strategies, distinct LSP contract logistics strategies were elaborated and considered towards their relevance for the resource portfolio in service bundle design. The results show variance in resource portfolios, depending on the individual competitive strategy. Resources and strategies involved in contract logistics are systematised and a concept for successful service bundle design by developing an appropriate resource portfolio for the design based on the competitive strategy is provided. These insights offer a basis for further research in the design of contract logistics service bundles.

Because of the conceptual-deductive and theoretical extraction of the results, the derived resource portfolios ought to be tested with practice and hence an empirical

analysis and validation is needed. Here, the identification and examination of the competitive strategies applied in practice will be fundamental. Furthermore, the analysed resource portfolios offer a starting point for further research, as this paper is the first to consider design-relevant resources in dependence of specific strategies. This research therefore lays the ground for analysing further prerequisites of the establishment of contract logistics service bundles.

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Appendix

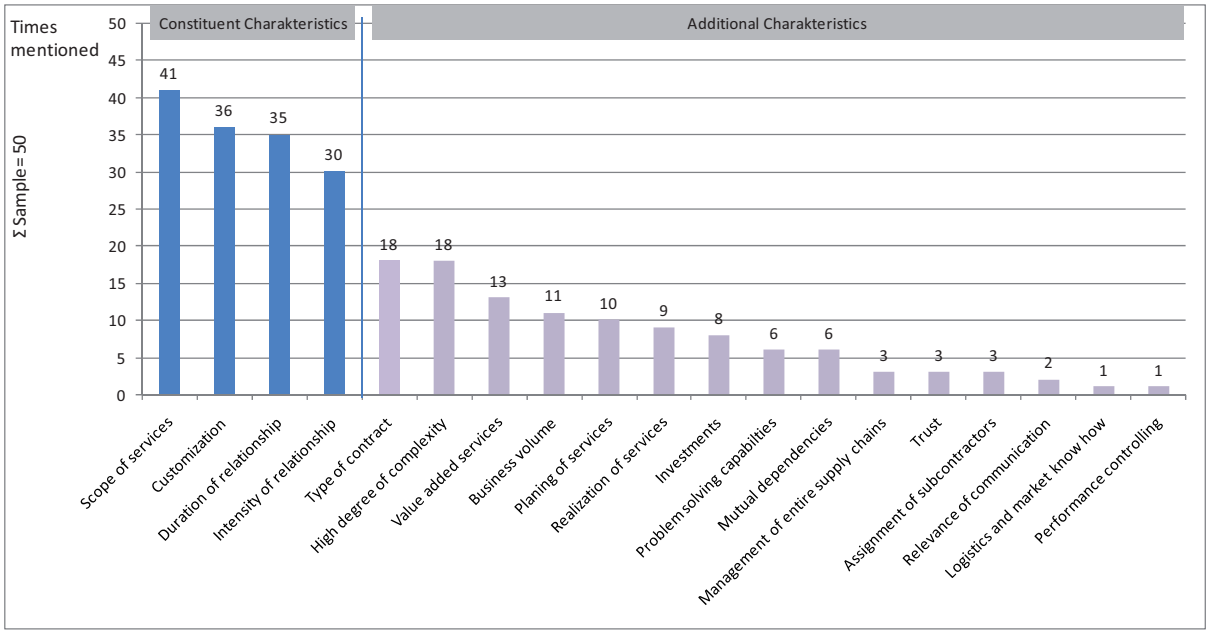

Fig. A-3: Results of the analysis of definitions

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Appendix B

B. Understanding customer needs and designing contract logistics service bundles – An exploratory study based on an absorptive capacity approach

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Abstract:

Purpose – The purpose of this study is to analyse interaction procedures applied by logistics service providers (LSPs) in order to understand and transfer customer requirements and needs in the design of contract logistics service bundles. In particular, we focus on the influence of the service bundle's complexity on the relevance of this interaction.

Design/methodology/approach – Case studies of eleven LSP-shipper relationships are conducted. As a theoretical foundation, the concept of absorptive capacity (ACAP) is discussed and adapted to contract logistics purposes. A semi-structured interview guide is used.

Findings – Procedures of designing contract logistics service bundles recognised in practice vary with service bundle complexity. Furthermore, experience either in contract logistics *per se* or in the specific shipper business is identified as a facilitator in understanding and transfer of customer requirement and needs in the design. Our

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findings may assist LSPs in establishing appropriate procedures for the interaction with shippers when designing contract logistics service bundles with respect to service bundle complexity by the identification of procedures applied. An ideal-typical framework was developed for this study.

Research limitations/implications – Quantitative assertions are not part of this study. The empirical study design leaves room for interpretation and personal emphasis. An ideal-typical framework was developed for this study. Other frameworks may reveal different results.

Originality/value – The study sheds light on the highly important but as yet unexplored topic of the design of contract logistics projects, and provides guidelines for LSPs.

B 1. Introduction

Contract logistics, also referred to as third-party logistics (TPL), has increasingly attracted attention in practice as well as in academic research. Contract logistics business is still developing, as the demand for outsourcing and advanced logistics services is steadily growing (Klaus & Kille, 2008; Langley & Capgemini, 2009; Stölzle *et al.*, 2010). However, contract logistics itself is not clearly defined, but characterised by integrated logistics services encompassing the entire logistics process or selected activities within that process (e.g. Bagchi & Virum, 1996). These activities are continuously gaining importance and require more comprehensive and closely integrated logistics functions (Hertz & Alfredsson, 2003). Due to the increased scope and the associated increased complexity of service bundles, the design process calls for extensive logistics service provider (LSP) competencies (Bask, 2001). The establishment of contract logistics relationships poses particularly significant challenges. In order to address this issue, publications in logistics and supply chain management postulate the need to take a closer look at the design phase of contract logistics (Selviaridis & Spring, 2007). In particular, the understanding of customer needs and their consideration in tailoring service bundles may serve as a sustainable competitive advantage (Zhao *et al.*, 2001) for LSPs and promote the success of the contract logistics relationship. As contract logistics service bundles typically differ by scope and involved tasks, the design of the respective service bundles requires the application of procedures, suitable for the specific degree of complexity. Hence the

understanding of customer knowledge concerning requirements and needs and its integration in concept-design becomes a major challenge for LSPs.

This paper addresses the interaction of LSPs and their customers – the shippers – in designing contract logistics service bundles. Despite the importance of designing the service bundles, little has been published concerning this issue. Authors primarily focus on the basics and origins of contract logistics (Ashenbaum *et al.*, 2005; Murphy & Poist, 2000; Sink *et al.*, 1996; Wilding & Juriado, 2004), outsourcing decisions, and provider choice (Baofeng *et al.*, 2008; Rao & Young, 1994; van Damme & van Amstel, 1996) or country-specific usage of TPL (Baofeng *et al.*, 2008; Bhatnagar *et al.*, 1999; Sankaran *et al.*, 2002). Extant publications tackle neither the design of contract logistics service bundles nor procedures applied in order to understand the customer's requirements and needs (Selviaridis & Spring, 2007). This is particularly surprising, as communication and information sharing between the partners are discussed widely and considered crucial for successful contract logistics relations (Stank *et al.*, 1996), especially in the pre-contracting phase (Bienstock *et al.*, 1997). Husikonen & Pirttilä (2002) discuss the use of inter-organisational coordination requirements on a lateral basis. Bagchi & Virum (1996) point out the importance of collaboration and mutual definition of processes implemented in the contract logistics relationships. As for achieving mutual definitions and a customised service bundle concept fundamental knowledge on current and required processes and procedures must migrate from the shipper to the LSP. LSPs need to absorb this knowledge during the design phase to be able to design services and contract details according to customer requirements and needs. Fulfilling or overreaching the customer's expectations commonly results in long-term relationships (Wallenburg, 2008). Absorptive capacity, as a firm's competence to absorb external knowledge (Cohen & Levinthal, 1990), serves as an approach to the transfer of knowledge between shippers and LSPs in this study. Therefore, the concept of absorptive capacity is adapted to the context of understanding and integrating the shipper's knowledge in designing contract logistics service bundles.

As contract logistics services vary widely and involve different degrees of intricacy, for this study, the complexity of contract logistics service bundles is perceived as a major factor of influence on the involved procedures. Therefore, we raise and analyse 11 case studies relating an individual service bundle's complexity to the procedures of understanding and integrating the shipper's knowledge. The paper at hand is organised as follows. First, we provide a general overview of the existing literature on contract

logistics as well as on the absorptive capacity construct, leading to our research questions. Secondly, the applied research methodology and the process of data collection are explained. The chapter concludes with the analysis and the results of the multiple case studies. The subsequent chapter discusses the findings and offers propositions. The final chapter concludes the work, points out limitations and gives directions for further research.

B 2. Literature review

Contract logistics – a service-intensive business

Definitions of contract logistics differ not only in the wording used, but also in the content (Lieb, 1992; Marasco, 2008). Terms like 'third-party logistics,' 'logistics outsourcing,' 'lead logistics,' 'logistics service systems' or 'contract distribution' are almost interchangeably used to describe the action of contracting out some or all of the logistics activities of a company to LSPs, often accompanied by services that are not part of traditional logistics operations. While some definitions interpret contract logistics as traditional 'arm's length' sourcing of transportation, the majority of definitions use the term for describing the outsourcing of complex service bundles, encompassing the entire logistics process and beyond (Knemeyer & Murphy, 2005a; Knemeyer & Murphy, 2005b; Marasco, 2008; Weber *et al.*, 2007). The different perceptions of contract logistics are reasonable, as different sources in the literature stress varying aspects of contract logistics, such as scope of services offered, customisation and type of relationships, as well as the duration of the respective relationships (Berglund *et al.*, 1999; Halldorsson & Skjott-Larsen, 2006; Lieb, 2008; Lieb & Bentz, 2005; Prockl & Pflaum, 2007; Prockl *et al.*, 2010; Skjoett-Larsen, 2000; van Laarhoven *et al.*, 2000). A major body of literature is reasonably concerned with contract logistics relationships, as the scope of services has grown steadily over the past decades, resulting in an increased need for interaction in order to manage these service bundles (Panayides & So, 2005; Persson & Virum, 2001; Rao & Young, 1994).

Service bundles may consist of elementary logistics functions like transport or warehousing, which are rather simple to define and distinguish, as well as value-added services like IT services or contract manufacturing (Andersson & Norrman, 2002), which are harder to differentiate. Hence contract logistics service bundles usually consist of operational and managerial tasks (Engelbrecht, 2003) with varying degrees

of complexity. Complexity may be driven either by the intellectual challenge of the services and tasks or by their sheer number (Backlund, 2002). The more advanced such services are and the more different services are combined, the more complex the customised service bundles and the design challenges for the LSP become (Gadde & Hulthén, 2009; Leahy *et al.*, 1995). As high complexity requires more competencies to design than less complex services, the complexity of service bundles may particularly influence procedures required to understand and integrate the shipper's needs and design an appropriate service bundle concept.

Interaction is of noteworthy importance for contract logistics relationships (Skjoett-Larsen, 2000). The interaction of the two parties in outsourcing logistics functions has been shown to be a particularly critical aspect for simple services (Smyrlis, 2006) as well as for more complex ones (Lei, 2007). The involvement of the two parties is crucial due to the character of contract logistics as a special case of services (Andersson & Norrman, 2002). One important element of service production and thus also of contract logistics services is the need to integrate the customer as a so-called external factor into the service production process (Zöllner, 1990). This also implies integrating customer needs in a form of learning process and to understand the influence of the external factor on learning initiatives in this context (O'Keeffe & Harington, 2001). Designing contract logistics service bundles requires consequently the absorption of the relevant knowledge in order individually to perform the heterogeneous and inseparable services. Learning from the shipper enables the understanding and transfer of the shipper's needs. The LSP and shipper may accordingly build a learning organisation. Hence the discussion of organisational learning (OL), along with customer integration, builds a theoretical foundation for understanding the customer. According to Shang (2009), integration capabilities have a positive effect on the organisational learning and service performance of LSPs. Organisational learning is perceived as a dynamic process of creating, acquiring, integrating and transferring knowledge (Jerez-Gomez *et al.*, 2005) within the boundaries of one organisation or across organisations (Lukas *et al.*, 1996). Despite the importance of LSP-shipper interaction in the design of contract logistics service bundles, little has been published concerning this issue.

Absorptive capacity as a basis for analysing the flow of knowledge

Absorptive capacity (ACAP) has frequently been observed as a predictor of organisational learning outcomes (Malhotra *et al.*, 2005). It may therefore be applied

to the process of understanding the customer and integrating his requirements and needs in the design of contract logistics service bundles. It resembles the dynamic process of the creation, acquisition, transfer and integration of knowledge from OL, enriched by a dedicated external perspective. Van den Bosch *et al.* (2003), for example, consider ACAP a mediator between publications on organisational learning, inter-organisational relations and network literature, along with other streams. The concept may help foster the relationship and the understanding between the involved parties, as insufficient information sharing between them has been proven frequently to promote a lack of understanding of the other party (Bagchi & Virum, 1998; Gadde & Hulthén, 2009; Knemeyer & Murphy, 2005b; Panayides, 2007; Razzaque & Sheng, 1998). The interaction between the shipper and LSP and involved procedures still seem rather unexplored areas, though they are "of particular importance to transfer technology and to provide the supplier with access to knowledge and skills in order to enhance performance" (Gadde & Hulthén, 2009, p. 638). Knowledge transfer to the LSPs may therefore be considered an integral part of interactive relationships (Gadde & Hakansson, 2007; Modi & Mabert, 2007). As a means for absorbing the shipper's knowledge, we introduce absorptive capacity and apply it to contract logistics service bundle design.

Initially developed by Cohen & Levinthal (1990), the concept of ACAP is defined as a company's ability to recognise the value of external knowledge, assimilate it and apply it to commercial ends (van den Bosch *et al.*, 2003). The initial model of ACAP, viewing it as a company's ability to gain competitive advantage through its three components of valuing, assimilating and applying new knowledge, has proven to be a flexible concept and was applied to a variety of fields of research, such as IT, R&D, strategic management and innovation management (Zahra & George, 2002). Lane *et al.* (2002) provide another overview of ACAP literature in the fields of knowledge transfer, organisational learning, innovation, corporate scope and alliances. Over the years the concept has been revisited and refined (Lane *et al.*, 2006; Stock *et al.*, 2001). Moreover, publications concentrating on the factors influencing ACAP can be identified. For example, Jansen *et al.* (2005) examine the organisational antecedents of potential and realized ACAP, and Garcia-Morales *et al.* (2007) analyse the effects of technology ACAP and technology pro-activity on OL, innovation and performance. Nooteboom (2000) examines learning by interaction and finds that there is no best way to share knowledge, as it is bound to certain contingencies. Huber (2006) tries to make the concept applicable by describing six ways of acquiring knowledge in firms. Lichtenthaler (2009) focuses on the type of prior knowledge possessed by firms,

identifying technological knowledge and market knowledge as fundamental components. ACAP is also applied to various industries or enterprise functions (e.g. Beckett, 2008; Dal Zotto, 2003; Koch & Strotmann, 2008; Park *et al.*, 2007; Salojärvi & Sainio, 2006). Finally, some authors use ACAP in a dyadic context (Cohen & Dal Zotto, 2007; Dal Zotto, 2003; Lane & Lubatkin, 1998; Lane *et al.*, 2001), offering a basis for the research at hand.

ACAP has found its way in the logistics and SCM (supply chain management) literature but has not been applied extensively. Publications mainly focus on integration and knowledge sharing in the entire supply chain (SC) with one focal enterprise, and has so far neglected the dyadic perspective in specific knowledge transfer relationships. Nevertheless, ACAP seems to be fruitfully transferable to the supply management realm (Schiele, 2007). In particular, publications with a logistics background apply ACAP to describe inter-organisational knowledge sharing and thereby provide a sound basis for the dyadic perspective of this paper. Arnulf *et al.* (2005) examine how the dynamics of trust and absorptive capacity affect SCM development projects. The case analysis shows that the dynamics of institutional trust and distrust caused obstructions to the mutual learning capacities of the participating companies (Arnulf *et al.*, 2005). Malhotra *et al.* (2005) used the absorptive capacity lens to build a conceptual framework in order to interlink configurations of SC partnerships. The approach of using ACAP as a lens and foundation for a framework also seems appropriate for the research of the paper at hand.

Building on the presented literature review, we propose the following research questions in order to shed light on interaction procedures in designing contract logistics service bundles.

Research questions

1. How does service bundle complexity influence the procedures used in designing contract logistics service bundles?

2. Which procedures do LSPs and shippers apply to foster the process of understanding and integrating shipper knowledge?

3. Which implications for contract logistics projects can be derived, and are there exceptions to discuss?

B 3. Research method

Knowledge absorption in contract logistics is poorly researched and characterised by complex social interaction and inter-firm relationships. Hence a qualitative research method promises the best results (Yin, 2003; Yin & Davis, 2007). We follow the proposal of Selviaridis and Spring (2007), who argued that "qualitative methods should be used to gain a deeper understanding of the formation and evolution of 3PL [contract logistics] relationships" (p. 141), and chose a multiple case study design as our methodology. To analyse the case studies, first a conceptual framework is developed based on the above considerations concerning service bundle complexity and ACAP components.

The conceptual research framework

The concept of absorptive capacity has gone through various developments and refinements in the past, and the three ACAP components proposed by Cohen & Levinthal (1990) have been widely discussed. Zahra & George (2002) argue for an additional component called 'transformation of knowledge', which describes a firm's capacity to develop and refine routines that facilitate the combination of existing and newly acquired and assimilated knowledge. This refined model incorporates the implications earlier assumed by other authors, like Szulanski (1996) and Lane & Lubatkin (1998).

Following the process-based perception of absorptive capacity discussed in the literature review (Lichtenthaler, 2009), the widely accepted framework of Zahra & George (2002) seems reasonable as the basis for analyzing the process of knowledge absorption in contract logistics service bundle design. Because of the separation into the acquisition of knowledge (potential ACAP dimension) and subsequent integration of this knowledge (realized ACAP dimension), the two-phased processual structure of this specific framework ideally resembles the two-phased absorption and integration of shipper knowledge in designing service bundles in contract logistics.

We apply the ACAP concept to the dyadic context of contract logistics service bundles and do not seek to cover the general capacity of a firm to absorb knowledge. When doing so, comparability between individual relationships and service bundles needs to be secured by introducing a moderating variable. As mentioned above, differences in service bundles characterise contract logistics. Hence, the service bundle complexity seems to have a non-negligible influence on the design of specific contract logistics service bundles. Consequently, the process of knowledge transfer and procedures

applied to absorb the knowledge are influenced by service bundle complexity. Gadde & Hulthén (2009, p. 638) support this notion by arguing that "there are clear connections between the scope of [outsourced services] and the involvement between provider and buyer." Lieb & Bentz (2005) agree by arguing that contract logistics relationships are increasingly complex and the management of those relationships is challenging to *both* parties. Hence we make use of the described ACAP dimensions and introduce 'contract logistics service bundle complexity' as a moderating variable. We seek to examine how service bundle complexity influences the process of understanding the customer's needs and integrating them to a design concept.

The adapted ACAP concept comprises shipper knowledge and LSP experience as antecedents of ACAP. The dimensions of potential and realized ACAP present the core of the framework, as they resemble the understanding and integration of knowledge. The first component of potential ACAP in the processual model is the acquisition of knowledge, in the sense of identifying and acquiring external knowledge. Acquisition is followed by assimilation, describing the firm's routines and processes that allow the analysis, processing, interpretation and understanding of the received information. Potential and realized ACAP are linked by social integration mechanisms. Transformation, the first process of realized ACAP, denotes a firm's capacity to develop and refine the routines that facilitate the combination of existing with new knowledge (Zahra & George, 2002). Transformation is followed by exploitation, which is the actual application of the knowledge absorbed. As for the developed framework, both dimensions of ACAP are influenced by service bundle complexity in contract logistics. In the light of this brief overview, we propose the framework shown in Fig. B-1 and will specify its elements in the subsequent analysis. Depending on the appropriability, the ACAP may lead to a competitive advantage in form of customized service bundles and a stable relationship based on satisfaction.

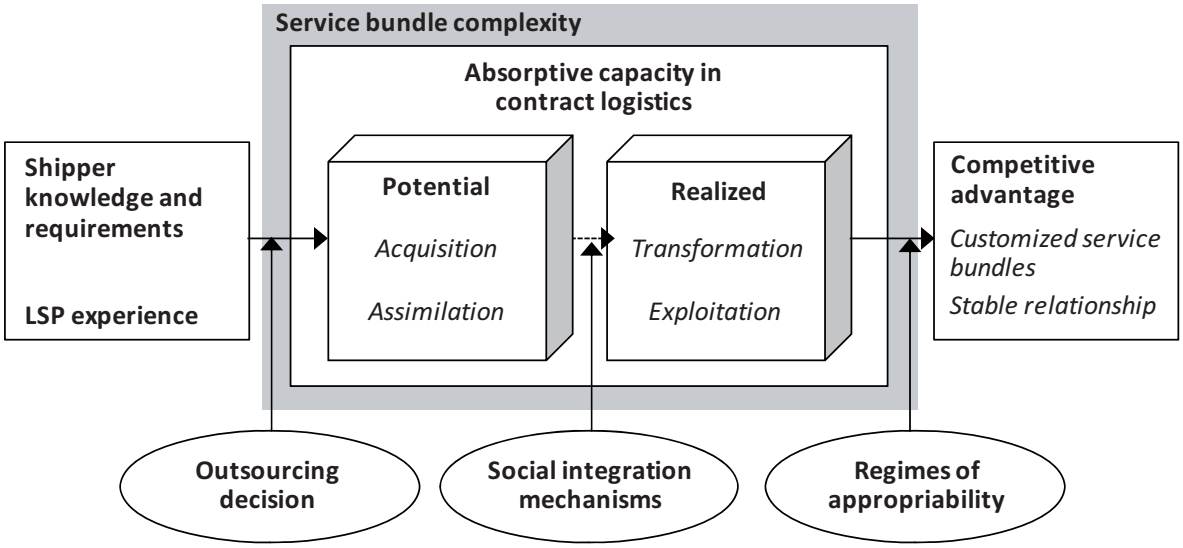

Fig. B-1: ACAP model for contract logistics service bundle design

Case selection

Eleven in-depth case studies were conducted. We specifically focused on companies, known as leaders in their industries. We intentionally did not focus on a particular shipper's industry or a certain kind of service bundle; instead, we aimed at different cases and varying case contexts, as we claim service bundle complexity to be the major influence on the process of understanding and transforming the customer's needs. As we intended to examine the relationship between the shipper and LSP, we selected cases that allowed interviews with both. We ensured construct validity by selecting cases that are suited for exemplifying the phenomena that are to be focused on in the study (Eisenhardt & Graebner, 2007) and by gathering and combining data from different parties (Yin, 2003).

One central precondition was a yet implemented contract logistics relationship between shipper and LSP, to ensure the observation of successful procedures. Other selection criteria were service bundle heterogeneity for the entire sample of case studies, concerning type or scope of services. We used theoretical sampling logic to ensure the external validity of the case studies and to allow the generalisation of the findings (Eisenhardt & Graebner, 2007).

As intended by the research setting, the population of cases reflected a variety of service bundles and different industries. Three cases were connected to the consumer electronics industry (notebooks or pay TV equipment), whereas two cases had a business electronics background (professional wires and cables or

telecommunications, as well as spare parts supply). Two cases were located in the household context (tools and appliances). Two cases handled foods and groceries, and two other cases were situated in the automotive industry. Concerning geographical orientation, two cases were national, six cases shipped Europe-wide and two cases were globally oriented.

Data collection

For the data collection we used semi-structured interviews for which we developed a structured interview guide. According to the structure of the interview guide, each interview ran through six sections. The first section comprised general data, including the shipper's industry and company profile data. The second section took a closer look at the contract logistics service bundle's characteristics necessary to understand the relationship between the shipper and LSP. Our observation focused in particular on contracting mechanisms, LSP's experience, types and numbers of services performed, kind of products handled, choice of partner, objectives of the relationship, performance indicators and duration of the partnership and applied IT structure. The content of this section was inspired by Mortensen and Lemoine (2008), Berglund *et al.* (1999) and Lambert *et al.* (1999). The third section comprised data on the absorption of knowledge by asking what procedures were undertaken to understand the shipper (from the LSP's perspective) and to clarify the requirements and objectives (from the shipper's perspective). Section Four dealt with the procedures applied in actually designing the contract logistics service bundles. Foundations for the latter two sections were mainly derived from Cohen & Levinthal (1989) and Zahra & George (2002), as well as Kuss (2009). As a means of monitoring the further progress, we added a section on the implementation procedures that usually take place after the design phase. We tried to evaluate whether changes in responsibility occurred and if the design concept was successfully implemented. In the final section we examined the success of the relationship by asking for personal valuations of the relationship on the one hand and several factors of outsourcing success, like intention to prolong and overall satisfaction, on the other.

We undertook a pilot study in order to test the structure and design, as well as the comprehensibility of the interview guide’s questions (Ellram, 1996). For this purpose we interviewed a CEO involved in the contract logistics service bundle design of a medium-sized LSP. Following this interview, minor refinements were made.

For each case study, one to four comprehensive and in-depth interviews were run. The interview guide was sent to the interviewees prior to the interview. The actual interviews were conducted by two researchers in order to avoid biases and to enhance information reliability (Yin, 2003). The interviewees from the LSPs were either CEOs involved in the acquisition of shippers and the design process or project managers directly involved in the understanding and integrating of customer demands. From the shipper's side, questions were answered mainly by logistics procurement officers.

The interviews were conducted in the second half of 2009. Each interview lasted from 3.5 to 4.5 hours and was recorded, transcribed and documented in written reports. Each report was sent to the interviewee for proofreading. The interviews were then structured and annotated according to the interview guide in order to enable cross-case comparisons.

B 4. Analysis and results of the empirical study

The analysis is guided by the research framework. Consequently service bundle complexity, potential ACAP and realized ACAP, each adapted to the contract logistics context, are analysed.

In order successfully to apply ACAP to the design of contract logistics service bundles, a closer look at operationalisations in existing literature is recommended. Applied to several contexts, ACAP is operationalised by different, mostly quantitative, measurements. Liu & White (1997) use the investments in R&D personnel to examine ACAP and innovation in developing economies using the example of China. Szulanski (1996) makes use of nine measures to capture ACAP by, for example, measuring different stages of internal knowledge transfer processes. Rather than a concrete operationalisation of ACAP, the number of scientific publications is used by Cockburn & Henderson (1998) to reflect ACAP as a predictor of research productivity. Kim (1998) develops ACAP measures to analyse a single case study applying changes in the company's orientation towards the use of assimilated technology. ACAP has been employed in a dyadic context by Lane & Lubatkin (1998) with respect to a firm's ability to learn from another firm, depending on the similarity of their knowledge bases, organisational structures, compensation policies and dominant logics.

As knowledge diffusion and therefore the ability to absorb knowledge is a matter of interaction between organisations (Gadde & Hulthén, 2009; Mentzas *et al.*, 2006; Shang, 2009), the potential and realized ACAP may be operationalised for the work at

hand by the interaction between the shipper and LSP. For this purpose we apply and adopt a combination of measures from Kuss (2009), Jaworski & Kohli (1993), Jansen *et al.* (2005) and Szulanski (1996). With the help of the four existing ACAP components – acquisition, assimilation, transformation and exploitation – adapted to our research purpose, as well as the existing operationalisation approaches, we develop a tailored evaluation guide.

Operationalisation and measurement of service bundle complexity

As the first of our key constructs we describe the operationalisation of service bundle complexity in this section and present the related results of our empirical study.

Large (2007) already called for a discussion of adequate measures of complexity of contract logistics service bundles, but leaves open how complexity should be operationalised. In the literature, complexity is perceived as "purely *relative to a given observer*" and "something in the eye of the beholder" (Ashby, 1973, p. 1). However, structures of a given system are generally considered complex if they consist of multiple pieces and are linked by several relations and operations, in a way that makes it impossible to anticipate the system's behaviour (Prockl, 2007; Simon, 1977). A complex structure of systems, which contract logistics service bundles can be considered as (Giesa & Kopfer, 2000), is accordingly characterised by the number and kind of elements (variety) as well as the kind of relations and number of connections (connectivity) (Patzak, 1982; Prockl, 2007). A high degree of complexity consequently goes along with numerous system components, considerable degrees of freedom or nonlinearity (Yates, 1978).

We thus propose the following operationalisation for service bundle complexity:

(1) Types and number of services: The types and number of services that the LSP performs for the shipper represent the number and kind of elements in the system (Andersson & Norrman, 2002). The more services a shipper tenders and the more comprehensive these services are, the higher the complexity of the service bundle, as there are more, varying and connected elements to consider and manage. Furthermore, all activities related to these services also influence complexity. In particular, multiple connected services drive complexity, making the management aspect of service bundles a fundamental element of overall complexity (Andersson & Norrman, 2002). Moreover, geographical scope and additional managerial tasks need to be included in this operationalisation of service bundle complexity.

(2) Product features and handling volume: Furthermore, the type of products handled within these services has a direct influence on the number and kind of elements and their connectivity within the system. Accordingly, wide ranges of different products (product heterogeneity) and hard-to-distinguish products imply a higher degree of complexity, as the system's elements' variety and connectivity are affected. Moreover handling volume, delivery times and product value as drivers of service bundle complexity are considered.

(3) IT system challenges: In order to make complex service bundles manageable and report service performance, IT systems play a vital role in contract logistics and may also be considered an indicator of complexity (Evangelista & Sweeney, 2006; Hertz & Alfredsson, 2003). Modeling the variety and connectivity of the service elements, IT virtually reflects the service bundles. Hence IT is the distinct system illustrating relations between the elements included in the service bundle. Comprehensive service functions and highly integrated systems require more effort in designing IT systems and programming interfaces.

(4) Financial aspects: As a final operationalisation of service bundle complexity, we consider financial aspects. Central financial aspects in contract logistics are the transaction volume, also known as business volume (Klaus, 2008), and the investment volume (Knemeyer *et al.*, 2003; Large, 2007). High business volume is not a driver, but rather an indicator of a high degree of complexity that is financially rewarded by the shipper. In contrast to business volume, investment volume is a driver of complexity as it affects the number and connectivity of elements in the service bundle.

Having defined our operationalisation of complexity, we now conduct a qualitative assessment of service bundle complexity in practice. In order to receive comparable results for each case with respect to the complexity operationalisations, we assign the values 'high,' 'medium' or 'low' to each measure in each case (Table B-1 in the appendix).

According to the operationalisation of service bundle complexity, we found four groups of cases varying in their degree of complexity. Three cases had a high complexity, with a large number of comprehensive services, encompassing management tasks, a variety of products and manifold processes. Medium complexity is represented by four cases. These cases feature varying characteristics, from high to low for the four different measures. A third group, characterised by rather low complexity, includes three cases. None of the measure is ranked 'high' in the cases –

only 'medium' or 'low'. The services are often related to classic logistics service provider tasks and are, for example, executed in so-called multi-user centers (e.g. Klaus, 2008). The main tasks in this category are the allocation of resources rather than the development of new solutions and concepts. The final group consists of only one case representing the lowest degree of complexity. Though still considered an example of contract logistics because of executing non-logistics, customised services, this case seems to have minor challenges compared to the other cases of the sample: no specific investments were needed and only minor value-added services, compared to standard logistics services, were assigned to the LSP.

Operationalisation and measurement of potential absorptive capacity

The next construct to operationalise is potential ACAP (PACAP), which refers to the understanding of customer needs and consists of the components knowledge acquisition and assimilation.

Both components of PACAP, may be operationalised with the degree of interaction between the involved parties. The greater the effort of interaction between the two firms, the more quickly the knowledge will be absorbed (Kim, 1997), implying a higher ranking in terms of PACAP. Moreover, as for acquisition, the intensity, speed and direction of the information flow in the cases are evaluated (Zahra & George, 2002). Assimilation is measured with respect to interpretation, comprehension and learning (Zahra & George, 2002). The operationalisation of PACAP was adapted to the contract logistics context and is measured on the basis of the following dimensions indicating the degree of interaction:

(1) Team and task sharing: Since interaction with and integration of the shipper are considered crucial for PACAP in contract logistics, we take a look at the interdisciplinary teams of the shipper and LSP. This means that we consider the number of team members as well as their respective tasks and the organisational structure of the team as an indicator of conscious team management enabling inter-organisational learning (Lane & Lubatkin, 1998). Moreover the integration of external knowledge carriers (Huber, 2006) with a potentially positive effect on PACAP is considered.

The knowledge transfer from the shipper to the LSP happens either by presenting explicit knowledge or by disclosing tacit knowledge in conversations. "Explicit knowledge is knowledge that is codified and transmittable in formal, systematic

language. It therefore can be acquired in the form of books, technical specifications, and designs, or as embodied in machines. Tacit knowledge, in contrast, is so deeply rooted in the human mind and body that it is difficult to codify and communicate and can be expressed only through action commitment, and involvement in a specific context" (Kim, 1998, p. 508). According to this notion, explicit knowledge may be transferred in written form or in graphical illustrations. Conversely, tacit knowledge can only be transmitted by interaction between persons. As for the analysis, we differentiate between visual learning (transfer of explicit knowledge) and interactive learning (transfer of tacit knowledge).

(2) Visual learning: Visual learning in the contract logistics context may be promoted by detailed tender documents (or service requirement documents) and functional specification documents, site inspections or additional means like glossaries, jointly used databases or data rooms, which assure a common ground of understanding.

(3) Interactive learning: Interactive learning serves as another operationalisation of PACAP. For this purpose, the number, structuring and formalisation of meetings as well as the intensity of interaction in these meetings are evaluated (Kuss, 2009).

(4) Documentation of results: As for assimilation, we considered learning methods as well as routines and processes allowing the team to analyse, process, interpret and understand the information shared (Zahra & George, 2002). In particular, feedback with the shipper and the documentation of learning efforts were considered (meeting minutes, project plans, regular feedback loops). This notion is based on the assumption that a successful assimilation will only be possible if the LSP reflects his learning results and the shipper checks whether the knowledge was adequately absorbed. Moreover, IT-system support of knowledge distribution is evaluated.

(5) Formalisation and centralisation: Building on Lane & Lubatkin (1998), we consider formal interaction and repeating patterns in operationalising ACAP. The waiver of centralised decisions within the design team also serves as a measure for PACAP, as Galbraith & Merrill (1991) found that the centralisation of decisions is negatively related to the level and quality of innovation. Hence, we consider methods, instruments and organisational means that the shippers and LSPs use to share explicit and tacit knowledge about the desired contract logistics service bundles.

We analysed the case studies with respect to the discussed measures of PACAP and ranked each case 'high' (1), 'medium' (2) or 'low' (3) on each measure (in comparison

with the other cases), see Table B-2 in the appendix. The resulting grades allow the identification of clusters and the comparison with the service bundle complexity (compare Table B-1).

Operationalisation and measurement of realized absorptive capacity

Finally we operationalise realized ACAP (RACAP) for the contract logistics context and present the results from the case studies. Both components of RACAP, transformation and exploitation, are therefore mirrored against their interaction elements in contract logistics service bundle design. Three measures, indicating the degree of interaction, are applied:

(1) Cooperation in the design process: Having operationalized PACAP, we consider RACAP in terms of integrating the absorbed knowledge. The cooperation between LSP and shipper in the design of contract logistics service bundles serves as one measure for RACAP. For this purpose knowledge and responsibility sharing in the cases is evaluated.

(2) Knowledge internalisation: In the literature, transformation is described as the way of developing and refining routines that facilitate the combination of existing knowledge and newly acquired knowledge (Zahra & George, 2002). In order to operationalise RACAP with the help of knowledge internalization, we consider roles and responsibilities (Jansen *et al.*, 2005) within the team. In particular, the ways of documenting the acquired knowledge and making it accessible for the entire firm (Jansen *et al.*, 2005; Kuss, 2009) are considered. If knowledge is stored and shared frequently between the LSP's employees, we assume a higher degree of RACAP (Zahra & George, 2002).

(3) Realisation: Finally, RACAP may be operationalised with the degree of interaction in developing elements of the service bundle concept. We observe how remuneration models, service level agreements, IT, contracts and the (possible) transfer of employees are accomplished.

Again we assigned the values 'high' (1), 'medium' (2) and 'low' (3) case-wise to each measure in order to operationalise RACAP (Table B-3. in the appendix).

B 5. Discussion

The case study analysis shows that interaction and applied procedures to absorb shipper knowledge are rather dependent on the specific context, especially the service bundle complexity. As interaction is mostly time-consuming and consequently expensive, different degrees of interaction according to the complexity seem reasonable. We discuss our findings in this chapter and highlight special cases that were not consistent with expectations. Moreover, applied procedures are discussed.

Service bundle complexity and potential ACAP (the understanding of the customer)

In accordance with the framework, we compared the ranking of service bundle complexity with the ranking of PACAP measures in each case. The rankings show coherence, confirming our central argument. Nevertheless, we also identified two cases (cases 6 and 7) that were not consistent with our expectation of a relation between complexity and PACAP. Across all cases, the procedures applied for understanding and integrating shipper knowledge vary widely. Nevertheless, some procedures are applied in almost all cases. Widely applied procedures were, for example, discussions between the two firms, functional specification documents, workshops, project plans and meeting minutes, though they were applied to varying extents. In some cases the shipper only knew what the service bundle's approximate extent would be and accordingly built on the LSP's advice and experience, while in other cases the specification was highly detailed.

In general, contract logistics relationships with complex service bundles seem to require more interaction procedures. They are characterised by intense interaction between the two firms and dedicated procedures for enhancing the knowledge transfer. The firms, mainly driven by the LSP, apply both visual and interactive learning methods. The degree of detail in the descriptions of the desired services and documents with functional specifications is particularly different from those in less complex cases. Additionally, databases, data rooms and the integration of external experts are frequently utilised to provide a sound understanding and integrating of knowledge. Databases in this case comprise specifications and explanations in a dedicated IT system. Data rooms are locations purely dedicated to the outsourcing endeavour and provide all relevant documents and on-site personnel to query. As for interactive learning and quick decision making, jointly staffed project offices are

frequently set up. Apart from the common methods for documenting results of workshops and meetings, the service bundle complexity seems to require IT systems to support the knowledge distribution and storage. This is feasible because many persons are involved in the process of understanding and the comprehensive know-how on the services needs to be documented and made available quickly.

Though partly found in the middle clusters of the sample, further methods used to gain knowledge of the shipper's requirements and needs include sending off of LSP pre-teams to the shipper, or the direct transfer of executive staff (and therefore knowledge carriers) from the shipper to the LSP. Pre-teams work under the shipper's instructions to learn more about the shipper's processes. A transferred executive was appointed for the project management and hence provided his experience directly in the transfer of knowledge. Moreover, questionnaires and glossaries are also used to clarify the shipper's demands.

Cases with complex service bundles showed a higher degree of structuring in communication compared to the less complex ones. Structuring is expressed by frequent and institutionalised meetings with explicit agendas. Feedback loops also contribute to the structure, as does the checking of learned results. Structuring is therefore discernible by routine practices. Also common are mutual firm and site inspections in order to gain a better understanding of the partner. For less complex service bundles, these site inspections appear to be rather optional than required. The inter-organisational teams in cases with less complex service bundles also display less heterogeneous team members. The same applies to steering committees, which tend to be either of symbolic nature or altogether non-existent.

Service bundle complexity and realized ACAP (designing service bundles)

The cross-case analysis showed that complex service bundles apparently require an intense interaction between the shipper and the LSP. Cases with complex service bundles showed a strong interaction in the design of the service bundles and knowledge transformation and exploitation procedures. The shipper is involved in the design process, and knowledge carriers from both firms are actively integrated into the development. This seems reasonable, as complex services call for the shipper's feedback. Yet, the required interaction varies for different service components. The design of service level agreements or the remuneration models, for example, seems to be of higher interest than, for example, the design of operative processes at the LSP's warehouse, as cost reduction and operational efficiency and effectiveness and hence

stable quality of services are focal drivers of outsourcing (Makukha & Gray, 2004; Mentzer *et al.*, 2000). In some cases those elements of service bundle design are not even a subject of discussion, but are already specified in the phase of communicating the requirements. Interestingly, the willingness to negotiate those dimensions seems to rise when the two firms work together in designing complex service bundles. In contrast to that, less complex cases mainly showed a higher shift of responsibilities to the LSP. Obviously the shipper communicated his requirements and devolved the liability of designing the concept to the LSP. As for knowledge internalisation means, the joint teams of the two firms in complex service bundles documented their results extensively. Thus, knowledge-sharing measures seem crucial for complex service bundles. Concerning the team structure, the persons involved in communicating and understanding the shipper's requirements and needs were integrated in designing the service bundles. While all cases applied dedicated project teams, those teams involved in projects with complex service bundles showed a higher degree of organisational structuring and interaction. Complex service bundles reflect a higher number of heterogeneous team members, while less complex cases generally got along with less mixed personnel. Although, in our cases, the development of a service bundle concept is mostly a task of the LSP, shippers appeared to be involved in complex cases. Accordingly, the coherence of service bundle complexity and RACAP ranking generally confirms the research framework.

Special Cases in absorbing shipper knowledge

Apart from the general confirmation of our expectations concerning the understanding and integration of shipper knowledge, we were also able to identify special cases. Those cases either do not reflect our expectations of rising interaction with growing service bundle complexity or suffered from an unsuccessful communication of demands. First of all, we describe two cases with initially unsuccessful communication and then discuss three cases that did not match our expectations.

Unsuccessful communication: Involvement of wrong persons

In case 10, the shipper and LSP intended to specify the services jointly, in order to determine the processes and required equipment based on specific measures of loading ramps and consignment sizes. For reasons of confidentiality the shipper only involved executives in the workshops with the LSP. These executives were not able to provide the required data resulting in constant discussions based on wrong data. The poor quality of data resulted in an overdrawn timescale for the definition of services. Despite the initial intention to clarify the demand within six months, this phase

ultimately took about 1.5 years. Only when the operational person in charge was called in the required data could be provided. In the meantime, the LSP had conducted various costly attempts to design an appropriate service bundle concept on the basis of wrong data.

Unsuccessful communication: Misinterpretation of terms

In case 8, a misunderstanding was recognized fairly late in the timescale of the project. After the two firms collaborated in workshops to define the services based on the requirements, the LSP established the services in his multi-user warehouse. Just before 'going live' the shipper realised that the LSP had misunderstood his notion of the term 'Lagerkarte'. For the shipper this term described a specific function provided by the IT system required for customs declaration, while the LSP interpreted this as written information on a paper card kept in a file card box. The misunderstanding of this single term resulted in high efforts to integrate and develop the IT system on time. Both, the shipper and the LSP simply failed to establish a common understanding of terms and notions in the design of contract logistics service bundles. A glossary would have helped to avoid this misunderstanding.

In conclusion, efficient information sharing and knowledge absorption play an important role in contract logistics (Overby, 2007). Appropriate procedures, including communication, help avoid costly and time-consuming adjustments.

Though featuring successful communication, the following cases did not confirm our expectation of coherence of interaction in understanding (PACAP) and integrating (RACAP) shipper knowledge and service bundle complexity. While one case is characterised by less interaction in understanding *and* integrating shipper knowledge, one case of higher interaction for understanding and one case of higher interaction in integrating shipper knowledge were identified.

Special case: less interaction intensity in understanding and integrating shipper knowledge

Case 7 shows that shipper experience in contract logistics may reduce the required interaction with the LSP in PACAP and RACAP. As for knowledge transfer, the case is characterised by a deviation of service complexity (rank 7) and interaction intensity (rank 10) by three ranks, indicating a less intense cooperation and learning in the exchange of demands than the complexity would have led us to expect. According to the interviewed experts, the definitions and declarations of services and processes were extraordinarily detailed in the service requirement document. By doing so, the shipper

intentionally aimed to reduce interaction with the LSP, as he considered himself as highly capable of specifying the services on his own. Inquiries by the LSPs were solely dealt with in two personal workshops. The offer of the selected LSP was finally discussed in a half-day workshop in order to check the LSP's understanding of the processes.

Because of the shipper's experience and the 'pre-design,' less interaction was also chosen in the actual design. With a shipper providing profound experience in contract logistics outsourcing, the highly detailed tendering documents allowed less intense interaction and fewer procedures despite complex service bundles.

Special case: exalted interaction intensity in understanding shipper knowledge

In this case the LSP aimed to signal competence through intense interaction. This case shows a deviation of two ranks between the complexity (rank 6) and the intensity of interaction (rank 4), indicating a more intense interaction than the degree of complexity would have led us to expect. The inspection of the case shows that the LSP intentionally established intense learning procedures with the shipper early on. Workshops were held to identify and define the expectations and demands for the contract logistics services. A pre-team was sent to the shipper's site to work under the instruction of the shipper to learn and personally experience the shipper's processes. The LSP's intention was to show a strong commitment to the shipper. By asking the 'right questions' the LSP wanted to emphasise his experience in the shipper's industry and the respective processes. By doing so, an early foundation of trust and the establishment of personal relationships were sought.

Special case: higher interaction intensity in integrating shipper knowledge

Case 9 shows that lacking experience in contract logistics or the shipper's business may be replaced by intense interaction. The case shows a relatively high degree of interaction for relatively low service bundle complexity, as complexity is ranked at 9 and the RACAP at 5. In this case the LSP intentionally collaborated with the shipper. Both partners conducted numerous workshops and developed processes and contractual aspects jointly. According to the interviewees, this process was essential, as neither firm had experience in contract logistics. Furthermore, the outsourcing happened at a time when contract logistics outsourcing was not very common in this industry. In order to cope with the subjectively perceived innovative challenges, the experience deficit was compensated by intensely working together in the exchange of ideas and joint decision making. In this case the LSP particularly sought to gain

comprehensive experience in the design of contract logistics service bundles to apply this know-how in future contract logistics relationships.

In conclusion, previous experience in contract logistics seems to allow reduced interaction. Nevertheless, detailed written information is crucial for the success of the outsourcing. If both partners have little experience – either the shipper with outsourcing procedures or the LSP in the shipper's business or contract logistics in general – a joint elaboration of the contract logistics service bundles promises good results for future relationships regardless of service bundle complexity.

B 6. Conclusions

This research examined the degree of interaction between LSPs and shippers based on interaction procedures and learning approaches applied against the background of complexity of the involved service bundles. In order to derive practical and theoretical implications we analysed eleven case studies in terms of their knowledge-sharing methods and procedures. As a framework of analysis we applied the construct of absorptive capacity to the contract logistics context. In order to compare the cases, we introduced the moderating variable 'service bundle complexity.' The study shows that interaction and knowledge flow, as well as procedures supporting the knowledge sharing between the shipper and LSP, are generally higher for the design of complex service bundles than for less complex service bundles. We thus formulate Proposition 1:

Proposition 1: *The degree of interaction between the two firms in understanding shipper knowledge increases with the complexity of the service bundles.*

The same applies to the actual design of service bundles, which is considered as integrating the acquired knowledge. This leads to Proposition 2:

Proposition 2: *The degree of interaction between the two firms in integrating shipper knowledge increases with the complexity of the service bundles.*

Apart from the general connection of service bundle complexity and interaction between both firms, the special cases show partially divergent procedures. This leads to the conclusion that the above claimed propositions are not prescriptive by any means. Rather, specific concomitants seem to require further examination.

The case with high interaction in PACAP though lower service bundle complexity shows that, by overly sophisticated knowledge-absorbing procedures and interaction

between the two firms, the LSP may show his commitment and thereby induce trust by the shipper. This leads to Proposition 3:

Proposition 3: *The signaling of competence and commitment by increased interaction leads to higher reputation and trust on the shipper's side.*

The case of less interaction in PACAP and RACAP though higher service bundle complexity shows a strong experiential background of the shipper, enabling him to define and describe the logistics service bundles with a high level of detail. This leads us to Proposition 4:

Proposition 4: *The process of understanding and integrating shipper knowledge may require less interaction if the shipper is experienced in defining service bundles and able to provide highly detailed tendering documents.*

The special case of highly intense interaction in RACAP though lower service bundle complexity provides the basis for another proposition related to experience. For both partners the design of contract logistics service bundles marked an innovative, challenging task, which they tried to accomplish by close interaction. This leads to another proposition:

Proposition 5: *The more innovative and challenging the development of specific contract logistics service bundles is considered by the firms, the more essential is the interaction in integrating shipper knowledge.*

We have seen that interaction is required for understanding the customer and designing appropriate service bundles. The special cases show that shipper experience in outsourcing may serve as a means of reducing interaction, while inexperience on either side may be compensated by higher interaction. However, when considering the results, distinct and highly elaborated knowledge-sharing mechanisms were not very widespread in the contract logistics sector, at least in the cases considered. LSPs may draw on the results when deciding on which procedures to use in order to understand and integrate shipper knowledge in the design of appropriate service bundles with respect to service bundle complexity.

This study is not free of limitations. The findings derived from case studies might not be transferable to all contract logistics relationships. Moreover, the framework also imposes certain limitations. It does not include how individual persons contribute to knowledge sharing and which procedures have the greatest impact on understanding and integrating shipper knowledge. Instead it allows the identification of common

procedures and the general finding that interaction needs to be higher with increasing service bundle complexity. Accordingly, although we were able to identify procedures in the establishment of contract logistics relationships, we cannot state that these results are final and generally applicable.

Further research on the basis of quantitative analyse may give statistical support to the results. Moreover, specific company strategies, especially at the LSP's side, may influence the procedures in the establishment processes. For example, if an LSP focuses on cost-efficient service production, he may not want to invest much time in the absorption of the shipper's knowledge. On the other hand, if the LSP's dedicated aim is to differentiate and provide innovative, highly customised contract logistics solutions, learning and interacting with the customer will be especially important to satisfy the customer.

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Appendix Paper B:

The appendix shows the results for service bundle complexity, potential ACAP and realized ACAP.

Complexity	Case 1		Case 2		Case 3		Case 4		Case 5		Case 6		Case 7		Case 8		Case 9		Case 10		Case 11	
Services	• Order picking • Packaging • Warehousing • Incoming goods inspection • Turnover • Individual goods Tailoring	high	• Supply of motor production line • Warehousing • Shipping of motors • Spare parts supply	high	• Distribution • Spare parts supply • Repair • Assembly • Incoming goods inspection	high	• Order picking • Warehousing • Repair and Refurbishment • Transportation coordination • Call-Center • Billing	high	• Warehousing • Returns processing • Route planning • Customer credit noting	medium	• Customizing • Reconfiguration • Rework • Software development	medium	• B2B Distribution • Warehousing • Labeling • Returns processing	medium	• Warehousing • Assembly of sets • inventory taking • Repacking	low	• Distribution • Incoming goods inspection • Warehousing	low	• Distribution • Billing • Transport coordination • Warehousing	low	• Transportation • Warehousing • Labeling • Label design	low
Managerial tasks	• Materials flow • Disposition • Quantitative planning • Job controlling	high	• Process improvement • concept improvement	high	• Scheduling • Coordination	high	• Process improvement • Cost cutting	high	• Process improvement • Operational coordination	high	• Process improvement • Cost cutting	medium	• none	low	• none	low	• Process improvement	medium	• Process improvement	medium	• Process improvement	medium
Geographical scope	• Worldwide	high	• Worldwide	high	• Mostly national and parts of Europe	high	• National	medium	• National	low	• National	low	• National	low	• Europe	low	• Europe	medium	• Europe	medium	• National	low
Product heterogeneity	• Sand paper to lawnmowers or partition screens	high	• Washers to flywheel	high	• Cable to server rack	high	• Receiver and cables	high	• Chocolate to Coffee • Temperature managed transport	low	• Notebooks	low	• Electrical goods up to refrigerators	high	• Only boxes	low	• Hard to distinguish due to similiarity	medium	• Cables	low	• None	low
Item numbers	• 22.000	high	• 16.000	high	• 20.000	high	• 300	low	• 1000	low	• 9000	medium	• 1200	medium	• 2000	low	• 1500	low	• 13'000	medium	• < 100	low
Handling volume / day	• 33.000-35.000 positions • 8000 packages • 1600 pallets	high	• 25.000 motors per month => 1250 motors per day	high	• 1000 consignments and 400 repairs	high	• 2900 sent • 2500 back	medium	• 5000 pallets a day	medium	• 20.000 positions	high	• nn	high	• 1200 packages	medium	• nn	medium	• 8000 packages	low	• n.n.	low
Delivery times	• National: 24 h • Europe: 48 h	medium	• 24h • and 12h for distribution • 4h for production supply	high	• 2h for express • 12h for normal goods	medium	• 24h	high	• 24h	medium	• 24h	medium	• 24h	medium	• 24-48h	medium	• National: 24h • Europe: 48h	medium	• National: 24h • Europe: 72-120h	low	• not specified	low
Product value	• 1-500 €	medium	• 10.000 €	high	• up to 600.000 € • 3.000 € (on av.)	high	• 50-100 €	high	• Unknown, but little	low	• 1.000 €	medium	• 20-15'000€	medium	100-8'000€	high	• 6 to 500€	low	• 1 to 60.000 €	medium	• 150 €	low
IT-system	• Highly integrated • Comprehensive functions	high	• Dedicated IT • no interface programmed	medium	• Highly integrated • Comprehensive functions	high	• Highly integrated • Comprehensive functions	high	• Highly integrated • Customized interfaces • Comprehensive functions	high	• Highly integrated • Customized interfaces • Comprehensive functions	high	• Integrated • Ordinary functions	medium	• Integrated with interfaces • Ordinary functions	medium	• LSP uses shipper system	low	• Integrated by interface • No specific functions	low	• Not integrated • Track and trace	low
Business volume	• about 60 m. €	high	• 20 m. €	high	• 8 m. €	high	• 15 m. €	high	• 17 m. €	high	• 4.2 m. €	high	• 9 m. €	low	• 3 m. €	low	• 7 m. €	medium	• 5 m. €	low	• 800.000 €	low
Investment volume	• 70 m. €	high	• 35 m. €	high	• 1.8 m. €	high	• 2 m. €	medium	• 4.9 m. €	medium	• 1.5 m. €	medium	• no specific investment	low	• no specific investment	low	• no specific investment	low	• 40.000 €	low	• no specific investment	low
Result	• 9 "high" • 2 "medium"	high	• 9 "high" • 2 "medium"	high	• 6 "high" • 5 "medium"	high	• 4 "high" • 3 "medium" • 4 "low"	medium	• 2 "high" • 6 "medium" • 3 "low"	medium	• 2 "high" • 6 "medium" • 3 "low"	medium	• 2 "high" • 4 "medium" • 5 "low"	medium	• 5 "medium" • 6 "low"	medium	• 5 "medium" • 6 "low"	medium	• 5 "medium" • 6 "low"	medium	• 1 "medium" • 10 "low"	low
Degree of complexity		high																medium-low				low

Table B-1: Results for complexity

Potential ACAP	Subsections 1=high;2=medium 3=low	Case 1	Case 2	Case 3	Case 6	Case 4	Case 5	Case 8	Case 9	Case 10	Case 7	Case 11
Team / task sharing (Acquisition und Assimilation)	Both firms involved	1	1	1	2	2	2	2	3	3	3	3
	Number of involved persons	1	1	1	1	1	3	3	3	2	2	3
	Different positions represented	1	1	1	2	2	2	2	3	3	3	3
	Dedicated responsibilities and tasks	1	1	1	1	2	2	2	3	1	2	3
	Integrating external experts	1	1	2	2	2	2	3	2	2	3	3
Visual learning (Acquisition)	Level of detail service requirement document	1	1	1	2	2	2	2	3	3	1	3
	Level of detail functional specification document	1	1	2	2	2	2	2	2	2	1	2
	Intensity site/facility inspections	1	1	1	1	2	2	2	2	2	3	3
	Additional (Glossaries, databases, data room, advance staff, transfer of experts)	2	1	2	2	2	3	3	3	3	3	3
Interactive learning (Acquisition)	Frequent and structured workshops	1	1	1	2	2	3	1	2	2	3	3
	Intense interaction	1	1	1	2	2	2	2	2	3	3	3
	Additional concepts (Questionnaires, Project office, Advance staff)	1	2	2	1	3	2	2	1	2	2	3
Documentation of results (Assimilation)	Meeting minutes	1	1	1	1	1	1	1	1	2	3	3
	Feedback loops	1	2	1	2	2	1	2	2	3	3	3
	Project plan	1	1	1	1	1	3	3	3	2	1	3
	IT-system support for knowledge distribution	2	1	2	1	3	3	3	3	3	3	3
Formalisation and Centralisation (Assimilation)	Formal interaction and repeating patterns	1	1	1	3	2	2	2	3	3	3	3
	Waiver of centralised decision making	1	1	1	2	2	2	2	2	2	2	3
Result		20	20	23	29	35	39	39	43	43	44	53
Degree of interaction in understanding shipper knowledge		high				medium				medium-low		low

Table B-2: Results for potential ACAP

Realised ACAP	Subsection 1=high; 2=medium, 3=low	Case 1	Case 2	Case 3	Case 4	Case 9	Case 5	Case 6	Case 8	Case 10	Case 7	Case 11
Cooperation in design process	Knowledge sharing between both parties (transformation and exploitation).	1	1	1	2	2	2	3	2	2	3	3
	Responsibility sharing for design (transformation and exploitation)	1	2	1	3	2	2	3	2	2	2	3
Knowledge internalisation (transformation)	Documentation	1	1	1	2	3	2	1	2	3	2	3
	Sharing within LSP's company	1	1	2	2	2	3	1	3	3	2	3
Realisation (exploitation)	Development of process design	1	1	1	2	2	2	2	2	2	1	3
	Development of remuneration models	1	1	2	3	3	2	3	3	2	3	3
	Development of SLAs	1	2	1	2	1	3	3	3	2	3	1
	Development of IT-system	2	2	2	2	2	2	3	1	2	2	2
	Design of employee transfer			2	2	2		2				
Result*		1.11	1.44	1.60	2.20	2.20	2.22	2.30	2.33	2.33	2.33	2.67
Degree of interaction in applying knowledge		high			medium			medium-low			low	

*For Realised ACAP average values were used, due to not all areas being relevant for each case (e.g. design of employee transfer)

Table B-3: Results for realized ACAP

Appendix C

C. Remuneration models in contract logistics

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Abstract

Purpose – This study examines remuneration models and additional incentive mechanisms (together remuneration sets) applied in contract logistics. The characteristics of remuneration models are described and the choice of remuneration sets is analysed with respect to contract logistics service bundle characteristics. Advice for the choice of appropriate remuneration sets is offered.

Design/methodology/approach – Case studies of eleven contract logistics service provider (LSP)-shipper relationships are conducted. The theoretical foundation of this paper is based on the literature on remuneration models and agency theory. A semi-structured interview guide was developed based on contract logistics service bundle characteristics as well as incentive setting, risk sharing and remuneration models.

Findings – For complex services and a high range of products, effort-based remuneration seems suitable, while more easily replicable services are remunerated on an outcome basis instead. Process-based remuneration, a separate remuneration model is identified in practice. Additional incentive mechanisms seem to be applied independently of the remuneration model.

Research limitations/implications – Quantitative assertions are not part of this study. The empirical study design leaves room for interpretation and personal emphasis. More research is needed for remuneration sets in other contexts of contract logistics and for other factors of influence on the choice of remuneration models.

Originality/value – The study sheds light on the highly important but so far unheeded topic of remuneration in contract logistics, derives general coherencies and mirrors these empirically. Guidelines for LSPs and shippers are provided.

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C 1. Introduction

Contract logistics, also referred to as third-party logistics or logistics outsourcing, has received increasing attention in practice and research in the past years (Cooke, 1998; Lieb & Bentz, 2005; Marasco, 2008). Contract logistics expanded rapidly to the outsourcing of more and more comprehensive services. The relevance of these services is further growing as trade and industry – the shippers – are still seeking for outsourcing non-core competencies to logistics service providers (LSPs), which in turn aim to integrate further value-added steps in order to obtain higher margins compared to the traditional, cost-driven transport business (Berglund *et al.*, 1999). Current market estimations assume 15-20% growth rates in Western Europe and the U.S. for the years between 2009 and 2011 (Deepen *et al.*, 2008). Studies with varying regional scopes substantiate the positive trend of these estimates (e.g. Klaus *et al.*, 2009; Langley & Capgemini, 2009; Stölzle *et al.*, 2010). As the services that a single LSP performs for a shipper comprise cumulative steps of value creation (the scope of services), these services are mostly perceived as customised, complex service bundles (Weber *et al.*, 2007). In order to minimise the risks and dependencies caused by focusing on a few LSPs, closer collaboration between the shipper and LSP in a stable relationship is regarded suitable (Rao & Young, 1994). Apart from relationship orientation, Williamson (1979) considers contracts as a significant means of relational governance (q.v. Lukassen & Wallenburg, 2010). The content specified in these contracts, including remuneration specifications, affects the satisfaction of the involved parties and thus influences relationship stability. Nevertheless, empirical observations show that shippers and LSPs lack the know-how of designing purposeful agreements and pricing structures (Lukassen & Wallenburg, 2010). The contracts, including distinct remuneration sets with a particular remuneration model and additional incentive mechanisms (AIMs), often set the wrong incentives and hence fail to govern the relationship (Halldorsson & Skjott-Larsen, 2006). The individual remuneration model specifies the way in which an LSP is compensated for his performance and motivated to meet the shipper's targets. Each remuneration model features inherent incentives, but AIMs can strengthen this effect and are therefore included in the remuneration sets.

Despite the importance of remuneration in contract logistics, the choice of the most adequate remuneration set has barely been researched (Selviaridis & Spring, 2007). The contract logistics literature preferentially describes the use of bonus and penalty systems in practice, but without discussing when to apply these and which

combinations are feasible (Lukassen & Wallenburg, 2010). Selviaridis and Spring note that "existing literature regarding 3PL contractual design is mainly conceptual in nature and further empirical evidence is needed about the type of contracts, charging mechanisms, and fee structures applied, the level of detail in respect of service specification and the extent of inclusion of penalty/incentive clauses" (Selviaridis & Spring, 2007, p. 140). Even though incentive mechanisms and remuneration in general are discussed (e.g. Hauptmann, 2007; Logan, 2000), influence factors like specific service bundle characteristics have not been considered. Theoretical input can be found in studies of contract logistics usage and service offerings as well as incentive mechanisms. Supply chain contracting (e.g. Arshinder *et al.*, 2009; Cachon, 2003; Cachon & Kök, 2007; Coltman *et al.*, 2009) and agency-theory literature (e.g. Eisenhardt, 1989; Jensen & Meckling, 1976; Logan, 2000) serve as a basis for structuring remuneration models. Challenges may arise in defining the remuneration set, because contract logistics relationships and the associated service bundles are highly individual (Sink *et al.*, 1996). Considering service bundle characteristics when deciding on the remuneration set seems to be of vital importance, as complex pricing decisions should incorporate the full range of price-influencing forces (Bonnemeier *et al.*, 2010). Well-fitted remuneration sets set the path for a long-term, stable contract logistics relationship based on mutual satisfaction (Avlonitis & Indounas, 2006; Tate, 1996). By contrast, inappropriate remuneration models may impede the relationship, because the LSP may only undertake the most necessary changes and improvements that are beneficial to the customer (Lukassen & Wallenburg, 2010). The purpose of this study is to structure and analyse the remuneration models potentially applied in contract logistics relationships with respect to contract logistics service bundle characteristics. Our paper on the one hand contributes to research by systemising remuneration models and incentive mechanisms with respect to service bundle characteristics in contract logistics relationships. On the other hand, the paper helps practitioners to receive guidance in the choice of an appropriate remuneration model and incentive mechanism according to the involved service bundle's characteristics.

The paper is organised as follows. First, we provide a literature review of the characteristics of contract logistics and their implications for remuneration in contract logistics. Then we build our framework for analysis and discuss certain remuneration models and AIMs and their individual characteristics. We then describe our research design and case selection, followed by empirical results derived from the case studies. These results are considered in the discussion and conclusion highlighting implications and limitations of the research.

C 2. Theoretical background

Contract logistics – characteristics and implications for remuneration

For the discussion of remuneration sets, a clarification of 'contract logistics' is needed in order to understand the peculiarities of the subject area. Contract logistics refers to customised and comprehensive logistics services performed by an LSP for a shipper on a long-term basis. Variations in definitions are reflected by the varying scope of services and involved tasks in practice. Nearly any service may be part of a contract logistics service bundle (Bask, 2001). As for this research service bundles comprise the entirety of services an LSP performs for a shipper and may involve operative and dispositive tasks.

The increased scope of services and long-term relationships became a prevalent topic for research as the exploitation of the benefits of contract logistics still goes on (Halldorsson & Skjott-Larsen, 2006; van Laarhoven *et al.*, 2000). Shippers try to benefit from e.g. the concentration on core competencies, reduction of asset investment and cost reduction in general (Ellram & Cooper, 1990). The concentration on only a few providers with higher amounts of services results in augmented dependencies, risks and higher coordination effort (Persson & Virum, 2001). Outsourcing organisations try to tackle these challenges by establishing and maintaining a close relationship with the LSP (Rao & Young, 1994) and managing the relationship with the help of contracts (Williamson, 1979). As a major influential factor in the satisfaction of the two parties and thus of a long-term, stable relationship, the preparation of appropriate contract content is seen as an important factor for success in contract logistics (Boyson *et al.*, 1999). Contracts and their respective specifications, as well as the setting of adequate incentives, are perceived as a means of tackling dependency issues – for example, to avoid opportunistic behaviour in relationships (Klein *et al.*, 1978).

When considering contract logistics contracts, attributes of agency theory may provide valuable input discussing the options for remuneration sets for the relationship between the principal (shipper) and the agent (LSP). Agency theory views "relationship management as a problem of deploying control mechanisms to manage partner opportunism, with the overall goal of minimizing governance costs" (Stump & Heide, 1996, p. 431). This notion is supported by most works of the relational research including Bergen et al. (1992), Ouchi (1979), Anderson (1985) and Lal (1990). In this research, we do not intend to test agency theory in the context of designing contract

logistics service bundles but rather make use of the theory's underlying logic to differentiate possible remuneration sets in contract logistics relationships, consisting of a particular remuneration model and additional incentive mechanisms. According to agency theory, the parties involved in any buyer-supplier-relationship, including contract logistics relationships, are expected to act opportunistically when they are given a chance to (Stump & Heide 1996, Bergen et a. 1992). However, before closing a contract, a company engaging in a buyer-supplier-relationship may define control mechanisms to prevent opportunistic action at any stage after the contract has been agreed on (Stump & Heide, 1996). In order to be effective, these control mechanisms must prevent opportunistic behavior or promote both parties' interest in a lasting relationship (Stump & Heide, 1996). Both sociological and agency theory literature distinguish between proactive and reactive control mechanisms depending on in which stage of the relationship they apply. While proactive measures like determination of incentive systems in the design of contract logistics service bundles are expected to encourage the parties not to show opportunistic behaviour, reactive measures intend to monitor behavior and if necessary penalize this behaviour (Stump & Heide, 1996, Bergen et al., 1992). A " general approach to managing the problem caused by specific investments is to design an incentive structure that discourages opportunistic behavior by the other party" (Stump & Heide, 1996, p. 432). As incentives are a major concern of remuneration sets, agency theory seems to be an applicable basis for discussing those. Hence, in this research, we intend to analyze the design of remuneration sets in a way that enables long-term gains from maintaining the relationship between shipper and LSP beyond short-term benefits. While some typical agency problems like hidden characteristics (the principal does not know if the agent is capable of performing the services) are dealt with when choosing an LSP, hidden action and information (when the principal is unable to evaluate the agent's performance) are ex-post relevant and need to be addressed by defining an appropriate remuneration set in the design of contract logistics service bundles governing the remainder of the relationship.

Remuneration in contract logistics and industrial services

An analysis of the literature reveals that no common wording concerning remuneration is in use. Hence the terms "charging mechanisms and fee structures" (Selviaridis & Spring, 2007, p. 140), "compensation" (Ellinger, 2000, p. 87), "remuneration" (van Laarhoven *et al.*, 2000, p. 432), "payment method" (Boyson *et al.*, 1999, p. 87) or "pricing" (Lukassen & Wallenburg, 2010) are used to describe the way of

remunerating the LSPs for their service performance. Without delving too deeply into the discussion of the terms, and in order to avoid confusion, we choose the terms 'remuneration' and 'remuneration model/set' for the research at hand.

The reviewed literature mostly focuses descriptively on the usage of bonus and penalty agreements as parts of incentive mechanisms observed in practice. A literature review of Lukassen and Wallenburg (2010) shows that nearly half of the considered articles addresses the usage of bonus and penalty in different industries or countries (e.g. Andersson & Norrman, 2002; Lieb, 1992; Lieb & Randall, 1996; Peters *et al.*, 1998; Sohail *et al.*, 2004; Sohail *et al.*, 2006; Sohail & Sohal, 2003). By the means of descriptive methods applied for the analysis of bonus-penalty agreements, few authors discuss the reward- and risk-sharing agreements in contract logistics from an empirical-descriptive point of view (e.g. Lambert *et al.*, 1999; Langley & Capgemini, 2007; Langley & Capgemini, 2009). Also conceptual papers can be identified. Lim (2000), for example, concludes that low base compensation combined with high outcome-based bonuses and penalties induce truth-telling by the LSP. Maltz and Ellram (1999) claim that remuneration should be more often based on delivered value to the customer, because services are hard to quantify. Logan (2000) applies an agency-theory perspective and claims that providers should demand outcome-based contracts, while customers should require open-book cost-plus (effort-based) contracts. Further publications discussing the decision between effort-based and outcome-based remuneration can be identified. Jaafar and Rafiq (2005) empirically analyse the usage of cost-plus contracts compared to fixed-rate contracts in the UK. Lieb and Randall (1999) find that outcome-oriented remuneration is the most common, followed by cost-plus and gain-sharing contracts. In a later study, Lieb and Bentz (2004) conclude that remuneration should be outcome-based rather than cost-based. Industrial service pricing literature, closely related to contract logistics, also tackles the differentiation between effort- and outcome-based remuneration. This stream of literature mainly takes the service provider's perspective by considering ways and methods to find a suitable price for service offerings (e.g. Avlonitis & Indounas, 2005a; Avlonitis & Indounas, 2005b; Avlonitis & Indounas, 2006; Avlonitis & Indounas, 2007; Cannon & Morgan, 1990; Hinterhuber, 2004). Despite the controversial discussion, the literature suggests that pricing should reflect the service characteristics (e.g. Taher & El Basha, 2006). Schlissel and Chasin (1991), for example, postulate that the different price models should be applied and combined to time-based prices for regular and cost-based prices for unique costs.

The literature review shows that payments may be awarded either for the effort made or the outcomes performed. Agency theory refers to this as behaviour-based (effort-based) versus outcome-based remuneration (Eisenhardt, 1989; Logan, 2000) and discusses their impact on the involved parties. Following their argumentation, we assume that the right choice of remuneration models affects the relationship's stability. The models may be complemented by AIMs in order to level out model inherent disadvantages. The adequate choice of the remuneration set can therefore be considered an important factor of influence on relationship stability. As the literature review showed, the usage of remuneration models and incentive mechanisms has not been researched satisfactorily in the contract logistics context. In agreement with Selviaridis and Spring (2007), research needs to focus on this topic, especially by taking service specifications into account in order to reveal how contractual design matches the characteristics of the involved services. In order to fully understand the mechanisms of remuneration, we aim to structure remuneration models and AIMs. Then we discuss how the choice of appropriate remuneration models and AIMs depend on the individual contract logistics service bundle characteristics. We therefore formulate the following research questions:

1. How can remuneration models be structured?
2. How do contract logistics service bundle characteristics influence the choice of remuneration models?
3. How can AIMs be structured?
4. How do contract logistics service bundle characteristics influence the choice of AIMs?

C 3. Building the research framework

For the purpose of building a research framework, we perform a stepwise examination of the character of contract logistics service bundles as a contextual factor affecting remuneration set choice and then discuss the potential types of remuneration models. We consider model-inherent incentive effects, risk implications and measurement expenditures for different remuneration models. These dimensions are derived from articles discussing contracts from an agency-theory perspective. Against the background of these dimensions we analyse the implications of remuneration models in contract logistics and discuss potential AIMs both describing the remuneration set.

Service bundle characteristics as a contextual factor in the choice of the appropriate remuneration set

For this research, service bundle characteristics include the type and number of services as well as product range and heterogeneity (see Fig. C-1). This operationalisation refers to the elements that the remuneration is rewarded for. In logistics, remuneration is mainly awarded for the type and number of services (e.g. length of transport route) and the type of shipped products (e.g. volume or weight). Both of these elements also directly influence the LSP's costs for service provision and accordingly require adequate remuneration. *Type and number* of services refers to the activities the LSP renders for the shipper. These activities can consist of multiple steps of the shipper's value chain and also include varying challenges (e.g. different degrees of management tasks). The type and number of services can reach from rather easy to comprehensive services. Products, the other dimension that remuneration is granted for, are not unconditionally comparable and logistics cost vary with product attributes (Ballou, 1999; Coyle *et al.*, 1996). Based on product characteristics in the literature (e.g. Ballou, 1999; Klaas, 2002; Pagh & Cooper, 1998; van Damme & van Amstel, 1996; van Hoek, 1998), two differentiation features, namely, product range and product heterogeneity, are applied. *Product range* covers the number of goods handled and may therefore be operationalised with the number of repeatedly identifiable stock keeping units (SKUs). The higher the number of SKUs, the more challenging the services will be. *Product heterogeneity* describes the variation in the products' features. Greater product heterogeneity, e.g. varying weights or sizes, poses varying and thus higher challenges for physical product handling.

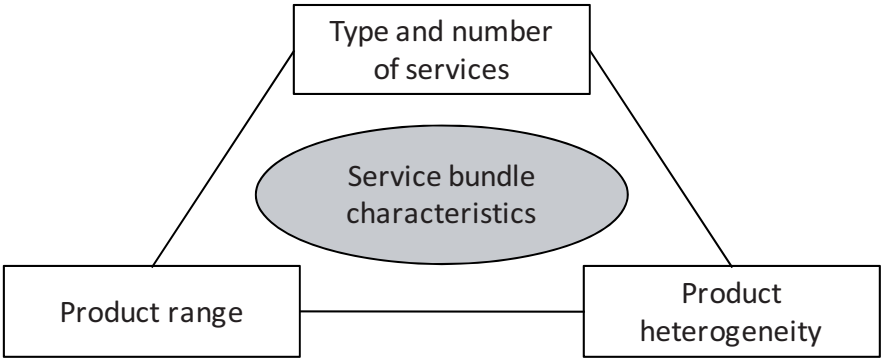

Fig. C-1: Service bundle characteristics

Specification of remuneration models

The literature offers input for the structuring of contracts and remuneration models. Apart from different types of contracts (e.g. Arshinder *et al.*, 2009; Höhn, 2010;

Keitel, 2008), which are not the focus of this study, a structure for remuneration models is provided. Effort-based remuneration describes a compensation granted for the entire expenses for personnel and materials, including management costs, plus a profit margin. By contrast, outcome-based remuneration describes a compensation based on a fixed fee for the outcome of the services, e.g. per unit of handled goods. The basis of assessment is variable. If the handled products vary, remuneration can be granted for the general amount of processed units without considering the type of product that was processed or awarded according to certain product groups. Apart from effort- and outcome-based remuneration, so-called hybrid remuneration models can be applied. Hybrid remunerations may consist of effort-based remuneration of fixed costs (e.g. warehousing rent) in combination with outcome-based remuneration for the employees' and provider's performance (e.g. handling the goods). However, these models vary as they are specified individually.

The remuneration models have a distinct effect on contract logistics relationships. According to agency theory, (agency) problems arise when the two parties have differing goals and when it is difficult or expensive for the outsourcing party (principal) to monitor what the provider (agent) is actually doing (Eisenhardt, 1989; Logan, 2000). Remuneration models set specific incentives helping the shipper to overcome information asymmetries and aligning the LSPs interests to the shippers aims. They as well entail distinct risk-sharing while implying certain expenditures for monitoring the basis of remuneration. Risk sharing also works as a form of aligning interests, as the LSP may behave differently if he bears more risk in the relationship and hence depends more on the relationship's success. Monitoring expenditures delimit the shipper's ability to reduce information asymmetries, as the monitoring of the LSP's activities is costly, though depending on the items monitored. For the research at hand 'monitoring expenditures' not directly refers to the expenditure for controlling the LSP's actions but rather describes the expenditures for finding the basis of assessment for the individual remuneration model. In order to understand the specific characteristics that each remuneration model provides, we discuss the outlined models with respect to the following three dimensions: *incentive setting, risk sharing* and *monitoring expenditures* (Buriánek, 2009; Lyons, 1996; Masten, 2000).

Incentive setting

Each remuneration model contains certain inherent incentives for the LSP. If, as in the effort-based model, all costs are remunerated completely, the LSP has little incentive to produce the services cost-efficiently (Logan, 2000) as he may charge all relevant

costs (Mayer & Weber, 2005). By contrast, outcome-based remuneration offers high incentives to the LSP, as any efficiency improvement measure developed by the LSP directly affects his bottom line (Berends, 2000). This means that the LSP receives the same remuneration per unit as before, but performs at lower production costs, resulting in a higher margin. For hybrid forms of remuneration, the incentive impact depends on the agreed model combination (Eisenhardt, 1989). If fixed costs are remunerated directly by the shipper, but the actual service execution is remunerated on an outcome-basis, the LSP is still incited to perform efficiently. Nevertheless, the will to operate cost-efficient premises when they are paid on a flat-rate basis may be lacking, resulting in an overall medium incentive effect in hybrid remuneration.

Risk sharing

'Risk sharing' is closely related to the incentive setting, as acceptance of risks is usually remunerated or at least incited. Risk sharing describes the risk that each partner takes. Assuming risk-averse parties, each partner would avoid covering the other party's risks without being compensated. "Risk aversion by the [shipper is] […] negatively related to behaviour-based contracts and positively related to outcome-based contracts" (Logan, 2000, p. 26)[2], as outcome-based contracts transfer the risks to the LSP. Generally, three kinds of risks in remuneration models may be discussed, the *capacity utilisation risk,* the *performance risk and* the *risk of rising factor costs* (Hauptmann, 2007). *Capacity utilisation risk* occurs when specific facilities are dedicated to a single shipper who hence determines the utilisation. *Performance risk* covers the risk of insufficient execution of the services, i.e. performance of a lower-than-desired service quality. The *risk of rising factor costs*, considers risks for higher expenses for e.g. fuel or labour (Hauptmann, 2007). Each risk has its own peculiarities but the general distribution of risks is specific for each remuneration model. For effort-based remuneration the risks stay with the shipper as the service provision, basically independent from service quality, is remunerated. Vice versa, the risks are transferred to the LSP in outcome-based remuneration as the LSP merely is remunerated for performing the services, independent from input factors and the according risks.

Monitoring expenditures

'Monitoring expenditures' in the different models, derived from "measurement difficulty" (Poppo & Zenger, 1998, p. 858), are dependent on the characteristics of the specific service bundle. Other than the two general mechanisms of incentive setting

[2] Text in brackets inserted by the author.

and risk sharing, which are solely dependent on the model itself, monitoring expenditures are potentially influenced by the character of service bundles. The basic assumption is that more complex service bundles, characterised by different types and a high number of services and involved tasks as well as a high product range and a strong heterogeneity of products, are influenced by multiple elements and interlinked connections (Patzak, 1982), causing higher expenditures for monitoring performance. Therefore we discuss the monitoring expenditures for the remuneration models against the background of complex service bundles on the one hand and standard service bundles on the other. Expenditures for monitoring **complex service bundles** in an effort-based remuneration approach are comparatively low, as the compensation is calculated by the actual costs unveiled in the accounting books. The same services remunerated on outcome basis drive expenditures for monitoring. With an increasing number of services for different products with different handling prices multiple variations of prices would have to be considered. The monitoring costs of outcome-based remuneration thus increase. We conclude that for complex service bundles, remuneration on an effort basis causes lower monitoring expenditures than remuneration on outcome basis.

Considering **standard service bundles**, outcome-based remuneration determines low monitoring expenditures as similar products and similar tasks are devoted to each unit, making it comparatively easy to invoice by multiplying units with a single price or few prices. Since the monitoring expenditures for standard service bundles remunerated on outcome basis are low, effort-based remuneration, which needs to consider all occurring costs would cause comparatively higher monitoring expenditures. Theoretically, as for simple services, determining the effort is rather time-consuming and thus costly compared to an easy summation of all units multiplied with the predetermined price. Hence, we conclude that, for simple services, effort-based remuneration causes higher or equivalent monitoring expenditures compared to outcome-based remuneration:

The monitoring expenditures for hybrid forms of remuneration again depend on the specific share of outcome- and effort-based remuneration, but are likely to result in medium monitoring expenditures. Table C-1 provides an overview of the discussed characteristics of the remuneration models.

		Effort-based remuneration model	Hybrid remuneration models	Outcome-based remuneration model
Incentive setting		Low	Medium	High
Risk sharing		Shipper	Both	LSP
Monitoring expenditures	complex service bundles	Low	Medium	High
	standard service bundles	High	Medium	Low

Table C-1: Incentive setting, risk sharing and monitoring expenditures in different remuneration models

Specification of additional incentive mechanisms

The following section addresses the structuring of AIMs potentially applied in contract logistics remuneration sets. By setting financial incentives, AIMs affect the LSP's total financial compensation and may be chosen to equate the disadvantages each remuneration model entails (Hauptmann, 2007; Lukassen & Wallenburg, 2010). Van Laarhoven *et al.* (2000) claim that additional incentive mechanisms are a fundamental part of the contract design. The literature here mainly discusses bonus and penalty agreements (Lukassen & Wallenburg, 2010). But not only incentive mechanisms for providers are conceivable. In order to share risk for leveling out the reservation of capacities, volume-related incentives in the form of penalties for insufficient utilisation of capacity may be directed towards the shipper (van Laarhoven *et al.*, 2000). Accordingly, the additional incentives have distinct incentive directions. Hauptmann (2007) offers two possible directions by distinguishing **performance-related** and **cost-related** incentives. Performance-related incentives aim to secure the desired level of service quality. As they transfer service performance risks from the shipper to the LSP based on dedicated service level agreements. Cost-related incentives aim to reduce the costs of the services rather than to enhance service quality. The cost reductions can be considered as either static or dynamic. Hence, LSPs may be rewarded for contributing to lower costs by a cost-saving idea or by agreeing to reduce the price for the services by a certain percentage each year. Apart from the incentive direction, shippers pursue a distinct target when setting an AIM. AIMs are either used to secure the achievement of **predefined objectives** (like frequent price reductions) or to foster **undefined improvements** (like newly developed, efficient processes). Meeting the predefined objectives is incited by rewarding superior performance or penalising inferior performance. By contrast, fostering undefined improvements is mainly positively incited by rewarding enhancements, since the absence of undefined improvements cannot be measured and thus cannot be punished.

Outline of the research framework

Having discussed the relevant factors of influence, we propose the research framework. The framework comprises service bundle characteristics, operationalised by the type and number of services in combination with product characteristics (range and heterogeneity) as a context variable. As the service requirements are given in advance, this context variable is fixed. In contrast to the context variable, the design variable is subject to choice. The design variable is the remuneration set, which consists of the remuneration model and the AIMs. As described in the discussion of contract logistics characteristics, long-term and stable relationships are a central concern of both LSP and shipper. Choosing the adequate remuneration set is vital for the relationship stability, as the shipper requires competitive prices and the LSP expects a fair compensation for their service performance. Hence we consider the choice of the remuneration model according to service bundle characteristics as an influence on the satisfaction of both partners fostering relationship stability (see Fig. C-2). We measured the stability of the relationship, considered as the dimension of success, by evaluating the satisfaction of LSP and shipper with the relationship. To operationalise the satisfaction, we applied a combination of Li and Dant's (1997) suggestions of general relationship satisfaction and Andaleeb's (1996) measure used to analyse manufacturer-distributor relationships.

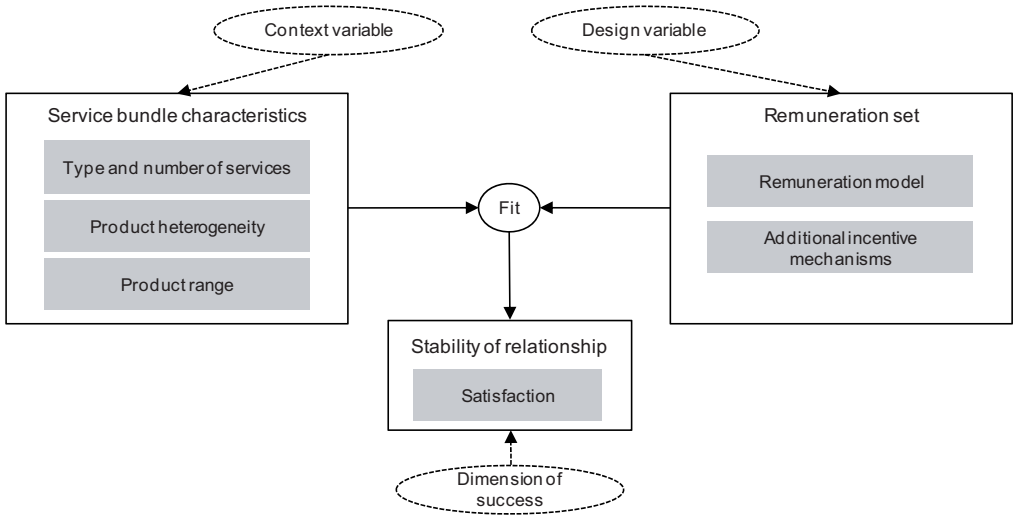

Fig. C-2: The research framework

C 4. Research method

In order to analyse remuneration in contract logistics as a complex phenomenon of inter-firm relationships, which has been rarely researched, a qualitative research

method promises the most profound results (Yin, 2003; Yin & Davis, 2007). A holistic view of the unit of analysis is estimated to provide in-depth data for the identification of relations, allowing the formulation of propositions. Following Ellram (1996), a multiple case study design seems a suitable methodology.

Case Selection

Eleven in-depth case studies were conducted. In order to be able to analyse as many remuneration sets with respect to the involved contract logistics service bundles as possible, we did not focus on a specific industry or certain elements of service bundles. As we also intend to examine the relationship between both parties, we investigated cases for which we were able to interview impressions of both the shipper and the LSP about a specific contract logistics relationship. We ensured construct validity by selecting cases that are suited for exemplifying the phenomena that we focused on in this study (Eisenhardt & Graebner, 2007) and by gathering and combining data from different parties (Yin, 2003).

One central precondition was an already-implemented contract logistics relationship, to ensure that the appropriate remuneration set led to success and in our context relationship stability. Other selection criteria were service-bundle heterogeneity in the entire sample of case studies, in order to consider different service bundle characteristics. Our case studies reflected, as intended by the researcher, varying service bundles and different industries. Table C-2 provides a brief overview of the cases.

Data collection

For the data collection in this study we conducted semi-structured interviews with the help of an interview guide. According to this guide, each interview ran through six sections. The first section comprised general data like the shipper's industry and company profile data. The following section aimed at collecting in-depth data concerning the motivation for outsourcing, service bundle characteristics, involved products, the remuneration set and financial data. The section was inspired by Mortensen and Lemoine (2008), Berglund *et al.* (1999), and Lambert *et al.* (1999). The third, fourth and fifth sections comprised data on the process of communicating, designing and implementing the services and the remuneration model, in order to understand the drivers behind the choice. In the final section we examined the success of the relationship by asking personal valuations of the relationship of the interviewees on the one hand, and of the factors of outsourcing success like intentions of prolongations and general satisfaction on the other.

First we undertook a pilot study in order to test the structure and design as well as the comprehensibility of the questions in the interview guide (Ellram, 1996). For this purpose we interviewed a CEO of a medium-sized LSP involved in contract logistics service bundle design. Following this interview, minor refinements were made.

For each case study one to four comprehensive and in-depth interviews were executed. The interview guide was sent to the interviewees in advance. The actual interviews were conducted by two researchers in order to avoid biases and to enhance information reliability (Yin, 2003). Interviewees from LSPs, either CEOs or project managers directly involved in designing the contracts, were queried. From the shipper's side, logistics procurement officers answered the questions.

The interviews were conducted in the second half of 2009. Each interview lasted from 3 to 3.5 hours and was recorded, transcribed and documented in written reports. Each report was sent to the interviewees for corrections and approval.

C 5. Empirical results

The continuum of potential remuneration models in practice reflects the models discussed in the literature, from effort-based remuneration, with all costs being compensated plus profit margin, to explicit outcome-based remuneration. In the following sections, we describe our findings concerning remuneration models as well as AIMs and relate the choice of remuneration sets to the specific service bundle characteristics. Table C-2 illustrates the empirical results.

		Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9	Case 10	Case 11
Type and number of services (service bundle characteristics)	Services	warehousing, packing, returns and customizing	warehousing, production supply, distribution, packing and spare parts service	warehousing, distribution, spare parts supply, assembly and repair	warehousing, packing, returns, customizing and repair	warehousing, distribution, returns management and value added services	warehousing, packing, returns, customizing and repair	cross docking, distribution, commission, returns handling	warehousing, distribution and customs clearance	warehousing, distribution, transport, customs clearing	warehousing, commission, distribution	warehousing, distribution, labelling
	Rating of service bundle charac-teristics	Very comprehensive	Very comprehensive	Comprehensive	Comprehensive	Comprehensive	Medium	Medium	Easy	Easy	Easy	Easy
Products (service bundle characteristics)	Product range (in stock keeping units)	high	high	high	low	low	medium	low	medium	low	low	low
		22'000 SKUs	16'000 SKUs	20'000 SKUs	300 SKUs	1'000 SKUs	9'000 SKUs	1'200 SKUs	13'000 SKUs	1'500 SKUs	2'300 SKUs	1 SKU
	Product hetero-geneity	high	high	high	low	low	low	low	low	medium	low	low
		tiny screws to lawnmowers, drilling machines gardening tools, spare parts	screws to sleeves, motor parts and entire engines	cable to server rack	receiver, smart cards	chocolate to coffee on pallets, in three temperature ranges	notebooks	small appliances to refrigerators; all on pallets	cables in varying forms	different muffs, hard to distinguish	Amplifiers in carton	bottles on pallets
Remuneration set	Remuneration model	Effort-based (cost+)	Outcome/ Process-based	Outcome/ Process-based	Outcome-based	Outcome-based	Outcome-based	Outcome-based	Outcome-based	Effort-based (cost+)	Outcome-based	Outcome-based
	Special tasks	-	-	-	effort-based	effort-based	effort-based	-	-	-	effort-based	-
	Add. incentive mech.	bonus-penalty, savings-incentive	penalties, savings-incentive, flat price reduction		bonus-penalty	bonus-penalty	bonus-penalty	bonus-penalty, competition, flat price reduction				penalties
	Hybrid com-ponents		payment of asset depreciations		payment of warehousing rent	payment of warehousing rent	minimum turnover					

Table C-2: Empirical results on service bundle characteristics

Remuneration models

Cases 1 and 10 are the only cases that apply an effort-based remuneration. The shipper compensates any expenses, including employee compensation, depreciation or warehouse rent, independently of the outcome. Nevertheless, the LSPs are compelled to perform efficiently. This is controlled by open-book calculations and dedicated key performance indicators that the LSP has to comply with. The LSP tries to accommodate variations in the shipper's business by offering flexible personnel, either by flexible wage records or contract workers.

Cases 3, 7, 8, 9, 10 and 11 use outcome-based remuneration. In most of these cases, the outcome is remunerated by unit, pallet or weight. It is the LSP's responsibility to ensure that their costs are covered by their communicated and later remunerated price per unit. These prices may consist either of a flat remuneration for the services performed and product handled, or groups of certain products and services. For example, while in case 7 all services independent of distances and product type are remunerated by kilogram, prices in case 10 are based on weight, destination and type of product, as well as an additional warehouse rent per piece. Independently of the case, prices for each unit are agreed on in advance.

Cases 2, 4, 5 and 6 are governed by hybrid-based remuneration models. In these cases, it is mostly warehouse rents that are directly compensated by the shipper. The individual agreements concerning the items being compensated vary widely. In case 6, a minimum turnover amounting to the fixed costs (excluding labour costs) is agreed upon, while in case 2 all depreciations are remunerated by the shipper. Shippers in cases 4 and 5 directly remunerate the warehousing rents. The extent to which fixed costs are compensated varies. In some cases only the warehouse rent is compensated, while in other cases all fixed costs are paid by the shipper. The activities are remunerated by outome.

In the case sample we identified a remuneration model not yet covered in the literature. Cases 2 and 3 feature a special kind of remuneration model with outcome-based remuneration based on executed processes. The single services performed serve as the basis for remuneration in this model. The sum of single executed processes (e.g. customising, packing and shipping of a product) multiplied with the determined price per process results in the amount of compensation to be paid.

Interestingly, four cases (4, 5, 6 and 10) applying outcome-based remuneration agreed upon an additional effort-based remuneration for specific services. These services comprise software development, construction of sales displays or rework and involve

mostly complex and thus not simply executable or reproducible tasks, supporting our idea of choosing the remuneration based on service characteristics.

Additional incentive mechanisms

Besides remuneration model inherent incentives, AIMs are also agreed upon to foster the achievement of objectives or to enhance innovation. Moreover different targets are aimed at with these AIMs. In our sample of case studies, we empirically identified four different types of AIMs, namely, bonus-penalty, savings, competition and flat-price reduction. These mechanisms seem to be implementable within any contract logistics contract. The results are shown in Table C-2. Well known to the literature are **'bonus-penalty'** agreements. Variations in the construction of these incentive mechanisms are widespread. The agreements imply a performance-related direction and target the achievement of predefined objectives. Cases 1, 2, 4, 5, 6, 7 and 11 include this mechanism. The incentive mechanism **'competition'** was only observed a single time in the sample (case 7). Here, the shipper arranges a competition among all the LSPs he collaborates with. Based on standardised indicators like customer satisfaction or delivery reliability, the shipper ranks all LSPs and warehouses. All data and information are transferred to a transparent scheme for comparison. According to a predefined grading, a profit-related reward is granted for the first three LSPs in this scheme. The aim of this incentive is to motivate the LSPs for superior performance (incentive direction). Moreover, innovative thinking of the LSPs is encouraged with this mechanism, thereby fostering undefined improvements as one of the aforementioned incentive targets. The AIM **'savings incentive'** was observed in two cases in the sample (cases 1 and 2). Savings incentives aim to incite the LSP mainly to reduce the costs (incentive direction) of the contract logistics service bundle and to foster undefined improvements. The basis of this incentive is a reward-sharing approach. If the LSP contributes to cost reductions for the shipper, e.g. in terms of process optimisations, the LSP may retain the saved costs for a certain period. After the expiration of an agreed period, the total amount of savings is forwarded to the shipper by means of permanently reduced costs. **'Flat-price reduction'** was found twice in the sample (cases 2 and 7), though in two different forms. With this agreement, LSPs are incited to reduce their costs on a frequent basis, the incentive thereby being cost-related (incentive direction) and aiming to meet predefined objectives. This AIM is an agreement of a recurrent reduced remuneration by a pre-defined percentage. The typical time frame for this reduction is a yearly decline at a predefined rate. One case took rising prices due to inflation into account. Assuming a

yearly inflation of 3%, at which the remuneration would be raised each year, the *de facto* remuneration only rises by 2%, leaving 1% for which the LSP has to optimise his cost structure or benefit from learning effects. Flat price reductions may hold a negative effect as the LSP may initially be offering higher prices for his services in order to secure a range for later price reductions. If applied this way, the shipper pays more for the first years than he effectively needed to.

		Incentive target	
		Predefined objectives	Undefined improvements
incentive direction	Performance related	Bonus – penalty	Competition
	Cost related	Flat price reduction	Savings-incentive

Fig. C-3: Structuring of empirically identified AIMs

Integrated view of remuneration sets and service bundle characteristics

According to the research framework, we relate the choice of remuneration sets to the specific service bundle characteristics. Two cases show a remuneration model on an effort basis and another two cases apply a process-based remuneration. Three of these four cases were identified to be the cases with the most challenging service bundle characteristics. Case 1 is characterised by numerous and comprehensive services and heterogeneous products like screws, drills or lawnmowers and the highest number of 22'000 SKUs in the sample. The process-based remunerated cases, cases 2 and 3, also include multiple, comprehensive services for various different products. The services applied to these products range from handling to repair and customising. The number of SKUs in these case studies is 16'000 and 20'000 respectively, marking the highest product ranges along with Case 1. The product heterogeneity also ranges from minor parts like cables and washers to server racks or complete engines. One exception was identified. Case 10 also uses an effort-based remuneration, even though the type and number of services, product heterogeneity and range are not nearly as complex as in the other effort- and process-based models. In this case, the LSP executes services like warehousing, distribution, transport or customs clearance for similar products at a comparatively small product range of 1'500 units. Nevertheless, effort-based remuneration was chosen because when the service bundles and respective remuneration model were designed in 1998, the shipper and the LSP had no

experience in contract logistics. Due to the lack of experience, the LSP was not able to calculate and guarantee fixed outcome-based prices as he had no reference projects. Due to these circumstances both partners agreed on an effort-based remuneration for these relatively standardised services.

Furthermore, all cases with outcome-based remuneration include rather narrow product ranges and heterogeneity and few, simple services. The services performed in these cases are comparable and reproducible. The monitoring expenditures are perceived as low because only the number of processed units is compensated, without specifying which actions were actually performed. Nevertheless, special, irregular tasks that the shipper requires from the LSP are remunerated on an effort basis.

When considering the dimension of success, namely relationship stability, all interviewees stated that they are satisfied or extremely satisfied with the remuneration set. Consequently, unfair remuneration did not provoke a breakup of the relationship and the chosen remuneration model fostered the relationship's stability. We therefore conclude that the appropriate remuneration was chosen accordingly and the choice is to some extend dependent on service bundle characteristics and influences relationship stability by ensuring the satisfaction of the involved parties. AIMs on the other hand, do not seem to be influenced by service bundle characteristics in practice. They are rather chosen based on personal experience and preferences.

C 6. Discussion

Concerning the first research question of how remuneration models may be structured, we developed a conceptual structure of three different potential remuneration models in contract logistics. This structuring was applied to the analysis of the case studies to answer Research Question 2 (*How do contract logistics service bundle characteristics influence the choice of remuneration models?*). We found that the cases we considered show a fit of the remuneration model with the service bundle characteristics. This fit seems to have a positive effect on contract logistics success in the sense of a long-term stable relationship. The companies are willing to pursue their cooperation in the future without changes in the remuneration set.

The empirical results mainly confirm our anticipation of a relation between service bundle characteristics and the choice of the remuneration model. Despite one exceptional case in the sample, the results show that, especially the cases with a high product range and product heterogeneity with multiple services, apply either effort-

based or process-based remuneration. These models seem to be chosen in order to reduce monitoring expenditures and performance risks for the shipper. By contrast, comparable and repeated services with narrow product ranges seem to allow outcome-based remuneration. The effort-based remuneration of special tasks, which are also more challenging than simple goods handling, in outcome-based remunerated relationships support our idea of remuneration models being affected by service bundle characteristics.

Based on these findings, we formulate the following propositions:

Proposition 1: *Multiple and comprehensive services for a high range of heterogeneous products favour an effort-based remuneration due to lower monitoring expenditures compared to outcome-based remuneration.*

Proposition 2: *Few and simple services for a narrow range of similar products favour an outcome-based remuneration due to lower monitoring expenditures compared to effort-based remuneration.*

Based on one special case, we also found reasonable motivation for diverging from these statements. The special case showed that, though involving a comparably simple service bundle, both partners agreed on an effort-based remuneration. As neither partner provided any experience in contract logistics, the agreement on this remuneration set was considered appropriate. This leads to proposition 3:

Proposition 3: *Lack of experience in contract logistics of the shipper and LSP favours effort-based remuneration.*

Concerning Research Question 3 (*How can AIMs be structured?*), we developed a structuring based on incentive direction and target. In practice, we found that AIMs seem to be randomly chosen or based on experience and personal preferences (Research Question 4). It seems that neither LSPs nor shippers pursue specific targets with the applied AIMs and are not always aware of which direction the incentives aim for. In particular, the monitoring expenditures for these mechanisms are not taken into account. Nevertheless, the results indicate that AIMs are widely applied in remuneration sets, which is consistent with statements from van Laarhoven *et al.* (2000). The theoretical discussion provided a structure for AIMs concerning the AIM's direction and target. The dimensions were filled with practical examples. Based on these insights we note that the theoretical deduction of AIMs being used to level out disadvantages of single remuneration models cannot be transferred directly to practice.

They rather constitute a theoretical explanation which should be examined more intensely.

Also, process-based remuneration was identified as another kind of remuneration model that has not been addressed in the literature before as well as in our theoretical deduction. This model can be rated as a special form of outcome-based remuneration. It differs from the unit-related outcome model, because the activities performed for this outcome are compensated, not the final result in terms of units. With a remuneration of activities leading to an output, the process-based remuneration also carries features of the effort-based remuneration. Considering the incentive aspects for this kind of remuneration, the LSP is incited to perform each process faster than initially defined in order to, for example, execute more tasks with fewer employees, thereby generating higher profits. The correct determination of time consumption for each process is consequently of significant importance. Adjustments in services need to be communicated to the shipper to adapt the executed processes. This enhances the information provision of the LSP. Considering this from an agency-theory perspective, the remuneration of single actions provides higher information to the shipper, as he gains deeper insights into the LSP's actions. Providing more sources of information is seen as a positive effect for relationships (Logan, 2000; Poppo & Zenger, 1998) and hence for partnership stability. Another issue to consider in process-based remuneration is the availability of reliable process times, particularly prior to the cooperation, when the LSP has to bid a price for the services. In the cases considered in our research, process times and costs were not known in advance. Hence, the shipper and LSP jointly took the process times by stop watches. In contrast to outcome-based remuneration, where the LSP makes a pricing offer for the services before the contract is signed, here the shipper probably accepts more performance risk because process times are not known until after the contract is signed.

Summing up, process-based remuneration may be considered a special kind of outcome-based remuneration containing effort-based elements. Process-based remuneration directly compensates all efforts that were needed to perform a particular outcome. Nevertheless, the risk of rising factor costs for labour is transferred to the LSP, which differs from effort-based remuneration. Effort-based remuneration rewards the entire input of labour, outcome-based remuneration rewards the outcome independently of the executed process; instead LSPs usually consider relevant processes and calculate a mixed price for all goods, in order to determine a price for the services. These prices are usually based on experience with similar services and

products. Due to the very detailed pricing, process-based remuneration seeks to share the risk by remunerating the effort of the LSP's employees.

C 7. Conclusions

The research at hand conducted a comprehensive investigation of the remuneration models in contract logistics. It extends existing research conducted by authors like Logan (2000) and Lukassen and Wallenburg (2010). The theoretically derived relation between service bundle characteristics and the choice of remuneration is carefully confirmed by the empirical observations. The theoretically derived relation between service bundle characteristics and remuneration sets makes sense in practice. Nevertheless, practical examples may be found, that show partnership stability but lack this relation e.g. by combining complex services with outcome-based remuneration. Guidance for the choice of remuneration models and the AIM's effective direction and target are provided. The theoretically plausible explanation of AIMs employed to level out drawbacks of each remuneration model was not confirmed by the study.

This paper contributes to research in two ways. On the one hand the relation of service bundle characteristics and remuneration was discussed for the first time from a conceptual point of view. AIMs were also considered from a theoretical perspective. A structure with which to cluster the mechanisms found in practice is provided. On the other hand, the research indicates factors of influence of remuneration model choice. The generated propositions provide a basis for quantitative studies. Future research may tackle this aspect and investigate the choice of remuneration models from other theoretical perspectives, or particularise the remuneration models chosen in practice. The empirically elucidated remuneration based on processes was presented in this paper, but calls for further investigation, especially against the background of monitoring expenditures.

The study at hand also provides implications for managers. When engaging in contract logistics, managers need to consider the type of services that they wish to outsource or take over when choosing the remuneration model. Specific service bundle characteristics require an appropriate remuneration model. The dimensions used to discuss remuneration models, namely, incentive setting, risk sharing and monitoring expenditures, provide guidance for managers in evaluating their designated remuneration model against the background of the specific service bundles. Additional

incentives should be added with caution in order to keep the monitoring expenditures at a comparatively low level. Process-based remuneration adds another remuneration model to the theoretical discussion and seems applicable to complex service bundles.

This study is not devoid of limitations. The amount of case studies does not account for statistically proven relations. Apart from the empirical constraints, the research framework may not be suitable in specific cases. For example, certain measures – e.g. personal preferences and experiences, tradition and company size – that potentially affect the choice of remuneration models were not analysed in detail. Future research may address these issues. Other streams of literature, such as the relationship literature as a foundation for examining truth telling and the trust literature for investigating the influence of trust on the remuneration, could be considered by future research with a different focus. Also, transaction cost theory may serve as an additional suitable approach. Future research may also include the bargaining power of the involved parties with respect to the choice of remuneration models. Additionally, the evolution of remuneration models and relationships over time may be addressed in a longitudinal study or from an evolutionary-theory perspective.

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Sprachen

Deutsch	Muttersprache
Englisch	Verhandlungssicher
Spanisch	Gut
Französisch	Grundkenntnisse

IT-Kenntnisse

EDV-Kenntnisse	MS Office, MS Windows, MS Windows mobile, Linux Suse, Mindjet Mindmanager, Lotus Notes, Grundkenntnisse SAP/R3
Programmiersprachen	Java, HTML