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CONTRACT DESIGNS IN THE GERMAN PIGGYBACK TRANSPORT INDUSTRY

A TRANSACTION COST ECONOMICS ANALYSIS

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A thesis submitted in partial fulfilment of the requirement of London Guildhall University for the degree of Doctor of Philosophy

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"But Jacob replied:

'I will not let you go unless you bless me.'"

Genesis 32:26b

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Uwe Doerr
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ABSTRACT

The liberalisation of transport capacities and prices of land-based transport of goods in Europe in the 1990s led to an increasingly market-orientated decision process for the users of piggyback transport services. However, the empirical research has not yet examined the contracts co-ordinating German piggyback transport chains in this changed environment.

This analysis seeks to explain the four types of contracts most commonly used in German piggyback transport by relating them to the theory of transaction cost economics (TCE). The qualitative case study approach adopted here derives from the tradition of Oliver Williamson's research.

The hypothesis of the thesis relates the different contract designs to the type of transport service: the higher the specificity of an asset to fulfil the transport service required by the freight forwarder, the higher the tendency to vertically integrate piggyback transport services. Put differently, the following question is answered: 'do the contracts used by freight forwarders to acquire the transport service of rail operators result in the lowest transaction costs of the existing contracts for the specific haulage requested?'

The thesis models these transaction attributes of the rail transport services for piggyback according to TCE and subsequently assigns them to the contract design elements of the four types of contracts. The first two contracts are efficient in all transport services they co-ordinate and the third is efficient to a large extent in terms of the volume of services co-ordinated. The fourth contract type cannot currently be designed in a way efficient for TCE.

LIST OF ABBREVIATIONS

The following does not list abbreviations for currencies, company names and legislation. See 'list of legislation' for abbreviations of legislation and footnotes for abbreviations of company names. Words and phrases denoted in <> show the original German term.

BMVBW	German Federal Ministry For Transport <Bundesministerium für Verkehr, Bauwesen und Wohnungsbau>
EUR	'Euro' unit of currency
EVU	rail transport undertaking <Eisenbahnverkehrsunternehmen>
FF	Freight forwarder
GTB	General terms of business
MSRP	Methodology of scientific research programmes
MT	Multimodal transport
MTO	Multimodal transport operator
NIE	New institutional economics
SDR	Special drawing right
t	tonne
TCE	Transaction cost economics
TEU	Twenty foot equivalent unit
tkm	tonne kilometre

LIST OF LEGISLATION

Angular brackets <> denote the short title that is used in the text's footnotes.

Comité international des transports ferroviaires CIT (ed.): Rundschreiben CIT 4.0.6./135 vom 21.01.1993

Convention Internationale Concernant le Transport des Marchandises par chemins de fer <CIM>

Convention relative au contract de transport international de Marchandises par Route <CMR>

Eisenbahnverkehrsordnung <EVO>

European Parliament and European Council (ed.): Entscheidung Nr. 1692/96/EG des Europäischen Parlaments und des Rates vom 23. Juli 1996 über Gemeinschaftliche Leitlinien für den Aufbau eines Transeuropäischen Verkehrsnetzes, Brussels 1996

European Commission (ed.): 1999/590/EG: Entscheidung der Kommission vom 4. Mai 1999 über Massnahmen zur Förderung der Umstrukturierung des Strassengüterverkehrs und der Weiterentwicklung der Intermodalität (Gesetz Nr. 454 vom 23. Dezember 1997), die Italien durchführen will, Brussels 1999

Gesetz zur Regelung des Rechts der Allgemeinen Geschäftsbedingungen (AGB-Gesetz)

Güterkraftverkehrsgesetz <GüKG>

Handelsgesetzbuch <HGB>

Intercontainer-Interfrigo (ICF) s.c. (ed.): General Conditions applicable to combined transport, Edition of 03.01.2000, Brussels. English version with equal legal validity to the German version (GTB Intercontainer is English version, see this thesis' appendix for full English version, the footnotes marked 'GTB Intercontainer' are direct reference from the English version) <GTB Intercontainer>

Kombiverkehr Deutsche Gesellschaft für kombinierten Güterverkehr mbH & Co KG (ed.): Allgemeine Geschäftsbedingungen der Kombiverkehr Deutsche Gesellschaft für kombinierten Güterverkehr mbH & Co KG für ihre Inlandverkehre, as of 01.07.1999, Frankfurt am Main. German version legally binding and no English version available (GTB Kombiverkehr is German version, see this thesis' appendix for full German version, the footnotes marked 'GTB Kombiverkehr' are direct reference from the German version) <GTB Kombiverkehr>

Kraftverkehrsordnung <KVO>

Rat der Europäischen Gemeinschaften (ed.): <Verordnung 1017/68> vom 19.07.1968 über die Anwendung von Wettbewerbsregeln auf dem Gebiet des Eisenbahn-, Straßen- und Binnenschiffsverkehrs

Rat der Europäischen Gemeinschaften (ed.): <Richtlinie 91/440/EWG> vom 29.07.1991 zur Entwicklung der Eisenbahnunternehmen in der Gemeinschaft

<Transfracht AGB>: Fassung vom 01.07.1993

<Transitvertrag> Schweiz - EU vom 02.05.1992

Union Internationale des sociétés de transport combiné Rail-Route (UIRR) (ed.): General Conditions of the Union Internationale des Sociétés de Transport combiné Rail-Route (UIRR), as of 01.07.1999, Brussels. German edition by Hupac (Chiasso), Ökombi Ges.m.b.H & Co. KG (Vienna) and Kombiverkehr (Frankfurt am Main). In case of dispute, French wording legally binding. (GTB UIRR is English version, See this thesis' appendix for full English version, the footnotes marked 'GTB UIRR' are direct reference from the English version) <GTB UIRR>

Vertrag zur Gründung der Europäischen Wirtschaftsgemeinschaft (EWGV)

GLOSSARY

I ENGLISH TERMS

asset specificity	specialised assets not re-deployable without sacrifice of productive value
assigning	ascribe transaction attributes (factor specificity, uncertainty and frequency) to the different forms of contract
bilateral governance	contract design where credible commitments are used as a means of creating a trust-building environment
bounded rationality	behavioural transaction attribute that derives from the limited information recording and processing capability of the human brain which makes decisions of transaction partners imperfect in relation to the utilisation of information
complexity	absence of any overview of interdependencies between the individual events in their effect upon the transaction
contingent claim	perfect contract
contract(ual) design	governance structure that embodies a degree of vertical integration, i.e. from non-existent vertical integration (in market contracts) to full vertical integration (in a hierarchy)
control	contracting process maximised in unified governance and using instructions as instruments for contract fulfilment as opposed to incentives
court ordering	procedure where contract disputes are settled by independent courts
credible commitment	instrument used as means of creating a trust-building transaction environment
dedicated assets	assets (not necessarily specific) from investments to increase capacity for delivery to particular categories of customers

frequency	measurement for repetition and volume of transactions between transaction participants
full vertical integration	situation where a firm's activities expand over the entire production process, i.e. a freight forwarder taking over all piggyback activities from road transport to rail transport of TEUs, including terminal handling
fundamental transformation	process through which, after a specific investment, quasi-rents are created and the possibility of opportunistic behaviour arises in a transaction
general purpose asset	asset consisting of general purpose technology
governance	contracting process in the context of private ordering
governance structure	contract design in the context of private ordering
hierarchy	contract design, that uses full vertical integration as solution for a service or product transaction, i.e. the co-ordination of a transaction within a firm. This contract design is the opposite extreme to market contracts
hold-up	type of opportunism that arises due to existing sunk costs of a specific asset
hostage	specific asset investment or other asset provided in support of a bilateral trade
institutional market separation	segmentation of product demand through organisational split of producers' sales activities, i.e. road-dominated and rail-dominated intermediaries segment the entire piggyback market in two parts
human asset specificity	human capabilities that are acquired which are useful only for the particular transaction concerned
market governance	contract design where service rendered and service in return coincide in time (time based) and where the identity of the transaction partners is irrelevant (anonymous contracting possible)

moral hazard	tendency of a transaction partner to exploit the incompleteness and uneven distribution of information (information asymmetry) to his own advantage
multimodal transport (MT)	a real process, using two or more separate transport modes to transport goods across a defined distance.
multimodal transport operator (MTO)	firm transporting goods using multiple means of transport and multiple transport modes; the shipper's transport certificate with an MTO covers the full length of the entire transport chain
opportunism	self-interest seeking with guile
organisation failure framework	constellation of transaction attributes, which result in inefficiency of market contracts
package freight	solid transport objects transported individually or in batches
physical asset specificity	production assets tailored to the transaction partner's needs
piggyback intermediary	piggyback intermediaries consolidate demand and offer both on the national and international transport segments, partly producing sections of the MT-transport chain
piggyback transport	a sub-segment of land-based multimodal transport (MT) that deals with the conveyance of the entire means of transportation ('Rolling Highway'), the parts thereof (trailer) or swap bodies
private ordering	out of court settlement of disputes
production costs	cost of producing an economic good according to the neo-classical production function, as opposed to transaction costs
quasi-rent	difference between the asset's value in this use compared to the asset's value in its next best use
rail transport operator	firm that provides trucking services on the rail network

reputation	intangible asset gained through positive experience in the past
road transport operator	firm that provides trucking services on the road network
site specificity	assets used for transaction partners situated nearby
special purpose asset	asset serving non-general purpose needs in producing a product
specific asset	asset consisting of transaction specific investments (see: asset specificity)
sunk costs	costs that even in the long run cannot be recovered upon termination of a transaction
technological market separation	segmentation of product demand through technological separation of intermediaries, i.e. maritime container oriented and piggyback container oriented intermediaries segment the entire piggyback market in two parts
TEU	twenty-feet equivalent unit. In this thesis term defined as: means of transport in piggyback (transport container), i.e. trailers, swap-bodies and whole truck loads for 'Rolling Highway'
transaction	good or service being transferred across a technologically separable interface
transaction costs	costs of planning, adapting and monitoring task completion under alternative governance structures
transaction object	economic good subject to be exchanged between transaction participants
trilateral governance	contract design where an independent expert third party assesses performance and settles disputes
uncertainty	measure of the ability to take account of all future scenarios in their effects upon a transaction
unified governance	contract design where the production of the transaction object is vertically integrated
vertical integration	situation where a firm extends its activities over more than one successive stage in the production process

II FOREIGN TERMS

(* = approximately UK equivalent)

Aktiengesellschaft (AG)	shareholder company
Allgemeine Bedingungen für den internationalen Huckepackverkehr der UIRR (AGB UIRR)	general terms of business (GTB) for the international piggyback transport via UIRR
Allgemeine Geschäftsbedingungen (AGB)	general terms of business (GTB)
Anlagegüter	fixed assets
Beförderungsauftrag	contract of transport*
Beirat	council of experts
Binnencontainer	special domestic multipurpose container
Binnenschiffahrtsunternehmen	domestic waterways shipping company
CIM-Frachtbrief/UIRR-Vertrag	CIM consignment note/UIRR contract
Eigenkapital	share capital
Einseitiges Pfandmodell	unilateral credible commitments
Eisenbahnverkehrsunternehmen (EVU)	railway company
Ereignisräume	occurrence areas
Frachtbrief	consignment note*
Frachtführer Schiene	rail transport operator, i.e. company providing the trucking service on the rail network
Frachtführer Strasse	road transport operator, i.e. company providing the trucking service on the roads
Frachtvertrag	transport certificate*
Frachtwert	freight value
Gesellschafterversammlung	company shareholders' meeting

Grosscontainer	maritime containers and piggyback containers
Huckepackverkehr i.e.S. (im engeren Sinne)	truck-trailer including traction engine on flat wagons
Huckepackverkehr i.w.S. (im weiteren Sinne)	piggyback transport
Kabotage	cabotage
Kapitalstimme	capital voting right
Kombi-Fahrplan	Kombiverkehr-timetable
Kommanditgesellschaft	limited partnership company*
Kommanditist	partners with limited liability*
Kommanditisteneinlage	partner's share*
Komplementär	general partner*
Lastkraftwagenzug	truck-trailer
Lastzug	truckload
Leistungsstimme	turnover voting right*
Logistikaufgabe	transport service
Logistiksystem	framework of logistics
Niederflurwagen	low altitude MT-wagon
Pflichteinlage als Kommanditist	obligatory contribution to capital as limited partner*
Rahmenvertrag	framework contract
Reederei	shipping company
Rheincontainerreedereien	domestic waterway shipping companies on the river Rhine
Rollende Landstrasse	rolling highway (conveyance of the entire means of transportation/'Rolling Highway')
Sachanlagen	tangible fixed assets

Sattelanhänger (Sanh)	semi-trailer or trailer
Satzung	articles of association
Seehafenhinterlandverkehr	maritime container transport for land-based maritime support traffic
Selbsteintritt	vertical integration of entire road-based freight forwarding service, including road trucking
Strassenverkehrsgenossenschaften	mutual road transport companies*
Streuverkehr	regional distribution, transport on trucks
Transportauftrag	transport instructions*
Übergabeschein	delivery note*
Ueberseecontainer im Hinterlandverkehr	maritime containers in port support transport service
Verordnung	regulation
Versandauftrag	shipping instructions*
Verwaltungsrat	supervisory board*
Wechselbehälter (WB)	swap body
Werkverkehrsunternehmen	shipper-owned road transport operators
Zinslose Bundesdarlehen	interest-free government loans
Zugmaschine	traction engine

CHAPTER 1: INTRODUCTION

1.1 HYPOTHESIS

The aim of this thesis is to relate the theory of transaction cost economics (TCE) to the piggyback transport industry in Germany.

The hypothesis of the thesis relates the different piggyback contract designs to the type of transport service: the higher the specificity of an asset to fulfil the transport service required by the freight forwarder, the higher the tendency to vertically integrate piggyback transport services.

Piggyback transport is defined here as a sub-segment of land-based multimodal transport (MT) that deals with the conveyance of the entire means of transportation (truckloads), the parts thereof (trailers) or swap bodies. Multimodal transport is defined as a multimodal transport of TEUs, i.e. a real process, using two or more separate transport modes to transport goods across a defined distance (Haesler, 1977:65). The following definitions have been provided by the ECMT (1993):

> Multimodal transport: the carriage of goods by at least two different modes of transport.
> Intermodal transport: the movement of goods in one and the same loading vehicle which successively uses several modes of transport without handling of the goods themselves in changing modes.
> Combined transport: intermodal transport where part of the European journey is by rail, inland waterway or sea and any initial and/or final leg carried out by road is as short as possible.

TEUs[1] in this thesis are transport containers used for piggyback, i.e. trailers, swap-bodies and whole truck loads for 'Rolling Highway'. TEU is therefore used as the synonym for the means of transport in piggyback. The distinction between MT and other forms of transport is that the TEU remains unchanged throughout the entire transport route (Seidenfus, 1974:2f; Bukold, 1996; Seidelmann, 1997:322).

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[1] The term TEU (twenty-feet equivalent unit) may be used differently in other transport sectors. The widespread use in statistical data throughout the piggyback transport industry on the one hand, and the tendency of the term TEU to become synonymous for 'transport container' on the other hand, made this definition in the thesis plausible.

The liberalisation of transport capacities and prices of land-based transport of goods in Europe in the 1990s led to an increasingly market-orientated decision process for the users of piggyback transport services. Two events were crucial to this development. Firstly, a cartel between European rail companies and suppliers of piggyback transport services was terminated in 1991. Secondly, the market regulation of price and capacity in Germany's road haulage industry was abandoned in 1994. As a result, the determining criterion of choice by freight forwarders when purchasing elements of piggyback transport services is no longer government *dirigisme* but efficient use of resources.

From the practical perspective of the transport industry, the thesis examines existing contracts in piggyback transport within an environment of increased market competitiveness due to liberalisation.

The thesis analyses contracts used by market participants in the piggyback transport industry. These contract designs represent the thesis's objects of investigation. They embody the agreements between the freight forwarder and the rail operator for the provision of piggyback transport. Significant investments are required by both the freight forwarder and the rail service provider.

In this context, the thesis examines whether there is an economic relationship between the different contracts in piggyback transport and the type of transport service provided by the freight forwarder. In the analysis, the economic product is defined as the specific rail service, which is part of the piggyback transport chain and needs to be supported by the above-mentioned investments.

Vertical integration is understood as being the situation where a firm extends its activities over more than one successive stage in the production process. Asset specificity is defined as specialised assets which are not re-deployable without sacrifice of productive value.

The thesis analyses the purchase or the production - in the case of vertical integration - of rail transport service for piggyback. This component represents one part of an integral system of solutions in the form of a transport chain that freight forwarders offer to shippers. Therefore, the transactions analysed here are restricted to the relationship between freight forwarder and rail transport operator. Other transaction relationships in MT, i.e. between the freight forwarder and the shipper, are not the object of further analysis.

The transport mode combinations, the transport operator combinations, market segments and types of TEU of the existing piggyback transport market are now described. The following continental transport modes are eligible for components of MT chains (Willeke, 1966:310).

1) airline operators (air);
2) pipeline operators (land);
3) railway operators (land);
4) road transport operators (land);
5) domestic waterways shipping companies <Binnenschiffahrtsunternehmen> (water).

Table 1.1 below, based on personal data and observations, describes the combinations of transport modes that are used in European continental MT. This table does not contain pipelines as a transport mode. Its main focus lies on trans- and cross-continental transport. In the left column all major combinations of transport modes are shown. From these combinations, the transport operator combination, the respective market segments they operate in, and the types of TEUs used are listed.

With regard to the transport operator combinations, the rail transport operator-road transport operator in the top line of Table 1.1 forms the focus of the analysis. The other transport operator combinations are consequently not the subject of this thesis.

Three main market segments of land-based MT can be identified: ferry transport, transport of containers to and from maritime ports, and domestic and international continental land-based piggyback transport together with container transport. The analysis in this thesis focuses on that latter market segment, as piggyback technology is used there. Container transport on the Rhine waterway does not have a land-based element and is therefore not regarded as land-based MT. In the subsequent contract analysis of the thesis, the term MT means 'land-based MT'.

Table 1.1: Multimodal Transport: Transport Mode Combinations

Transport mode combination	Transport operator combination	Market segment	TEU
Road/rail (land/land)	Rail transport operator/road transport operator	Container transport/piggyback transport (incl. 'rolling highway')	Maritime container/trailer/ swap body/truck
Ship/rail (sea/land)	Rail transport operator/maritime vessel shipping company (seagoing)	Container transport serving maritime ports	Maritime container
Ship/sea (waterway/sea)	Maritime vessel shipping company (seagoing)/domestic waterways shipping company	Container transport Rhine waterway	Maritime container
Ship/rail/road (sea/land/land)	Maritime vessel shipping company (seagoing)/rail transport operator/road transport operator	Ferry transport (e.g. Oeresund Fehmarn/Channel)	Truck/wagon

Source: personal data.

Table 1.1 also underlines the special technical peculiarity of piggyback transport versus other segments of the MT-market regarding the TEU used. Other combinations of transport modes have evolved into a single, mutually agreed TEU such as the standardised maritime containers or the technical harmonisation of entire wagons or trucks. The standardisation of the maritime container from the sea/land transport mode has resulted in a standardisation of the container transport of the land/land transport mode. However, piggyback transport uses a variety of different TEU types to date. As a result, a significant distinction can be made within the rail-road transport mode combination between container transport and piggyback transport. The focus of the analysis in terms of TEU types lies on swap body, trailer and entire truck.[2] Other TEU types are not subject to this analysis.

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[2] 'Rolling Highway' <Rollende Landstrasse>: for more detailed explanation see section 3.3.2. Words and phrases denoted in <> show the original German technical term.

The rail transport operator services in piggyback transport represent therefore the good exchanged between the two transport modes rail transport and road transport, that is subject to the contract designs of the thesis. The rail transport operator can either directly exchange this good with the road transport operator or - more commonly - by using a freight forwarder. Piggyback transport intermediaries in this context are an instrument for freight forwarders to accomplish the organisation of the transport chain.

1.2 THE CHOICE OF TCE AND EXISTING TCE RESEARCH

This section firstly attempts to justify the choice of transaction cost economics (TCE) for carrying out the analysis of piggyback contracts, and secondly gives an overview on existing TCE research.

Although choice of the theory for investigating the thesis' problem can ultimately only be justified *ex-post* via satisfactory findings of the analysis undertaken, there are people within areas of TCE who suggested *ex-ante* that this theory could provide an appropriate tool for analysing German piggyback contracts.

Due to the broken character of MT-transport chains, which usually involve a multitude of transaction partners, transaction costs and their reduction are crucial areas in determining the choice of institutional co-ordination. This applies specifically to the MT-sector piggyback transport where a transaction takes place between a freight forwarder company and a rail transport operator. Historically, an institutionally rooted friction between the road and rail sector exists (explained in detail in chapter 3), which leads to increased costs of co-ordination between the transaction partners and potentially decreases the efficiency of the transactions. TCE provides explanations for vertical integration and contractual choice, with emphasis on transactional efficiency by minimising transaction costs (TC).

MT constitutes a highly investment intensive service sector of the transport industry. The initial empirical data gathered for the existing contract designs suggested that the high level of assets invested was paramount for choosing non-market forms of co-ordination for these transactions. According to TCE, vertical integration as a contractual arrangement may be preferred to other institutions if transactions are supported by investments in highly specific assets.

TCE allows a detailed contract analysis by investigating typical contract elements and attributing these to types of co-ordination. One of these key elements is

mutual commitments between transaction partners. These elements (e.g. in the form of guarantees, liability clauses and profit sharing), could be found in the empirical data of contract elements in the piggyback industry, suggesting that TCE provides a suitable framework for the analysis of the piggyback contracts.

TCE explains how market failure can be cured using appropriate alternative contract designs. Most of the transactions in piggyback transport are co-ordinated in non-market type transactions, i.e. with a longer-term commitment of both partners to the transaction relationship.

TCE allows to form a hypothesis that links the degree of vertical integration on the one hand and the efficiency of contract arrangements on the other hand, and to relate this hypothesis to an empirical context. Different to other conventional theories (as explained in chapter 2), TCE provides a detailed framework for analysing contract instruments, which seemed to be necessary to match the wide-ranging contractual arrangements within the four contracts analysed.

In summary, the theory necessary for the analysis of German piggyback contracts in this thesis should provide explanations of different forms of co-ordination, and should be able to generate hypotheses that are testable in an empirical context about the connection between the transaction context, contract form and economic efficiency. TCE appeared to suffice these criteria *ex-ante* compared to other conventional theories.

From the perspective of economic theory, the thesis encounters a widely unexplored application of TCE in the area of the transport services industry regarding the aspects of vertical integration and governance (Langner, 1996).[3]

Under governance is understood a contracting process in the context of market or non-market co-ordination.

Relating TCE to the area of contracts that co-ordinate German multimodal transport has not been accomplished so far. Nevertheless, wide-ranging investigations of TCE have already been undertaken in other industries such as the oil industry, car manufacturing, the gas industry, pharmaceuticals, aeroplane manufacturing and telecommunications, the first three representing the majority of existing research projects (according to studies on existing research on TCE:

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[3] This publication is a test of TCE in the context of the airline industry in the field of vertical integration and governance aspects.

Shelanski & Klein, 1995; Motz, 1998.). In recent years, three branches of research within TCE have evolved: vertical integration, long-term contract design and measurement.

From 1980 onwards, the majority of research can be found in the field of vertical integration. Almost 60 research projects focused on this area of TCE. Only 16 projects dealt specifically with the aspect of long-term contract design and complex contracts. Finally, only 9 sources could be found on research in the field of measuring transaction costs (TCs). Moreover, these projects differ widely in the type of measuring methodology adopted. The following overview sums up research in the field of vertical integration within TCE. Existing research on long term contracting and measurement unanimously backs TCE within the various industries reviewed - disregarding two projects where the degree of confirmation of the theory was rated as neutral. However, the picture in the field of vertical integration is not as clear: 42 out of a total of 52 projects confirm the TCE hypotheses; only 10 reject them (Shelanski & Klein, 1995). Nevertheless, this result is above average in empirically oriented research within economics.

In the past, Williamson's theory has been criticised, particularly regarding his attempt to measure TC levels and transaction attributes. Despite this, the existing empirical research clearly indicates that rejecting TCE outright (as in Schneider, 1985; Sydow, 1992; Gerybadze, 1995) contradicts the above empirical findings. Thus Shelanski and Klein comment on the research results on vertical integration as follows:

> "To sum up, the evidence on the transactional determinants of vertical integration seems quite striking. Asset specificity and uncertainty appear to have significant effects upon the vertical structure of production. This is especially remarkable when compared with the relative dearth of evidence on market power explanations for integration, and with the results of rare studies that explicitly compare TCE-based theories with market-power theories" (Shelanski & Klein, 1995:344).

The existing literature on TCE in the field of vertical integration seems to put forward a clear case for the necessity for more empirical evidence in the transport industry. Furthermore, it clearly indicates the need to 'put more flesh on the bones' of the field of vertical integration within TCE. In the words of Joskow (1993:133), the existing empirical research results have increased the likelihood of "a pot of gold to be found at the end of the rainbow" in terms of the value of TCE for explaining co-ordination structures in an economy.

In summary, TCE has been applied through intensive empirical research in the past 20 years. The existing TCE research has underlined the importance of TC considerations by firms investing in specialised assets and taking decisions about the degree of integration of their production. However, the empirical research has not yet examined the contracts co-ordinating German piggyback transport chains.

1.3 SOURCE MATERIAL AND LITERATURE

Data has been collected on both a macro and micro level. Governmental and other official agencies and transport associations were sources of macro data.

On a micro level of data gathering, annual reports and general terms of business (GTBs) were examined and semi-structured interviews were conducted with key representatives of the three relevant intermediary companies (Intercontainer, Kombiverkehr and Hupac) and the two main rail infrastructure companies in Germany and Switzerland (DBAG and SBB). The key aim of these interviews (see Appendix I: people interviewed) was to filter information not available in secondary sources and annual reports about the piggyback contract details on the one hand, and about the transaction situation, especially details of asset specificity, on the other hand. Under 'semi-structured', it is understood that all interviews were covering a similar range of topics regarding contract details and the transaction situation. Where necessary, as the study progressed, interviewees were contacted more than once to improve the level of detail necessary for applying TCE in this case study. Additionally, information was sought through specific information requests (see Appendix I: information contacts).

Unless otherwise stated, the year 1997 represents the latest year where full year figures are available at the time of completion of the thesis for the market and company data. Other literature and information sources are included up to the end of 1999.

1.4 SCOPE OF METHODOLOGY ALTERNATIVES AND THE CHOICE OF MSRP

In this section on scientific methodology, the aim is to lay a foundation for application of the theory of TCE, which is used here in the context of piggyback transport.

From the perspective of falsificationism as defined by Karl Popper, the exposure of a theory to empirical counter-examples against observation statements drawn from the hypothesis is the object of scientific methodology.

> "We say that a theory is falsified only if we have accepted basic statements which contradict it" (Popper, 1977:86).

The falsification of a theory is possible if only one of the systems of statements from the hypothesis is falsified. Falsificationism recommends for the empirical research of economists the derivation of hypotheses, or empirical propositions, from their theories with a high level of specificity. Non-occurrence of these propositions would invalidate the entire theory.

Kuhn, by contrast, stresses the continuity of scientific growth. In replacing the logic of scientific recovery with a psychology of scientific recovery, he replaces the volatile existence of a theory until its probable falsification as is the outcome of intense testing with the concept of paradigms. Over a normal period of time, the dominant paradigm establishes a pattern of growth of knowledge as a result of scientific discovery and is then eventually overthrown by a crisis (Lakatos, 1970:178; Kuhn, 1970). In a comparison of the two, Popper's scientific research programme aims to achieve a description of objective scientific growth, whereas Kuhn's scientific research programme aims at a description of change in the scientific mind (Lakatos, 1970:180).

In the 'methodology of scientific research programmes' (MSRP), a research programme is seen as an organic unit that contains both essential components and non-essential ones. As developed by Lakatos (1970:135),[4] the non-essential, replaceable components are called the programme's 'protective belt', whereas the essential, structural elements are called the 'hard core'. The 'hard core', or 'negative heuristic', is protected by the surrounding belt, or 'positive heuristic', of the research programme. A 'protective belt' consists of a chain of models simulating reality and in the form of auxiliary hypotheses represents the refutable variants of the research programme. This methodology may rationally disallow refutations of this 'hard core' in empirical research, as long as changes made in the surrounding auxiliary hypotheses are progressive, i.e. if the supporting empirical content of the 'protective belt' of auxiliary hypotheses increases (Lakatos, 1970:134).

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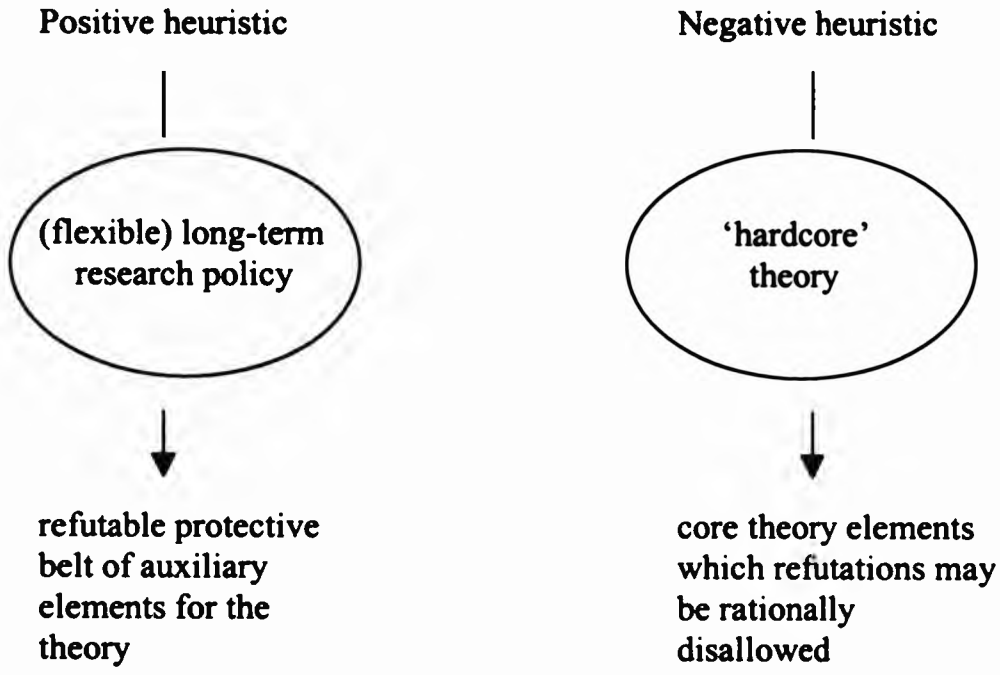
[4] See also: Feyerabend (1981), Latsis (1976) and Kuhn (1970).

Figure 1.1: Methodology of Scientific Research Programmes



Source: according to Lakatos (1970:134f).

Compared with the two scientific methodologies highlighted above, MSRP does not appraise a hypothesis or systems of hypotheses only. The evaluation targets an entire research programme. As an organic unit, a research programme contains both essential components and non-essential ones (Latsis, 1976:14-16); the amendment or exchange of a non-essential element of the research programme does not invalidate the theories in the 'hard core'.

TCE - given the partly negative results of empirical applications listed in chapter 1 - would have been long refuted on the grounds of a Popperian falsification methodology.

> "The message of falsificationism is not *mere* testing but *severe* testing, and adoption of the techniques of qualitative comparative statics makes severe testing practically impossible." (Latsis, 1976:8) [italic in original]

In this thesis, new institutional economics (NIE) - including TCE as one theory element - is regarded as 'hard core' - or 'negative heuristic' - of the research policy, in which explaining vertical integration through TCs is one topical element. By using this approach, the addition of auxiliary elements - or 'positive heuristic' for the research programme - to the theory does not change the research

path of TCE. Empirical findings can be integrated which initially contradict the theory. Consequently, the conclusion in chapter 6 is allowed to contribute to the development of the theory rather than merely stating the falsification or non-falsification of it. The choice of MSRP underlines the thesis' aim to relate TCE to the empirical context rather than testing it.

1.5 THE CHOICE OF QUALITATIVE VERSUS QUANTITATIVE APPLICATION OF TCE

The qualitative case study approach to the TC analysis of piggyback transport contracts adopted in the thesis derives from the tradition of Oliver Williamson's research (Williamson, 1985). Although many research projects broaden his qualitative approach by using quantitative components in TCE, they do so mainly in order to achieve a better explanation of the results derived from a previous qualitative analysis. Besides qualitative case study, the two other econometric and historical methods that can be observed in other empirical work on TCE are quantitative case study and cross-sectional econometric analysis (Shelanski & Klein, 1995:338).

Williamson's qualitative approach consists of a comparison of discrete structural alternatives in the field of comparative organisation theory and can be traced back to Herbert Simon (1978). According to Simon, functioning organisation structures differ in their cause rather than in their extent. In other words, institutions and co-ordination designs in an economy for the transfer of services and goods can be classified in non-discrete groups. Their difference is qualitative, not quantitative. Simon focuses upon how to seek economic solutions for the transfer of services or goods by choosing institutional organisation structures. Consequently, a marginal analysis of TC-levels for a service co-ordinated under different contract alternatives is not necessary. The comparison of TC-levels for discrete structural alternatives of rail transport co-ordination is carried out, i.e. the search for optimum levels of TC, within a given choice of contracts for each piggyback service. Williamson himself states that, not the absolute level of TC is decisive for TCE-analyses, but the difference between TC of alternative institutional arrangements (Williamson, 1990c:25). A simple comparison is sufficient to arrive at statements of preference in choosing from different contract designs. The exact amount of TC does not have to be quantified (Picot, 1982:271).

Subsequently, the term 'qualitatively modelling' stands for a qualitative analysis of piggyback contracts together with the transport services that these contracts are

supporting, using the perspective of TCE. In the course of this analysis for the piggyback contracts, the contract elements are transformed into TCE's pattern of credible commitments, whose intensity is then qualitatively measured using Williamson's criteria set out in chapter 2. Regarding the transport services, the environmental factors (transaction attributes) of Williamson's organisation failure framework are derived and qualitatively evaluated according to indicators set out in chapter 2.

In summary, this thesis performs an empirical qualitative case study in applying the hypothesis stated in chapter 1, based on the theory of TCE. It uses the methodology of scientific research programmes (MSRP).

The incompleteness and imperfection of markets - in this case the market for rail services as part of piggyback transport - lead to market failure and to contract solutions away from the pure market co-ordination. Four different contracts, which can be used by freight forwarders to arrange piggyback transport to and from Germany, are analysed. The contracts in piggyback transport, from the perspective of TCE, are mutual agreements between market participants to reduce the market failure. In this context, market co-ordination is one extreme of a possible spectrum of contract alternatives. Market co-ordination may be the efficient contract design from the perspective of TCE, but only if factors for market failure are of marginal importance in the transaction relationship. These factors - or transaction attributes - will be explained in chapter 2.

1.6 SEQUENCE OF ARGUMENTS IN THE THESIS

In chapter 2, TCE as the tool for investigating the objects of research, the contract designs, is described. The thesis therefore answers the question of what differentiates TCE from other theories that makes it more appropriate than other theories for the thesis' hypothesis. The objects of investigation and the core problem of TCE are described, along with an accepted classification. The main emphasis of the chapter lies in the description of the elements and the instruments, which TCE uses to explain the degree of vertical integration in the organisation of business transactions.

Chapter 3 consists of an overview of piggyback transport services and a description of the German piggyback transport market, which provides the context for the contracts investigated here. The chapter answers the questions of who the main players are in the German piggyback transport market, as well as what its market potential is in both multimodal transport in its entirety and

piggyback transport specifically. Taking the perspective of TCE, the focus of the chapter lies upon describing the transaction object, i.e. piggyback transport services, the transaction partners and the transaction situation, i.e. the market set-up. An analytic framework with logistics dimensions to describe piggyback transport services is introduced. Part of the description of the transaction situation is an overview of the technology used in piggyback rail transport in the contracts analysed.

The fourth chapter comes from the perspective of contractual relationships and focuses upon examining four contract designs in piggyback transport. These contract designs represent the contracts of European piggyback transport operators, who cover transport originating from or terminating in Germany. The question asked in this chapter is, 'what is the degree of vertical integration from the perspective of TCE in these four contracts?' Therefore, this chapter firstly pinpoints and illustrates the contract relevant companies which participate in the piggyback transport chain, and secondly the relevant contract elements. The contract designs, i.e. forms of agreements, restrictions and scope of contracting are looked at from the degree of vertical integration that forms the main criterion of differentiation. Although general terms of business (GTBs) play an important role and contribute as an underlying foundation to the transactions' governance, further contract elements such as national and international legislation, shareholdings between participants and existing infrastructure assets must be included. Thirdly, the contract designs used for co-ordination of piggyback transport are qualitatively modelled according to TCE.

The analysis of contract elements creates a basis for the examination of the connection between transaction tasks (transport service) and forms of contract (contract design) in chapter 5. On the basis of this analysis of the four contract types, it becomes possible to draw conclusions on the degree of vertical integration within the transport chain from the standpoint of the freight forwarder, i.e. the hypothesis in this thesis. In chapter 4, the existing infrastructure assets of the transaction participants are analysed for the share of special purpose investments in comparison to general purpose investments. An analysis for degrees of asset specificity follows in chapter 5.

The contract designs are explained in chapter 5. In this chapter, the focus is on TCs. The analysis takes the perspective of contract efficiency. From the perspective of transport costs, chapter 5 therefore answers the question: 'Do the contracts used by freight forwarders to acquire the transport service of rail operators result in the lowest TCs of the existing contracts for the specific

haulage requested?' Therefore, the influence of the type of services in piggyback transport on the contractual factors - or transaction attributes - is investigated. Thereafter, an analysis of existing contract designs in terms of TC efficiency, i.e. their ability to minimise TCs, is carried out. The thesis models these transaction attributes according to TCE and subsequently assigns them to the contract design elements modelled in chapter 4. Finally, the comparative TCs of alternative contract designs for the transport services are investigated.

CHAPTER 2: DESCRIPTION AND CLASSIFICATION OF THE THEORY

2.1 THE DIFFERENT FOCI OF TCE

TCE is based upon interdisciplinary approaches of economic, legal and organisation-theory research in the 1930s (Williamson, 1990a:137)[1] Commons (1934:4ff) uses the transaction as the object of study. From this the need arises to evolve institutions which have as their subject-matter trade between parties with opposed interests. Micro-economics is not institution-neutral, according to Commons, i.e. the choice of contract design for a transaction influences the efficiency of producing a good or service.

Coase (1937) starts from the notion that the utilisation of markets is not cost-free. In examination of the behaviour of economic activities within markets or firms, according to Coase, the calculation of TC is relevant to decision-making, as well as production cost calculation.

> "Neoclassical micro-economics on the lines of general equilibrium theory reached the limits of its empirical use around the Sixties" (Richter, 1991:396).

2.1.1 Problem and Object of Explanation as a Starting Point

New institutional economics (NIE) - and, as one of its lines of research, TCE - rejects the premises of social order (institutions) as exogenously given model variables. Institutions are influenced by economic behaviour (and *vice versa*), and are decision variables (Williamson, 1984:195).

NIE studies markets and firms, including their (hybrid) intermediate forms as economic co-ordination institutions (objects of explanation) (Schumann, 1987:391). Economics is conceived by Buchanan (1975:229) as a "science of contract" in which firms fulfil a co-ordination function, as well as a production function.

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1 For further literature on the origins and the focus of TCE see Commons (1934) (economic); Coase (1937) (economic); Llewellyn (1931) (legal); Barnard (1962) (organisation theory).

2.1.2 Research Programme and Aims of Explanation of TCE

All of the research lines of NIE deal with the interdependence between human rational behaviour and institutional rules, from the standpoint of the way in which markets operate (Hax, 1991:55). Among the explanatory objects of TCE, the following can be identified as the most important:

1) The explanation of organisational diversity (Williamson, 1984:195).
   Why are there (besides the market) very many different forms of firm behaviour?
2) The explanation of vertical integration (Williamson, 1984:212).
   What determines the depth of a firm's production?

Optimal substitution of transactions in market co-ordination by such in co-ordination with firms is achieved when the marginal costs, i.e. the sum of production costs and TCs, of in-house transactions have risen to the marginal costs of market-co-ordinated transactions (Schumann, 1987:392f). The TC-minimising institutional structure in a national economy consists, according to Coase (1937:320), of markets and "islands of planning", i.e. (permanent) firms. The existence of firms must be attributed to cost-intensive utilisation of the institution market as a co-ordination tool. Costs arise here, on the one hand, for price information and, on the other, for negotiating, concluding and adapting contracts. The costs of in-house co-ordination are, according to Coase, attributable to diminishing marginal returns in the co-ordinating capability of the firm's management with an increasing number of transactions. Costs arise here owing to the increasing probability of wrong corporate decisions and inefficient factor output (Schumann, 1987:392).

Both explanatory objects stated above regard cost-minimising as a core problem of economic co-ordination (Williamson, 1990a:137).

2.2 RELATIONSHIP BETWEEN NIE AND NEOCLASSICAL ECONOMICS

The research programme of neoclassical theory consists of the study of allocation of scarce resources by means of the market mechanism.

The elements of neoclassical theory are market participants and market equilibrium. Among market participants, producers behave so as to minimise costs (in accordance with the production function) and consumers so as to

maximise utility (according to the utility function). All market participants have complete, cost-free information and behave in a perfectly rational way (Richter, 1991:400). The equilibrium of the market is static, i.e. time is not a fundamental variable; that which has happened in the past is unimportant. Market equilibrium is established free of time- and cost-expenditure.

The market price of Walrasian equilibrium on factor and production markets reflects all of the information relevant to resource allocation. Markets are a signalling device (Williamson, 1984:195). Whereas in perfect competition offer and demand are co-ordinated through the price mechanism, in-house control takes place within firms by means of instructions. No clear distinction exists between market and firm, the distribution of economic activities between markets and firms being assumed as an exogenously-given datum.

The interest of neoclassical economics in the firm applies only to the production quantity and the supply price (Teece & Winter, 1984:119). The production quantities are determined by the production function. The production function specifies particular technical rules, under the existence of which an entrepreneur transforms factor input quantities into production quantities.[2]

The phenomena of increasing returns to scale (mass production) and bundling income (team production) justify, as characteristics of the production function, only the size of the production unit or of the particular production stage concerned, but not the economically appropriate size of the firm (Richter, 1991:398). Several firms can take advantage of economies of scale through joint use of an industrial production unit. A single firm can overcome diminishing returns by connecting together several industrial production units.

Neoclassical economics studies the organisation of economic behaviour (economic organisation) via technological conformity to law, principally with the aid of the production function (Williamson, 1990b:61f). The characteristic question of neo-classicism is "What is the law here?", whereas TCE concentrates on "What is going on here?" (Williamson, 1990b:65; McCloskey, 1986). Neoclassical theory is, therefore, institution-neutral and pursues a non-contractual approach, i.e. it is irrelevant for the equilibrium price whether each individual stage of production constitutes a separate firm, or several production stages are combined into firms (Baur, 1990:40).

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[2] Further literature on the production function in neo-classicism: Henderson & Quandt (1971:52); Lipsey (1992:177).

The regulations of the legal system are strictly observed by all individuals. The result of this is that, when contracts are concluded, future contractual adaptations between market participants do not constitute a cost factor, since court ordering - according to Williamson's (1984:195) TCE - is considered to be effective (legal centralism tradition). This assumption results - together with the assumption of perfect rationality of individuals, mentioned above - in perfect contracts being concluded between individuals on markets. TCE is based upon neoclassical micro-economics, insofar as the latter embodies the case of TC-free utilisation of markets and hierarchies (business governance), i.e. represents a special case of TCE. Three characteristics, in particular, distinguish TCE from neoclassical micro-economics (Hax, 1991:56).

1) The capability of individual information processing is limited.
2) Opportunistic behaviour of individuals predominates.
3) In the case of long-term contracts, in contrast with spot deals on markets (perfect contracts), contractual adaptations result in potential high (consequential) costs.

2.3 THE CENTRAL HYPOTHESES OF TCE

The explanation of organisational variety is achieved in TCE by allocation of appropriate governance structures to particular transactions under the efficiency criterion of TCs (see section 2.1.2).

> "Organisational variety is explained by the fact that transactions differ in their attributes, on account of which their governance needs vary" (Williamson, 1984:196)

The description of TCE in this section follows this logic. First, the transaction is defined as a unit of investigation and TCs are defined as an efficiency criterion (section 2.3.1). Transactions are modelled by using transaction attributes (section 2.3.2 and section 2.3.3). The failure of market co-ordination is the starting-point for explaining the great diversity of non-market forms of governance (section 2.3.4). Finally, non-market forms of governance are described in their varied use of contractual instruments. Modelling of contracts can be undertaken with the aid of these contractual instruments (section 2.3.5). Williamson's concept of assigning transactions to existing forms of co-ordination (forms of governance) is given in section 2.3.6.

2.3.1 The Perspective of TCE

2.3.1.1 Transaction and TCs

The transaction in TCE is defined here as follows:

> "A transaction occurs, when a good or service is transferred across a technologically separable interface" (Williamson, 1985:1).[3]

An MT-terminal can be used as an example for this type of transfer. Its purpose is the loading and offloading of MT-containers. The crane technology separates two transaction partners, i.e. a road transport company (haulier) and a rail transport company (railway). Arrow defines TCs as "the cost of organizing the economic system" and implies three sources of TCs (Arrow, 1969:48):

1) exclusion costs;
2) costs of communication and information; and
3) costs of disequilibrium.

Transaction costs as a criterion of efficiency are defined here as:

> "Costs of planning, adapting and monitoring task completion under alternative governance structures" (Williamson, 1985:2)[4]

Williamson distinguishes between *ex-ante* and *ex-post* TCs (Williamson, 1985:20f). The former are the costs of drafting, negotiating and safeguarding an agreement. The latter include

1. *maladaption costs* incurred when transactions drift out of alignment;
2. *haggling costs* incurred if bilateral efforts are made to correct *ex-post* misalignments;
3. *setup and running costs* associated with the governance structures; and
4. *bonding costs* of effecting secure commitments.

Further developed by Picot (1982:270) and Albach (1988:1160f), these cost types (with examples) are, in particular:

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[3] This definition of transaction, which follows John Commons, is used throughout the thesis. Further literature offering an overview on definitions which broaden, narrow or deviate from Williamson: Albach (1988:1159ff); Schmidt (1992:column 1855).

[4] For further literature on definitions of transaction costs see Wegehenkel (1980:16) and Picot (1991a:344).

1) *Search costs*, e.g. interview costs, market research costs, costs for the purchase of specialist journals;
2) *Start-up costs*, e.g. tendering costs, costs of information gathering, such as postage, telephone, entertainment, costs of address gathering, lobbyists' salary;
3) *Negotiation costs*, e.g. travelling expenses, production of negotiation background literature/documents, costs of translation and interpreting, legal costs;
4) *Decision-making costs*, e.g. costs of co-ordination with works council or supervisory board, costs of tax advice, costs of examining alternative tenders, salaries of staff departments;
5) *Agreement costs*, e.g. costs of drawing up and formulating agreements, legal costs, costs of government approval or official registration, commission and success bonuses, costs related to the intensity and duration of negotiation;
6) *Execution costs*, e.g. costs of control (according to contract) (Osten, 1988:58);
7) *Inspection and testing costs*, e.g. costs of in-firm monitoring of deadlines, quality testing, costs of securing secrecy agreements (i.e. setting up Chinese walls within companies), laboratory tests (quality control), costs of measurement technology, salaries for contract supervision;
8) *Costs of adaptation*, e.g. amendment of computer programmes, costs of organisational adaptation, costs of contract amendment in quality, price, quantity or duration;
9) *Amendment costs*, e.g. training costs, penalties, breach of contract-costs, loyalty discounts;
10) *Costs of termination*, e.g. extraordinary depreciation-costs of irreversible investments, redundancy costs, judicial costs, cost of lawyers.

TCs are thus essentially costs of information and communication in the preparation, execution and supervision of job execution on a shared-work basis, i.e. using separate units or employees for value-adding, both internal and external of firms (Picot, 1993:column 4195). The above listing will be referred to as TC-phases, below.

2.3.1.2 Contingent claims and imperfect contracts (contractual gap)

By 'contingent claim' (perfect contract) is understood a contract in which the beginning and end of the transaction are clearly defined and, in addition, the good or service provided and that which is provided in return by the transaction partners can be precisely determined when the contract ends. Occurrences which

the contract does not itself settle can be eliminated or set aside by (e.g. dispositive) statutory law (legal centralism) (Richter, 1991:407; Williamson, 1985:20).

It must be emphasised that TCE rejects the efficiency of regulation of the exchange of goods and services by contingent claims, not for all transactions, but for all of those transactions which show transaction attributes (defined in sections 2.3.2 and 2.3.3) of the market failure framework (defined below in section 2.3.4). One key element of contingent claims, court ordering, can be subject to opportunistic behaviour, i.e. behaviour of lawyers, and bounded rationality, i.e. sentencing of judges.

Court ordering is understood as a procedure where contract disputes are settled by independent courts. Imperfect contracts displaying contractual gaps appear. Court ordering must therefore be supported by private ordering in cases of market failure (Williamson, 1990b:67).

2.3.2 The Transaction Attributes of the Transaction Partners

The TCs examined in this study can arise only through concurrence of two behavioural assumptions (Williamson, 1981:676): behavioural uncertainty (opportunism) and bounded rationality, also called 'human factors'. TCE sees in human factors only a prerequisite for contract problems to appear, whereas the environmental factors defined in section 2.3.3 influence the level of TCs. This importance between the two categories of transaction attributes for the explanation of contracts is taken into account here. The human factors opportunism and bounded rationality are explained in more detail below.

2.3.2.1 Opportunism

For the human factor opportunism, first its relationship with the choice of form of contract will be formulated in a hypothesis, then its definition follows. As the next step, the concept of man in TCE is explained and illustrated by means of the explanatory approach of neoclassicism.

- Hypothesis

According to Williamson (1985:57), together with the environmental factor of factor specificity, through the occurrence of TCs, the behavioural assumption of opportunism results in a failure of market governance. This failure is caused by

the potential of hold-up in view of the transaction partner's sunk costs of a specific investment.

Hold-up is defined here as a type of opportunistic behaviour that exists only in combination with asset specificity. It is opportunity that profits from unprotected specific assets on the other transaction partner's side. For example, a freight forwarder, who has invested in specific wagons for piggyback transport, can potentially be forced by the railway company into price increases for the rail transport service of these wagons. Subsequently, the term hold-up is replaced by opportunistic behaviour, as only situations relating to asset specificity problems are being looked at in this thesis.

As a result, opportunistic behaviour, even if applied by only some of the transaction partners, leads to reinforcement of contractual problems in the TCs process and can result in the failure of market governance (Williamson, 1985:47).

- Definition

Opportunism is, according to Williamson (1985:47), at some point in the course of the transaction, a form of behaviour perceivable to others (i.e. to transaction partners), consisting of action "self interest-seeking with guile". If only one transaction partner behaves in this way before or during the conclusion of the contract, does it influence the contract already, i.e. affect the appearance of TCs? This uncertainty of strategic behaviour (Williamson, 1984:204f) becomes visible in imperfect or misleading reporting of information and in intentional striving to mislead, pretend, confuse others or impair the judgement of others. For instance, in the example for hold-up above, the railway company could wait until the full investment of the freight forwarder in specific wagons is completed before implementing price increases. Opportunism in this respect stands in sharp contrast to the uncertainty of a non-strategic nature, i.e. the uncertainty as defined in section 2.3.3.2.

- The concept of man in TCE

Transaction cost theory goes beyond the assumption of neoclassicism that individuals act out of self-interest (Williamson, 1985:49).

> "Opportunism refers to making false or empty, that is, self-disbelieved threats or promises, cutting corners for undisclosed personal advantage, covering up tracks, and the like" (Williamson, 1979:957).

Opportunistic behaviour is characterised as the self-interest of certain individuals, achieving personal advantage at the expense of others and, at the same time, disregarding contractual obligations and general standards of fair trading. An essential prerequisite for opportunistic behaviour is its applicability to the individual level. TCE does not study abstract units such as enterprises and households, but the individuals acting within these pursue specific objectives (Hax, 1991:56f).

Opportunism is a reinforcement of the utility-maximising behaviour of neoclassical economics. The background to utility-maximising behaviour, not explicitly explained by Williamson, is explained below. Opportunistic behaviour is not adequately explained by Williamson (1990a:138ff). However, neoclassical economics provides a basis for illustrating in more detail the reasons for opportunistic behaviour.

The neoclassical utility theory sees in people maximisers of utility who take decisions with the aim of maximising their expectations of value (Williamson, 1985:49; Weede, 1992:97). If the benefits of an action alternative multiplied by its probability is greater than the benefit of all other action possibilities, then the acting individual will decide in favour of the first and most favourable alternative. If the benefit from searching for further action alternatives proves to be negative, this will result in abandonment of the search and will confine the benefit calculation to the existing number of alternatives (Opp, 1992:36: Michaelis, 1985:107). According to Weede (1992:97), neoclassical utility theory can be considered only slightly rational, since probabilities of the individual can diverge greatly from objective probabilities.

2.3.2.2 Bounded rationality

The second human factor, bounded rationality - a contributory factor towards TCs, according to Williamson - is described below.

- Hypothesis

The behavioural assumption of bounded rationality brings about, in conjunction with the environmental factor of uncertainty, the imperfection of contracts (contractual gap). Without this behavioural assumption, a contingent claim represents the most efficient contract alternative (Williamson, 1985:50).

- Definition

Williamson's definition of bounded rationality goes back to Simon, who characterised the actions of economic actors as intendedly rational, but only limitedly so (Simon, 1961:xxiv). Bounded rationality is caused by the limited recording and processing capability of the human brain for information. This results in transaction partners to take imperfect decisions in relation to the perfect utilisation of information.

2.3.3 The Environmental Transaction Attributes

Now that transaction attributes between the transaction partners have been explained, a description follows of the factors which influence the transaction from outside. These so-called environmental transaction attributes influence TCs directly, unlike the transaction attributes of the transaction partners in section 2.3.2. They are therefore also characterised as determinants of TCs (Baur, 1990:48).

Three environmental factors are considered below: specificity, environmental uncertainty and frequency. Williamson's hypothesis on the relationship of the respective environmental factor with the choice of contract is formulated first, in order then to define each environmental factor and to evolve indicators for determining its qualitative form.

2.3.3.1 Specificity and strategic importance of investment (quasi-rent)

- Hypothesis

Factor specificity is the sufficient condition, among the three environmental factors of specificity, environmental uncertainty and frequency, for the efficiency of non-market forms of governance. However, according to Williamson, these contractual problems arise only in connection with the behavioural factor of opportunism.

- Definition

The concept of factor specificity (or asset specificity) can already be found with Alfred Marshall. He discusses idiosyncratic employment for workers who are specialised to the work of a particular firm. According to TCE, elements for safeguarding employment will appear in their labour contracts (Marshall, 1948:626). The following definition of factor specificity, according to Williamson, is used in this study:

> "Specialised assets cannot be redeployed without sacrifice of productive value if contracts should be interrupted or prematurely terminated" (Williamson, 1985:54).

These specific investments have, via so-called lock-in effects, dominant effects (or "large and systematic ramifications", according to Williamson (1985:53)) upon the negotiating position of those transaction partners who make investments of this kind. So-called appropriable quasi-rents subsequently arise (Klein *et al.*, 1987:298); the (neoclassical) anonymity of the markets is destroyed. Klein defines quasi-rent value as follows:

> "The quasi-rent value of the asset is the excess of its value over its...value in its next best *use* to another renter. The potentially appropriable specialised portion of the quasi rent is that portion, if any, in excess of its value to the second highest-valuing *user*" [italic in original].

Put differently, the quasi-rent value is a value difference. It is the difference between the asset's value in one use compared to the asset's value in its next best use.

The situation of a customer with many suppliers (large-numbers bidding condition) is reduced to a small group of bidders (in the extreme case consisting of one supplier) (Williamson, 1985:61). Williamson (1984:203) calls this process fundamental transformation, in order to illustrate the fundamental change in the transaction relationship.

> "After a specific investment is made and such quasi-rents are created, the possibility of opportunistic behaviour is very real" (Klein *et al.*, 1987:298).

- Indicators

Transaction costs economics works with two aspects for the operationalisation of factor specificity: type classification and degree-of-intensity classification. A distinction is made between four types of factor specificity:

1) Site specificity, i.e. performers of contractual obligations situated nearby.
2) Human asset specificity, i.e. human capabilities are acquired which are useful only for the particular contractual obligation concerned, e.g. technical know-how or management know-how.

3) Technical specificity (physical asset specificity), i.e. production plants tailored to the customer's needs, e.g. specialist machinery, components thereof or other technical appliances.
4) Dedicated assets, i.e. increase in capacity for delivery to particular categories of customers. The investments are not necessarily specific. (For example, a freight forwarder purchases an additional fleet of lorries for a new customer's transport demand. From the perspective of the freight forwarder, this fleet is not a specific asset, yet it carries quasi-rent value as the investment cannot be deployed quickly to other uses from one day to the other, should the shipper's demand terminate on short notice.)

Regarding the intensity of factor specificity, in this study a distinction is made according to two indicators:

1) Durability[5] or possibility of sale of the asset
With continued production, this is determined by the number of alternative transaction partners, i.e. alternative buyers of the good produced under factor specificity, taking into account the realisation of sunk costs in this next-best use. Sunk costs are defined here as costs that even in the long run cannot be recovered upon termination of a transaction. Alternatively, there may be sales possibilities of the asset in the event of collapse of production whose success is determined by the number of potential buyers of the assets and by the extent of sunk costs if the assets are sold.

2) Continuity
This arises out of the importance of the transaction for the investor in factor specificity, e.g. the proportion of the firm's total turnover that depends upon production in conjunction with the examined factor specificity.

Williamson distinguishes three stages for asset specificity: none, mixed and high. For determining the level of asset specificity, the following gradation is chosen. Sustainability, i.e. the number of alternative transaction partners and the saleability of the asset (durability) are the most important indicators of the level of asset specificity. At a high number of alternative transaction partners and high selling opportunity, or one of the two high, transaction specificity is 'low'. With a small number of alternative transaction partners and little selling opportunity, transaction specificity will lie in the 'mixed' zone. High asset specificity appears where there is additional high proportion of the investment in total turnover

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[5] See Williamson (1984:202); Williamson (1985:55).

concerned to the transaction partner (continuity), i.e. only with all three indicators high can one speak of 'high' specificity of investments. A high form of the three indicators each will not itself result in any asset specificity.

2.3.3.2 Uncertainty

- Hypothesis

Uncertainty is a necessary environmental factor for market failure. Imperfect contractual agreements, and as a consequence TCs in the case of contractual adaptations, lead to non-market forms of governance (Williamson, 1985:57f). However, according to Williamson, these contractual problems only arise in connection with the behavioural factor of bounded rationality and opportunism.

- Definition

Uncertainty is a measure of the ability to take account of all future environmental states in their effects upon the contractual obligations between transaction partners (Rennings, 1992:32). In terms of decision theory, the uncertainty in TCE can be categorised as uncertainty of the first degree, i.e. as a decision-making situation with known event-intervals and unknown entry-probabilities (Albach, 1976:column 4037). With increasing time-distance between decision and event-entry (e.g. in the case of long-term contracts), decision situations with second-degree uncertainty arise, i.e. in addition to the unknown entry probabilities, the event-interval can no longer be determined, either.

Superimposed upon this (stochastic) uncertainty of the first and second degrees is the absence of any overview of interdependencies between the individual events in their effect upon the transaction relationship (complexity) (Picot, 1991b:148 & 162). Complexity and uncertainty result in the inability of the transaction partners to identify the decision tree as a whole (Baur, 1990:70 & 78). Even if the possibility of identification existed for the decision tree, this is not achieved, owing to possible high information costs. This implies the behavioural assumption of bounded rationality: "Approximation must replace exactness in reaching a decision" (Simon, 1972:170). Williamson does not separate complexity from (external) uncertainty in their effect on the level of TCs in a contractual relationship:

> "... the distinction between deterministic complexity and uncertainty is inessential" (Williamson, 1975:23).

- Indicators

Two indicators are used for uncertainty (Walker & Weber, 1984:376; Williamson, 1988:360): technological uncertainty, i.e. a change in the (originally provided for) economic useful life of a technology or - as Walker and Weber (1984:376) put it - "a change in component specification." Additionally, according to Fonger (1992:72), technical adaptation, damage in the operational process, but also change in the duration and scheduling of contractual performance and the development of technological innovations (e.g. in the case of information and communication systems (Picot, 1991b:148)) can bring about changes of this kind. The second indicator is demand uncertainty, i.e. effects of a fluctuation in demand upon the transaction situation. This indication is influenced, for example, by change in the stability of market prices and their forecasting, by change in the pace of market innovation and also by spatial market size (Baur, 1990:73ff; Fonger, 1992:73).

Whereas technology- and volume-uncertainty in the case of the contracts studied show a strongly defined form, less marked influential factors which are not considered further are presented below. These factors are random acts of nature, changes in the competitive situation of the market (i.e. changes in the regulation intensity), political/legal stability of the market milieu (i.e. changes in the legal system), intellectual or cultural differences between the market partners (social framework conditions), or changes in the technological circumstances (technological framework) (Williamson, 1984:204; Eucken, 1989:133f; Baur, 1990:84ff; Fonger, 1992:73). The four latter examples, sometimes referred to in a separate entity as complexity, are consolidated, following Williamson's approach, into uncertainty.

Now that two indicators of environmental uncertainty have been presented, the effect of environmental uncertainty upon vertical integration must be examined.

- Effect upon vertical integration

Uncertainty affects the degree of imperfection of contracts. Owing to uncertainty, contractual gaps appear in the adaptation phase of the transaction (Williamson, 1985:60 & 79). Williamson (1985) discusses this influential factor of TCs in the development of the model, first as a constant existing "in sufficient degree", and then works out its change effects upon the formulation of contracts.

Depending in each particular case upon the time at which contractual consideration of uncertainty takes place, the resultant TCs occur in different

transaction phases (Picot, 1982:272). When consideration does not take place until after changed environmental circumstances come into effect, considerable adaptation costs arise, depending in amount upon the willingness of the participants to agree to adaptation of the contract to changed events. If frequent changes of these data occur in conjunction with a high degree of factor specificity, i.e. the possibility of transaction partners exploiting contractual gaps to their own advantage, then hierarchical governance by means of instructions is the only possibility for effectively limiting TCs (Picot, 1993:column 4200).

For contracts within the spectrum between market and hierarchy, an increase in uncertainty has a polarising effect, i.e. elements of the extreme forms of hierarchy or market governance in the particular contract concerned are increased (Picot, 1993:Section 4201; Williamson, 1988:360; 1991:35). This takes place through, for example, increased standardisation of the product (reduction of factor specificity), in consequence of which market governance becomes possible. According to Williamson, bilateral contracts can nevertheless survive a significant increase of uncertainty without modification of the contract structure, provided the transaction partners are mutually independent (Williamson, 1985:80).

Hierarchy is defined here as contract design, that uses full vertical integration as solution for a service or product transaction. This contract design is the opposite extreme to market contracts.

Increase of uncertainty can also make the proving of opportunistic behaviour difficult and therefore necessitates adaptation of the incentive structure in the contract (Spremann, 1990:631ff). A decrease of uncertainty - e.g. when the maturity stage of a market is reached - strengthens the tendency towards market governance. This tendency can be slowed if the investments (factor specificity) are very long-term.

2.3.3.3 Frequency

- Hypothesis

In contrast with the environmental and human factors of the market failure framework, frequency is not, according to Williamson (1985:60), an independent factor influencing contract formulation. However, a high frequency of a transaction results in non-market contracts in high TCs during the starting phase. A longer or more intensive transaction relationship enables these higher TCs of initial agreement to be paid off.

- . Definition

Frequency is, according to Williamson (1985:60), a measure of the intensity of use of a form of contract.

- Indicators

Indicators of frequency in this thesis are the number of transactions and the amount of a transaction in value terms (volume). Williamson (1985:79) differentiates between three levels of frequency: one-off situations, occasional, and recurrent.

- Effect upon vertical integration

Frequency influences the level of average TCs and hence the TC of economic efficiency of transaction governance. For transactions which necessitate high TCs as initial agreement costs up to the end of the contract, calculation of average costs is usually necessary. These TCs must be paid off in the ensuing transaction phases, and this applies especially to (non-market) contracts with high factor specificity and uncertainty (Picot, 1982:272). Consequently, "...specialised structures come at great cost, and the question is whether the costs can be justified" (Williamson, 1985:60). Without factor specificity and uncertainty, contingent claims, i.e. according to Williamson market governance as the contract form, could be concluded, regardless of the form of frequency.

The transaction attribute frequency thus does not affect contract formulation independently, but is a "relevant" factor (Williamson, 1985:60) for the degree of vertical integration: at the same time, more complex forms of contract are presumed only in the case of repeated or, at least, occasional transactions (Rennings, 1992:32). Influential factors to change (lower) average TCs via frequency here are:

1) Degressive fixed costs, which is important particularly where there are high initial agreement costs with long contract duration (Picot, 1982:272),
2) learning effects achieved in the course of transactions, e.g. discovery of simplified procedures in the formulation and negotiation of the contract (Pfohl & Large, 1992:23), automatisation of information gathering in the case of longer-term business relationships (Rennings, 1992:33),
3) economies of scale, e.g. by specialisation in particular transaction problems (Picot, 1982:272), and

4) economies of scope due to bundling of demand according to similar transactions on a single, already existing (complex) contract, under reduction of high initial agreement costs (Williamson, 1985:60), (e.g. by applying GTB to various, separate transactions), and utilisation of, for example, already-existing contract-specific monitoring systems (Pfohl & Large, 1992:23).

These influential factors shorten the period of TC-amortisation, thereby making non-market contracts more advantageous (Picot, 1993:column 4201). Table 2.1 provides measurement definitions for the transaction attributes defined in this section. These proxies are taken from the existing empirical research both in the field of transport and, where useful to apply in the thesis' context, from other industry research.[6]

The three most important transaction attributes are measured according to their intensity. Asset specificity can be found in the top row, and uncertainty and frequency in the bottom row of the table. There is an equal weighting for all proxies. Asset specificity only contributes to TC if sunk costs are a threat in the transaction relationship for one or both partners. Therefore, the proxies for asset specificity in the top row are split between asset specificity itself and sunk costs. The proxies for asset specificity follow the sub-segmentation by Williamson into four types (physical, site, human, dedicated). These proxies will be used in the modelling of the transaction situation by qualitatively assessing the transaction attributes in chapter 5.

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[6] See chapter 1 for sources of existing research in TCE.

Table 2.1: Transaction Attributes and Measurement Definitions

ASSET SPECIFICITY (principal factor)	
Physical (specialisation)	Alternative use opportunity cost Alternative user opportunity cost (sale) Component complexity [1] Research & development expenditure [2]
Site (proximity)	Amount of alternative nearby contractors
Human (specialisation)	Degree of work-specific knowledge[3]
Dedicated (output volume)	Alternative contractors with similar volume
SUNK COSTS	
Ratios	Asset's share of turnover produced (importance of transaction) Asset/total assets ratio (importance in assets) Asset/fixed assets ratio (importance in assets) Investment/total turnover ratio (write-off possibility)
UNCERTAINTY (supporting factor)	
Non-economic	Changes of business customs or law system Political instability External natural catastrophes [4] Unpredictable changes in consumer preferences [4]
Economic	Demand uncertainty Technological uncertainty
FREQUENCY (supporting factor)	
Investment Specificity	Amount of single transactions Recurrence of transactions

Note: Sources are only given for measurement definitions which have not been mentioned in the chapter. These additional measurement definitions will therefore not be used in the subsequent analysis.

Sources:

[1] Masten (1984:417).
[2] Shelanski & Klein (1995).
[3] Monteverde & Teece (1982).
[4] Koopmans (1957:162f).

2.3.4 Market Failure Framework According to Williamson

The transaction attributes listed in sections 2.3.2 and 2.3.3 are, according to TCE, factors responsible for the failure of the price mechanism, i.e. the co-ordination form of market governance. The priority factor (or principal factor) and the most critical dimension for describing transactions, according to Williamson (1985:30 & 90) and Picot (1991a:342), is factor specificity; supporting factors are uncertainty, frequency (environmental factors) and also opportunism and bounded rationality (human factors) as necessary factors which together form the so-called 'market failure framework' (Williamson, 1975; Ouchi, 1980:132ff). Therefrom the hypothesis of this thesis is derived (see section 1.1).

According to Albach (1988), there are three reasons for market failure, i.e. for the need to co-ordinate transactions in a higher degree of vertical integration:

1) Scale effects (economies of scale), i.e. possible lowering of production costs through business concentration,
2) external effects, in consequence of which distortions of competition can appear, and
3) asymmetric information, in consequence of which TCs rise, owing to bounded rationality and the possibility of opportunistic behaviour, to a level which can no longer be handled by the individual firm.

TCE studies market failure which arises owing to the latter problem. Asymmetric information dissemination and asset specificity make contingent claims inefficient: contractual agreements in the contract conclusion-phase, i.e. all TC-phases of the transaction up to phase 5 (see section 2.3.1.1), have to be supplemented or altered in the phase of adaptation. From this market failure, i.e. the failure of contingent claims based on legal centralism (see section 2.3.1.2), a bandwidth of imperfect contracts, bilateral in nature, arises.

The following can be stated in summary of section 2.3.4 and in view of the description of elements and instruments of TCE so far: TCE explains how, with the existence of asset specificity, market failure can be successfully cured.

2.3.5 The Governance Structures

The aim of this section is to explain market governance and alternative forms of contract for co-ordination via the market. At the same time, these contract forms are described and their instruments for lowering TCs are presented.

TCE examines alternative forms of contract for co-ordination via the market. Contracts for curing market failure (on the basis of the factors of the market failure framework) are directed in a continuum towards the degree of controllability and the degree of incentive intensity. Whereas the market maximises incentive intensity at one end of the continuum, the contract form 'hierarchy', i.e. the co-ordination of a transaction within a firm, constitutes its opposite pole with maximisation of controllability (Williamson, 1975:101).

In the (micro-economic) contract form which is efficient for the particular transaction concerned, the degree of controllability and the degree of incentive intensity (lowering of TCs by means of contractual instruments) are tailored to the scale of the market failure framework factors. At the same time contracts, according to Williamson (1985:69) and Macneil (1978),[7] are systematised according to the nature of the relationship between the transaction partners, in accordance with the role of the independent legal system (court ordering) for solving problems during the term of the contract and according to the contract instruments.

2.3.5.1 Market governance

This form of contract is time-based, i.e. service rendered and service in return coincide in time (Picot, 1993:column 4197). On the basis of standardised transaction services (no factor specificity), the identity of the transaction partners is irrelevant (Williamson, 1985:69).

Disputes are settled by independent courts (court ordering). The consequences of non-fulfilment of the contract terms are predictable for both transaction partners. A judicial settlement is a way of settling the dispute desired by both sides. A protracted contractual relationship is not sought by any of the participants (Williamson, 1985:74).

For market governance, the contractual focus is upon strictly-defined, formalised contract terms and reference to standardised legal rules, which can be subsequently followed by courts.

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7 Further literature about categorisation of contracts is given by Ouchi (1980) (market, bureaucracy, clan).

2.3.5.2 Bilateral governance

The object of bilateral contracts is first to create, with the aid of trust-building measures, a *milieu* in which the exchange of goods and services, accompanied by specific investments (factor specificity), is established. Specific investments can be justified - as explained in section 2.3.3.3 - only with a high transaction frequency. High transaction frequency allows a contract structure tailored specifically to the transaction partners to be established. Great importance is attached by transaction partners to continuity of the contractual relationship (Williamson, 1985:75). Whereas in the case of market and trilateral governance, when there are problems or lack of clarity recourse is had to the original agreement, with bilateral governance, the reference for analysing a contract is the whole contractual relationship, with all of its changes in the course of time (Macneil, 1978:890).

Contractual changes over time, with bilateral governance, are a reaction of the transaction partners to the impossibility of protecting oneself against uncertainty in long-term contracts (Williamson, 1975:91ff). Contracts are therefore formed, in principle, in such a way that adaptations of the contract are possible and feasible. The key requirement for bilateral co-operation to work is a trust-building environment. Credible commitments are used as a means of creating this trust-building environment.

Credible commitments of bilateral governance analysed in the literature of TCE (Picot, 1982:267ff; Williamson, 1985:163ff; Spremann, 1990) can be classified as such - according to Williamson (1985:163ff) - on the unilateral application-model and are also referred to as 'hostages' below. They are implemented in support of a bilateral trading relationship. Five instruments of credible commitments - or hostages - between contract partners are to be mentioned (with examples given in brackets):

1. Sharing in the result of the transaction, i.e. turnover or profit sharing (a freight forwarder receives dividends through shareholding in rail transport operator).
2. Warranty, in the sense of a subsequent compensation for damage or loss. Liability commitment, guarantee, and warranty are all variations of this type of commitment (clearly defined compensation for loss of transport container with defined compensation payment per kilo of gross weight of container and included in GTB of that transaction).
3. Conventional penalty, i.e. tangible pledges higher in value than potential losses of the transaction partner (penalty for not finishing the building of a

MT-terminal on a defined deadline to be paid by a construction company and over a sum unconnected with the value of that MT-terminal).

4. Reputation, i.e. intangible pledges with a value higher than potential losses of the transaction partner (due to non-fulfilment of contract, the standing of a transaction partner in future negotiations about similar transport but in separate transactions will suffer and as a result transaction partners may require additional guarantees otherwise not necessary) (Spremann, 1990:637).
5. Asset specificity, i.e. the credible commitment consists of specialised assets that are not re-deployable without sacrifice of productive value (investment in low-profile wagons by freight forwarder only usable in trans-alpine transport and with one transaction partner).

In the case of the credible commitments, reputation and conventional penalty, the mere threat of punishment is intended to bring about behaviour in accordance with the contract. The above pledges vary in each case according to the required level of the atmosphere of trust (depending upon the degree of factor specificity) and its potential effect in the particular transaction concerned.

The difference between the first three commitments and the last is that the former have a cost effect as a material compensation to the beneficiary, whereas the last yields no cost change for the beneficiary of the commitment in case of a transaction amendment. Reputation - as the fourth and as a type of immaterial credible commitment - has no direct cost effect on either the owner of that hostage or the beneficiary of the hostage in case of a transaction amendment.

It is be noted here that vertical forms of co-operation which focus upon trusting co-operation and mutual obligation between legally independent firms also come under bilateral governance (Baur, 1990:101ff).

Table 2.2 shows the types of credible commitments under market co-ordination and bilateral contracting. They represent examples of credible commitments under Williamson's unilateral hostage model (1985:179). The credible commitments in their categorisation are split between material and immaterial in the top row. The bottom row contains the ratios for measuring the intensity of the credible commitment. The ratios for the intensity of the credible commitment are equivalent to the ratios used for asset specificity measurement in section 2.3.3.3. These proxies will be used, in chapter 5, in the modelling of the contract designs by qualitatively assessing the intensity of the credible commitments as contract elements.

Table 2.2: Credible Commitments and Measurement Definitions

TYPES	
Material Commitments	Guarantee (e.g. liability) Profit sharing (e.g. profit participation agreement, shareholding) Contractual penalty Specific investment (i.e. investment carrying asset specificity which is added into the transaction relationship by one transaction partner)
Immaterial Commitments	Reputation
MEASUREMENT	
Ratios	Hostage's value share of single transaction turnover (importance of transaction) Hostage value/total assets value ratio (importance of asset) Hostage value/fixed assets value ratio (importance of asset) Hostage value/total turnover ratio (write-off possibility)

Source: Williamson (1985:179).

2.3.5.3 Unified governance

Unified governance must be mentioned as the final form of contract, in which production is vertically integrated. Under vertical integration, this thesis defines a situation where a firm extends its activities over more than one successive stage in the production process. The following barriers for vertical integration usually appear in the transport industry (Polzin, 1999a:206; Picot, 1991:347ff; Stahl, 1995:118f).

1. know-how barriers of acquiring specialist knowledge, e.g. high TCs of gaining the knowledge or information paradoxon, i.e. an information is devalued once passed on to recipient,
2. barriers due to special transport industry specifics, such as public access or government priority usage.

Of these reasons against vertical integration that can appear in the transport industry, only barriers due to special transport industry specifics are relevant in this analysis.

Vertical integration of a transaction relationship within a firm is used whenever contractual adaptations are so frequent or radical that the necessary co-ordination with an (autonomous) transaction partner gives rise to TCs, in an amount which can no longer be handled at the level of the individual firm. Reasons for these adaptations can be behavioural uncertainty (exploitation of the lock-in position in the case of factor specificity) and/or environmental uncertainty (Spremann, 1990:622f).

In the case of unified governance, the intensity of control is maximised by means of instructions within the firm. Forms of governance which, formally speaking, do not appear to be unified governance, but are *de facto* of a unified nature, must be included also in this type of governance. The term 'vertical government' is used here by way of distinction from bilateral governance (vertical co-operation forms) since, in contrast with bilateral contracts, a unilateral power shift in favour of one transaction partner takes place and legal dependence comes into effect (Baur, 1990:96ff & 101).

2.3.6 Assigning Transactions to Contracts

The description of the forms of governance represents only a categorisation of the great diversity of actual and conceivable contract alternatives between market and hierarchy. The TCE answer to the question of the form of governance of a transaction is not, therefore, market or hierarchy, but how much market, i.e. the proportion of contract instruments influencing incentive intensity, and how much hierarchy, i.e. proportion of contract instruments affecting the possibility of control, is efficient for a particular transaction? (Picot, 1982:273 & 275).

Figure 2.1 below aims to answer this question. Williamson assigns the main determinants of TCs, i.e. the aspects for describing transactions, factor specificity, uncertainty and frequency, to the different forms of contract with their various levels of opportunity for control and incentive intensity, under the condition of TC-minimisation. This assigning is illustrated graphically: uncertainty is assumed to exist in adequate amount, i.e. present in sufficient degree (Williamson, 1985:79). The changing of the uncertainty level causes the tendency, as described above, towards polarisation of the contract form to the extremes of the market-hierarchy continuum.

The x-axis on Figure 2.1 (asset specificity) represents the main exogenous variable to this function of assigning transaction attributes to contracts, whereas governance structures are endogenous variables. Asset specificity originates from the producer of the service or goods to be subject to this transaction (Williamson, 1985:72). The y-axis (frequency) originates from the buyer of the service or goods. Together with uncertainty, the other exogenous variable, frequency, helps determine the extent of hierarchy or market in the governance structure to be chosen. The forms of contract relevant to the problem-formulation of this study are market contracts (market governance), bilateral and vertically integrated contracts (bilateral governance and unified governance). Trilateral contracts do not occur for the transactions examined in this study.

Figure 2.1 shows that market governance - according to Williamson - is only efficient, *ceteris paribus*, if asset specificity stays on a low level and uncertainty is non-existent, whereas this first contract can be applied to all types of frequency. Bilateral governance is only efficient, *ceteris paribus*, with mixed asset specificity and frequency in all types. In the case where asset specificity is high (idiosyncratic), unilateral governance only can be applied to high frequency transactions with high uncertainty.

This chapter on description and classification of TCE thus concludes with the assigning of attributes to governance structures under the efficiency criteria minimising TCs. This assigning process will be applied in chapters 4 and 5 to practical cases of the German piggyback transport market.

Figure 2.1: Efficient Governance

FREQUENCY	ASSET SPECIFICITY		
	Non-specific	Mixed	High
Occasional	Market governance (classical contracting)	Trilateral governance (neo-classical contracting)	
Recurrent		Bilateral governance (relational contracting)	Unified governance [1] (relational contracting)

incentive ◄——————————————————► *control*

Notes:

[1] High uncertainty.

Uncertainty possesses a polarising effect on the choice of the governance structure. Therefore, if present (in its used manifestations as demand uncertainty and technological uncertainty on a low or high level), uncertainty draws contract solutions towards the left (incentive) or right (control) side of the x-axis spectrum of the figure.

Source: Williamson (1985:79).

CHAPTER 3: OBJECT OF RESEARCH AND DEFINITIONS

The following chapter identifies and describes the object of the research and its essential definitions. Following the setting up of the theoretical framework in chapter 2, this chapter establishes the practical link with the German piggyback industry as part of the European transport industry.

Firstly, the chapter provides a systematic description of the transaction object, i.e. the economic good subject to be exchanged between transaction participants, in section 3.1. Secondly, the transaction participants or partners, who exchange this object, are the centre of attention in section 3.2. From a neo-classical perspective, this section could be named as description of market players in the German piggyback transport market. Thirdly, the transaction situation or environment is the focus of the analysis. The market environment (section 3.3.1) and technological environment (section 3.3.2) influence the exchange of the transaction object between the transaction participants. From a neo-classical perspective section 3.3 can be called market structure of the German piggyback transport market.

3.1 THE TRANSACTION OBJECT

The description and systematisation of the transactions between rail operators and freight forwarders follows the logic of TCE, i.e. the transport service provided by the rail operator is the transaction object.

The analysis of contract designs in MT concentrates on piggyback transport as a sub-segment of MT. This type of MT is dominant in North-South traffic across Europe. Container traffic dominates international transport in an East-West direction as well as in maritime traffic. Furthermore, in container transport there is lower shock-sensitivity and less risk of theft. These two characteristics put the container-based MT systems at a significant advantage over the traditional rail transport to and from Eastern European countries.

The contract designs are analysed from the perspective of the specific transport service that they fulfil. As mentioned above, piggyback-based and container-based MT differentiate in these specific underlying transport services: piggyback-based transportation is the clear land-based alternative of MT (Bukold, 1996). Moreover, the container-based type of MT includes a different range of transport

means, e.g. different types of wagons, terminals and transport units. Different types of contract designs are a result of these technological differences.

An institutional difference also plays a major part in the sharp separation in the maritime-container transport and the land-land-piggyback transport. In order to gain control over the transport chain, train operators have introduced a market separation which is neither technically nor operationally induced, namely through a special domestic multipurpose container <Binnencontainer> for both maritime ISO-containers and road transport on trucks. Due to the imminent threat for the stronghold of the rail operators in maritime container transport, this bi-purpose container was artificially restricted to the maritime container transport segment only. Over a long period of time since 1969, road-dominated piggyback transport operators in Germany, which were dominated by the road-side, were not allowed to transport these special domestic containers <DB-Binnencontainer>. There, rail operators fully control the land transport, whereas in land-based piggyback transport the freight forwarders dominate the transport chain. The piggyback operators from the rail domain kept out of the transport in road-based trailers (Bukold, 1996). Often, piggyback transport and <Rollende Landstrasse> are separated (Bukold, 1996). This definition is not followed here, where piggyback transport includes 'Rolling Highway' <Rollende Landstrasse>.

The thesis now looks at the transport service of the rail transport operator from the perspective of the theoretical framework of logistics. The framework of logistics <Logistiksystem>, according to Pfohl (1990:4 & 9), is defined as a system for the transformation of goods in space and time. Therein, transport constitutes a logistic function next to job processing, storing and packaging. Pfohl (1990:7f) and Cerwenka (1993:134) distinguish four dimensions of transformation of physical and real goods in fulfilling the transport service: space, time, mass and information. These dimensions are based on the three fundamental dimensions of classic mechanics - movement of mass objects in real space in real time - with information transfer added as the fourth.

By establishing these four dimensions, according to Pfohl (1990:7f), we are able to describe the transport services in MT, which are co-ordinated through the different contract designs. The first dimension is space. This dimension describes the transfer from the point of delivery to the point of reception and the logistic processes when handling and transporting goods. The second dimension, time, can be influenced by the transformation of goods, specifically through storage, but also through changes in speed and frequency of transport (Ihde, 1991:152). The dimension mass refers to the handling of goods, where the physical amount,

types and characteristics of goods may be changed. Changes can be differentiated into those of a qualitative nature, e.g. sorting, and quantitative, consolidating or de-consolidating.

The final dimension, information, constitutes a necessary prerequisite for the flow of goods between point of delivery and point of despatch. Information initiates the flow of goods *ex-ante*, accompanies it and follows the physical transport. Information as part of the logistic process therefore has a hybrid character. On the one hand, information can be seen as unlocked from the physical mass of goods, e.g. documents of carriage, and it achieves the character of a solitary transferable object (Cerwenka, 1993:134). On the other hand, the information can be looked upon as the transfer of goods to be performed in an efficient manner and as linked to the goods without gaining the character of a separate entity. In the context of the contracts of transport services analysed in the thesis, examples for the information dimension are:

1) Changes in the logistic determination of the physical (underlying) commodity, e.g. information attached to the commodity regarding the type of goods transfer,
2) information regarding the type of handling for facilitating the logistic process, and
3) position of the physical commodity (Pfohl, 1990:8).

As a summary of section 3.1, piggyback transport - not container transport - constitutes the transport segment of the thesis. The rail transport service of the piggyback transport chain represents the transaction object in the context of TCE.

3.2 THE TRANSACTION PARTICIPANTS

The transaction partners who exchange the transaction object are freight forwarders on the one hand, and rail transport operators <Frachtführer Schiene> on the other hand, with the help of specialist intermediaries. The year 1997 represents the latest year where full year figures are available at the time of completion of the thesis. Germany in its borders before 1990, i.e. before the unification, consists only of West Germany regarding market data.

There are various definitions of the role of *freight forwarder*. The freight forwarder in the context of the thesis is defined in his original role as 'architect' of transport processes. Therefore he enhances the transparency of the market for shippers on the market for logistic components. Moreover, he increases the

efficient allocation of resources due to wide-scale consultancy and his advisory role in finding individual and tailor-made solutions (Willeke, 1966:316; Ihde, 1991:38f).

A *road transport operator* <Frachtführer Strasse> in this thesis is a company professionally transporting goods.[1] Due to the transport component of transport service being the focus of this analysis, a freight forwarder, who has been reduced to a mere road transport operator, is not treated as a freight forwarder any more. For the same reason, there are freight forwarders, whose product range includes the physical transport of goods alongside co-ordinating the transport chain. These are treated consistently in the thesis as freight forwarders, not as freight forwarders in one instance and as road transport operator in the other.

The vertical integration of transport services into freight forwarder companies is very common in Germany and can be explained by the existing market regulation origins in the past.[2] The reason for this is that before the market liberalisation of the 1990s, the majority of companies demanding rail transport services were as freight forwarders carrying a long-distance road transportation licence.[3] Moreover, many road transport operators organise - not just produce - transport services themselves, i.e. they perform services typical of a freight forwarder. This can be explained by a high level of potential arbitrage profits in the formerly regulated market.

Rail transport operators <Frachtführer Schiene> in this analysis consist of the national railway companies, namely DB, SBB, FS, SNCF, to name the biggest by turnover used for national and international piggyback transport from Germany. Despite a decision to liberalise the access to the rail transport market on an EU-level - as outlined in chapter 1 - to date no private company has entered the market of rail transport services for the piggyback transport chain.

Road transport operators in general possess direct access to the freight forwarders, whereas the purchase of rail operator services for piggyback transport is not possible directly by freight forwarders. Freight forwarders in Germany have to use *piggyback transport intermediaries*, which can be grouped as follows:

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1 HGB, Paragraph 425.

2 See section 1.1.

3 Information from Hans Wenger, Kombiverkehr Deutsche Gesellschaft für kombinierten Güterverkehr mbH & Co. KG, Frankfurt am Main, on 22.06.1993 in Sulzbach am Taunus/D.

1) National and international subsidiaries of rail operators, who focus specifically on container (not piggyback-TEUs) and swap body transport. The most important regarding turnover and market penetration in Germany are:

- Transfracht Deutsche Transportgesellschaft mbH (Transfracht), Frankfurt am Main/D, a subsidiary of DB,
- Intercontainer (ICF), Brussels/B, a subsidiary of a conglomerate of Western European rail operators,
- Compagnie Nouvelle de Conteneurs C.N.C. (CNC), Paris/F, a subsidiary of SNCF, and
- Cemat, Milan/I, a subsidiary of FS.

2) National subsidiaries of road transport operators, who focus specifically on swap bodies and trailers. Those are all 17 members of the Union Internationale des societes de transport combine Rail Route (UIRR) (UIRR, 1999:3) in Brussels. The most important UIRR members regarding turnover and market penetration in Germany are:

- -Hupac AG, Chiasso/CH and
- -Kombiverkehr GmbH, Frankfurt am Main.

3) The final group consists of multimodal transport operators (MTO). These are freight forwarders, who offer intermediary services and therefore possess direct access to the MT rail component market, and who have partially or entirely integrated other non-rail MT components of the transport chain. These hybrid companies therefore combine both freight forwarding activities - all of them are registered as freight forwarders - and transport operator activities, and can be typified by the use of the transport mode they originally come from (maritime sea transport, road transport) into four sub-groups (Bukold, 1996):

- multinational freight forwarders such as Hoyer/D, Hangartner/CH, Bertschi/CH, using land based road transport,
- mid-sized freight forwarders with a strong focus on a special niche of road-based MT, such as Ambroggio/I,
- multinational shipping companies <Reederei> such as Cast, Maersk, using sea based transport,

- mid-sized freight forwarders with strong focus on port despatch traffic, such as ECT/NL or Eurokai/D, using land-based road transport subsequent to maritime transport.

The main difference legally between a freight forwarder who organises the different components of the transport chain on behalf of the shipper and an MTO is that the latter performs the transport through a transport certificate <Frachtvertrag> covering the full length of the transport. On the contrary, a freight forwarder ceases the responsibility of road transport operator to the respective suppliers of the piggyback transport chain that he organises (Polzin, 1999:92).[4]

The choice of the transaction partner by the freight forwarder for the transport service requested by the shipper is therefore a decision problem of purchasing transport services offered by different providers and intermediaries. In general, the choice of a specific component producer by the freight forwarder determines the structure of the transport chain. On top of this purchasing decision problem of the freight forwarder, the thesis includes the alternative vertical integration,[5] i.e. in this case the freight forwarder produces the trucking function himself <Selbsteintritt>.

The two transmission points in piggyback transport chains are technologically and institutionally rooted. While section 3.1 and section 3.3.2 refer to the technologically caused transmission points, this section defines the institutionally rooted transmission points in a MT chain to and from Germany. They originate through the existence of intermediaries, whose function is to establish a distribution channel for train operators on the rail transport service needed for the piggyback transport.

Therefore, from the perspective of market competition, the piggyback transport intermediaries between rail transport operators and freight forwarders form (i.e. bring together demand and offer) and shape the market (i.e. set the market practices for exchange of the transaction object in question). Piggyback transport intermediaries are key to understanding the makeup and competition on the German piggyback transport market. Nevertheless, from a contractual point of view, freight forwarders are using land-based piggyback transport components produced by companies with a core business interest both in piggyback and

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4 See also Ihde (1991:54 & 98).

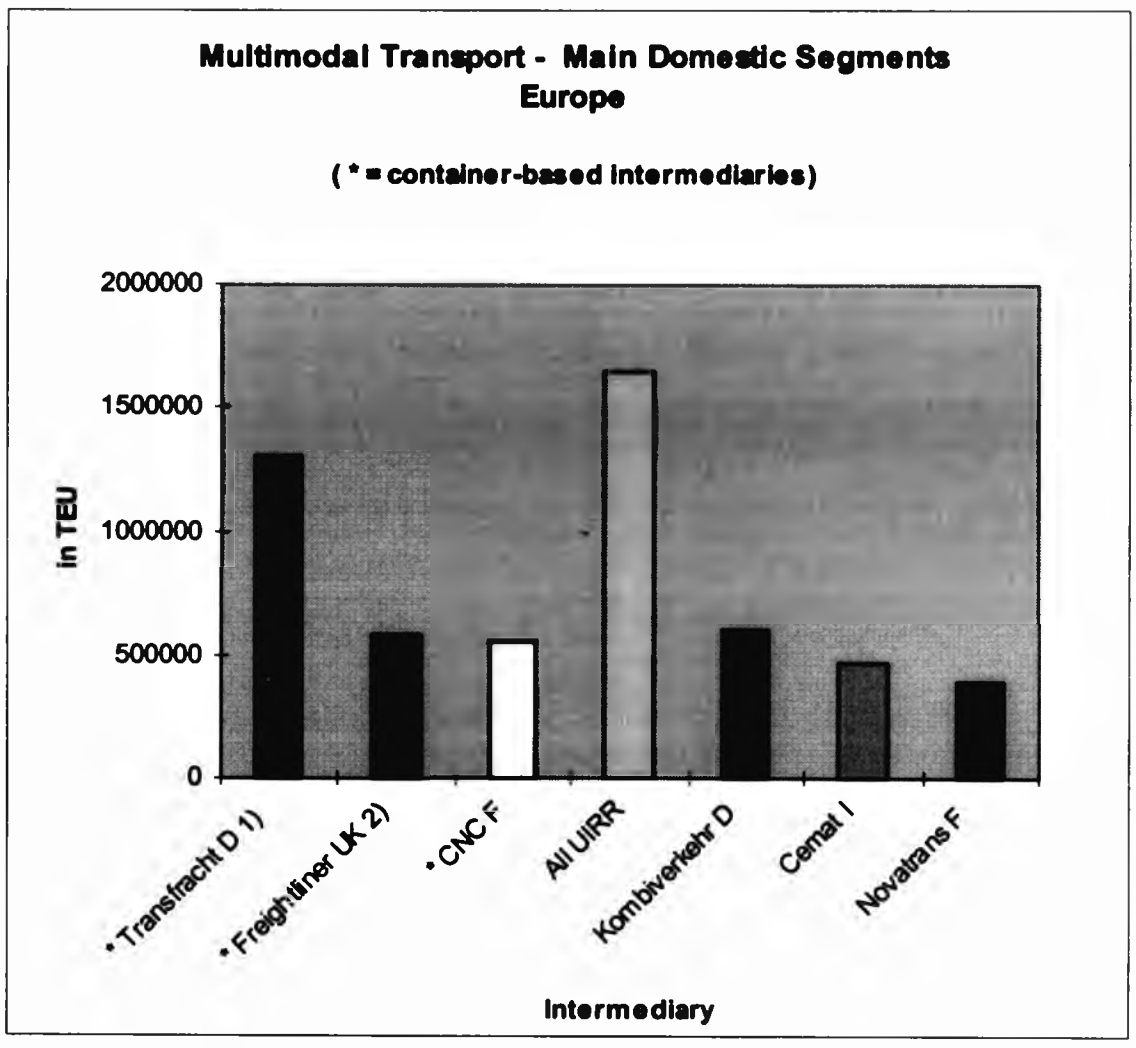
5 See section 1.1 for definition of vertical integration.

container transport due to the historical development of this transport industry in Germany. Because of the market liberalisation, as described in chapter 1, container transport operators offer intermediary services for piggyback transport components to the freight forwarders (Seidelmann, 1997:324). The following two figures show an overview of the key piggyback transport intermediaries in terms of market size, both in the segment of international (cross-border) transport and in the domestic segment of the European piggyback transport market.

3.2.1 Main Domestic Players in Europe

Figure 3.1 contains data supplied by UIRR, Transfracht, the German container intermediary, and Freightliner, the UK MT intermediary. 1998 is the latest available data. The aim of the chart is to identify the major domestic market intermediaries for both piggyback and container transport in Europe. As the domestic markets for the two segments are traditionally highly dominated by the domestic intermediary companies, as opposed to foreign intermediary providers, the intermediaries' total of consignments (in TEU) can be used as the measure for the size of domestic MT-markets. The overall total for all domestic piggyback transport - i.e. non-container - segments is denoted 'All UIRR'. There are no total figures available for the container market, i.e. the equivalent to the piggyback transport 'All UIRR' figure. As the thesis focuses on piggyback transport, the container market is cited for comparison purposes and only the biggest three European domestic container intermediaries are shown. Figure 3.1 underlines that Germany is the most important domestic market in Europe for national piggyback transport and national container transport in terms of the amount of consignments. The three biggest domestic piggyback transport intermediaries in Europe make up for almost 80% of the total piggyback transport market.

Figure 3.1: Multimodal Transport: Main Domestic Segments - Europe



Source: UIRR (1999:9).

Legend: 1 consignment = 2.3 TEU = one 9m/12m-swap body = two 7m swap bodies = one trailer = one truck load

1) estimate 2) from 4/1998 - 3/1999.

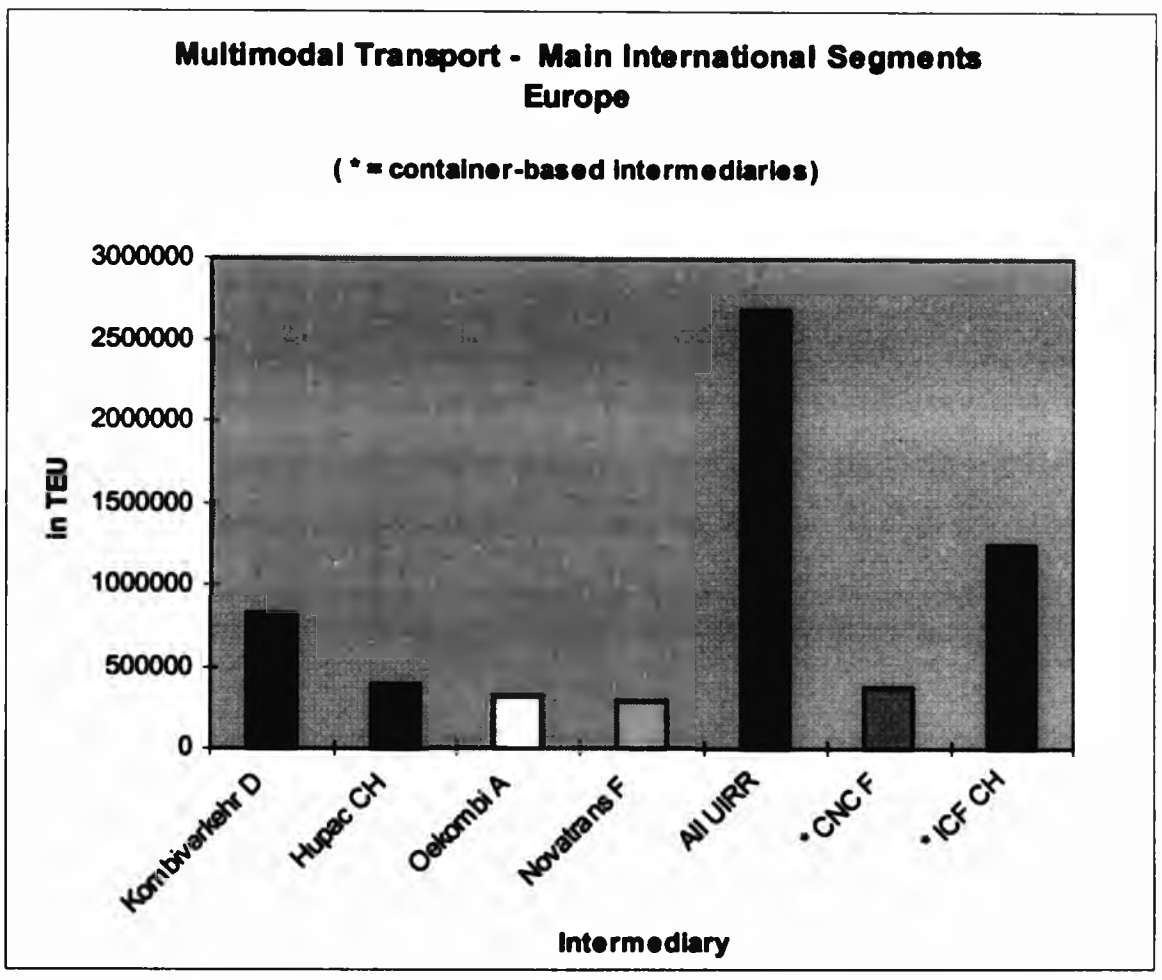
3.2.2 Main International Players in Europe

Figure 3.2 contains data supplied by UIRR, the European piggyback transport association, and Intercontainer, the Swiss-based container and piggyback transport intermediary. 1998 is the latest available data. The aim of the figure is to identify the major international market intermediaries for both piggyback and container transport in Europe. The international cross-border market is highly regionalised. As a consequence, although foreign intermediaries could offer their services for international transport abroad and bypass the major domestic intermediary, the terminal infrastructure and historical constraints usually keep the respective domestic intermediaries dealing with the international transport. As in the domestic market, the intermediaries' total of consignments (in TEU) serves as the measure for the size of MT-markets. The overall total for all international piggyback transport - i.e. non-container - segments is denoted 'All UIRR'. There

is no total figure available for the container market, i.e. the equivalent to the 'All UIRR' figure. The container market, with the two most important international container intermediaries, is only cited for comparison purposes.

Figure 3.2 underlines that Germany and Switzerland have the most important intermediaries in Europe for international piggyback transport in terms of the amount of consignments. The four biggest domestic piggyback transport intermediaries in Europe make up almost 70% of the total piggyback transport market. The intermediary Intercontainer serves both the container and the piggyback transport market. As Intercontainer's data splits consignments statistics by product types only, i.e. refrigerated and bulk transport, no differentiation between transport volume in piggyback and container transport is available.

Figure 3.2: Multimodal Transport: Main International Segments - Europe



Source: UIRR (1999:9).

Legend: 1 consignment = 2.3 TEU = one 9m/12m-swap body = two 7m swap bodies = one trailer = one truck load.

To summarise section 3.2, the purchase of rail transport services to be built into transport chains for MT-piggyback transport is organised through intermediaries in Germany, mostly attributable either to the transport modes road or rail. The transaction transmission points exist on the one hand technologically due to the change of transport mode from road to rail, on the other hand institutionally due to the missing direct sales channel between rail transport operators and freight forwarders for MT rail transport services. The institutional market separation is a direct result of the train operator's aim to control the MT-transport chain. Nevertheless, because of the close attachment of all piggyback transport intermediaries to one single land transport mode, the amount of transaction partner types for the freight forwarder can be reduced to three, namely rail company dominated intermediaries (for example Transfracht, Intercontainer), road transport dominated intermediaries (for example Hupac, Kombiverkehr) and MTOs (for example Bertschi, Hangartner, Hoyer).

The motives of the transaction participants to get involved in MT and consequently to enter the contracts described in this thesis are strikingly different. The main motive for train operators to participate in MT is and always has been to win back control of the land-based piggyback transport chain (Bukold, 1996). On the other hand, for road transport operators it has been of vital interest to regard railways only as a supplier to the transport chain best used in a position remote from client contact (Bukold, 1996). Therefore, the perception of who should do what in piggyback transport has differed widely ever since its commercial start in Germany in the late 1960s.

3.3 THE TRANSACTION SITUATION

The exchange of the transaction object between the transaction participants is subject to the market environment and the economic and technological environment, henceforth defined as the transaction situation. Initially, no distinction is made between the general MT market and the piggyback transport market. Following a market-led approach in section 3.3.1, the technological alternatives in supplying rail transport to the piggyback transport chain are described in section 3.3.2. As the reason for the existence of the contracts in piggyback-transport is not subject to this analysis, the explanation of the variety of technologies used in German MT is not the subject of the thesis, either. An in-depth description and analysis of existing technologies for wagons, terminals, trailers and containers is therefore not necessary.

3.3.1 The Market for Piggyback Rail Transport Operator Services

This section describes the existing modal split in land-based transportation in Germany, followed by the description of the existing piggyback market. Finally, potential market growth of the piggyback market is analysed.

There is no unanimously agreed definition of MT and particularly piggyback transport across Europe among the statistical sources. As a result, these sources do not provide particularly consistent information that can be applied to the entire piggyback market in Germany - including both domestic and international traffic (Bukold, 1996).

3.3.1.1 Modal split in land-based transportation (Germany)

This section focuses on continental long-distance transport in excess of 75 km, which is the area where MT can be reasonably used. Its minimum range in terms of production cost efficiency starts between 200 km and 433 km, varying between different studies on MT's production costs (Bukold, 1996; Backhaus & Bueschken, 1998:35-5873 Fn.1).

The data for Table 3.1 has been provided by the German Ministry of Transport (BMVBW), with 1997 being the latest figures available. The left column represents the four domestic transport modes currently available in Germany. The breakdown by years shows their share of the total transport volume in long-haul transport in tkm.[6] This measure prohibits an overweighing of the short-haul transport as compared to using the transport weight in t[7] only. The rows highlighted show the two transport modes which this thesis concentrates on.

Table 3.1 shows that over the past 30 years the road has constantly improved its market position, whereas the rail more than halved its market share. Moreover, the only transport mode of the four shown on the table with constant and stable growth over the last quarter of the past century has been road transport.

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6 'tkm' used as abbreviation of tonne kilometre.

7 't' used as abbreviation of tonnes.

Table 3.1: Modal Split in Germany: Long Distance Transport (excess of 75 km) 1970-1997

Transport Mode	1970*	1980*	1990*	1997*
Rail	**33.2**	**25.4**	**20.6**	**16.2**
Road	**36.2**	**49.0**	**56.7**	**67.1**
Domestic waterway	22.7	20.1	18.3	13.8
Pipeline	7.9	5.6	4.4	2.9
Total	100	100	100	100
Total absolute in tkm	179.2	211.8	250.9	384.1

* = in % of tkm.

Source: Bundesminister für Verkehr (1999:223f).

Legend: 1997 is the latest year where full year figures are available at the time of completion of the thesis.

3.3.1.2 Real transport volume for MT and piggyback transport

This section describes the German market by transport volume within and between regions (axes) on the one hand and identifies the market share of piggyback intermediaries on the other hand. As the thesis focuses on the contractual aspects of piggyback transport, an in-depth analysis of market shares and market trends is not the intention of this section. The aim here is to give more transparency where the piggyback contracts analysed later are predominantly used.

Apart from transport volumes broken down by regions and intermediaries, the technology used (see section 3.3.2) is the third standard classification of transport volumes. As far as types of goods are concerned, i.e. package freight or special freight (such as liquid, gaseous, refrigerated and hazardous goods) there exists currently no recent nationwide statistical data for the German piggyback market. The latest market study providing transport volumes on types of goods dates from the late 1980s (Forschungskonsortium Kombinierter Verkehr, 1988). The scarcity of data in this field can be explained by the historically engineering driven investigation of data, focusing predominantly on technical measures such as transport distance and transport technology.

- **Domestic market (Germany)**

An overview of the main Western European domestic MT markets in Figure 3.1 in section 3.2 found that Germany - represented by the intermediaries Kombiverkehr and Transfracht - is the most important market (region) in terms of the amount of consignments as a domestic MT market.

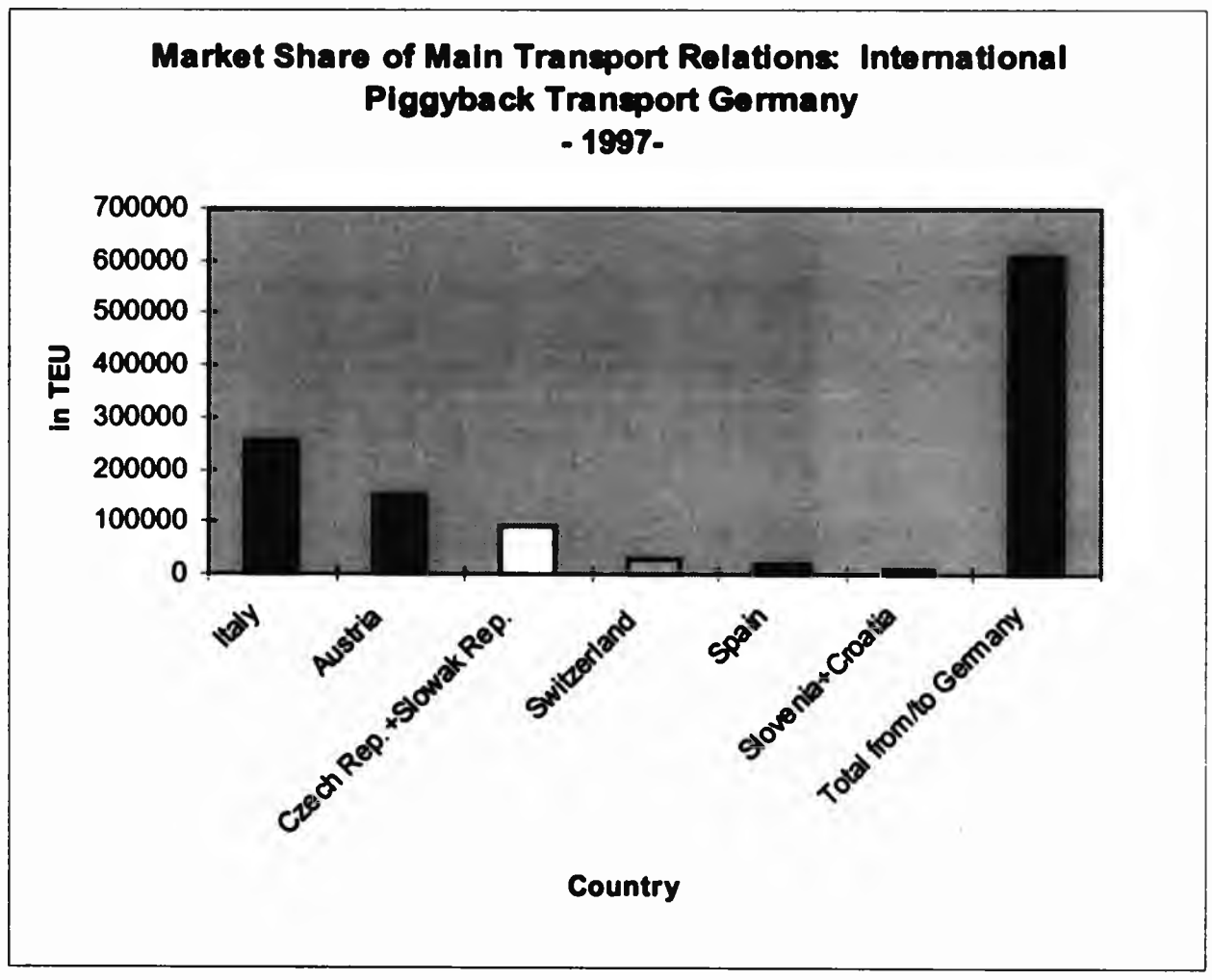
In terms of the distribution of transport volume across the German domestic piggyback market, a strong North-South and East-West direction of the transport flows is manifest. The technological transmission points are evenly distributed across the country. So are - in broad terms - the transport volumes in domestic transport (Bundesverband des Deutschen Güterfernverkehrs, 1998:60). The main centres of transport interchange regarding transport volume in tkm are Nordrhein-Westfalen (Duisburg, Köln, Bielefeld), Southern Bavaria (Munich, Augsburg, Ulm), coastal areas in the North (Hamburg, Bremen, Lübeck) and Eastern Germany (Leipzig, Dresden, Berlin). Although, in general, transport volumes show a fairly even distribution regionally, there is an emphasis on the relation Ruhr-Area to and from Southern Germany. From the freight forwarders' point of view entering into a piggyback contract, the intermediary Kombiverkehr dominates the domestic market and commands 100% market coverage (Kombiverkehr, 1999a).

- **International market (Germany)**

Figure 3.3 originates from the German association of freight forwarders (Bundesverband Güterkraftverkehr, Logistik und Entsorgung, BGL). After highlighting the sizes of the domestic markets, this figure describes the size of international piggyback transport to and from Germany broken down in target and source countries/regions with transport volume measured in consignments, one consignment being the equivalent of 2.3 TEU. The vertical axis shows the target and source countries/regions split up into the six biggest on the left side and on the right the overall total including the separately listed counties/regions on the left.

For international transport, the German piggyback axes are directed North-South with Switzerland, Austria and Italy as target and source-countries occupying more than two thirds of the entire transport volume. Therefore, trans-alpine relations clearly dominate the piggyback market from and to Germany.

Figure 3.3: Market Share of Main Transport Relations: International Piggyback Transport - Germany 1997



Source: Bundesverband Güterkraftverkehr, Logistik und Entsorgung (1998:60).

Legend: 1 consignment = 2.3 TEU = one 9m/12m-swap body = two 7m swap bodies = one trailer = one truck load

In Germany, only three piggyback intermediaries are selling international piggyback services to freight forwarders. In 1998, the following split existed between these intermediaries (in consignments) (Intercontainer, 1999; UIRR, 1999):

1) Intercontainer 39%
2) Kombiverkehr 36%
3) Hupac 25%

Section 3.3.1.2 described the existing German domestic and international piggyback transport market. Domestically, the transport volumes show a fairly

even regional distribution. Germany is the most important source or target country for international piggyback transport in Europe. Trans-alpine piggyback transport dominates in international transport to and from Germany.

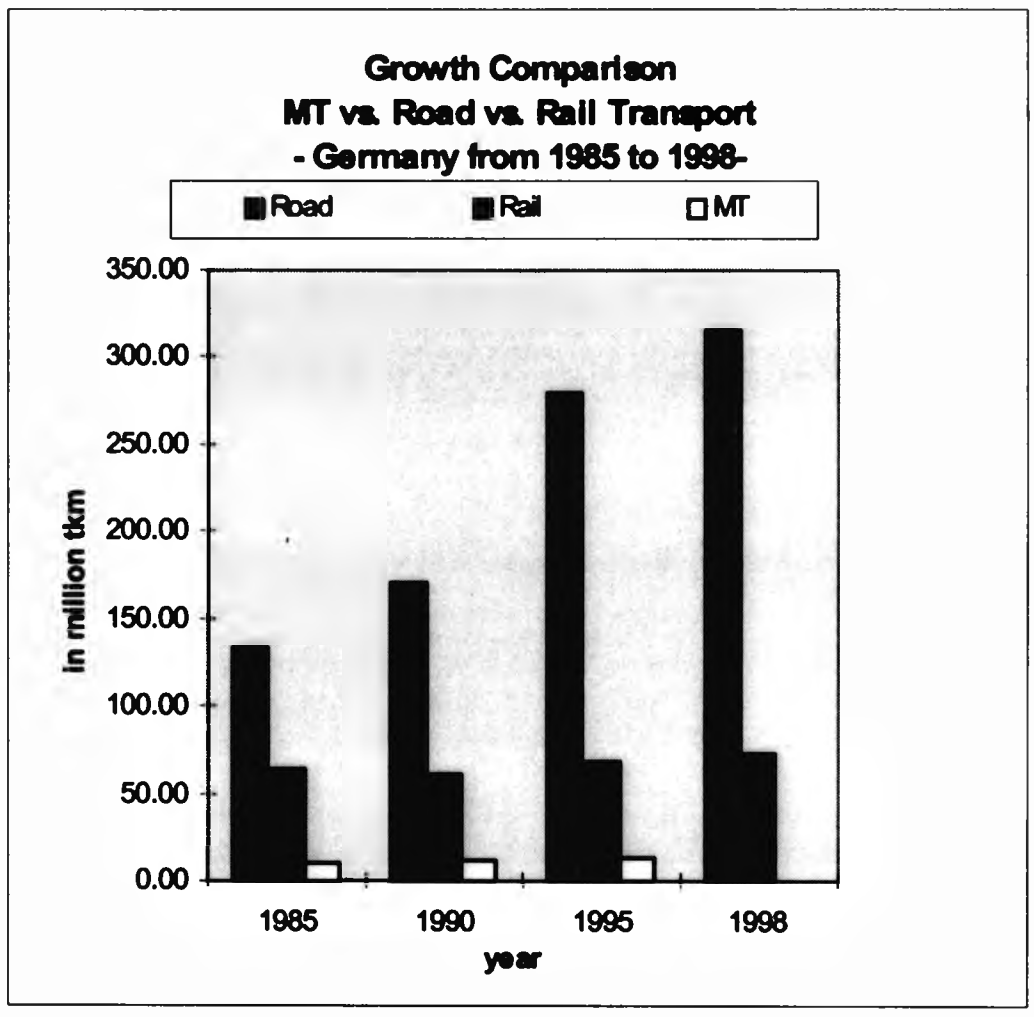
The following sums up the existing market in terms of piggyback transport volume in Western Europe (all in tkm): international piggyback transport contains 60% starting or ending in Germany, 70% trans-alpine traffic and 95% starting or ending in Germany or alpine countries (Switzerland, Austria, Italy). This underlines the dominating position of the North-South axis in international piggyback transport. As regarding domestic transport, of the overall domestic transport volume in Western European countries 35-40% can be found in Germany, followed by 15-20% in France.

3.3.1.3 MT market potential

Whereas section 3.3.1.1 (existing modal split) and 3.3.1.2 (existing MT-market through intermediaries) focused on an historic perspective, section 3.3.1.3 (growth potential) centres on the potential of the MT-market. This section contains a comparison of growth of the two major land-based transport modes versus MT in the continental long-distance transport in excess of 250 km.

Figure 3.4 utilises data from the German ministry of transport (BMVBW). The latest figures available are from 1997 for MT transport and 1998 for the rest. The purpose of the chart is to compare the development of the absolute amount of transport between the transport modes rail and road with the development of MT. All MT transport volumes are double counted in either the road or the rail operator figures and therefore appear twice on the chart. The tkm measure is chosen to allow a more even attribution *pro rata* to the underlying transport distances.

Figure 3.4: Growth Comparison: MT vs. Road vs. Rail Transport - Germany 1985-1998



Source: Bundesminister für Verkehr (1999:60f & 228f).

Legend: 1998 MT no figure available to date; 1997 14.4 million tkm.

MT, both piggyback and container transport, have taken a similar development in the past 15 years like the rail transport mode, a stagnation of the transport volumes. During that time, road transport more than doubled in transport volume. The existing MT market represents only approximately 10% of the overall MT market-potential. A continuance of the stagnation of MT, in line with the rail transport volume, is expected by the latest market study commissioned by the German transport ministry.[8]

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[8] The annual piggyback market volume has been stable since the mid-1990s at around 30 million tkm, with a volume projection of 38.8 million tkm until 2010 (Hacon Ingenieurgesellschaft, 1999:7).

3.3.2 The Transaction Technology

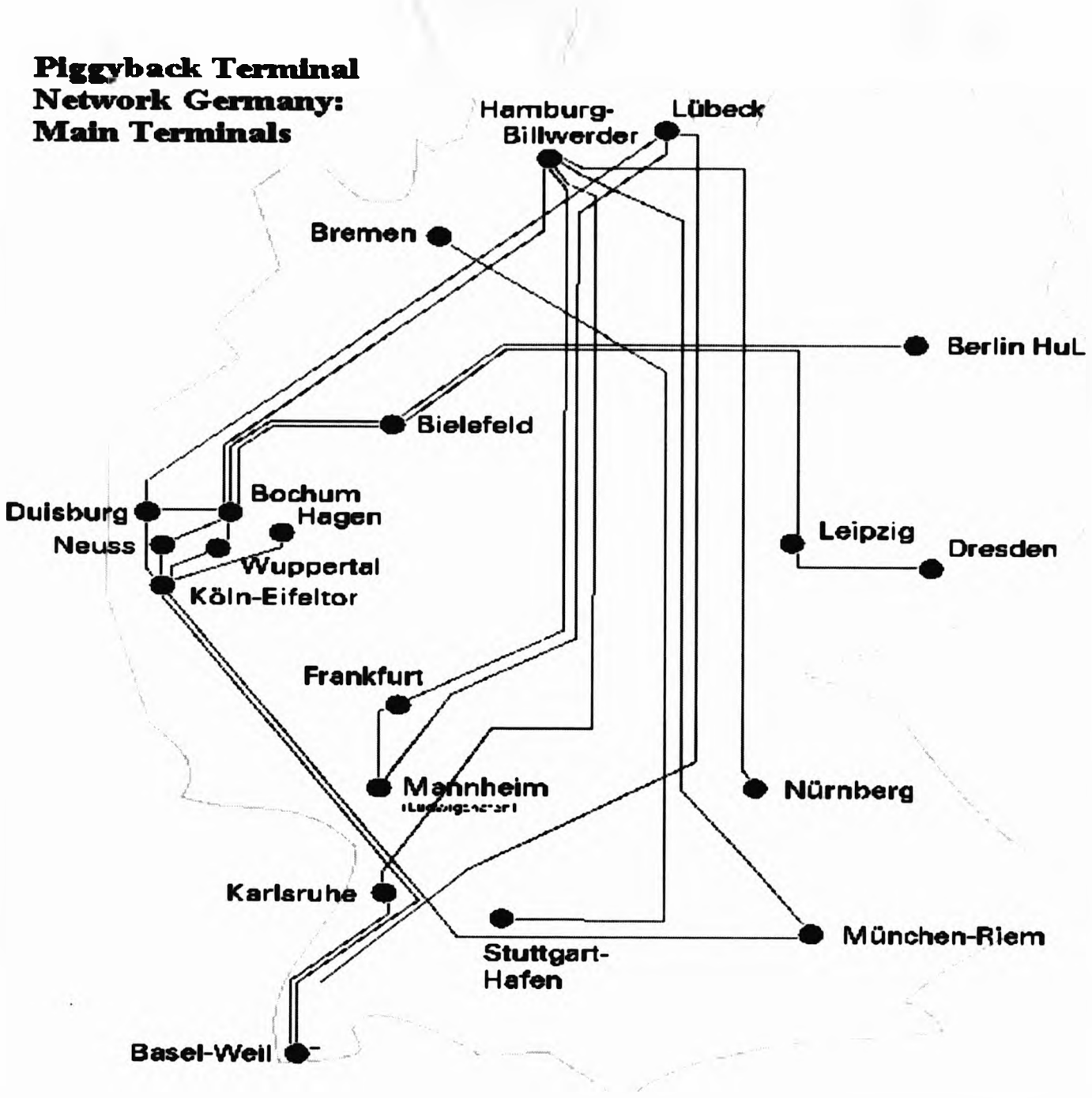
3.3.2.1 The network

In piggyback transport, a technological transmission point normally occurs twice due to storage and moving processes (Pfohl, 1990:9f; 1993:section 2620), being once at a consolidation point and once at a break-bulk-point. These transmission points are also bottleneck situations in the changeover of the transport modes used. From the perspective of the freight forwarder the rail transport operator can only add value, if the TEU's change of the transport mode is inherently built into the transport chain changeover at a piggyback terminal. Therefore, the changeover of the transport mode is included in the analysis, but only in its relevance to the rail transport of piggyback, which the thesis focuses on. Any further transport services <Logistikaufgabe>, which are performed in MT-terminals, are excluded from this analysis.

Figure 3.5 is supplied by the main intermediary of piggyback transport in Germany, Kombiverkehr. Its purpose is to identify the technological infrastructure of the piggyback transport market in Germany, i.e. the major MT-terminals. It is obvious that despite some regional strongholds of MT-terminals in the West of Germany, the major terminals are spread fairly evenly throughout the country, with a focus on North-South traffic links.

These MT-terminals, or points of technological fragmentation of the transport chain, represent the transmission of the TEUs from road to rail transport operators.

Figure 3.5: Technological Transmission Points: Piggyback Terminal Network, Germany



Source: Kombiverkehr (2000).

3.3.2.2 The means of transport (TEU)

From the ultimate consumer point of view - with the perspective of shippers in mind - there are only three different TEUs, namely swap bodies, trailers and full truckloads. However, the perspective of producing the piggyback service on rail transport and exchanging it via MT-terminals to road users, forces to differentiate these three technology alternatives further to a total of five. They form the

technological environment of the transaction situation (Jünemann, 1989:286ff, 292ff & 329ff; Rossberg, 1990:4ff; Oelfke, 1991:158f):

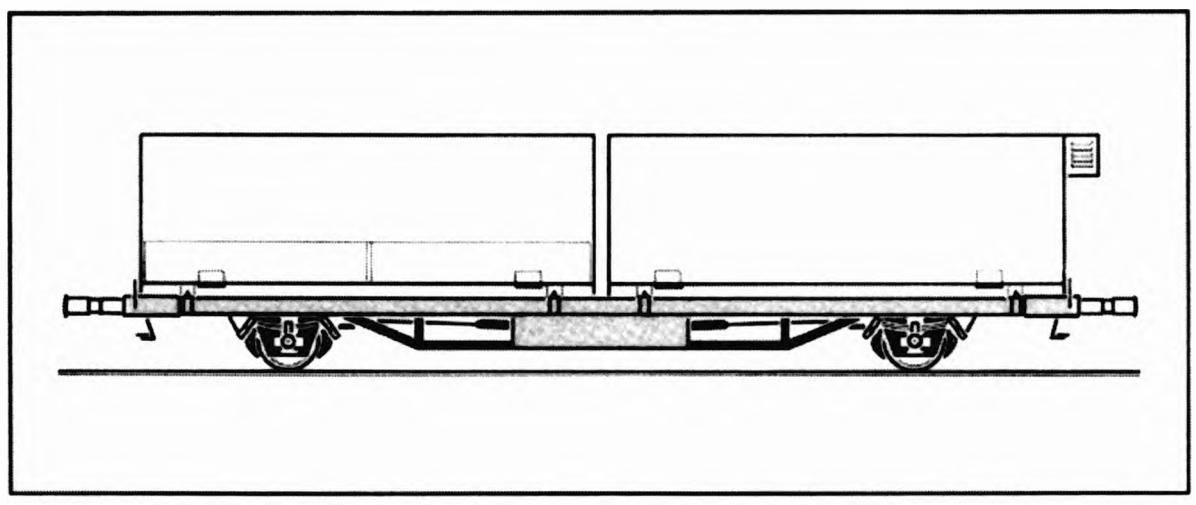
1) 'Zero-alternative': no rail transport, entire transport chain on the road. Road transport of swap bodies, trailers, or trucks that are not suitable for piggyback transport. Piggyback transport legally constitutes a road traffic diverted on the rail, therefore this alternative is piggyback's most eminent competitor. As this thesis investigates contract choices within piggyback, not transport mode choices, this 'zero-alternative' is not analysed further.
2) 'Rolling Highway'-alternative: rail transport with entire road transport vehicles. Rail/road-transport of traction engine <Zugmaschine> and trailer or truck-trailer <Lastkraftwagenzug> on special low altitude MT-wagon <Niederflurwagen>. These wagons are loaded horizontally. This alternative is called piggyback transport in a narrow definition <Huckepackverkehr im engeren Sinne>, which underlines the fact that the TEU operates independent of other traction systems.
3) 'Horizontal MT-terminal'-alternative: rail transport with MT-TEU only. Rail/road transport of trailer or swap bodies on MT-wagons with horizontal changeover in the terminal. This alternative is also called 'piggyback transport in a narrow definition' <Huckepackverkehr im engeren Sinne>.
4) 'Vertical MT-terminal'-alternative: rail transport with MT-TEU only. Rail/road transport of trailer, swap bodies on MT-wagons with vertical changeover via mobile or static crane systems on the terminal. This alternative is also called 'piggyback transport in a broader definition' <Huckepackverkehr im weiteren Sinne>.
5) 'RoadRailer'-alternative: rail transport with technically bimodal trailers. Rail/road transport of bimodal trailers without MT-wagons with horizontal changeover (Rossberg, 1990:6ff).

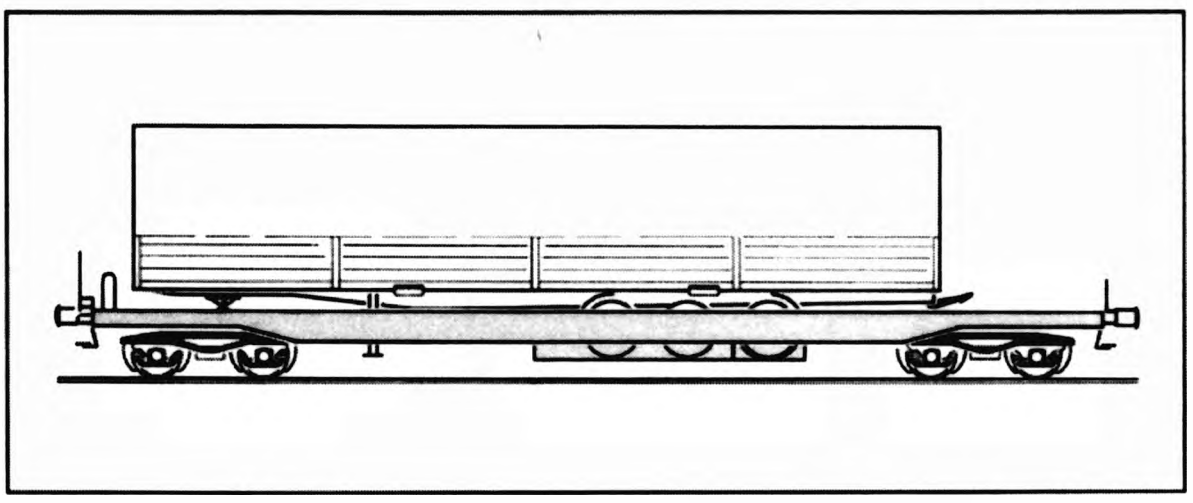
The last technology alternative is not yet used commercially, at the time of completion of the thesis, so an in-depth analysis on efficiency of contract designs using this technology is therefore not possible (Klotz, 1994:154). The middle three of these five alternatives will be the reference for all further analysis. Figure 3.6 originates from the main domestic intermediary, Kombiverkehr. It highlights the three most commonly used piggyback technologies in Germany, named as alternatives 2, 3 and 4 above, whose analysis forms the central technologies for the thesis.

Figure 3.6: Transaction Technology in Piggyback Transport

Non-accompanied

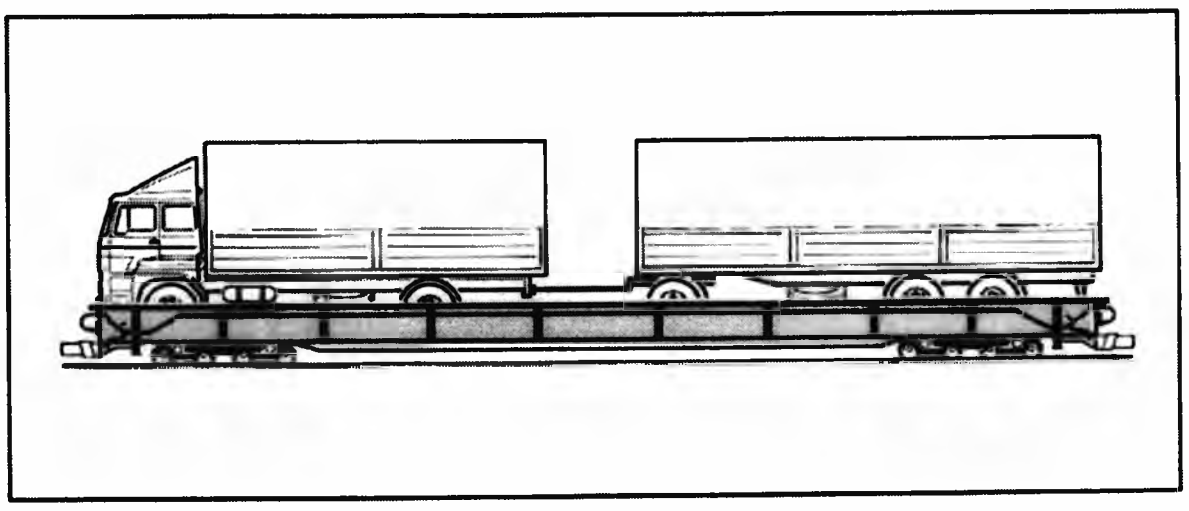
Freight-boxes, swap bodies and containers are loaded vertically via terminal crane or mobile crane on wagon.





Trailer is loaded vertically via terminal crane or mobile crane on wagon.

accompanied

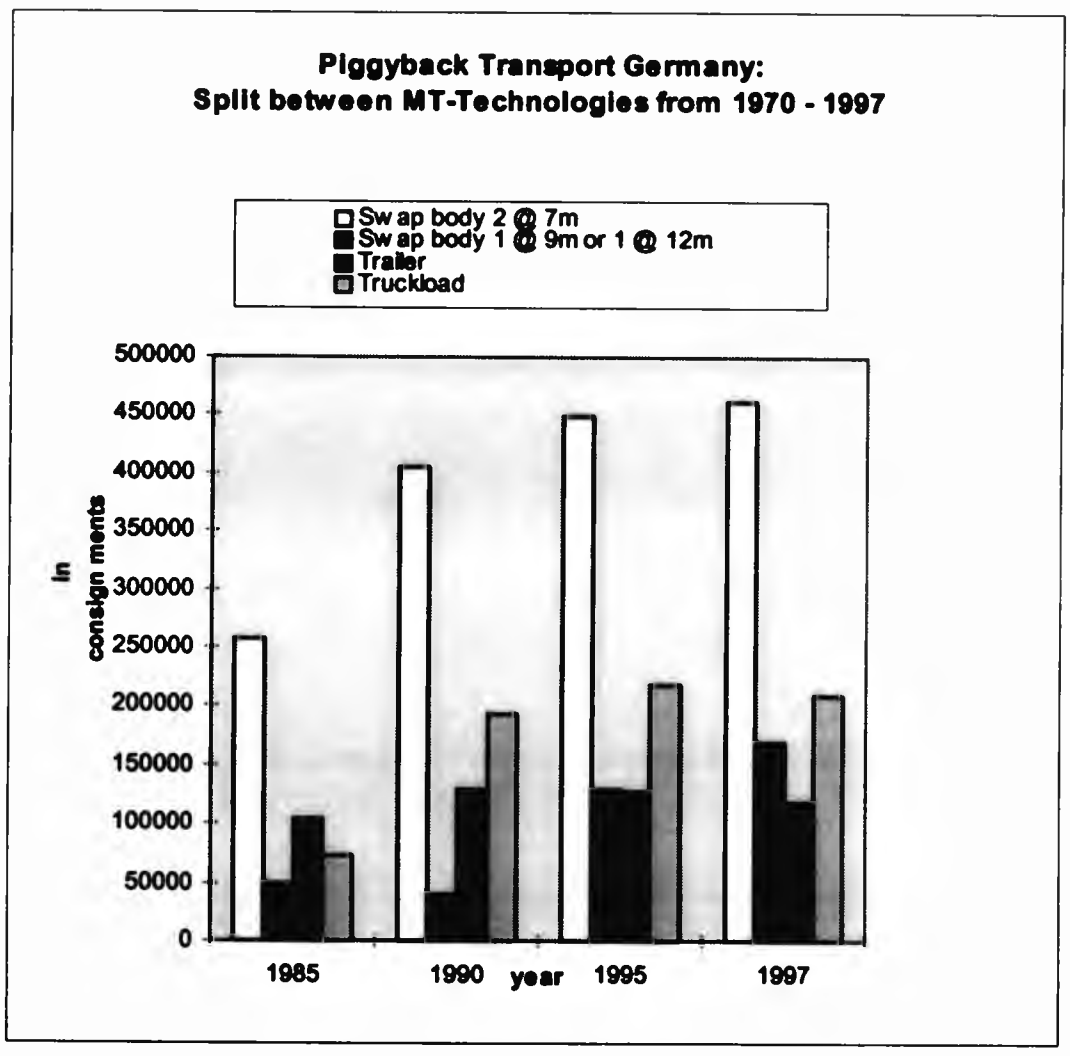


Trucks (engine, trailer) are driven horizontally via ramp on special wagon (low-profile wagon). The driver accompanies the transport via sleeping car on rail.

Source: Kombiverkehr (1998b); Bukold (1996).

Figure 3.7 originates from the German association of freight forwarders (Bundesverband Güterkraftverkehr, Logistik und Entsorgung, BGL). Its focus lies on describing the three major MT-technologies currently in commercial use in domestic German piggyback transport, i.e. three types of swap-bodies, trailers and full truckloads. The latter is also called 'Rolling Highway' <Rollende Landstrasse>. The transport volume attributable to each technology is compared across time intervals measured by number of consignments, one consignment being 2.3 TEU. One consignment either exists of 1 truckload, one trailer, one 9m/12m-swap body or two 7m-swap bodies.

Figure 3.7: Piggyback Transport Germany: Split Between MT-Technologies From 1970-1997



Source: Bundesverband Güterkraftverkehr, Logistik und Entsorgung (1998:61).

Legend: 1 consignment = 2.3 TEU = one 9m/12m-swap body = two 7m swap bodies = one trailer = one truck load.

In domestic German piggyback transport, the swap body TEU technology far outweighs the trailer as TEU, with 70% of share of consignments. In sharp contrast to this domestic figure is international transport to and from Germany, with 78% of consignments in trailers (Oelfke, 1991:178).

The trailer technology - especially with southern European countries such as France, Spain and Italy, is the dominant piggyback technology used. There is no similar data on transport technologies used to and from Germany available that can be compared with the domestic data provided in Figure 3.7 above.

3.3.2.3 The technology components

In the MT chains, four technology components interact for the transport of TEUs (Willeke, 1966:309):

1) transport route (rail track/road),
2) vehicle (trailer, MT-wagon),
3) engine unit (traction engine <Zugmaschine>, rail locomotive), and
4) terminals for start and end of the rail transport element of the transport chain (despatch ramp on the MT-terminal).

The investments which accompany the contract designs in piggyback transport are broken down into TEUs and these four components in the subsequent analysis of chapters 4 and 5.

Chapter 3, which focuses on the transaction object, participants, situation and technology of piggyback transport in Germany, can be summarised as follows. The transaction object is the rail transport operator service used for continental land-based transport rail/road. The transaction partners on the one hand are freight forwarders, who demand the transaction object, and rail transport operators and intermediaries on the other hand, who supply or broker the transaction object. The latter can be clearly attributed to be either dominated by the road or by the rail transport industry. Piggyback intermediaries consolidate demand and offer both on the national and international transport segments in Germany. Therefore, they are key to understanding the makeup and the competition on the piggyback market.

The market potential for MT - the transaction situation - in Germany is exceeding the volume of the existing market transactions by many times. One possible explanation, to be investigated through this thesis, could be an inefficient supply

of contract alternatives or an inefficient contract selection for piggyback transport transactions in Germany.

As regarding the transaction partners and transaction technology, the control of the transport chain in MT has been the major motivation for train operators to join into a transaction with road-dominated freight forwarders for the train transport service needed for the MT-chain. On the other hand, the road transport providers teamed up with the railways mainly due to external factors outside the transport market: ecological pressures, transport policy, and demand from maritime shippers and freight forwarders to automate and rationalise the containerisation. The effect for the road carriers, from the point of view of the transport system advantages, has always been that road transport operators weaken the built-in strengths of their road network with the rail component. These control issues on the transport chain will be followed up in chapters 4 and 5.

From the perspective of the thesis' hypothesis, this thesis examines the contracts in piggyback transport, the sub-segment of MT, on their TCE-efficiency, and could therefore contribute to the answer for the unexplored market potential in MT. Moreover, it focuses on the trans-alpine traffic North-South, and therefore deals with the most significant part of German piggyback transport both in size - as shown in chapter 3 - and profit margins.

CHAPTER 4: DESCRIPTION OF PIGGYBACK TRANSPORT CONTRACTS FROM THE FREIGHT FORWARDING STANDPOINT (APPLICATION OF THEORY)

Chapter 4 analyses the contracts that are eligible from the standpoint of freight forwarders in Germany to acquire rail transport services for piggyback transportation. As pointed out in chapter 1, from a methodological point of view, this empirical work represents a qualitative case study.

Firstly, section 4.1 outlines the companies participating in the transport chain and their contracts. Secondly, section 4.2 presents the four contracts chosen for the TCE analysis in detail and qualitatively models them applying the instruments of TCE described in chapter 2. The degree of vertical integration, i.e. the amount of control by one transaction partner over the transaction, forms the main criterion of differentiation in this undertaking.

4.1 OVERVIEW OF MARKET PLAYERS AND CONTRACT TYPES

4.1.1 Market Participants

There are two parties involved in the transactions examined. Firstly, the freight forwarder, who purchases the rail transport service from the carrier; secondly, the railway company which, as rail carrier, renders this rail carrier-service. In the case of forwarders, in addition to the traditional forwarding functions as explained in section 3.2, a distinction can be made between those which produce the combined transport examined here and those which specialise in road transport only. The former transport specialists are called multimodal transport operators (MTOs).[1]

In international piggyback transportation, there are various rail carriers, and these are regarded as a single supplier from the forwarder's standpoint, because balancing of the service for rail infrastructure takes place through a single railway company. The services of the European railway companies participating in transport are then offset against one another.

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[1] See definition of MTO in section 3.2 and also Ihde (1991:98).

Between purchaser (freight forwarder) and supplier (rail transport operator) of the rail transport service, the following piggyback transport intermediaries for container and piggyback transport - introduced in section 3.2 - are interpolated in the contract analysis:

1) Intercontainer (container company/piggyback company).
2) Kombiverkehr (piggyback company).
3) Hupac (piggyback company).

The intermediary company Intercontainer has its original business activity, the transport of containers, extended over the transport of piggyback consignments. It can be observed here that contract terms are also transferred out of container business into business with piggyback consignments. As intermediary for North-South piggyback transportation over the Alps, Hupac occupies a prominent position. More than 90% of piggyback transportation in transit, starting from and ending in Switzerland, is co-ordinated through this intermediary (Guggenbühl, 1993:36).

Whereas Intercontainer is a subsidiary of various railway companies, freight forwarding companies hold a majority interest in the intermediaries Kombiverkehr and Hupac. The Compagnie Nouvelle de Conteneurs C.N.C. (container company/piggyback company) and a further 15 piggyback transport companies can in principle be conceived as additional intermediaries, from the standpoint of freight forwarding to and from Germany. Of these, the most important ones in terms of transport volume are:

1) T.R.W. (Belgium)
2) Trailstar (Netherlands)
3) Novatrans (France)
4) Cemat (Italy)
5) Ökombi (Austria)
6) Kombidan (Denmark)
7) Kombilux (Luxembourg).

The contractual analysis has been confined to transactions through the three formerly-mentioned intermediaries, since in Germany only these companies approach forwarders directly via (sales) agencies.

4.1.2 General Terms of Business (GTB)

GTBs are defined here as conditions upon which a company bases particular transactions. GTBs become crucial if they are communicated to the other transaction partner before the contract is signed, or reference is made to them by means of a notice clearly displayed at the place of signature of the contract.

If both parties make individual contractual agreements, they will have precedence over GTB. The content of GTBs covers reservation of ownership, liability for defects, place of jurisdiction and place of performance. If the GTBs impose unfavourable terms and conditions upon the contractual partner, or restrict the contractual partner's economic mobility, the GTB become null and void. If the meaning of the GTBs drawn up by a company is doubtful, they will be interpreted in a way such that they are less favourable for that company.[2] The three above-mentioned intermediaries use various types of contracts which have the form of GTB. The following types of GTBs exist:

1) Intercontainer (international transportation via Intercontainer)
2) Kombiverkehr (for national transportation)
3) Union internationale des sociétés de transport combiné Rail-Route (UIRR) (for international transportation via Kombiverkehr or Hupac).

Intermediaries such as Intercontainer, who are dominated by the railway companies, use standard GTBs for both national and international transport. In the case of those intermediaries who are controlled by freight forwarders (Kombiverkehr and Hupac), a distinction is made between GTB for national and for international transportation. The GTBs for national transportation are drawn up by the respective national piggyback transport company (here: Kombiverkehr), and those for international transportation by UIRR, the umbrella organisation of the European piggyback transport companies.

4.1.3 Contract Forms

Four types of contract appear between supplier and purchaser of the rail carrier service in piggyback transport. A feature common to all these is their basic documentation in the form of GTBs. The following four forms of contract

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2 Law concerning regulation of General Terms of Business Law (AGB-Gesetz), § 1, 2, 4 and 5.

constitute the objects of explanation of the thesis, as mentioned in chapter 1. They are named according to the specific intermediary companies:

1) Intercontainer contract.
2) Kombiverkehr contract.
3) Hupac with traditional freight forwarder contract.
4) Hupac with MTO contract.

4.1.4 Scope of Market and Technology Analysis

These above forms of contract reflect the focal points and restrictions of the transport services examined:

1) The analysis is confined technically to piggyback transport which is provided by both piggyback transport companies and container companies.[3]
2) The transport chains examined here are organised by forwarders, not by shippers. The choice of contract after the transport order has been placed is therefore also made by the freight forwarder on behalf of the shipper.[4]
3) By focussing on piggyback transport the analysis is confined to continental land transportation. For international transportation, the focus falls upon North-South relations, since West-East transportation is carried out mostly with container technology, particularly to Eastern Europe.[5]
4) Four piggyback techniques in commercial use will be analysed, namely swap bodies, trailers for vertical loading, trailers for horizontal loading and 'Rolling Highway' <Rollende Landstrasse>.[6]

4.1.5 Scope of Contract Analysis

Apart from GTBs, a freight forwarder faces various other legal prescriptions when organising an MT regarding the liability of the transaction participants. A significant degree of detail analysing the four contracts mentioned had to be undertaken, as there is no general law applicable for the entire MT chain regarding liability for failure to meet delivery deadlines and loss/damage of the TEU. Various intentions to combine these liability clauses into a unified law code

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3 See section 3.1.
4 See section 3.2.
5 See section 3.3.
6 See section 3.3.

for the freight forwarder have not yet been realised. These ongoing attempts are aimed at both German domestic and international MT.[7] The GTBs on the basis of standard transport documents can also be interpreted as an answer from the transport industry to this vacuum. Nevertheless, as GTBs often interfere with the existing transport laws, both the commercial (GTBs) and the legal liability clauses are analysed in section 4.2, as they form an integral part of what TCE understands as a contract between transaction participants.

In summary, the aim of section 4.1 was to typify the players involved in the contracting process, compared to typifying the players involved in the piggyback transport market in chapter 3. A key finding in section 4.1 is that although GTBs play an important role and contribute as an underlying foundation to the transactions' governance, further contract elements such as national and international legislation, participations, shareholdings and infrastructure investment must be included. Otherwise, the level of the vertical integration involved in the transactions, according to TCE, cannot be understood.

Following the thesis hypothesis, the contract analysis is carried out in the next section (4.2) according to the degree of vertical integration. This includes incentive issues such as liability - in the contract spectrum at the market co-ordination end - on the one hand, and ownership and control issues, such as shareholdings and direct investment - in the contract spectrum at the hierarchy end - on the other.[8]

Moreover, none of the examined intermediaries in combined transport is independent. They are dominated in each particular case by the purchasers of the transaction object (freight forwarders) or their suppliers (rail carriers). The ownership and control issues related to these intermediaries will be explained in the following section.

4.2 CONTRACT ANALYSIS ACCORDING TO THE DEGREE OF VERTICAL INTEGRATION

In this section, the forms of governance arising from contract types are analysed in the context of TCE. The whole structure of the contract represents the object of study, i.e. the contract instruments, written and unwritten, that are used for

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7 See also Mueller-Feldhammer (1996) and Wulfmeyer (1996).
8 See chapter 2.

verification and as an inducement in the case of the purchaser (forwarder) and the deliverer (rail carrier).

The five steps of analysis of each contract can be grouped into two areas. Contract issues, i.e. the contract taken from the practical application in the piggyback transport industry on the one hand, and the governance issues, i.e. the contract issues transformed in the context of TCE on the other hand.

As a first step, ownership of the intermediary is summarised in terms of vertical integration. Secondly, the practical use of the contract and the contract participants is summarised. The third step describes the sources of the contract, which are important documents about the relationship between the transaction partners. This is followed by a description of the elements of the contract examined in each particular case. Under elements here, those contract components are examined which refer to the specificity of the contractual relationship between the transaction partners. In the context of TCE, these contract elements can be transformed into contract incentives for further analysis. Therefore, as a final and fifth step, these contract elements are as instruments of inducement to a transaction partner in accordance with TCE. Thus, these five steps create the basis for examining the connection between transaction tasks and forms of contract in chapter 5.

The five steps can be summarised by using their underlying questions as follows: the first step asks, 'who does the intermediary belong to?' The second step examines where the contract can be found. The third step deals with where the contract comes from. 'What are TCE contract elements?' follows as the next question. In this step, all elements apart from the transport investments are modelled according to TCE. The transport investments as part of the contract - or artificial hostages - will be modelled through TCE in chapter 5, together with transport investments as part of the transport chain - or built-in hostages. The final question is: 'How strong are these elements in causing or avoiding TC?'

On the basis of the analysis of the four contract forms, it is possible to draw conclusions on the degree of vertical integration within the transport chain.

The contracts of Intercontainer, Kombiverkehr and Hupac are analysed below where, in the case of Hupac, a distinction is made between a contract involving a traditional freight forwarder and a freight forwarder as a multimodal transport operator (MTO). In the case of measurement criteria for the types of credible commitments, analysed here under 'elements of contracts', the rail transport

operator Deutsche Bahn AG (DB) in Germany is split into two separate corporate entities, DB Netz AG (DB Netz) for infrastructure and DB Cargo AG (DB Cargo) for goods transport operations. The business data, such as total assets or total turnover of this rail transport operator, follows this split. For example, to get the measurement definition of DB's damage liability in piggyback transport to the freight forwarder, the maximum liability figure in relation to the turnover of DB Cargo, the subsidiary which operates the rail transport, can be used. This specifically applies to the Kombiverkehr contract, where DB is the primary rail transport operator transaction partner.

4.2.1 Intercontainer Contract

This section typifies the Intercontainer contract between freight forwarders and rail transport operators. After a brief outline on this intermediary and the practical use of its contract, its sources and contract elements and secondly its TCE-contract incentives are analysed from the standpoint of the transaction participants.

4.2.1.1 Contract structure

4.2.1.1.1 The intermediary

The contract intermediary Intercontainer[9] comprises stakeholdings of 27 individual European railway companies, together totalling EUR 37 million share capital.[10] None of the railway stakeholders, apart from DB with 16%, participates in a higher than 12% share. The company is established as a co-operative society registered under Belgian law (Intercontainer, 1999:26 & 36). With less than 10 shareholders holding more than 50% of the share capital, decision taking in the AGM is facilitated despite the large total number of shareholders. Adding to this, Intercontainer is operationally independent and not dominated by any single or group of railway companies. Nevertheless, it must be classified as a rail-based intermediary, due to its rail-only owner structure.

Intercontainer pursues as its corporate aim the co-ordination and development of both maritime containers and piggyback TEUs <Grosscontainer> transport and the organisation and provision of appropriate additional services. For analysis of this contract, its sources and elements as well as the contract instruments are considered from the standpoint of the transaction participants.

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9 Subsequently for: Intercontainer-Interfrigo (ICF) s.c., Brussels/B.

10 As of September 1999. Interview with Jury Cavanak, Intercontainer, in Basel/CH, on 21.06.2000.

4.2.1.1.2 The contract use

In the finalisation of the contract, Intercontainer acts as intermediary agent. Intercontainer mainly organises international traffic, in the case of the thesis' market segment starting and ending in Germany. This intermediary acts as an agent between the offer of rail transport service (from the rail transport operators) and its demand (from the freight forwarders) and mainly for international transportation. The average transport distance per TEU of this contract amounted to over 1,200 km in 1997 for continental transport.

4.2.1.1.3 Contract sources

The sources of contract between the freight forwarder and the rail transport operator are Intercontainer's GTB <AGB Intercontainer>,[11] the delivery note <Übergabeschein> and the provisions of international rail transport law, i.e. the "Convention internationale concernant le transport des marchandises par chemins de fer (CIM)".[12] The outsourcing of rail transport services via MT through Intercontainer is governed by Intercontainer's GTB. These terms explicitly allow separate written agreements on delivery deadlines.[13]

The source of the contract certifying the process of transport from a legal point of view is the so-called delivery note <Übergabeschein>. As for road transport, the consignment note serves as legal evidence for the specific transport concerned. Despatch of the consignment to Intercontainer with this delivery note <Übergabeschein>, signed by the freight forwarder, represents the contract of transport <Beförderungsauftrag> and documents acknowledgement of the specific GTB.

In addition to the sources mentioned above, the legal regulations and requirements of the (national) rail transport operators carrying out rail transport are applicable, insofar as there is no conflict with Intercontainer's GTB.[14]

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11 GTB Intercontainer. See appendix.

12 CIM is part of "Convention du 9 mai 1980 relative aux transports internationaux ferroviaires (COTIF)".

13 GTB Intercontainer. See appendix.

14 GTB Intercontainer. See appendix.

4.2.1.2 Intercontainer governance

4.2.1.2.1 Elements of the contract between freight forwarder and rail transport operator

In this section the following contract elements are described: profit-sharing, liquidated damages, specialised investments, and liability between freight forwarder and rail transport operator.

- Profit-sharing

From the freight forwarder's standpoint, there is no profit-sharing in the contract with Intercontainer. The contract participants are directly - in the case of rail transport operators - or indirectly - in the case of Intercontainer - entirely state-controlled via participations. The state control also applies to the decisions about the use of the profits from MT activities. Conversely, from the standpoint of rail transport operators, there is no substantial profit-sharing with other companies from MT-activities. The rail transport operators involved in this contract own no substantial shareholding in the road haulage industry.

- Specialised investment

The contract participants, freight forwarders and the rail transport operator, finance all investments into the transport chain apart from TEUs. According to Intercontainer's GTB, even these freight forwarder-financed TEUs could be provided via Intercontainer.[15] Intercontainer's and rail transport operator's investments cover:

1) wagons (5,342 fully owned), with the following wagon types (approx. as of 1999) (Intercontainer, 2000:13):
   - 4,700 flat wagons
   - 200 pocket wagons
   - 299 Mega-wagons;
2) MT-terminals, i.e. investment in a minority stake of CLB Container Logistics Bettembourg S.A., Bettembourg/F, a MT-terminal operator serving Luxembourg, where Intercontainer holds 10% share capital (Intercontainer, 1999:25);
3) rail tracks in terminal areas; and
4) sales agencies, i.e. 6 sales offices, of which five exist in Germany out of a total of 22 sales offices Europe-wide.

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15 GTB Intercontainer. See appendix.

- Liability (general clauses)

Damage or loss occurring to transported goods is regulated through CIM.[16] According to CIM, the rail transport operator does not incur liability where damage or loss was unavoidable or was caused by circumstances whose negative effect could not be averted.[17] Liability is also not incurred in the case of damage caused by wilful actions of persons not acting on behalf of the rail company. Whereas the first risk can be classified from the point of view of TCE as uncertainty, the latter is opportunism. In both cases, the burden of proof to exclude liability lies initially with the rail transport operator.[18] Intercontainer, as the intermediary, can only be held liable through own fault. The burden of proof in this case lies with the freight forwarder as principal.[19]

The following summarises the terms of liability for both rail transport operator and Intercontainer for exceeding the delivery deadline, on the one hand, and for damage/loss to the transported goods, on the other.

Time liability (exceeding delivery deadline): Intercontainer's liability in relation to delivery deadlines is not covered by its GTBs, but requires a separate agreement in writing.[20]

Although the GTB of Intercontainer do not cover liability deadlines, for a delivery deadline problem, international rail transport law applies, i.e. CIM. Thereafter, Intercontainer - acting as the intermediary - can be held liable for a maximum of three times the transport charge. As an indication of the maximum delivery deadline, a measure of approx. 400 km per 24 hours is used.[21]

The rail transport company is liable for up to three times the transport charge[22] for not meeting the above delivery deadline according to CIM. The legal option of fixing delivery deadlines in writing, i.e. via regular transport timetables, is not normally used in this contract. This timeframe for continental transport is without practical relevance in most cases, as shippers demand much shorter delivery times from freight forwarders.

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16 See section 4.2.1.1.3.
17 CIM Art. 36 § 2.
18 CIM Art. 37 § 1.
19 GTB Intercontainer. See appendix.
20 GTB Intercontainer. See appendix.
21 CIM Art. 27 § 2; Legal option for special delivery times: CIM Art. 27 § 2 and Art. 43 § 6.
22 CIM Art. 43 § 1.

Although delivery deadlines can be fixed between freight forwarders and Intercontainer in written form,[23] the liability is confined in these types of agreements to damage for which Intercontainer is to blame. If no other special written agreement has been made, Intercontainer underlines its non-commitment to these competitive rail-based delivery deadlines by referring its own delivery deadline liability to less competitive delivery clauses of CMR, the international road transport law.[24] Under CMR, the delivery period, if not specified, is 60 days.[25]

Damage/loss liability: The participating rail transport operators are held liable to the following extent, according to CIM, when the transported goods are lost or damaged:

1) maximum of 17 SDR (Special Drawing Rights) per kg gross weight (approx. EUR 24.3),[26]
2) in absolute terms at the current market price as a maximum, including customs and transport charges,[27] with the damage calculated as the fall in value of the goods despatched fully and on time, at the point of destination.[28]

The weight in the calculations above includes the TEU, i.e. the trailer or swap-body.

Intercontainer legally interprets its role as a 'forwarding agent',[29] therefore adopts liability levels that are closer to the CMR clauses of road freight forwarding. For the non-rail-based portion of the transport, CMR applies, anyway. In cases of loss or damage,[30] the liability of Intercontainer according to the GTB is limited to a maximum of EUR 100,000 which includes goods and TEU.[31]

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23 GTB Intercontainer. See appendix.
24 GTB Intercontainer. See appendix.
25 CMR Art. 20: 1 and CMR Art. 19.
26 CIM Art. 40: 2.
27 CIM Art. 40: 1.
28 CIM Art. 42: 1.
29 GTB Intercontainer. See appendix.
30 GTB Intercontainer. See appendix.
31 GTB Intercontainer. See appendix.

In the case of incomplete fulfilment of transport services, the liability of Intercontainer towards the freight forwarder only applies to damage through own fault.[32]

4.2.1.2.2 Contract incentives and summary

Following the description of the sources and elements of the Intercontainer contract between rail transport operator and freight forwarder, this section now appraises this contract in the context of TCE. The contract incentives, implemented to benefit fulfilment of the contract between transaction partners, will now be attributed in accordance with TCE to each participant.

In the Intercontainer contract, the exposure of the rail transport operator to specialised investments is on a very low level. Only a small percentage of the contract turnover is exposed to specialised wagons. Of Intercontainer's wagon investments, only about 10% of the wagon fleet is specialised. Therefore, the specialised terminal investments remain at a low level and only one minority participation in one MT-terminal exists. Terminal investments undertaken by the national railways can be used for non-MT as well, and are therefore general purpose investments.

The liability of Intercontainer, when it performs services normally covered by the rail transport operator, is very limited. The intermediary can only be held liable for loss or damage if the freight forwarder proves a case of own fault for Intercontainer. The delivery deadline applied in this transaction is beyond commercial relevance for MT. On the other hand, on a practical level the liability of the national railways involved is only enforceable with a high degree of uncertainty, as will be seen in chapter 5.

The freight forwarder provides only TEUs as investment into this transaction. These are standard piggyback containers, which could be used for any other of the three contracts analysed in the thesis. The degree of specialisation of wagons on the rail transport operator's side exemplifies the lack of specialised investment by the freight forwarder. The motivation behind the rail transport operator to provide so called mega-wagons for this transaction, for example, is to increase the number of standardised 9m swap bodies from one to a total of two on one wagon. The liability of the freight forwarder is of a professional nature and not specifically designed for this transaction.

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[32] GTB Intercontainer. See appendix. Interview with Hans-Jörg Bertschi, Bertschi AG, Dürrenäsch, on 30.08.1993 in Birrfeld/CH.

4.2.2 Kombiverkehr Contract

This section investigates the Kombiverkehr contract between freight forwarders and rail transport operators. After a brief outline on the intermediary and the practical use of the contract, firstly its sources and contract elements and secondly its TCE-contract incentives from the standpoint of the transaction participants are analysed.

4.2.2.1 Contract structure

4.2.2.1.1 The intermediary

Kombiverkehr's corporate structure is as follows. On the basis of its legal structure, Kombiverkehr is a limited partnership company <Kommanditgesellschaft> with a 100% interest in the general partner <Komplementär> Kombiverkehr GmbH. The company's annual shareholders' meeting <Gesellschafterversammlung> consists of 282 partners with limited liability <Kommanditisten> (Kombiverkehr, 1999a), who are representatives of the road transport industry, mostly freight forwarders, liable only to the extent of their share capital, approx. EUR 15,000 each. The supervisory board <Verwaltungsrat>, a non-executive board, is elected through the company's general meeting <Gesellschafterversammlung> (Kombiverkehr, 1996:Arts. 2 & 8; Kombiverkehr, 1999a:42).

In terms of voting power, DB participates, through its goods transport operator DB Cargo,[33] in the profit of the intermediary via a capital share that amounts to double the obligatory contribution to capital as limited partner <Pflichteinlage als Kommanditist> of Kombiverkehr (1996:Art. 12a), i.e. approx. EUR 30,000 (Kombiverkehr, 1999a:41). A limited liability partner's share <Kommanditisteneinlage> confers one 'capital voting right' <Kapitalstimme>, whereas every 0.5% contribution to Kombiverkehr's group turnover confers one 'turnover voting right' <Leistungsstimme>. The maximum voting power is 11 votes in the company's general meeting <Gesellschafterversammlung>, consequently, the maximum single annual shareholders' meeting vote is limited to 4% of all votes.

Kombiverkehr pursues three main aims (Oelfke, 1991:S.157). Firstly, it organises road trucking to and from the MT-terminals. This service is performed partly by the freight forwarders themselves and partly by road transport operators. In the

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33 DB Cargo AG, Frankfurt am Main: 100% subsidiary of Deutsche Bahn AG.

latter case, Kombiverkehr acts as intermediary. Secondly, it organises rail transport on behalf of freight forwarders, not only for shareholders but also for shipper-owned road transport operators <Werkverkehrsunternehmen>[34] and has it executed by DB Cargo. Consequently, it creates a joint demand for these outsourced transport services,[35] and acts as agent to DB Cargo. Thirdly, Kombiverkehr builds and maintains MT-infrastructure of MT. This includes not only technical equipment for terminal transhipment and wagons, but also agencies at the MT-terminals.

To sum up, the intermediary Kombiverkehr[36] is a consumer co-operative.[37] Due to the dominant position which the freight forwarding industry holds in terms of Kombiverkehr's capital participation, this intermediary can be grouped with the freight forwarding industry. This attribution is underlined by the corporation's aim to lobby interests of road transport versus the rail industry (Kombiverkehr, 1996:Art. 2:1). DB Cargo cancelled in 1999 the minority stake it had held in Kombiverkehr since 1969. The single shareholder's voting power of an individual company is nevertheless very limited.

4.2.2.1.2 The contract use

The MT organised by freight forwarders in domestic transport or international transport via Kombiverkehr is defined from a legal standpoint as road traffic using the rail network.[38]

4.2.2.1.3 Contract sources

The sources of the contract between freight forwarder and rail transport operator can be subdivided into the rights and duties of the road side on the one hand, i.e. of the freight forwarder himself and of the road-based intermediary Kombiverkehr, and of the rail side, i.e. of the railway, on the other.

The legal contract documents from the standpoint of the freight forwarder are the so-called shipping instructions <Versandauftrag>. As for the consignment note <Frachtbrief> in road transport, this document serves as the legal evidence of the contract. Moreover, Kombiverkehr's shipping instructions are the legal

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34 Interview with Rainer Mertel, Kombiverkehr Deutsche Gesellschaft für kombinierten Güterverkehr mbH & Co. KG, Frankfurt am Main, on 18.06.1999 in Frankfurt am Main.

35 GTB Kombiverkehr Art. 1:1 and 2. See appendix.

36 Subsequently for: Kombiverkehr Deutsche Gesellschaft für kombinierten Güterverkehr mbH & Co KG, Frankfurt am Main/D.

37 See chapter 3.

38 GüKG Art. 3:2; Oelfke (1991:157); Geßler (1977:Art. 425, No. 34-39).

equivalent to the delivery note <Uebergabeschein> of the Intercontainer contract as mentioned above. The contracts for this transaction, as far as the freight forwarders are concerned, are:

1) regarding ***Kombiverkehr*** in relation to the supplier ***rail transport operator***:
   - Kombiverkehr's GTB <AGB Kombiverkehr> covering domestic transport;[39]
   - UIRR's GTB <AGB UIRR> covering international transport;[40]
   - Legend appendix attached to the Kombiverkehr-timetable <Kombi-Fahrplan> (Kombiverkehr, 1999b); and
   - Kombiverkehr's (1996) articles of association <Satzung>.

2) regarding individual ***freight forwarder*** as transport operator in relation to the ***shipper***:
   - Para. 425 HGB, Para. 631 ff. BGB and Para. 675 BGB for domestic transportation; and
   - "Convention relative au contrat de transport international de marchandises par route (CMR)",[41] especially CMR Art. 23 Sect. 5 (damage/loss) and CMR Art. 20 Sect. 1 in conjunction with CMR Art. 19 (breach of delivery deadlines) for international transport.

3) regarding ***freight forwarder*** in relation to the ***rail transport operator***:
   - CIM as foundation for the transport certificate <Frachtvertrag> with DB Cargo[42] for international transport; and
   - framework contract <Rahmenvertrag> between Kombiverkehr and DB Cargo.[43]

From the standpoint of the railway, the general outline contract <Rahmenvertrag>, finalised in 1968 and updated only twice since, is the framework for the relationship between DB Cargo and Kombiverkehr. It guarantees special conditions for Kombiverkehr as the biggest buyer of train slots for piggyback transport in Germany. The contract specifically makes the slots more easily available and cheaper for Kombiverkehr. At its last amendment, it

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39 GTB Kombiverkehr. See appendix.

40 GTB UIRR. See appendix.

41 in full: "Convention du 19 mai 1956 relative au contrat de transport international de marchandises par route (CMR)"; enacted by law in Germany since 16.08.1961.

42 GTB Kombiverkehr Art. 7:1 and 2. See appendix.

43 Once revised since 1969. Information from Hans Wenger, Kombiverkehr Deutsche Gesellschaft für kombinierten Güterverkehr mbH & Co. KG, Frankfurt am Main, on 22.06.1993 in Sulzbach am Taunus/D.

even guaranteed a price for the purchase of slots, i.e. this treaty guaranteed price stability until May 1998.[44]

Important operational changes in the rights and duties between the rail side and the road side that complement the contract details are now considered. Until 1999, Kombiverkehr was not liable and did not directly deal with faulty rail transport service they sold to the freight forwarders, except where Kombiverkehr was itself to blame and for gross negligence.[45] That is to say, it used to pass on all rights and duties of one contract participant directly to the other transaction participant.

A significant change - parallel to Kombiverkehr gaining the status of freight forwarder[46] - has occurred affecting contract disputes over railway contract clauses, which sometimes due to bureaucracy red tape from the railway companies were not enforceable in an efficient manner. Since 1999, Kombiverkehr does not forward smaller freight forwarders' claims of damage and delays to the rail transport operator directly, but deals with them itself. The striking difference to the status-ante is Kombiverkehr's decision to settle disputes immediately through payment of damages of some sort. This has been introduced in case taking up the evidence and tracing the faulty part in the transport chain is either against the transaction participant's interest or may result in costs in excess of the amount under dispute.

4.2.2.2 Kombiverkehr governance

4.2.2.2.1 Elements of the contract between freight forwarder and rail transport operator

In the contract between freight forwarders and the railway, the following elements relevant to TCE can be distinguished:

- Profit sharing

On the one hand, DB Cargo holds two capital votes in Kombiverkehr, which qualify for dividend payments. On the other, Kombiverkehr's profits above 5% of share capital are distributed through dividend dependent on the annual turnover of the respective shareholder with Kombiverkehr. Given that Kombiverkehr's annual shareholders' meeting has a minimum of 282 voters and the profits after

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44 Interview with Rainer Mertel on 17.04.2000 in Frankfurt/Main/D.

45 GTB Kombiverkehr Art. 1. See appendix.

46 Since 01.07.2000 Kombiverkehr has legal status of freight forwarder; Interview with Rainer Mertel on 17.04.2000 in Frankfurt/Main/D.

tax have been on average DM 1 million (approx. EUR 500,000) in recent years, the relative power of DB Cargo's votes including the approx. EUR 300,000 total annual dividends distributable relative to the turnover of DB Cargo make these incentives negligible from the standpoint of the rail transport operator.

From the standpoint of freight forwarders, directly there is no substantial (i.e. relative to turnover) profit-sharing in place derived from freight forwarder activity specialising in MT-transport. With profit levels as above, a typical partner has less than 0.5% of Kombiverkehr's profits as dividend entitlement via shareholding and approx. EUR 300,000 total additional turnover dividend is split between all 282 shareholders. Therefore, the incentive profit sharing for the freight forwarder through shareholding in Kombiverkehr carries no substantial financial gains for freight forwarders and can be neglected in comparison to the full turnover of these companies participating in piggyback transport.

- Specialised investment

The following investments have been undertaken by Kombiverkehr:

1) Wagons

   Kombiverkehr does not hold specialised assets for rolling stock on a significant level. A former participation in Kombiwaggon GmbH,[47] Eltville, has been discontinued, as well as investments in special trans-alpine wagons for the 'Rolling Highway' <Rollende Landstrasse>. Kombiwaggon GmbH, Eltville, is the rail-based provider of wagons for the piggyback transport industry. Kombiverkehr uses specialised wagons of other piggyback transport intermediaries for international transport and DB Cargo's specialised wagons for domestic transport. Only on one international route - certain transport to Italy - has Kombiverkehr itself started to invest in specialised wagons on a very small scale in 1997.[48]

2) MT-terminals

   Almost 80% of Kombiverkehr's participations are placed in various companies involved in either planning or operating MT-terminals.[49]

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47 Subsequently for: Kombiwaggon Servicegesellschaft für den Kombinierten Verkehr mbH, Mainz/D. Kowag is a 100% subsidiary of DB Cargo (total share capital DM 500,000). Interview with Juergen Hipp, Division KLV, DB Cargo AG, Mainz, on 29.05.2000.

48 Interview with Rainer Mertel on 18.06.1999 in Frankfurt/Main/D.

49 The most significant (above EUR 50,000 and consolidated) are: Terminal Mannheim (via Deutsche Umschlaggesellschaft Schiene-Strasse DUSS mbH, Bodenheim/Rhein), Terminal Basel (via Kombiverkehr Agentur Basel AG, Basel/CH), Terminal Krefeld (via HUG Hohenbudberg Umschlaggesellschaft mbH & Co. KG, Krefeld), Terminal Neuss (via Neuss-Hessentor

Kombiverkehr (1999a) is in direct possession of a fleet of mobile cranes for handling TEUs in the terminals.

3) Sales agencies
Kombiverkehr (1999a) owns sales agencies in all major domestic MT-terminals.

To summarise Kombiverkehr's piggyback transport investment, it does not carry significant investment in wagons. However, its investments in MT-terminals through participations and direct ownership of sales agencies on the one hand, and through direct investment in mobile handling machinery on the other hand, are significant. In terms of specialised investment, a clear difference exists between the Intercontainer contract and the Kombiverkehr contract.

The specialised piggyback transport investments of the railway in the area of terminal operations are substantial, and even increased through a participation in Duss mbH, the company for planning, financing, building and organising the MT-terminals in Mannheim/D.[50]

- Liability

The liability of the rail transport operator is governed by CIM for international transport and by DB Cargo's GTBs for domestic transport. The ***domestic transport*** liability to be covered by the ***rail transport operator*** amounts to:

1) DEM 20/kg gross weight of the goods (approx. EUR 10),
2) DEM 2,000,000 maximum (approx. EUR 1,000,000),
3) DEM 5/kg total weight of TEU including goods (approx. EUR 2.5),

whichever amount is greater.

These liability limits apply to all cases apart from gross negligence and own fault. For domestic transport there are no liability clauses for breaking delivery deadlines in DB Cargo's GTB. On the other hand, liability for the ***rail transport***

Multimodal GmbH), Terminal Bremen (via Roland Umschlaggesellschaft für kombinierten Güterverkehr mbH & Co. KG, Bremen), Terminal Ludwigshafen (via Kombierminal Ludwigshafen KTL GmbH, Ludwigshafen). Kombiverkehr (2000:48).

50 Subsequently for: Deutsche Umschlaggesellschaft Schiene-Straße (DUSS) mbH, Frankfurt am Main. Participation of Deutsche Bahn via DB Netz in Duss mbH: 50% (of total share capital of DEM 1,000,000). Interview with Juergen Hipp, Division KLV, DB Cargo AG, Mainz, on 29.05.2000.

operator with ***international transportation***, as outlined in section 4.2.1.2.1, is according to CIM:

1) a maximum of 17 SDR (Special Drawing Rights) per kg gross weight (approx. EUR 24.3),[51]
2) in absolute terms at the current market price as a maximum, including customs and transport charges,[52] with damages calculated as the value depreciation of the goods compared to being despatched in full and on time at the point of destination.[53]

The weight in the calculations above includes the TEU, i.e. the trailer or swap-body. Furthermore, a maximum liability of three times the freightage[54] is used for not meeting the delivery time according to CIM, which as a guideline requires approximately 400 km per 24 hours.[55]

The liability of the ***intermediary Kombiverkehr*** in ***domestic transport*** amounts to:

1) SDR 8.33/kg gross weight of the TEU (approx. EUR 11.9),[56]
2) DEM 2,000,000 maximum (approx. EUR 1,000,000),
3) a maximum of 3 times the freightage for breaking delivery deadlines,

according to Kombiverkehr's GTB.[57]

For ***international transport***, the liability of the ***intermediary Kombiverkehr*** is:

1) SDR 8.33/kg gross weight of the TEU (approx. EUR 11.9),
2) SDR 300,000 maximum per TEU (approx. EUR 430,000),
3) SDR 2,000,000 overall maximum per incident (approx. EUR 2,850,000), and
4) a maximum of 2 times the freightage for breaking delivery deadlines,

according to UIRR's GTB for international transport.[58]

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51 CIM Art. 40: 2.
52 CIM Art. 40: 1.
53 CIM Art. 42: 1.
54 CIM Art. 43: 1.
55 CIM Art. 27: 2; Legal option for special delivery times: CIM Art. 27: 2 and Art. 43: 6.
56 At a rate of 0.70 SDR/EUR as of 30/05/00.
57 GTB Kombiverkehr Art. 8. See appendix.
58 GTB UIRR Art. 8.4f. See appendix.

Without special agreement, the intermediary Kombiverkehr - in this case acting as a ***freight forwarder*** for the entire transport distance, road and rail - can be held liable on the basis of the HGB for ***domestic transportation*** for:

1) SDR 8.33/kg gross weight of the TEU (approx. EUR 11.9), and
2) a maximum of 3 times the freightage for breaking delivery deadlines,

according to HGB.[59] Special agreements can be finalised in the range of 2-40 SDR/kg gross weight of TEU (approx. EUR 2.85-57.0).[60]

In ***international transport***, CMR applies, with:

1) maximum freight value <Frachtwert> of the goods for loss/damage,[61] and
2) the same liability as in damage or loss, for breaking delivery deadlines from 30 days in the case of a specific agreement (if not specified: 60 days).[62]

CMR's definition of delay is not practicable for any scheduled service on piggyback transport. Therein, a delay occurs if the actual duration of the carriage exceeds the time it would be reasonable to allow a diligent carrier.[63]

To summarise liability as an instrument of guarantee in the contract for both freight forwarder and rail transport operator, there is a built-in incentive to the former for contract fulfilment via the liability clauses in DB Cargo's GTB. Nevertheless, this incentive is relatively low. Its liability for damage and loss is significant, via Kombiverkehr's GTB. However, for the rail transport element in piggyback transport, the exposure to potential damage compensation duties is fairly limited from a practical point of view. Liability of the freight forwarder is not relevant in this contract.

4.2.2.2.2 Contract incentives and summary

The above mentioned sources and elements of the Kombiverkehr contract between freight forwarders and rail transport operator can be summarised as follows in the context of TCE.

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59 HGB Art. 431: 1 and 3.
60 HGB Art. 449: 2.
61 CMR Art. 23: 5.
62 CMR Art. 20: 1 and CMR Art. 19.
63 CMR Art. 19.

From the standpoint of the service provider (rail transport operator), the scope of control in this transaction is high, due to the widespread vertical integration of wagons and the production units used in terminals. The incentive of profit sharing, however, is not significant for the rail transport operator. DB Cargo, i.e. the rail transport operator, finances and builds all major MT-terminals in Germany.[64] Moreover, in the area of terminal operations, the contract incentive through its participation in Duss mbH, the MT-terminal operator, is substantial. Most wagons used in this contract are financed and operated by DB Cargo, either directly or indirectly via Kombiwaggon, the German piggyback transport wagon service company.

From the standpoint of the service recipient (freight forwarder), its specialised investments focus on MT-terminals, i.e. fixed terminal investments and mobile cranes. There is no significant specialised investment in TEUs or wagons. Its exposure to potential damage compensation via Kombiverkehr or itself acting as a freight forwarder in the non-rail elements of the piggyback transport chain is higher. However, the liability limits are not commercially relevant for the goods transported in this contract.

4.2.3 Hupac Contract with Traditional Freight Forwarder

This section typifies the Hupac contract between traditional, or so-called classical, freight forwarders and rail transport operators. This 'Hupac contract with traditional freight forwarder' will also be called 'Hupac contract' below. As in the previous contracts Intercontainer and Kombiverkehr, first will be an outline on the intermediary and the practical use of the contract. This is followed by analysing its sources and contract elements and then its contract incentives, focusing especially on those incentives influencing the level of TCs, from the standpoint of the transaction participants.

4.2.3.1 Contract structure

4.2.3.1.1 The intermediary

The intermediary Hupac, Chiasso/CH,[65] is established as a shareholder company <Aktiengesellschaft (AG)> with a majority holding by Swiss-based freight forwarders. Its share capital consists of 72% freight forwarders and road transport

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64 See chapter 3.

65 Subsequently for: Hupac S.A., Chiasso/CH. Interview with Peter Hafner, Hupac SA, Chiasso/CH on 20.06.2000.

operators participation, and 28% railway companies participation, thereof 24% SBB (Swiss railways).[66]

The aims of Hupac are firstly the marketing of MT-services of rail transport operators to freight forwarders and secondly the acquisition and operation of piggyback transport with its own wagons and MT-terminals (SBB, 1991b:21; Hupac, 1998:Appendix). Hupac even provides rail transport services with its own locomotives within the boundaries of MT-terminals in Switzerland (Hupac, 1998:Appendix).

4.2.3.1.2 The contract use

The main transport axes of the Hupac contract with traditional freight forwarder are trans-alpine routes in the North-South direction.

4.2.3.1.3 Contract sources

Freight forwarders who organise transport to and from Germany carry out international transportation under this contract:

1) with acknowledgement of UIRR's GTB <AGB UIRR>, published and governed via UIRR, the umbrella association for European road-dominated piggyback transport intermediaries;
2) subject to the legal terms of CIM, especially for the liability of the rail transport operators in relation to freight forwarders; and
3) there exists a co-operation contract between Hupac and SBB, the Swiss federal railway framework contract <Rahmenvertrag>.

This agreement between the intermediary and the rail transport service provider is comparable with the framework contract between Kombiverkehr and DB Cargo of section 4.2.2.1. However, the Hupac-SBB contract does not contain any information relevant to the TCE approach of this thesis, unlike the Kombiverkehr-DB Cargo contract, as it does not touch investment, liability or profit commitments on either side.[67]

The legal contract for international transport of piggyback transport consignments with the three participants freight forwarder, Hupac as intermediary and rail transport operators, is the CIM consignment note/UIRR-contract <CIM-

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66 Interview with Peter Hafner, Hupac SA, Chiasso/CH on 20.06.2000.
67 Information from Hans-Jörg Bertschi, Bertschi AG, Dürrenäsch, on 30.08.1993 in Birrfeld/CH.

Frachtbrief/UIRR-Vertrag>.[68] This document is equivalent to the shipping instructions <Versandauftrag> of the Kombiverkehr contract and the delivery note <Uebergabeschein> of the Intercontainer contract (Oelfke, 1990:42).

4.2.3.2 Hupac governance

4.2.3.2.1 Elements of the contract between freight forwarder and rail transport operator

The elements of the Hupac contract are broken down into profit-sharing, liability and specialised investments of freight forwarders and rail transport operator.

- Profit-sharing

There are no direct profit distribution structures in place from railway companies to freight forwarders. On the other hand, SBB, the Swiss national railway, holds a minority stake in Hupac which affects international transport to and from Germany. The SBB participation in Hupac's share capital of SFR 12 million (approx. EUR 7 million) is 29.2% (SBB, 1993a:23). As a reference, the share capital <Eigenkapital> and interest-free government loans <zinslose Bundesdarlehen> of SBB amount to SFR 12 billion (approx. EUR 7 billion) (SBB, 2000a). From the standpoint of rail transport operators involved in this contract, such as SBB, SNCF, FS or DB, relative to turnover there is no substantial profit-sharing in place with the freight forwarders from MT activities.

- Liability

Claims can be submitted by the freight forwarder to the railway company according to CIM and to Hupac according to GTB UIRR. From the standpoint of a German freight forwarder, only international, and not Swiss domestic, transportation law is relevant. Consequently, liability as governed by CIM - and

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[68] Comité International des Transports Ferroviaires (eds.): Rundschreiben CIT 4.0.6./135 dated 21.01.1993: Lettre de Voiture/Contrat UIRR with the following elements (in German, due to specialist law system terminology untranslatable into English law terminology):

<1) Versandschein
2) Frachtbriefdoppel
3) Empfangsschein
4) Kopie Empfangsspediteur
5) Frachtkarte
6) Frachtbrieforiginal
7) Kopie Ausliefertransporteur>.

This contract corresponds in its set-up to the so called "KVO-Frachtbrief". Art. 10 ff. KVO; Art. 426 HGB; Oelfke, Wolfgang: Güterverkehr, 1991, 145. Similar structure of the so-called "EVO-Frachtbrief" (rail transport). Art. 61 ff. EVO; vgl. Oelfke, Wolfgang: Güterverkehr, 1991, 96 ff. Additional documents under 4), 5) and 7) are necessary here due to the broken character of the MT-transport chain.

Hupac's GTB are important here. The liability clauses for international transportation of the railways involved and for the intermediary Hupac are identical to those cited in connection with the Kombiverkehr contract in section 4.2.2.2.1.

- Specialised investment

The freight forwarder receiving rail transport operator services, indirectly via Hupac, holds various significant specialised investments.

1) Wagons

For all MT-transport technologies commercially used (swap body, trailer and 'Rolling Highway'), Hupac owns more than 1,800 wagons directly. The wagon types are (approximately, as of 1999) (Hupac, 1998:Appendix): [69]

- 30 'Rolling Highway' sleepers
- 220 low-loader wagons
- 210 mega (2-part) wagons
- 20 jumbo (2-part) wagons
- 450 pocket wagons
- 450 flat wagons.

Hupac holds 20%, equivalent to EUR 20 million, of Cemat SpA, Milan/I, a company that owns and manages piggyback wagons.

2) MT-terminals

Hupac owns three international MT-terminals for piggyback transport in Busto Arsizio/I, Singen/D and Oleggio/I. Additionally, Hupac owns or participates in a majority stake in two additional MT-terminals in Northern Italy, namely Milan and Chiasso.[70] Moreover, a minority shareholding of C.I.M., Novara/I, of approx. DEM 1 million (approx. EUR 500,000 and equivalent to 4.8% total share capital of C.I.M.), represents another significant investment in terminal infrastructure. Additionally, Hupac controls all terminals and rolling stock of Trailstar N.V., Rotterdam, the Dutch road-industry-dominated intermediary for piggyback transport. A majority shareholding was acquired in 1998 (Hupac, 1999).

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69 Less than 7% of the rolling stock is leased.

70 The most significant participations (above EUR 50,000 and consolidated) are: Terminal Busto Arsizio (via Hupac S.p.A., Busto Arsizio/I), Terminal Oleggio (via Fidia S.p.A, Oleggio/I), Terminal Singen (via Terminal Singen TSG GmbH, Singen/D); Hupac (1999) and Hupac (1998:Appendix).

3) Rail tracks
Hupac directly invests in all rail tracks in terminal areas.

4) Sales agencies
Hupac owns sales agencies in all of its terminals.

5) Investment in MT-know-how
Through its German subsidiary Hupac GmbH, Singen/D, Hupac holds a railway licence for Germany, i.e. the intermediary can act like a railway company <Eisenbahnverkehrsunternehmen (EVU)> (Hupac, 1999).

In summary, Hupac undertakes specialised investments on a large scale along the entire MT chain, i.e. constantly invests in a wagon fleet, of which approx. 50% is highly specialised investment suited only for alpine transport. Moreover, Hupac's investments cover MT-terminals, including terminal agency offices. The geographical distribution of these specialised investments underlines the importance of the North-South axis as a market segment for this intermediary. Tangible fixed assets <Sachanlagen> in wagons and MT-terminals account for more than 60% of Hupac's approx. EUR 90 million consolidated balance sheet total in 1997. Moreover, it directly owns sales agencies in key consolidation and distribution areas of in trans-alpine transportation.

On the other hand, the rail transport operator as the service provider only engages in specialised investment in rail tracks in MT-terminal areas. The remaining investments, such as TEUs, wagons, and terminal infrastructure like cranes, are owned by the road transport industry directly or indirectly via Hupac.

4.2.3.2.2 Contract incentives and summary

From the standpoint of the service provider (rail transport operator), the scope of controllability in this contract is much weaker than in the previous contract Kombiverkehr. This is due to the widespread vertical integration of the production units used in wagons, terminals, sales outlets and MT-know-how from the road transport industry via Hupac. The incentive of profit sharing is very low for the rail transport operator, SBB. The latter finances and builds MT-terminal track investment in Switzerland. Its relevance for this contract from the TCE perspective lies in the area of building and maintaining specifically designed MT-terminal approaches for trans-alpine traffic. Moreover, there is a contract incentive for the service provider via the liability clauses of CIM, identical with

the German railway DB Cargo's liability mentioned in the previous contract. Nevertheless, just like for DB Cargo, this incentive is relatively low.

From the standpoint of the service user (freight forwarder), the incentive of profit sharing is non-existent. Its specialised investments in MT-terminal infrastructure and wagons above constitute an important incentive element in the Hupac contract. Via UIRR's GTB, the freight forwarder's liability for damage and loss is significant. Moreover, due to the high level of vertical integration in the transport chain, the exposure to potential damage compensation is significant, different to the previous contract Kombiverkehr.

4.2.4 Hupac Contract with MTO

This section investigates the Hupac contract between freight forwarders as MTOs and the rail transport operator. After a brief outline on the intermediary and the practical use of the contract, firstly the contract sources and contract elements and secondly the contract instruments and incentives from the standpoint of the transaction participants are analysed. As this contract - especially from its legal sources - uses a similar set-up to the previous Hupac with traditional freight forwarder, the analysis focuses only on the differences to the three contracts typified so far.

4.2.4.1 Contract structure

4.2.4.1.1 The intermediary

Just like in the Hupac contract in the previous section 4.2.3, this contract also uses Hupac as intermediary. Therefore, Hupac's ownership structure and corporate aims apply.

4.2.4.1.2 The contract use

A freight forwarder as MTO, specialising in MT, acts as the transaction participant in the contract Hupac with MTO, compared to a general-purpose freight forwarder in the contract Hupac with traditional freight forwarder. The previous Hupac contract vertically integrates specialised investments within a freight forwarder-owned co-operative. The contract type with an MTO differs from the previous contract with traditional freight forwarders, insofar as now some of the specialised investments are being vertically integrated within individual freight forwarder companies (MTOs).

4.2.4.1.3 Contract sources

As for the contract Hupac with traditional freight forwarder already described in section 4.2.3.1, the most important contract sources used for this contract Hupac with MTO analysis are UIRR's GTB for the intermediary's liability and CIM for the rail transport operator's liability. As for the previous contract, the transport instructions <Transportauftrag> are documented through the so-called CIM consignment note/UIRR-contract <CIM-Frachtbrief/UIRR-Vertrag>, which the freight forwarder finalises with the intermediary.

4.2.4.2 Hupac with MTO governance

4.2.4.2.1 Elements of the contract between freight forwarder and rail transport operator

From the standpoint of liability and profit-sharing there is no difference regarding contract elements to the Hupac contract in section 4.2.3.2. However, the freight forwarder's investments are significantly more specialised compared to the previous contract.

- Specialised investments

The MTO provides specialised investments in fixed assets <Anlagegüter> at the MT-terminals, in wagons, swap bodies and trailers dedicated to MT-transport.[71] Moreover, MTO investment can be found in information processing tools, i.e. to enable accompanying information ahead of or following consignments.

However, in contrast with the former contract, control over all these investments - namely from the freight forwarder as MTO - is absolute, compared with the indirect control over these investments of freight forwarders via Hupac in the previous contract. In the latter case, freight forwarders only participate indirectly, specifically in those MT-specialised investments involving wagons and MT-terminals. Now the specialised investment in the specific areas are assets provided directly by the MTOs. The following specialised investments apply for MTOs:

1) TEUs:
   Due to the time-sensitivity and special physical appearance of the goods transported under this contract, tailor-made TEUs are provided by MTOs.

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[71] Information from Hans-Jörg Bertschi, Bertschi AG, Dürrenäsch, on 30.08.1993 and Bertschi (1995).

2) Wagons:
Investments with a high specialisation are low-profile wagons suitable for the Swiss railway tunnels, which carry a special profile.

3) MT-terminals:
Specialised investments are terminal infrastructure owned directly by MTOs. Examples of this kind of specialised investment are, Bertschi AG, Dürrenäsch/CH, and Giezendanner Transport AG, Rothrist/CH who own one MT-terminal each, Dürrenäsch and Rothrist (both CH).[72]

Other examples of piggyback transport MTOs, with highly specialised investments in TEUs in wagons, terminals or rail tracks, are Hoyer AG (Hamburg/D), Hangartner (Aarau/CH), Ambroggio (I) and Intermodali Italiana (I).

4.2.4.2.2 Contract incentives and summary

The incentive instruments via profit-sharing and liability, applicable to both rail transport operators and freight forwarders, are identical with the Hupac contract. The control of the rail transport provider over the transport chain in this contract is at its lowest level compared with all other contracts in the thesis.

All incentives, such as profit sharing and liability for service failures, and specialised investments are identical compared to Hupac with traditional freight forwarder. On top of the freight forwarder's commitment to the contract, however, significant specialised investments in TEUs and immobile fixed assets of terminal infrastructure apply to this contract. This contract marks the maximum control of the road transport side of all four contracts analysed.

Because of the low investment commitment in specialised assets, the tendency of the rail transport operator for a long-term contract horizon is weaker than in any other contract in the thesis. The Hupac contract with MTO allows the freight forwarder to control directly, via hierarchy and orders within the company, the entire transport chain except for the rail transport service itself.[73] Consequently, the motivation from the freight forwarder as transaction participant to negotiate a long-term type of contract with the rail transport operator for providing the rail transport service is higher than with any other contract analysed so far.

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72 Information from Hans-Jörg Bertschi, Bertschi AG, Dürrenäsch, on 30.08.1993 in Birrfeld/CH.

73 The reason for this is the insufficient finalisation of EU-regulation 1017/68 into national legislation. Verordnung 1017/68.

4.3 SUMMARY OF CONTRACT DESCRIPTION

This chapter has focused on TC-relevant elements of contracts a freight forwarder can be involved with when organising piggyback transport in Germany. Its purpose has been to pinpoint and illustrate the relevant contract elements that allow an explanation of the degree of vertical integration for the production of rail transport operator services in that industry. For this reason, the description of all contract elements apart from investments has been carried out in chapter 4.

Firstly, although piggyback transport intermediaries hold a prominent position in the contracting process, they can - due to their ownership structure - all be attributed to either the rail side (sell-side) or road side (buy-side) of the transaction. Secondly, the key differences in the contract elements other than credible commitments via asset specificity have been established, that differentiate the four contracts in terms of the degree of vertical integration, i.e. their position as form of co-ordination in the spectrum between market and hierarchy. A full assessment of that degree cannot be carried out until the modelling of asset specificity for the use of credible commitments has taken place.

The qualitative modelling of investments as artificial (contract-rooted) or built-in (service-rooted) asset specificity follows in chapter 5. Subsequently, the connection can be established between asset specificity, as defined in chapter 2, and vertical integration.

CHAPTER 5: EXPLANATION OF PIGGYBACK TRANSPORT CONTRACTS AND COMPARATIVE ANALYSIS OF ALTERNATIVE CONTRACTS

5.1 EXPLANATION OF CONTRACT FORMS

The aim of this section is to explain the contracts described in chapter 4 which co-ordinate the freight forwarder's purchase of the rail transport operator's service in piggyback transport.

For each of the contracts, the arguments are advanced in three stages: first, the transport services are described by using the logistics dimensions developed in section 3.1 (space, time, quantity, information). Then, the environmental factors of Williamson's organisation failure framework are derived. At the same time, these transaction attributes are evaluated according to the indicators set out in chapter 2, i.e. qualitatively modelled. For the hypothesis of the thesis, the asset specificity from which hold-up situations can arise is decisive here. This asset specificity is modelled on four factors: physical, dedicated, site and human asset specificity. If not stated otherwise, 'asset specificity' stands for physical asset specificity in this chapter. Besides the existence of a hold-up position caused by one of these factors, the relative level of sunk costs from this hold-up position is of key importance. In the third stage, the instruments used in the contract forms to reduce TCs are compared with the sources of TCs in accordance with the types of contract described in chapter 2. Here, in addition to the incentives in the form of material hostages, such as liability and profit sharing, the incentives in the form of specific assets play a decisive role. The absolute amount of sunk costs of these asset-based credible commitments is adjusted on the basis of the difference between the respective lock-in effects of the two transaction partners. The greater the resulting net lock-in effect on the part of one transaction partner, the stronger the effect of the hostage upon the transaction as a credible commitment. Asset specific investments therefore are analysed firstly in their capacity as transaction attributes (built-in asset specificity) and secondly in their capacity as contract elements (artificial asset specificity). The former create TC, whereas the latter reduce them. As a result, attributes can be assigned to instruments, according to Williamson.

On the one hand, the achievement of this section consists in a categorisation of transport services through the logistics dimensions as developed in chapter 3. These transaction attributes are further modelled in accordance with TCE. On the

other hand, the contracts described in chapter 4 are assigned to these modelled transport services (assigning of contracts to transactions).

As explained in chapter 1, the method used here is a qualitative case study, i.e. the calculation of the degree of market failure - hold-up situation and sunk costs - as well as the attribution of contracts to transactions - assigning - is undertaken in a qualitative way. The credible commitments other than asset specificity used as hostage, such as profit sharing and liability, have already been modelled qualitatively in chapter 4. The credible commitments based on asset specificity are now analysed in conjunction with the lock-in-effects in this chapter. On the one hand this sequence of analysis allows a clearer view on the assigning process later in this chapter. The distinction between 'artificial' asset specificity as a hostage and 'transaction built-in' asset specificity cannot always be drawn clearly in piggyback transport. In most cases, the hold-up effects can only be weighted against each other without exact attribution as to whether the assets in question constitute an 'artificial' or 'transaction built-in'-type of asset specificity. On the other hand, in perspective of the thesis' aim to explain contracts and to judge on their efficiency, a distinction is not necessary.

At the same time, the connection between the degree of the asset specificity and the degree of vertical integration necessary for the production of the piggyback rail transport service will be examined.

5.1.1 Intercontainer Short-term Purchase Agreement

The contract between the freight forwarder and the rail transport operator, co-ordinated via the Intercontainer intermediary, is explained below. The procedure here is in three stages. First, the transport services co-ordinated through the Intercontainer contract are characterised using logistics dimensions. Then follows an analysis of possible sources of TCs and, finally, an assigning of contract instruments to these transport services for minimising TCs. The instrument liability via GTB and via transport law is highlighted.

5.1.1.1 The transport service: package freight

The transport service via Intercontainer can be characterised by the dimensions space, quantity, time and information, as developed in chapter 3.

- Space

Goods transport under this contract shows a wide dispersion spatially, over a comprehensive network of MT-terminals within Europe.[1]

- Quantity and time

In this contract, the transport of package freight predominates. This is understood to mean solid transport objects transported individually or in batches, e.g. cartons, sheet metal, pipes, crates and machinery. Planning and organising is not a strategic success factor. These goods are considered problem-free, purely operational, and standard (Offergeld, 1984:27f). Package freight goods have a high proportion of transport under this contract (Ihde, 1989:78). In addition, there is transport, owing to excess demand, which the forwarders cannot handle in road transport alone. This transportation in the form of wagon-loads exhibits lower time-sensitivity.

- Information

In general, the transport chains under this contract exhibit lower sensitivity to consignment information. For example, no information speeding ahead of the consignment is offered with this contract (i.e. the transmission of information on the consignment for the shipper and the recipient beyond the statutory standard (accompanying documents under §425 HGB) is not a strategic success factor).

5.1.1.2 Sources of TCs

TCs arise owing to opportunistic behaviour by a transaction partner in transactions in which specific assets are used to skim off quasi-rents. Uncertainty and asset specificity are presented below as a source of TCs in the handling of a transport assignment which is typical of the Intercontainer contract.

- Uncertainty

In all four contracts the transaction attribute of uncertainty in the form of:

1) change in customs or legal system,
2) arbitrary use of political power,
3) theft,
4) political unrest, or
5) danger from random acts of nature,

are slight.

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[1] See chapter 3 and ICF (2000).

Political instability and changes in the legal system are disregarded as factors of uncertainty, as well. Since the start of piggyback transport in Western Europe in the late 1960s, contracts between the transaction participants have not been influenced by these two types of uncertainty. As this applies to all four contracts analysed in the thesis, political and legal changes as a source of TCs will not be further investigated in the following three contracts, either.

Technological uncertainty is not considered here, as no specialised technologies are used for transporting package freight. The only applicable factor of uncertainty in this contract is demand uncertainty.

- Asset specificity

Owing to investment by the freight forwarder and the rail transport operator, the extent of asset specificity is decisive for the level of TCs. Specialised assets for this contract have been summarised in section 4.2.1.2.1. This data is now looked at from the perspective of TCE's asset specificity with the measurement definitions laid out in section 2.3.3.

- TEUs

Only the forwarder invests in TEUs as assets in the Intercontainer contract. However, a large re-purchase market exists for TEUs as swap bodies or trailers for standard transportation. They can, moreover, be used alternatively in container transport (in the case of swap bodies) or in road transport alone (in the case of trailers) without substantial extra costs. A possible asset specificity therefore does not exist, as far as the forwarder is concerned.

- Wagons

In the case of unilateral termination of the transaction, wagons can be sold off to a limited extent by rail transport operators. Owing to technological diversity within Europe, only a small number of potential purchasers can, therefore, use these wagons. The criterion which exists here of asset specificity - number of alternative transaction partners - is analogous to the case of the MT-terminal described above. Thus here, too, no asset specificity can be observed. It must be emphasised that factor specificity as an important causal factor of TCs does not arise for either of the two transaction partners in the case of wagon assets.

- MT-terminals

The rail transport operator invests in MT-terminals to fulfil the contract. When the transaction relationship is terminated by the forwarder, there are no sales opportunities for MT-terminals, since they represent fixed capital assets. However, the decisive criterion of asset specificity is sustainability (number of alternative transaction partners) which the rail transport operator finds when the transaction relationship is terminated. Since the contract has been concluded with only one forwarder, the rail transport operator will probably find a new transaction partner, as any forwarder in Germany who has swap bodies or trailers at his disposal can enter into the contract. Consequently, no specificity of assets exists in the case of terminals.

5.1.1.3 Assigning the instruments for reducing TCs to transport services

The analysis below of incentives to reduce TCs follows the classification of credible commitments introduced in chapter 2. As explained there, the following incentives exist for reducing TCs in accordance with the unilateral hostage model.

1) Participation in profits,
2) liability guarantee,
3) specific assets.

The incentives thus introduced were complemented by empirical contract data in section 4.2 for each of the four contracts studied. These incentives were then subject to a qualitative analysis according to TCE. This analysis prepared the allocation of transactions to contract forms in this chapter. Here, transactions according to factor specificity, frequency and uncertainty are assigned to the individual contract forms and their varying degrees of controllability according to TCE. This allows the efficiency of transport service co-ordination in the piggyback transport industry in Germany to be judged.

- GTB and statutory liability of the rail transport operator

The Intercontainer contract is clothed legally - as explained in chapter 4 - in the form of GTB. Compared with the purchase of road transport operator services by forwarders according to the general legal system, the Intercontainer contract is harmonised more specifically with the transaction situation. Compared to using general legal system clauses, only the higher information and agreement costs of GTBs can be offset owing to the higher frequency of contract use with each contract partner. In spite of absence of specific assets, the frequency of the

transport service leads to a contract tailored more to the transaction partner than to market co-ordination based upon the GTB legal system.

> "The cost of specialised governance structures will be easier to recover for large transactions of a recurring kind" (Williamson, 1984:206).

Also regulated in the GTBs is the assumption of liability by the supplier of the transport service. This is equivalent to the liability of a road transport operator for road transport operator services.[2] CIM, covering international transportation, imposes upon the railway no liability for external risks. In the Intercontainer contract the railway's own intermediary Intercontainer assumes, just as in the case of road transport, no liability for unavoidable events, i.e. uncertainty. Moreover, without authorisation by Intercontainer, personal injuries are excluded from liability.

Incentives going beyond the above-mentioned instruments cannot be found, and due to lack of asset specificity would not be an efficient contractual solution, either. Neither of the two transaction partners could exploit opportunistic behaviour for contract adaptation, since sunk costs for both forwarder and rail transport operator are not significant. Limits to liability are not very competitive, in the case of both loss or damage and also late delivery by the rail transport operator. Moreover, the possibility of recourse by the forwarder against the railway and Intercontainer is restricted. On the one hand, Intercontainer must itself be proved to blame. On the other, the rail transport operator can be sued at law only at great public expense.[3] As already pointed out in section 4.2.1.2.1, there is no profit sharing agreement set up in this contract.

As a result, the only incentives from the standpoint of TCE are guarantees in the form of liability clauses in the GTB used. No credible commitments in the form of reputation are recognisable. Intercontainer's liability commitments in its GTB go beyond the legal statutory provisions for transport operator services. Owing to the absence of any hold-up risk, failing specific assets, an incentive for Intercontainer to observe contract-compliant behaviour is not necessary and is not justifiable on grounds of TC-savings. However, the frequency of use of the contract results in a contract on GTB being selected to co-ordinate the transaction instead of a market form of co-ordination. The GTB are thus an expression of

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2 § 425 HGB and CMR.
3 See section 4.2.1.2.2.

frequent usage of this contract on similar conditions where a contract flexibility higher than that of a statutory arrangement is desired. The GTB can be amended or changed more quickly, i.e. in negotiations with the transaction participants, than transport law as part of general legislation, such as the HGB or CRM applicable to road transport domestically or internationally.

Owing to the lack of mutual hostages and significant incentives, the contract can be described as a short-term purchase agreement.

5.1.2 Kombiverkehr with Bilateral Co-operation

The contract between the forwarder and the rail transport operator which is co-ordinated through the MT intermediary is explained below. As already takes place in the Intercontainer contract, in sections 5.1.2.1 and 5.1.2.2 there is firstly a characterisation of the transport service using dimensions, followed by an analysis of the organisation failure framework (transaction attributes) resulting from this service. The incentive instruments of contracts modelled in chapter 4 can then - in section 5.1.2.3 - be allocated to the transport services (assigning).

5.1.2.1 The transport service: package freight and special freight

The transportation handled by forwarders through Kombiverkehr is characterised below using the dimensions space, quantity, time and information.

- Space

Kombiverkehr co-ordinates about 50% of its piggyback transport consignments within domestic transport in Germany. These transport tasks exhibit a very wide dispersion structure within the network of 61 domestic terminals.[4]

- Quantity

The goods transported under this contract are usually package freight, similar to transport under the contract Intercontainer, i.e. solid goods carried in standard swap bodies, trailers or trucks of the rolling highway. Besides package freight, impact-insensitive special goods (bulk freight, liquid freight and gaseous freight) are transported, for which special swap bodies are needed.

Bulk freight is understood as particulate, granular or powdery goods that are delivered loose for transport and for loading and unloading are poured into or out

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4 See chapter 3.

of the transport vessels, e.g. grain, flour, sugar, artificial fertiliser (Offergeld, 1984:27f). Liquid goods under this contract are goods of high or low viscosity which are likewise transported in bulk, e.g. leaches and acids (Offergeld, 1984:27f). Under gaseous freight is understood all gases transported in a vessel belonging to the means of transport and transported in bulk, e.g. natural and refined gases (Offergeld, 1984:27f).

- Time

Both standard goods and goods in special swap bodies exhibit low time sensitivity. High-speed scheduled transport services have been used by Kombiverkehr only on selected routes, e.g. Nuremberg-Hamburg with maximum speed of 160 km/h. For this high-speed link, 90 special purpose wagons were used at the beginning of the commercial service in 1991. This investment is an insignificant amount of specialised and dedicated assets compared to the 1,500 wagons in total of Kombiverkehr's main wagon provider Kowag GmbH, then 50% owned by the Kombiverkehr. The high-speed link was no longer operating in 1999 (Kombiverkehr, 1993a:26).[5] Transport of 24 hours' duration within Germany and 48 hours' duration within Europe is usually adequate under this contract.[6]

- Information

The transported goods do not exhibit any particular sensitivity to the flow of information. The consignment follow-up is largely the same as that of conventional rail transport by the German federal railway holding Deutsche Bahn AG (DB).

Not until the end of 1993 was an EDP-supported information system for fast, advanced consignment information tested on an experimental stretch of line and it still has not been used over the whole network. Only a few regional EDP-systems are currently used commercially. One example - Kombiverkehr's "Ali Baba" - supports a 48-hour link between Busto/I and Stockholm/S. "Ali Baba" not only enables the transport monitoring, but also booking, check-in and invoicing of the transport assignments (Kombiverkehr, 1999c; 1999d). This information system gets its information via sensors installed next to the track. As

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5 Interview with Rheinhilde Priebe, Kombiverkehr Deutsche Gesellschaft für kombinierten Güterverkehr mbH & Co. KG, Frankfurt am Main, on 17.04.2000 in Frankfurt am Main.

6 Interview with Rainer Mertel, Kombiverkehr Deutsche Gesellschaft für kombinierten Güterverkehr mbH & Co. KG, Frankfurt am Main, on 11.12.1991 in Frankfurt am Main.

the train passes these sensors, information is gathered on the nature and composition of the consignments via bar-coding.

5.1.2.2 Sources of TCs

The factors which appear as sources of TCs in the transport of goods under the Kombiverkehr contract - frequency, uncertainty and asset specificity - are presented below.

- Frequency

The value-level and number of transactions serve as indicators of frequency. If freight forwarders decide to use this contract, they usually transport significant annual transport volume. This fact is reflected in the formal requirements for use of this contract. As a shareholder of Kombiverkehr, forwarders enjoy more favourable transport terms and conditions, compared with outside forwarders. The minimum shareholding amounts to approx. EUR 15,000 (DEM 30,000) (Kombiverkehr, 1996:Article 3:3 & 4).[7] On the other hand, freight forwarders are forced to set up an account with a specialist transport bank,[8] which offers Kombiverkehr appropriate guarantees.

As a result, frequency in the Kombiverkehr contract is accordingly higher compared with the Intercontainer contract, owing to the larger number of individual transactions effected on the basis of capital participation and the more favourable terms and conditions.

- Uncertainty

From the standpoint of the forwarder and the rail transport operator, uncertainty is caused by demand uncertainty and technological uncertainty. As the technological specialisation of assets is still relatively low, uncertainty is comparable with the Intercontainer contract. As a result, uncertainty as a necessary factor for market failure shows no distinctive form from that of the Intercontainer contract.

- Asset specificity

In the Kombiverkehr contract, specific assets of the transaction partners are split up in four areas of the transport chain: namely TEUs, wagons, MT-terminals and terminal equipment. The hold-up position for the potential transaction partners

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7 See also chapter 4.

8 Deutsche Transportbank AG, Frankfurt am Main.

resulting from these assets is determined below, on the basis of the distinctive character of the specificity of the respective assets.[9] A detailed breakdown of the specialised investments has been provided in section 4.2.2.2.1. The focus in this chapter is on assessing the specificity of these assets.

- TEUs

Swap bodies, trailers and, for rolling highway <'Rollende Landstrasse'>, whole motor trucks are used as TEUs for MT with the Kombiverkehr contract. All TEUs in this contract are financed directly by the forwarder. The cost of a swap body is approx. EUR 7,500 (DEM 15,000), that of a trailer approx. EUR 20,000 (DEM 40,000).[10] However, with opportunistic behaviour by the transaction partner DB, these assets could be sold or used otherwise, including outside Kombiverkehr. A MT trailer with a more rigid chassis and gripping devices for vertical loading can be used, for example, without additional capital expenditure and without appreciable losses, in road transport alone.

Since sufficient alternative sales and application opportunities exist for transport TEUs, no physical asset specificity exists for forwarders in this contract.

- Wagons

From the total of approx. 11,000 piggyback wagons used under this contract in Germany, DB Cargo, the rail transport operator, owns approx. 83% (9095) (Bundesminister für Verkehr, 1991; DB, 1999).[11] Procurement costs for individual wagons are high. A standard flat wagon suitable for one trailer and a flat wagon suitable for two swap bodies amounts to approx. EUR 60,000 and EUR 40,000 respectively.[12] The total asset value of DB Cargo's wagons represents a substantial percentage of its approx. EUR 750 million (DEM 1,530 million) total fixed assets. If wagons are sold off, DB will be faced with the problem of technological diversity within Europe. Only a small number of potential purchasers can, therefore, use these wagons. However, the most important criterion for asset specificity is the number of alternative transaction partners. Since Kombiverkehr represents a co-operation of all major MT-forwarders, if the contract is terminated, the rail transport operator is faced with the problem of finding alternatives. Kombiverkehr represents the principal

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9 See section 2.3.3.1.

10 Jünemann (1989). Similar purchasing price estimates, approx. EUR 9,000 (FF 50,000), also in European Conference of Ministers of Transport (1984:Section 16).

11 Information by Herbert Essler, DB Cargo, Frankfurt am Main, on 02.10.2000.

12 Interview with Rainer Mertel, Kombiverkehr Deutsche Gesellschaft für kombinierten Güterverkehr mbH & Co. KG, Frankfurt am Main, on 08.12.2000 in Frankfurt am Main.

demand segment of forwarders. High asset specificity exists in the case of wagons for the rail transport operator.

From the standpoint of Kombiverkehr, 56 special purpose wagons for the transit line Germany-Italy are of no significance as potential sunk costs. These assets equal less than 1% of Kombiverkehr's annual turnover (Kombiverkehr, 1999a:39).[13] Consequently, no sunk costs emerge from this asset. All other special purpose wagons which Kombiverkehr includes in its product range are not owned by it. Kombiverkehr thus hires from Cemat S.p.A., the Italian piggyback transport intermediary, special purpose wagons for refrigerated transport, which form part of the approx. 13% non-DB owned wagons listed above.

- MT-terminals

In the case of MT-terminals, assets break down into three areas. These are the financing and operation of complete terminals, organisation of agency work and terminal equipment at the terminal. The terminal equipment will be analysed separately. As regards MT-terminals, of the currently 61 in Germany, only approx. 38% (23) are not owned by DB directly. An additional three MT-terminals - Hannover, Ingolstadt and Wolfsburg, - are financed in co-operation with private operators, all predominantly with car manufacturing related transport.[14] The majority of investment in MT terminals is therefore not carried by the freight forwarders. Nevertheless, as Kombiverkehr's total fixed assets invested in MT-terminals amount to approx. 5% of Kombiverkehr's total fixed assets, the sunk costs are significant.[15]

Agency work is shared to only a small extent by freight forwarders since, besides Kombiverkehr, agency work is carried out by DB mostly at small MT-terminals with little revenue. At larger MT-terminals, the agency work is also provided by road transport co-operatives <Strassenverkehrsgenossenschaften (SVGs)>, Duss mbH and various local terminal operating companies (e.g. Mannheim, Basle, Krefeld, Neuss and Bremen terminals).[16] As regards to the freight forwarders' specialised assets via Kombiverkehr in principal MT-terminals (terminal assets and agency services), the freight forwarders are in a similar position as DB Cargo

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13 Interview with Rainer Mertel, Kombiverkehr Deutsche Gesellschaft für kombinierten Güterverkehr mbH & Co. KG, Frankfurt am Main, on 08.12.2000 in Frankfurt am Main.

14 Information by Herbert Essler, DB Cargo, Frankfurt am Main, on 02.10.2000.

15 Interview with Rainer Mertel, Kombiverkehr Deutsche Gesellschaft für kombinierten Güterverkehr mbH & Co. KG, Frankfurt am Main, on 08.12.2000 in Frankfurt am Main.

16 See section 4.2.2.2.1.

with its specialised wagon assets. The number of potential buyers, or the number of alternative transaction partners for these assets, is low due to the market dominance of DB.

Asset specificity is now tested from the standpoint of the rail transport operator, holding the main asset share in MT-terminals and agency work. The first criterion of asset specificity, number of alternative transaction partners (physical asset specificity), is of a highly distinctive character, as DB Cargo would have to replace a customers base of the size of Kombiverkehr should the transaction relationship be terminated. The second criterion, sales opportunity, is likewise highly distinctive owing to the supplier monopoly of DB and the non-variability of the asset, MT-terminal. The importance of sunk costs - as measured by ratio of the value of the lost hostage over total fixed assets - is very pronounced. Moreover, MT represents a strategically important field of business for the rail transport operator. As a result, the degree of asset specificity for DB Cargo in MT-terminals is, on the whole, high. Agency work represents, on the other hand, a human asset specificity and physical asset specificity in a mixed degree.

- Terminal equipment

Apart from the fixed cranes for vertical handling, the 'piggypacker', a mobile terminal crane for vertical handling, forms a substantial investment of terminal equipment. The cost per piggypacker amounts to between EUR 0.55 million and EUR 0.75 million (DEM 1.1 million and DEM 1.5 million), depending in each case upon load capacity (Kombiverkehr, 1993a:27). For owner-operated MT-terminals, DB invests in portal crane installations and in mobile vertical terminal equipment. The latter exist at 35 out of 61 MT-terminals.[17]

In total, Kombiverkehr owns 24 piggypackers distributed between 8 of the 61 MT-terminals, in Germany (Kombiverkehr, 1993a:27). In the event of contract termination by DB with the forwarder, the latter can sell off piggypacker cranes to only a limited extent. Alternative transaction partners do not exist, owing to the monopoly position of DB. For forwarding, one may speak here of high asset specificity in the case of terminal equipment. The proportion of total company turnover over total assets in piggypackers is slightly higher than 5% (Kombiverkehr, 1993a:39).

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[17] Information by Bernhard Judith, Deutsche Bundesbahn, Geschaeftsbereich Ladungsverkehr, Frankfurt am Main, on 26.08.1993.

To sum up the entire asset specificity exposure of the transaction partners, it must be emphasised that for the rail transport operator asset specificity is very marked in the case of wagons and MT-terminals (agency work and immobile assets). Asset specificity for the forwarder is, on the other hand, low in the case of TEUs, but mixed for terminals (immobile assets) and high for mobile terminal equipment. Measures to reduce these TCs follow in the next section.

5.1.2.3 Assigning the instruments for reducing of TCs to transport services

The contract instruments in the case of the Kombiverkehr contract reducing TCs are, according to Williamson (1985:163ff), in all instances credible commitments typified in the unilateral hostage model.[18] In addition, within these instruments a distinction is made between incentives for the forwarder (purchaser of the transaction object) and incentives for the rail transport operator (supplier). These incentive instruments are intended to induce contract-compliant behaviour from the transaction partner.

An incentive for the forwarder for contract-compliant behaviour, through the instrument of profit-sharing, exists on the basis of indirect participation of the forwarding side through Kombiverkehr, as the MT-intermediary holds 50% of Duss mbH, the MT terminal operator. Nevertheless, as explained in section 4.2.2.1, the profit shares of both DB Cargo, the rail transport operator, and the forwarders in the piggyback transport intermediary company are negligible compared with the turnover and profit figures on both transaction partners' balance sheets.

The liability clauses as credible commitments from the road side via Kombiverkehr are not significant from the TC point of view, as Kombiverkehr's exposure to potential liability duties for the rail transport component is limited from a practical point of view. Also, as outlined in section 4.2.2.2.1, the liability of DB Cargo is relatively low in absolute terms both for missing delivery deadlines and damage compensation. As a result, Kombiverkehr has introduced a new service since 1999 of dealing with all smaller liability claims of damage and delays from freight forwarders to rail transport operators directly, with direct client compensation. For these small claims, instead of acting as intermediary in liability disputes, Kombiverkehr takes financial responsibility.[19] Therefore, Kombiverkehr's changed role regarding liability for services provided diminishes the TCs occurred at the contract execution stage.

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[18] See also section 2.3.5.

[19] See chapter 4.

For transactions co-ordinated in the Kombiverkehr contract, the rail transport operator and the forwarder use built-in asset specificity as an incentive to prevent hold-up behaviour (Palay, 1984:S.277ff). The forwarding side provides specific assets in immobile and mobile terminal infrastructure which makes hold-up behaviour of the transaction partner, the rail transport operator, possible. In addition, the forwarder holds shares in the undertaking for financing and operating MT-terminals (Duss mbH). The hostage as an incentive to avoid possible hold-up behaviour by DB consists in its direct holding of assets in wagons and immobile terminal infrastructure, on the one hand, and in the participation in an undertaking to finance and operate MT-terminals (Duss mbH), on the other hand, hold-up behaviour therefore cannot arise.

Taking the contract instrument analysis in chapter 4 (credible commitments and incentives ex-asset specificity) and chapter 5 (asset specificity as credible commitment) together, and owing to this mutual hostage, the contract can be described as bilateral co-operation between the purchaser/forwarder and the vendor/rail transport operator.

5.1.3 Hupac with Traditional Freight Forwarder Under Bilateral Co-operation

The contract between the forwarder and the rail transport operator co-ordinated through the Hupac intermediary, is explained below. First, the characteristics of the transport service are described in logistics dimensions, followed by the analysis of the sources of the TCs. The instruments to reduce the TCs suffered by the transaction partners - as modelled in chapter 4 except for the hostages based on asset specificity - can then finally be assigned to these TCs.

5.1.3.1 The transport service: package freight and special freight in alpine transit

The forwarder's transport services are to be described below by means of the logistics dimensions space, quantity, time and information.

- Space

In transport services that are co-ordinated with this contract, the nature of the lines (alpine transit) predominates. As part of Switzerland's transport policy, there are international treaties with Switzerland's neighbour states e.g. for the maximum amount of 40-t motor trucks to transit Switzerland (SBB, 1993a:11 &

27).[20] These treaties are used to a great extent as the basis for maintaining a rail corridor for 40-t motor trucks through Switzerland. The corridor runs over two lines via Gotthard/CH and Lötschberg-Simplon/CH from Basle/CH to Milan/I. Its capacity totals 365,000 wagons annually, i.e. via the Gotthard route 44 trains and via Lötschberg-Simplon 14 trains per day. The maximal train length amounts to 700 m and the maximum tare weight of wagons including 3 traction locomotives is 1,600 t (SBB, 1993a:20). Since this geographical bottleneck exists, no distribution covering the area, i.e. spatial dispersion, is carried out by Hupac as in the Intercontainer and Kombiverkehr contracts.

- Quantity

The goods transported are not essentially different, in the structure of the types of goods, from those of the Kombiverkehr contract. The transported goods are package freight and also special freight (bulk goods, liquid goods, gaseous goods).[21] A difference can be observed, however, in the weights (and lengths) of the MT-consignments. Besides so-called high-cube TEUs, large-capacity swap bodies and extra-long trailers are used (Hupac, 1993a:18). These special purpose TEUs allow exploitation of the limited haulage capacity in alpine transit more intensely.

- Time

Compared with the preceding contracts, the time sensitivity is high. Punctuality is a strategic success factor, particularly for overnight alpine transportation. For example, different from the previous two contracts, Intercontainer and Kombiverkehr, Hupac publishes service delay statistics (Hupac, 1993a:11). In terms of delivery speed, on the Hupac timetable 75% of all transport has a delivery time within 24 hours, compared with 20% of Kombiverkehr.[22]

- Information

Owing to the time sensitivity of transported goods, a direct information link of shippers via forwarders to the rail transport operator is a strategic success factor (Hupac, 1993a:11). In addition, the information link serves the optimisation of wagon planning and of the operational terminal process. This optimisation measure is necessary due to the high line-share of transportation under this contract in which, for example, circulation of wagons and smooth throughput constitute a major bottleneck owing to the small number of alpine terminals in

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20 Transitvertrag (Transit treaty Switzerland - EU dated 02.05.1992).
21 Information by Theo Allemann, Hupac SA, Chiasso/CH, on 29.04.1994.
22 Interview with Peter Hafner, Hupac SA, Chiasso/CH, on 27.09.2000, via telephone.

Switzerland (Hupac, 1993a:14). The following transport information management tools are used: the consignment follow-up system 'Goal' of Hupac and also 'Caesar', a joint venture of UIRR, the EU-Commission and the Swiss government, have been introduced especially to optimise the above-mentioned bottlenecks.

5.1.3.2 Sources of TCs

Factors which cause TCs to appear in the Hupac with traditional forwarder contract are described below. These are frequency, uncertainty and asset specificity.

- Frequency

By frequency is understood the value-amount of the transaction and the level of the number of individual transactions in the exchange of services between the transaction partners. The special feature of MT for trans-alpine goods transport must therefore be mentioned. Owing to given geographical circumstances and measures of government transport policy, the proportion of total alpine freight transportation undertaken by a specialist freight forwarder is higher than, for example, by a freight forwarder with mainly domestic freight transportation in Germany. Consequently, for alpine freight forwarders, their respective share of turnover in alpine MT is larger, and the latter therefore also use the Hupac contract more frequently than the Kombiverkehr contract. TCs which appear on conclusion of the contract for this transaction can therefore be paid off faster over the duration of the transaction than is the case for transport expenditure for the Intercontainer and Kombiverkehr contracts.

- Uncertainty

Uncertainty, in terms of demand uncertainty and technological uncertainty, is comparable with the Kombiverkehr contract.

- Asset specificity

In the Hupac contract, specialised assets are invested on three levels of the transport chain, namely TEUs, wagons and terminals. Whereas assets in TEUs are provided directly by forwarders, the Hupac intermediary, in which the forwarders participate with a majority of capital, finances the wagon and terminal infrastructure.[23]

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[23] See section 4.2.3.

- TEUs

Compared with the other areas of the transport chain, swap bodies and trailers of the forwarders can easily be sold on. Moreover, just as in the case of the Kombiverkehr transport assignment, they can be used purely for road transport without significant extra costs. These assets therefore carry zero asset specificity.

- Wagons

Through Hupac, the forwarder's assets in wagons are substantial,[24] particularly pocket wagons for trailers and swap bodies, flat wagons for swap bodies only and low-loader wagons <Niederflurwagen> for alpine transit in tunnels with low headroom. But also the so-called jumbo wagons and mega wagons, specially-developed 2-part wagons, are substantial in number. The high extra costs in the wagon fleet are incurred in order to fully exploit the changed tunnel cross-section (profile) and transport more TEUs per metre of the complete train. For example, a low-loading pocket wagon costs about EUR 4,000 more than a normal pocket wagon. Pocket wagons are equipped with an extendable short coupling, providing two Euro-pallets of space more per wagon than with standard TEUs. As against this, however, procurement and maintenance costs are higher for these special couplings. Jumbo wagons allow two trailers to be transported on one wagon. Hupac owns approx. 1,900 wagons for swap bodies, trailers and 'Rolling Highway' <Rollende Landstrasse>. The assets invested in alpine-specific wagons represent 50% of Hupac's total fixed assets (Hupac, 1993a:15; 2000).

Potential alternative transaction partners do not exist as suppliers of rail transport besides SBB in the market for alpine transit, since SBB owns the actual rail monopoly. Container transport is the only possibility for use as an alternative to alpine transit. These possible alternative uses tend towards zero in the case of jumbo wagons, mega wagons and low-loader wagons (for trailers and 'Rolling Highway') (Hupac, 1993a:15; Jünemann, 1989:299).[25] For these wagons, in Europe only intermediaries specialising in trans-alpine transportation would come under consideration as buyers, such as Ökombi Ges.m.b.H, Vienna/A, and Cemat S.p.A., Milan/I. Owing to the small number of alternative transaction partners and possible alternative uses, asset specificity of freight forwarder wagons must be classed as high.

Hupac's 20% participation in Cemat S.p.A., the Italian alpine MT-intermediary, must likewise be classed as high asset specificity. Compared with the total Hupac

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24 See 4.2.3.2.1 for exact numbers and breakdown of Hupac's wagon fleet.

25 See also section 4.2.3.2.1.

holdings, the participation amounting to approx. EUR 6 million (CHF 10 million) - 45% of Hupac's total consolidated participations (Hupac, 2000) - is substantial. Hupac's majority holding in Trailstar N.V., the Dutch MT-intermediary, is not specific from the standpoint of wagon investment, since its wagons are comparable with those in the Kombiverkehr contract and can therefore be used elsewhere.

- MT-terminals

Hupac invests in Switzerland at MT-terminals in portal cranes for vertical loading and in office premises. The remaining terminal infrastructure such as tracks in the MT-terminals in Switzerland is owned by SBB. Only SBB - and for the terminal installations in Germany (Rielasingen) and Italy (Busto Arsizio), DB and FS as monopoly suppliers - can provide rail transport operator services to and from them (Hupac, 1993a:20; 2000).[26] The first asset specificity criterion - number of alternative transaction partners - for office premises and portal cranes in the event of termination of the contract by the rail transport operator is very high, as the railway enjoys a monopoly position and comes under consideration as the sole transaction partner. Regarding the second asset specificity criterion - possibility to sell the asset - only limited opportunities to sell exist, since MT-terminals can be used as an alternative only in container operation. Hupac's approx. EUR 5.3 million (CHF 7.5 million)[27] MT-terminal assets equal approx. 25% of the company's total fixed assets, so sunk costs are therefore significant. On the other hand, the terminal assets of Trailstar N.V., which can be used for the Hupac contract as through-terminals, do not carry asset specificity. The alternative use in container transport with other transaction partners is very high in the Netherlands.

As already mentioned, the remaining terminal infrastructure (e.g. tracks, reinforcements for motor-truck approach ramps) is entirely owned by SBB, the rail transport operator in this contract. This is a specific asset since, owing to the monopoly position of SBB, this capital asset can neither be sold unchanged nor, for example, be used by alternative transaction partners. The total assets held by SBB in MT-terminal infrastructure amount to more than 3% of its total fixed assets, therefore these sunk costs are significant for the rail transport operator.[28]

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26 Information by Theo Allemann, Hupac SA, Chiasso/CH, on 29.01.1994.

27 Exchange rate: 1.67 CHF/EUR.

28 Total fixed assets <Sachanlagen> SBB: CHF 15,479.8 mill. (approx. EUR 880 mill.) as per 31.12.1999. Information by Silvan von Rohr, SBB Cargo AG, Bern/CH, on 26.06.2001; SBB (2000a:20); Interview with Peter Hafner, Hupac SA, Chiasso/CH, on 27.09.2000, via telephone.

To sum up, it can be stated that, on the whole, freight forwarders' assets in wagons, mobile assets (portal cranes) and agency work (offices) at MT-terminals represent a genuine and - compared with the preceding contracts, new - quality of the rail transport operator's hold-up potential which have a high TC potential. The high technological specificity of wagon assets and the lack of alternative rail transport operators in alpine transit must be regarded as the reason.

After the sources of TCs, the instruments to reduce TCs now follow.

5.1.3.3 Assigning the instruments for reducing TCs to transport services

As for the contracts of Intercontainer and Kombiverkehr, the instruments used in the Hupac contract with traditional forwarder to reduce TC are compared with the sources of TC analysed in the previous section.

SBB, the rail transport operator, holds a 29% participation in the share capital of Hupac.[29] Just as in the Intercontainer and Kombiverkehr contracts, as the second means of reducing TCs, liability in the event of damage or loss of the transported goods for the forwarder is contained in the liability provisions of the international railway transport legislation (CIM).[30] Whereas the freight forwarder holds specific assets in wagons, portal cranes and office infrastructure, only one sector of investment, specific assets in MT-terminals, such as rail tracks and ramps, are to be observed by the freight forwarder's transaction participant, the rail transport operator.

According to the unilateral hostage model, the question must be examined as to whether the specific assets of the forwarder, modelled in section 5.1.3.2, are faced with incentives of the same intensity to minimise TC. From this perspective, a risk for hold-up exists for the forwarder owing to the unevenly distributed assets of the two transaction partners.

Regarding contract incentives, the liability incentive is, as explained in chapter 4, only slight. The only incentive for the railway to offset this hold-up risk and to behave in conformity with the contract is its participation of 29% in the profit on Hupac's share capital. But this small share cannot be regarded as a significant incentive to prevent opportunistic adaptation of the contract by the rail transport operator.

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29 See section 4.2.3.

30 See section 4.1.1.2.3.

To sum up, from the standpoint of TCE, this contract is not adequately protected for the forwarder. The Hupac contract thus tends to be sub-optimal: this sub-optimality arises from the high potential TCs in the case of contractual adaptation, or termination of the contract by the railway.

Why is an inefficient contract used by the transaction partners? From the logistics dimensions of space, quantity, time and information, this contract clearly forms a difference to the previous two contracts of Intercontainer and Kombiverkehr. The transport now is entirely trans-alpine, all have a high time sensibility and require a significantly different information technology. The dimension quantity may differ within the transactions co-ordinated under Hupac. This contract is used both with specialised MT-wagons and general purpose MT-wagons. As outlined in sections 4.2.3.2.1 and 5.1.3.2, only 50% of Hupac's asset consists of alpine-specific wagons. As a consequence, for the remainder of its wagons, the hold-up position the rail transport operator can realise when changing transaction terms during the course of the transaction are on the same level as in the Kombiverkehr contract. Therefore, for the goods and transport services that do not require alpine-specific wagons the contract Hupac is efficient. There exists no more optimal transport contract alternative, either, for these goods.

Taking the contract instrument analysis in chapter 4 (credible commitments and incentives ex-asset specificity) and chapter 5 (asset specificity as credible commitment) together, the contract can be described as bilateral co-operation, given various mutual hostages but no full vertical integration from either side of the transaction partners.

5.1.4 Hupac with MTO Under Bilateral Co-operation

The following section explains the contact between MTO and rail transport operator using the intermediary Hupac. As in the previous three contracts of this chapter, the process of analysis follows three steps. Firstly, the transport services are characterised via the logistics dimensions as developed in chapter 3. Secondly, the transport services are further modelled as attributes of TCE's market failure framework as developed in chapter 2. Finally, these attributes - or sources of TCs - can be assigned to the contract instruments as modelled in chapter 4 (assigning contracts to transactions). Whereas the previous contract is called Hupac with traditional freight forwarder (or only 'Hupac'), this fourth contract is named Hupac with MTO, below.

5.1.4.1 The transport service: special goods in alpine transit

The transportation of goods in this contract is orientated most strongly towards the preferences of the shipper. Compared with the other contracts of MT, the multimodal transport operators (MTO) produce transport services at the interface between shippers and transport component suppliers, dominated by special freight transport. From the perspective of the shipper, MTOs provide a consumer market for logistics services and tend to be direct suppliers of MT in what is completely owned production, including the rail transport operator service. New legislation in Germany allows this vertical integration. Via the legal status of a so-called rail transport undertaking <Eisenbahnverkehrsunternehmen (EVU)>, a freight forwarder can produce the complete transport chain itself. At the moment, however, only large shippers are active within this segment. Also, the intermediary Hupac holds an EVU-licence in Germany,[31] but without actively using it. Vertical integration along the value-added activities of the transport chain is a vital characteristic of this contract and a key difference to the preceding Hupac contract.

Compared with the preceding Hupac contract, the forwarder as MTO continues to use the same contract intermediary for the purchase of rail transport operator's service. However, the MTO uses its own TEUs, wagons and, to some extent, terminals.

- Space

Special freight in scheduled alpine transit, i.e. on scheduled timetable services, is transported - just as with the Hupac contract - along two corridors via Gotthard/CH and Lötschberg-Simplon/CH. This is not an area-covering distribution, being line-orientated, and scheduled service prevails.

- Quantity

In the contract there is a high proportion of special freight, such as:

1) refrigerated freight,
2) hazardous goods, e.g. liquid freight or gas,
3) pharmaceuticals,
4) high-value freight (Schomaker, 1993:675f; Bukold, 1993:496).[32]

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31 See section 4.2.3.2.1.

32 Information by Hans-Jörg Bertschi, Bertschi AG, Dürrenäsch/CH, on 30.08.1993.

Compared with the transport services examined so far, the forwarder has to execute these transport services in a more varied and complex way. This includes, for example, safety precautions for the cargo and special wagons.

- Time

The degree of specialisation within the goods often relates also to time sensitivity, i.e. 'just in time' or 'fastest in time'. The service offer now frequently includes storage cost-minimisation for the shipper. Consequently, service performance is a matter not only of speed, but also of punctuality in delivery. For example, the higher vertical integration along the MT chain of the MTO Bertschi AG, Dürrenäsch/CH, has enabled the terminals Cologne, Mannheim, Hamburg, Antwerp/B and Busto Arsizio/I (near Milan) to be within daily reach from the central MT-terminal, Switzerland (in Birrfeld near Zurich/CH), overnight. The above Hupac contract - described in section 5.1.3 - does not contain this percentage of MT-terminals within a 24-hour reach.

- Information

In the contract of Hupac with MTO, consignment information systems are used for the first time as a key service of the transport function, instead of just for shipper information.

An EDP-supported fast advance flow of information predominates. This transport feature is an important factor for avoiding disastrous accidents (Zöllner, 1990:55 & 65). The MTO Bertschi AG, Dürrenäsch/CH, has, for example, a system of fast advance information flow for all goods in road transport and in rail/road MT between northern Europe and Italy, i.e. over a large geographical area and across many national borders.[33] Own customs offices in the general collecting and buffer warehouses, i.e. for transit goods, arrange, in connection with the transport, fast flow of information that is partly preceding the physical consignment. The customs service is integrated into the order processing, for speedier, more accurate goods distribution. In addition, vertical integration with process organisation and process control of all information affecting the transport can be observed. At the same time, the MTOs deliver logistics components to parts-suppliers, i.e. in MT the trucking to and from the terminals.

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[33] Information by Hans-Jörg Bertschi, Bertschi AG, Dürrenäsch/CH, on 30.08.1993.

5.1.4.2 Sources of TCs

Factors relevant for the appearance of TCs and means of reducing them are described below.

- Uncertainty

Characteristic for the contract of Hupac with MTO are transactions in which the service contents have to be adapted *ex-post* owing to environmental changes (uncertainty).[34] In this case, the fixing of long-term contracts is either too expensive, because the costs of information gathering and contract negotiating exceed the overall benefits of the contract, or else they are not feasible because contract-relevant information on environmental changes is not accessible. This is seen here as a result of bounded rationality as introduced in section 2.3.2.2.

- Demand uncertainty

The unpredictable fluctuation in the shippers' demand for piggyback transport services feed through to the MTO's order levels in a significantly higher degree than in the previous three contracts due to the high specialisation of the transport service in this contract. If it comes to a decline in demand for this transportation from the shipper side, then these demand losses cannot be offset by transport of other goods, owing to incompatibility of the TEUs for other transport assignments. This fluctuation of shippers' demand leads to a change in forwarders' demand on the components market for transport operators' services.

Demand on the components market for rail transport services through the MTO, assuming in-house production or outsourcing is to be considered below. With potential internal production by the forwarder,[35] the following TCs arise:

1) Costs of overcapacity and shut-down of short capacity, or costs of excess demand and quality defects, or costs of building up extra capacity in the production of transport services (Rennings, 1992:32).
2) The demand uncertainty leads to higher TCs than in the preceding Hupac and Kombiverkehr contracts. These TCs must be distinguished from the costs of hold-up caused opportunistically. The costs described above arise outside the intention of the transaction partner, although they are both rooted in sunk costs caused by asset specificity.

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34 See section 2.3.3.2.

35 An internal production of rail transport services is not yet exercised by MTOs, see section 5.1.4.1.

3) With outsourcing, the costs of protection over credible commitments or costs of writing off the sunk costs created by specific assets, with contract adaptation in the event of hold-up behaviour, arise as TCs.

- Technological uncertainty

Because of the specific transport technology, due to the higher investments from the forwarder's standpoint in EDP-controlled information systems, changes arise also with technological uncertainty. The probability and scope of technological innovations and also the uncertainty in the service of existing technology due to lack of experience (Walker & Weber, 1984:274ff) are fundamentally altered by the use of comprehensive transport information systems compared to the three other contracts. The most important uncertainty factors here are:

1) Uncertainty about the possibility of future use of the selected transport technologies, and
2) technological breakdown or accidental breakdown due to misuse (Walker & Weber, 1984:377; Fonger, 1992:72ff).

A further source of TCs, asset specificity, is examined below in the contract Hupac with MTO.

- Asset specificity

Compared with the Hupac contract, the forwarder as MTO is now the full owner of:

1) TEUs,
2) wagons and
3) at least one MT-terminal (start- or destination-terminal in full ownership, one terminal is an outside terminal).[36]

- TEUs

In this contract, special TEUs are used for the transport of refrigerated, hazardous and pharmaceutical goods and high-value freight. These are, for example, tankers and silo-type TEUs provided by the MTO. In the case of a premature end of the transaction relationship, the number of alternative purchasers - i.e. possibility to sell the asset - for these special TEUs is limited owing to the relatively small value market segment which this special freight represents. The second

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[36] See section 4.2.4.2.1.

specificity criterion - number of alternative transaction partners - is high for the same reason. For example, the share of TEUs' asset carrying this specificity level compared to the total fixed assets of MTO Bertschi AG amounts to 5%.[37] Therefore, the potential sunk costs are significant for the freight forwarder. As a consequence, in this contract, unlike the preceding contracts, high asset specificity of the TEUs exists.

- Wagons

The asset specificity in wagons is identical with the Hupac contract and on a high level.

- MT-terminal of the MTO forwarder

The forwarder as MTO invests in its own MT-terminal in portal cranes, offices and the remaining infrastructure for exclusive use. It must be stated here that the forwarder as MTO uses in some instances the assets of the railway and Hupac, described in the preceding Hupac contract, namely MT-terminals as a destination- or starting-point. In the event of termination of the contract by the rail transport operator, for the forwarder as MTO no alternative transaction partners are available, owing to the quasi-monopoly position of the railway in alpine transport. Direct selling opportunities exist only to a few other MTOs. The entire terminal assets of the MTO Bertschi AG equals 25% of its total fixed assets.[38] Sunk costs, therefore are high and as a consequence, the specificity of the assets in MT-terminals must be classed as high.

Of all four piggyback transport contracts, this contract carries the highest asset specificity on the part of the freight forwarder. Compared with the Hupac contract, in addition to highly specific assets in wagons, specific assets in TEUs and full investment in owner-used MT-terminals now become effective. A hold-up risk on a considerable scale thus arises for the rail transport operator. Besides asset specificity, technological uncertainty is a reinforcing factor of this contract. Means of reducing this hold-up potential are presented below.

5.1.4.3 Assigning the instruments of reducing TCs to transport services

According to the unilateral hostage model of TCE, the following incentives exist for reducing TC. Profit sharing in the transaction exists indirectly through Hupac as a result of a shareholding of 29% owned by the rail transport operator. The second incentive type, guarantee for damage or loss of the transported goods, is

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37 Information by Hans-Jörg Bertschi, Bertschi AG, Dürrenäsch/CH, on 05.10.2000.

38 Information by Hans-Jörg Bertschi, Bertschi AG, Dürrenäsch/CH, on 05.10.2000.

unchanged compared with the Hupac contract on the basis of the CIM in favour of the freight forwarder.

Both incentives are unchanged in their intensity compared with the previous contract. In view of the contract instrument analysis in chapter 4 (credible commitments and incentives ex-asset specificity) and chapter 5 (asset specificity as credible commitment), the contract can be described as bilateral co-operation, given various mutual hostages but no vertical integration from either side of the transaction partners.

However, new and significant specialised assets in TEUs from the MTO and the fact that all key assets are directly owned without having to use the intermediary Hupac through shareholding - as was the case in the previous contract - lead to a significantly higher hold-up-position in favour of the rail transport operator. This additional hold-up-potential remains uncovered in the contract choice as there are no additional credible commitments from the railway company in the contract Hupac with MTO.

- Effects of the TC-inefficient contract choice

This sub-optimality of the choice of contract is reinforced by the very marked technological uncertainty and demand uncertainty in this contract, which have a polarising effect towards vertical integration of the transport operator's service.[39]

As a first consequence, sub-optimality of this kind leads, for example, to defective price-fixing for haulage services of the rail transport operator as against the forwarder as MTO. The railway does not take the selling prices for its transport operator's services out of the general price-adjustment mechanisms. This means that, from the forwarder's standpoint, the purchase prices for the rail transport operator's services are, with a certain period of adaptation (e.g. 3 months), variable. Forwarders usually agree with shippers longer-term contracts with long-running price-fixing. Short-term price changes by the railways thus are not allowed to be passed on to the shippers by the MTO.[40]

A further consequence of sub-optimality is the calculation of prices for the rail operator's service in relation to the forwarder's. Instead of being per consignment (loading unit), as is usual here, a charging per haulage job (total train weight) would be based more directly upon the railway's expenditure on locomotive

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39 See section 2.3.3.2.

40 Information by Hans-Jörg Bertschi, Bertschi AG, Dürrenäsch/CH, on 30.08.1993.

haulage, and at the finished-product market based more closely upon the trend of the ultimate consumer's demand for transport services, owing to the widespread practice there of charging by loading weight.

A third consequence of sub-optimality is the written recording, hitherto lacking, of agreements between MTOs and rail transport operators.

It must be stated that the limitation of contract choice by tying MTOs to the agreements, e.g. of Hupac, which serves as an intermediary to the railways, hampers the development of stronger bilateral contract instruments. A stronger bilateral line on the finished-product market (shipper-forwarder) is not met on the components-market with the rail transport operator in this way. The difference between the pledges used on these two markets thus persists in the case of the forwarder. This is especially true for liability clauses such as loss, damage or delay.

To sum up, for the MTO determining the environmental factors of the transport services co-ordinated with this contract are: high specificity of assets (TEUs, wagons and terminals) and high uncertainty, particularly owing to demand uncertainty and the technological uncertainty. A significant incentive to contract-compliant behaviour for the rail transport operator is only its profit sharing in Hupac, which is allocated to the forwarding side and whose activity as intermediary is used by the forwarding trade.

In view of the high asset specificity of the MTO, this hostage is not sufficient to prevent hold-up behaviour by the rail transport operator. The rail transport operator has opportunities for short-term contract adaptation, sub-optimal calculation of locomotive haulage from the forwarder's standpoint and absence of written recording of agreements. This choice of contract is thus inefficient from the standpoint of TCE.

Why is an inefficient contract used by the transaction partners in Hupac with MTO? Compared to the previous contract - Hupac - the transport services under Hupac with MTO do not allow to choose between specific asset wagons and non-specific asset wagons. As outlined in section 4.2.4.2.1, all wagons here are asset specific low-profile alpine wagons. As a consequence and different to the previous contract, even taking this differentiation of transport services under one single contract into account, the current co-ordination of Hupac with MTO remains inefficient according to Williamson's TCE.

5.1.5 Summary of Assigning Transport Services to Contract Instruments

Table 5.1 provides a summary of assigning contract instruments to transaction attributes as undertaken in sections 5.1.1 to 5.1.4. Contract by contract, the sources of TCs - asset specificity, uncertainty and frequency - are compared with the contract instruments to control these TCs - profit sharing, liability clauses and hostages through asset specificity. The instruments and attributes highlighted in bold are excess factors that are either not necessary to be included in the contract - in the case of instruments - or represent unprotected hold-up positions - in the case of attributes. In both cases a contract inefficiency appears. The levels of the transaction attribute asset specificity are taken from Williamson's distinction into three stages outlined in section 2.3.3.1: none, mixed and high. Although the contract names carry the intermediaries' names, the intermediaries themselves (Intercontainer, Kombiverkehr and Hupac) - as mentioned in chapter 3 - are part of either the road transport industry (FF) or the rail transport industry (rail operator). They are not independent but belong to one of the transaction partners.

The purpose of Table 5.1 is to make contract inefficiencies according to TCE in the German piggyback transport market visually transparent.

Table 5.1: Contract Incentives and Control in German Piggyback Transport

INTERCONTAINER			KOMBIVERKEHR		
Rail operator		FF	Rail operator		FF
	• Asset specificity			• Asset specificity	
Ø	- TEUs:	0	Ø	- TEUs:	0
0	- wagons:	Ø	2	- wagons:	Ø
0	- terminals: mobile fixed assets	Ø	0	- terminals: mobile fixed assets	2
0	- terminals: immobile fixed assets	Ø	2	- terminals: immobile fixed assets	1
0	- terminals: agency management	Ø	1	- terminals: agency management	1
	• Other transaction attributes			• Other transaction attributes	
1	- uncertainty	1	1	- uncertainty	1
1	- frequency	1	1	- frequency	1
	• Other credible commitments			• Other credible commitments	
Ø	- profit sharing	Ø	Ø	- profit sharing	yes
yes	- liability guarantee	Ø	yes	- liability guarantee	Ø
	MARKET CONTRACT			BILATERAL CO-OPERATION	

Table 5.1: Contract Incentives and Control in German Piggyback Transport (cont.)

HUPAC TRADITIONAL		
Rail operator		FF
	• Asset specificity	
Ø	- TEUs:	0
Ø	- **wagons:**	2
Ø	- **terminals: mobile fixed assets**	2
2	- terminals: immobile fixed assets	Ø
Ø	- terminals: agency management	2
	• Other transaction attributes	
1	- uncertainty	1
2	- frequency	2
	• Other credible commitments	
yes	- profit sharing	Ø
yes	- liability guarantee	Ø
BILATERAL CO-OPERATION		

HUPAC & MTO		
Rail operator		FF
	• Asset specificity	
Ø	- **TEUs:**	2
Ø	- **wagons:**	2
Ø	- **terminals: mobile fixed assets**	2
2	- terminals: immobile fixed assets	2
Ø	- terminals: agency management	2
	• Other transaction attributes	
2	- uncertainty	2
2	- frequency	2
	• Other credible commitments	
yes	- profit sharing	Ø
yes	- liability guarantee	Ø
BILATERAL CO-OPERATION		

Table 5.1: Contract Incentives and Control in German Piggyback Transport (cont.)

Legend:

All elements of asset specificity in the contract (TEUs, MT-terminals, wagons, MT-terminal equipment) are weighted equal. Elements of asset specificity which cause contract inefficiency are highlighted in bold.

Intensity of asset specificity:
- Ø = specialised investment non-existent
- 0 = specialised investment existent but zero intensity of asset specificity
- 1 = mixed asset specificity
- 2 = high asset specificity

Intensity of liability and profit sharing:
- Ø = non-existent
- Yes = existent

Intensity of frequency and uncertainty:
- 1 = low
- 2 = high

FF = Freight forwarder

Source: personal data.

5.2 COMPARATIVE ANALYSIS OF ALTERNATIVE CONTRACTS

This section investigates co-ordinating each of the underlying transport services of the four contracts (Intercontainer, Kombiverkehr, Hupac and Hupac with MTO) with the three alternative contracts and pursues the question, whether there is a more efficient contract alternative within the contract alternatives analysed for a specific transport service. By 'more efficient' is understood, whether transferring a transport service to an alternative contract would decrease the TCs involved.

The analysis specifically compares contract incentives to lower the level of TCs with the transaction attribute asset specificity. The analysis considers the assets necessary to perform the required transport services as directly linked or immediately caused by the service requirements, i.e. built-in asset specificity (Williamson, 1985:62 & 73). For example, trans-alpine transport can only be organised with special piggyback wagons that fit the maximum tunnel surface requirements and the standardised size of the TEUs.

The two transaction attributes frequency and uncertainty are not analysed specifically, as in the first three contracts (Intercontainer, Kombiverkehr and Hupac) they have the same characteristics. However, the attribute uncertainty in the contract Hupac with MTO is significantly higher and will be dealt with separately (section 5.2.4).

5.2.1 Assigning the Transport Service Intercontainer to Alternative Contracts

The asset specificity of the transaction participants rail transport operator and freight forwarder in this contract has been analysed in section 5.1.1. On the one hand, the rail transport operator holds out assets in TEUs, wagons and terminal infrastructure. These assets are nevertheless without specificity. On the other hand, the freight forwarder provides no significant assets into the transport chain in this transport service.

5.2.1.1 Attribution of transport service Intercontainer to Kombiverkehr contract

The incentives of the contract Kombiverkehr from the perspective of the rail transport operator consist of a participation of the share capital of Kombiverkehr. Additionally, the rail transport operator is liable for loss, delays and damage on

the basis of general transport legislation. The freight forwarder has an incentive for contract fulfilment in a 50% shareholding of Duss mbH, the terminal operator. Apart from the above unilateral credible commitments in profit sharing and liability, there is also a compensation of the freight forwarder's asset specificity through asset specificity operating as credible commitment from the rail transport operator's side, i.e. an artificial asset specificity.

From the standpoint of the Intercontainer transport service, no specific assets are necessary, so therefore no commitments are necessary to prevent hold-up for the contract. The above incentives included in the Kombiverkehr contract result in contract preparation and negotiation costs that are evitable.

The Kombiverkehr contract therefore represents an inefficient solution to the transport services linked to Intercontainer.

5.2.1.2 Attribution of transport service Intercontainer to Hupac and Hupac with MTO

Thereafter, the contracts of Hupac and Hupac with MTO will be considered together, as in both the incentives profit sharing and liability derive from identical agreements, and these incentives exist only on the side of the rail transport operator. As stated in section 5.1.3, the Hupac contract constitutes a direct profit sharing through a 29% participation of SBB in Hupac's share capital, whereas in the Hupac with MTO contract the profit incentive works only indirectly through the use of Hupac by the MTO. The liability is based on transport legislation. There are no incentives for the freight forwarder in both contracts.

The profit sharing scheme as an incentive for the rail transport operator to non-opportunistic behaviour in the Hupac contract cannot be justified in the Intercontainer service, as asset specificity for the freight forwarder does not exist. The costs of negotiating these incentives are therefore evitable, as there are no hold-up opportunities for the rail transport operator. Similar to the co-ordination with the Kombiverkehr contract, the unilateral commitments to lower TCs by preventing hold-up situations are unnecessary. The high TCs due to negotiation make the Hupac and Hupac with MTO contracts as a contract solution for Intercontainer services inefficient.

5.2.1.3 Summary

For the transport of standardised goods in regional distribution <Streuverkehr>, which is characteristic for the piggyback transport service linked to the Intercontainer contract, market co-ordination represents the most efficient

contract solution compared to the three other bilateral contracts (Kombiverkehr, Hupac and Hupac with MTO). As stated above, safeguards to secure the transaction process from opportunistic behaviour lead to unnecessary TCs, as there is no asset specific investment necessary to perform the transport service.

5.2.2 Assigning the Transport Service Kombiverkehr to Alternative Contracts

In section 5.1.2, the assets necessary to fulfil the transport service Kombiverkehr were described. Rail transport operators' assets in wagons and terminals were highly specific. The freight forwarder places assets in TEUs and mobile terminal equipment. The TEUs are non-specific, whereas the assets in terminal equipment are highly specific. This necessary set of assets for the Kombiverkehr service is now assigned to alternative contracts (Intercontainer, Hupac and Hupac with MTO), and compared with the set of incentives in the respective contracts. The aim is to find a more efficient co-ordination of the transport service Kombiverkehr.

5.2.2.1 Attribution of transport service Kombiverkehr to Intercontainer

The freight forwarder, compared to the rail transport operator, carries a lower asset specificity in this transport service. Consequently, according to TCE there is a freight forwarder incentive necessary to prevent hold-up. Such an incentive is non-existent in the Intercontainer contract, where only the railway is liable on the basis of transport legislation. As a result, high potential hold-up costs (TC), due to hold-up opportunities, exist for the freight forwarder against the rail transport operator. The co-ordination of the transport service Kombiverkehr through the Intercontainer contract is therefore inefficient.

5.2.2.2 Attribution of transport service Kombiverkehr to Hupac and Hupac with MTO

As in section 5.2.1, the contract alternatives of Hupac and Hupac with MTO are analysed in combination. In the transport service Kombiverkehr, highly specific assets of the rail transport operator in wagons and terminals are balanced by specific assets of the freight forwarder in mobile terminal equipment.

From the perspective of the freight forwarder, there are no incentives in the contracts with Hupac and Hupac with MTO. Only the rail transport operator delivers incentives in its share of 29% of Hupac and the transport liability through transport legislation. Consequently, the highly specific assets of the

railway in the transport service Kombiverkehr are not compensated by incentives for the freight forwarder for keeping the contract agreement in the Hupac contract. Therefore, the freight forwarder holds a significant hold-up potential against the rail operator, should he wish to alter the contract during a transaction. From the perspective of credible commitments via asset specificity, the freight forwarder invests specifically in wagons and terminals in the Hupac contract. Due to the intensity of their asset specificity, these credible commitments transform a potential hold-up situation in favour of the freight forwarder into a lock-in effect against him. As an overall result, the railway could compensate a breach of contract more easily than the freight forwarder.

Consequently, taking the entire set of incentives and credible commitments of the Hupac contract with traditional freight forwarder (and Hupac with MTO) together, the potential hold-up costs (TC) from the perspective of the freight forwarder are higher than in the original (Kombiverkehr) contract. Therefore, co-ordinating the transport service Kombiverkehr with the alternative Hupac or Hupac with MTO contract results in an inferior efficiency level.

5.2.2.3 Summary

The service Kombiverkehr is co-ordinated efficiently. A comparison of alternative incentive designs to lower the TCs incurred through potential hold-up positions does not lead to a more efficient solution in terms of TCs. The TCs in alternative contracts are higher in all three cases.

5.2.3 Assigning the Transport Service Hupac to Alternative Contracts

The transport services under the Hupac contract with traditional forwarder produce a significant mis-balance of specific assets of the transaction participants, as stated in section 5.1.3. While the freight forwarder invests in TEUs, wagons and terminal equipment, the rail transport operator invests in additional fixed terminal equipment, such as cranes and tracks. This unequal distribution of asset specificity requires commitments to protect the freight forwarder from hold-up.

5.2.3.1 Attribution of transport service Hupac to Intercontainer

The incentives for the railway company to perform the agreed transaction agreement in the Intercontainer contract consist only of liability in transport legislation. The specific assets of the freight forwarder linked to the transport service Hupac are thus insufficiently protected against potential hold-up of the rail transport operator.

5.2.3.2 *Attribution of transport service Hupac to Kombiverkehr*

The incentives in the Kombiverkehr contract focus on a liability of the rail transport operator. Its terms are defined in the transport legislation. The freight forwarder holds highly specific assets in the transport service Hupac, in wagons and terminal equipment. A co-ordination under the Kombiverkehr contract would lead to these being counterbalanced by the rail operator's assets in wagons and fixed terminal equipment, but the degree of specificity of the assets of the two transaction partners' assets remains significantly different: the freight forwarder's assets are on a high specificity level, whereas the rail operator's only on a mixed level. As a result, the highly specific asset from the freight forwarders for the Hupac service receive insufficient protection in the Kombiverkehr contract through bilateral commitments.

5.2.3.3 *Attribution of transport service Hupac to Hupac with MTO*

In comparison to the Hupac contract with traditional forwarder there is an identical profit sharing incentive for the rail operator in the Hupac with MTO contract. Additional incentives for the rail transport operator for dropping opportunistic behaviour in view of the additional TEU investments of the freight forwarder do not exist. The co-ordination of a 'Hupac with MTO'-service with a 'Hupac with traditional freight forwarder'-contract therefore does not change the inefficient TC level existing compared to leaving it in the original contract.

5.2.3.4 *Summary*

None of the analysed contracts deliver a more efficient co-ordination in terms of TC efficiency for the transaction service Hupac than the contract of Hupac itself. All alternative contracts share an insufficient design of incentives through unilateral credible commitments for the railway company to safeguard the freight forwarder's highly specific assets in wagons and terminal equipment.

5.2.4 Assigning the Transport Service Hupac With MTO to Alternative Contracts

Both contracts, Hupac with traditional freight forwarder and Hupac with MTO, share the uneven distribution of specific assets in favour of the rail transport operator. While the freight forwarder holds assets in wagons, terminal equipment and - in the latter contract - even in TEUs, the railway company only invests in additional terminal equipment.

Consequently, a more efficient co-ordination of the transport service Hupac with MTO compared to the contract now in use, Hupac with MTO, is possible through creating incentives to ease the lock-in effect of the freight forwarder. The incentive design according to unilateral credible commitments, such as liability and profit sharing, is either identical (Hupac) or lower (Intercontainer, Kombiverkehr) with alternative contracts compared to Hupac with MTO. The only contract which uses incentives bearing the nature of unilateral credible commitments via asset specificity and which could potentially offset those missing incentives is Kombiverkehr. Nevertheless, in the Kombiverkehr contract, the incentives for the rail operator to conform to the transaction agreements via specific assets in wagons and fixed equipment on terminals cannot compensate the lack of profit incentives for the rail transport operator in the Kombiverkehr contract compared to both Hupac contracts. This is because of the lower level of asset specificity in the Kombiverkehr contract for the rail operator compared to the asset specificity level in the Hupac with MTO contract.

5.3 SUMMARY OF CONTRACT EXPLANATION

In the first two, Intercontainer and Kombiverkehr contracts, transactions are co-ordinated which are efficiently organised according to Williamson's TCE. Whereas the former is co-ordinated through a market-type contract design, the latter comes in the form of bilateral co-ordination between freight forwarder and rail transport operator. The third contract, Hupac contract, shows sub-optimality for particular, but well-defined, transport services. For the goods and transport services that do not require alpine-specific wagons, and which form a significant part of the entire transport volume, the Hupac contract is efficient. Therefore, the contract supports the hypothesis for certain types of transport services. The current co-ordination of the fourth contract, Hupac with MTO, remains inefficient according to Williamson's TCE.

The two contracts of Hupac and Hupac with MTO contain - partially or entirely - uneven distributions of asset specificity to the disadvantage of the freight forwarder, or insufficient incentive structure for the rail transport operator. They therefore bear - partially or entirely - a significant risk for unilateral contract adaptations or even contract termination through the rail transport operators.

Regarding the Hupac contract, only specific areas of services are non-efficient. From the standpoint of TCE, this contract is not adequately protected for the forwarder in the case of trans-alpine shipment of specialised goods. This sub-optimality arises from the high potential TCs for contractual adaptation, or

termination of the contract by the railway. The level of uncertainty in the contract's underlying transactions, though, is inferior to the fourth contract, as volatility of demand and technological uncertainty are at a low level. Despite all transport under the Hupac contract being trans-alpine, this contract is used with both specialised MT-wagons and general-purpose MT-wagons. As outlined in sections 4.2.3.2.1 and 5.1.3.2, only 50% of Hupac's assets consist of alpine-specific wagons. As a consequence, for the remainder of its wagons, the hold-up position which the rail transport operator can realise when changing transaction terms in the course of the transaction, is at a level similar to the Kombiverkehr contract. As a result, the contract for part of its transactions is efficient; for the remaining part it could be carried out with a more favourable TC level in an alternative contract design, namely full vertical integration.

The contract of Hupac with MTO represents in contrast a sub-optimal governance solution for all transport services co-ordinated through it. High specificity of assets (containers, wagons and terminals) is the determining environmental factor of the transport services co-ordinated with this contract. Moreover, the factor uncertainty now plays a decisive role in the polarisation of transaction co-ordination towards a hierarchy solution, particularly owing to demand uncertainty and technological uncertainty. Uncertainty in the contract's underlying transactions is high. The transport services from the shipper to the freight forwarder could therefore be carried out more efficiently in practice - with a more favourable TC level - through an alternative contract form, namely through higher vertical integration, whereby the MTO provides the rail transport in-house. The thesis argues that this alternative is currently not feasible in practice, due to insufficient application of existing EU transport legislation. Compared to the previous Hupac contract, the transport services under Hupac with MTO do not allow choosing between specific asset wagons and non-specific asset wagons. As outlined in chapter 5, all wagons here are asset specific low-profile alpine wagons. As a consequence and unlike the previous contract, even taking this potential differentiation of transport services under one single contract into account does not change the state of inefficiency. In view of the high asset specificity on the part of the MTO and the overall high uncertainty environment of the transaction, the bilateral co-ordination used as the current contract design is not sufficient to prevent hold-up behaviour by the rail transport operator.

In the concluding chapter, an explanation outside TCE's market failure framework according to Williamson will be outlined to solve the existing dilemma of a contract being used - Hupac with MTO - that carries inefficiency with respect to TCs.

CHAPTER 6: CONCLUSION

The aim of this thesis was to relate the theory of TCE, developed by Oliver Williamson, to the German piggyback transport industry. The objects of investigation were the forms of contract designs in this industry. The service investigated was the rail transport provided by the rail transport operators for the piggyback transport chains, both within Germany and to and from Germany.

The hypothesis of the thesis stated that the degree of vertical integration is a function of the degree of asset specificity of the rail transport service, i.e. each contract in the German piggyback transport industry is adapted to meet different degrees of asset specificity. This analysis sought to explain the four types of contracts most commonly used in German piggyback transport by using TCE and testing their TC-efficiency.

The thesis found that three of the four contract designs support the hypothesis. The first two contracts are efficient in all transport services they co-ordinate and the third is efficient to a large extent in terms of the volume of services co-ordinated. The fourth contract type cannot currently be designed in a way efficient for TCE.

6.1 SUMMARY OF RESEARCH PROCESS

Following the introduction to the thesis in chapter 1, TCE and the instruments for analysing the objects of investigation, the contract designs, were described in chapter 2. Contract problems occur when human-factor opportunism influences the contract relationship, i.e. opportunism is a key contributor to market failure and, therefore, the existence of TCs. Contracts for curing market failure can be positioned with their degree of controllability and their degree of incentive intensity. Whereas market co-ordination maximises incentive intensity at one end of the continuum, the contract form 'hierarchy', i.e. the co-ordination of a transaction within a firm, constitutes its opposite pole where control is maximised by means of instructions within the firm. The following types of contract designs exist according to Williamson: market governance, bilateral governance and unified governance. TCE explains how, with the existence of asset specificity, market failure should be cured.

Chapter 3 described German piggyback transport in a market context. From the perspective of TCE, the main elements are firstly the transaction object, i.e. the

rail transport service for piggyback transport chains, secondly the transaction partners, i.e. freight forwarders (road side), rail transport operators (rail side) and intermediaries, and thirdly the transaction situation, i.e. the market set-up and the market players. The transport object was described by means of four logistics dimensions for the transformation of goods. Piggyback transport as one sector of MT was defined as the transport of TEUs, using two separate transport modes to move goods over a defined distance. The transport services analysed in this thesis comprised the entire means of transportation (traction engines and trailers of the 'Rolling Highway') and the parts thereof (trailers) or swap bodies. Piggyback-based transportation is the clear land-based alternative of MT. In terms of the market participants, i.e. the transaction partners, the purchase of rail transport services to build into transport chains for piggyback transport is organised through intermediaries in Germany. Regarding the transaction situation, the market potential for MT in general and piggyback transport specifically exceeds the volume of existing market transactions many times over. The annual market volume for piggyback transport has been around 30 million tkm since the mid-1990s and a volume of 38.8 million tkm is projected up until 2010, according to the latest government market study of the German transport ministry (Hacon Ingenieurgesellschaft, 1999:7).

From the perspective of the thesis' hypothesis, the contracts in piggyback transport could now be examined in terms of their efficiency. In chapter 4, the contract designs used for the co-ordination of piggyback transport were specified. The contract instruments were described and then qualitatively modelled according to TCE. As a result, the degree of vertical integration, as the first element of the thesis' hypothesis, could be differentiated. According to Williamson's typification of contract designs, described in chapter 2, 'degree of vertical integration' for the four contracts analysed in the thesis means the degree by which the freight forwarder controls the production of the rail transport component of the piggyback transport chain. A low degree of vertical integration, i.e. a spot contract purchase of the service, represents the lowest level of control for the freight forwarder in terms of instructions within a firm. The highest degree of vertical integration on the other hand is the in-house production of the rail transport element, where control is maximised from the perspective of the freight forwarder. Chapter 5 firstly classified the underlying transport services' characteristics in terms of logistics dimensions introduced in chapter 3. Secondly, the transaction attributes of TCE from these transport services were extracted and then qualitatively modelled. Thereafter, the degree of asset specificity, as the second element of the thesis' hypothesis, could be differentiated for the contracts' underlying transport services. In the third step, the contract instruments, i.e. the

means for reducing TCs, as modelled in chapter 4, were allocated to the transaction attributes, i.e. the sources of TCs, as modelled in chapter 5. It was possible thereby to assign degrees of vertical integration to degrees of asset specificity. As a result, the contract designs used for providing the rail transport service in piggyback transport could be explained through TCE.

6.2 SUMMARY OF RESULTS AND IMPLICATIONS

This section will outline the results of the TCE-analysis of German piggyback contracts in chapters 4 and 5 graphically. This is followed by the implications of these findings.

Figure 6.1 uses Williamson's framework of the contract for transaction assignment and places the piggyback transport contracts analysed into this framework. The figure summarises the contract position on the basis of the analysis of the three most important transaction attributes: asset specificity, frequency and uncertainty from chapter 5.

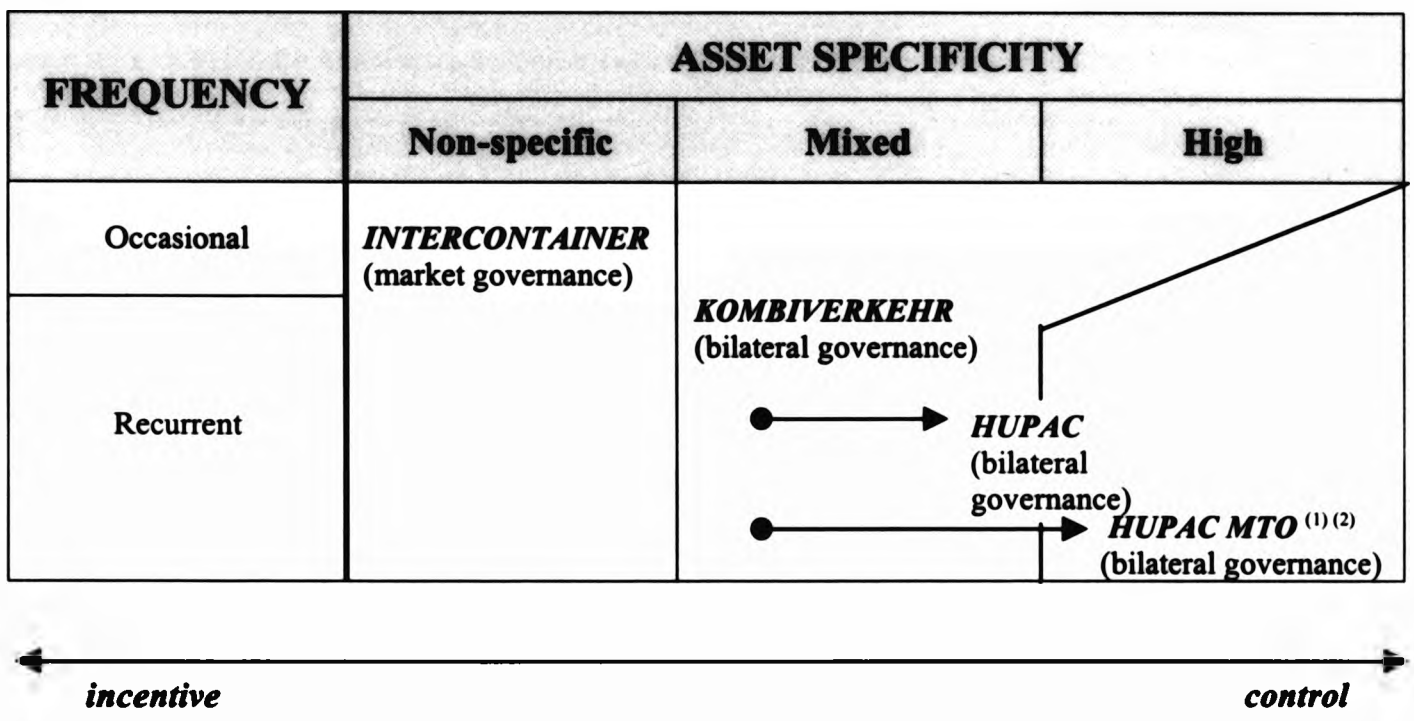
The transaction attributes frequency - in 2 levels - and asset specificity - in 3 levels - are shown on the y-axis and upper x-axis. Uncertainty - in 2 levels low and high as defined in the notes - causes the polarisation of the contract choice. Trilateral governance as governance structure does not appear on this figure, as it is not used in the piggyback transport contracts in Germany. The figure shows the *status quo* transaction attributes of the contract designs of the German piggyback transport market within Williamson's framework of ideal, i.e. most TC-efficient, governance structures. The *status quo* governance structures result from the analysis of contract design elements in chapters 4 and 5. A discrepancy between the most efficient contract design and the *status quo* contract design is highlighted in the figure (circle - *status quo* position and triangle - most efficient position).

In all three contracts, Intercontainer, Kombiverkehr and Hupac with traditional freight forwarder, transactions are co-ordinated which are efficiently organised according to Williamson's TCE. However, in the third contract, Hupac with traditional freight forwarder, specific areas of services were shown to be non-efficient. The fourth contract, Hupac with MTO, in contrast to the three contracts above, represents a sub-optimal governance solution for all transport services co-ordinated through it. However, the transport services could be carried out more efficiently - with a more favourable TC level - through an alternative contract form, namely through full vertical integration of the piggyback rail transport

service. The thesis argues in section 5.1 that this alternative is currently not feasible.

New legislation in Germany allows for freight forwarders to set up a railway operation as a subsidiary company. Nevertheless, the quasi-monopoly of the German national railway (DB) over the distribution of time slots on the rail network diminishes the profitability of this contractual alternative for freight forwarders in a significant way. New entrants are only awarded unattractive time slots and as a result of these access restrictions no full vertical integration of the entire piggyback transport service has so far taken place.

Figure 6.1: Piggyback Contracts in Germany



Notes: (1) High uncertainty.
(2) ●⟶ Contract design, where status quo governance structure differs compared to most efficient governance structure.

Source: Williamson (1985:79) and personal data.

This thesis supports Shelanski's assessment of the TCE theory's predictions:

> "Taken as a whole, the body of empirical research in TCE shows that a good deal of economic activity aligns with transactions in the manner predicted by the theory" (Shelanski & Klein, 1995:352).

However, the thesis' findings hint at areas of further development of TCE, which now follow as implications of the thesis' results.

As a first implication of the results of relating TCE to the piggyback transport industry, the concept of uncertainty could be worked out in more detail. Its impact is different to that of the continuous shifting effects of asset specificity and frequency. Given its polarising effect on the choice of contract, uncertainty should be separated more clearly into complexity and stochastic uncertainty.[1]

A second implication of the thesis' results is that more discrete sub-types should be integrated into Williamson's framework of efficient governance. Bilateral governance had to be split up more discretely into sub-types than in Williamson's governance structures, due to the non-existence of alternatives to full-scale vertical integration of rail transport services in the German piggyback transport industry. The contracts of Kombiverkehr and Hupac with traditional freight forwarder are both bilateral contracts, although contract incentives built into the latter contract move this governance structure more towards vertical integration. The asset specificity involved creates an environment of increased control for the freight forwarder side in the Hupac contract. This applies especially to the crucial area of MT-terminals along the piggyback transport chain. On top of these two additional subtypes, a further subtype had to be added due to a discrete difference in the area of asset specificity. A full take-over by the MTO of all TEU investments involved in the transaction in the Hupac with MTO contract was instrumental for this marked difference.

The third implication arises from the result of analysing the fourth contract, Hupac with MTO. Highly specific assets support the transactions under this contract, which together with high frequency make vertical integration the efficient contract design. The Hupac with MTO contract (i.e. incentives and hostages) is based on bilateral elements. The three other contracts do not contain this mismatch, although part of the Hupac contract - as mentioned above - would

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1 See definitions in chapter 2.

be more efficiently co-ordinated via unified governance, i.e. vertical integration of the train transport service by the freight forwarder. However, current legislation restricts this contract design alternative. The MTO would have to establish a railway operation in the form of a separate railway company <Eisenbahnverkehrsunternehmen (EVU)>, e.g. as a subsidiary company,[2] instead. This option of vertical integration has not been used so far by freight forwarders, due to the quasi-monopoly of the German national railway for the rail transport service of piggyback. The current bilateral contract solution for piggyback transport of MTOs represents a substitute for the above-mentioned EVU.

Therefore, TCE may not be applied in the current form to the empirical framework of piggyback transport for the last contract, because of a possible deficiency of the transaction attributes of TCE. A causal explanation of the last contract (Hupac with MTO) may be accomplished through an alternative theory or an extension of the theory of TCE. These two routes for causal explanation for the Hupac with MTO contract are now being looked at in more detail.

In a first alternative for contract explanation, the freight forwarders' decision to use the last two contract designs, despite the costly lock-in situations due to unbalanced specific investments, could be explained by the expectation of liberalisation of rail track access to the continental European rail networks. Those MTOs, who start integrated piggyback transport directly after liberalisation has been fully implemented, may achieve a superior competitive position over other MTO companies through *ex-ante* acquiring know-how of a fully integrated rail transport system before full access is permitted by legislation.

As TCE does not cover the acquisition of future know-how, an alternative theory to examine freight forwarders' investments would need to be studied. This means that TCE theory is not suitable for the context of the last contract investigated in this thesis.

As a second alternative for contract explanation, freight forwarders could interpret contractual and financial commitments by governments, i.e. Switzerland, as a long-term prospect for using piggyback transport for trans-alpine traffic. The transit agreement between Switzerland and the EU dated 02.05.1992[3] forms an example of this kind of government commitment. This

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2 See section 5.1.4.
3 See section 5.1.3.

agreement binds Switzerland to extend its trans-alpine traffic capacity and makes it more competitive through piggyback transport. The contract commitment would therefore involve the reputation of the Swiss government, acquired through consistent historical transport policy. In contrast to the first alternative of theory deficiency, an element of existing theory - namely, credible commitments of the transaction participants - could possibly be extended. The commitment in this case, contrary to Williamson's TCE, stems from a macro-economic perspective outside the transaction participants, which do not directly participate in the transaction of piggyback rail transport service. The concept of government reputation as credible commitment could be added to the theory, i.e. national government policy in the case of transportation across the Alps could be built into TCE.

The second alternative for explaining the Hupac with MTO contract is to be favoured from the background of the methodology of scientific research programmes (MSRP), as introduced in chapter 1. This alternative would also mean adjusting the 'protective belt' around the overall research programme of New Institutional Economics (NIE), of which TCE is one element, by adding auxiliary hypotheses that would include government reputation into the contract instruments. This alternative would not query the 'hard core' of NIE, which on the one hand is the hypothesis of efficiency and represents the 'negative heuristic' of the research programme and, on the other, the research programme's aim of explaining vertical integration through TCs, which is the 'positive heuristic' of NIE.

Taking these implications of the thesis results with areas of improvement for TCE into consideration, the cases examined show that the TCE is fundamentally suitable for providing causal explanations for contracts in the German piggyback transport industry.

Finally, weaknesses and strengths of the thesis are discussed. Specifically, after the liberalisation of the road haulage sector under EU-legislation in the 1990s from the previous regulation of price and capacity, cross-border mergers within the Western European freight forwarder industry have increased substantially. As a result, the scope of alternatives as to which country to use as a hub for piggyback transport has broadened for the individual market participants in Germany. By looking only at contracts eligible for freight forwarders located in Germany for acquiring rail transport services in piggyback transport, it could be argued that the recent internationalisation of the freight forwarder industry is not sufficiently covered. However, as pointed out in chapter 3, Germany represents

the most important source and target country for international piggyback transport in Europe. Moreover, Germany is by far the biggest European domestic piggyback transport market. Looking at only the four contracts eligible to choose from in Germany, it has been possible to carry out the case study significantly deeper than if various other European piggyback contracts with their respective national transport law had been included.

Moving forward, the qualitative criteria for applying TCE to the piggyback transport industry that were developed in this thesis could be used for other European markets, as well.

The qualitative application to the TC analysis in this thesis, as pointed out in chapter 1, derives from Oliver Williamson's approach of comparing discrete structural alternatives, which differ in their cause rather than their extent. Although the findings of the thesis are unambiguous in terms of transaction cost levels for the four contracts investigated, it could be argued that an additional quantitative approach may be used to confirm these findings.

A quantitative approach could prove specifically useful in cases where TC-levels as the result of assigning contract elements to transaction situations are not as unambiguous, e.g. when relating TCE to other piggyback contracts in other countries.

As a strength of the thesis one can emphasise its approach in applying the entire framework of TCE to the contracts investigated and not focusing on certain factors causing market failure, such as uncertainty or asset specificity. In a step by step process, all transaction attributes from the transaction situation and the entirety of credible commitments built into the contracts are analysed as developed by Williamson for the TCE-field of investigating vertical integration. Moreover, the four contracts together with the corresponding types of piggyback transport services that they support are systematically carried through this process in order to arrive at a judgement regarding their efficiency in chapter 5.

This qualitative case study of relating TCE to the contracts that co-ordinate German multimodal transport – not accomplished so far – could be applied to other countries internationally. As pointed out in chapter 1, the data gathering for analysing the piggyback contracts investigated in the thesis was predominantly though primary sources, i.e. interviews and primary literature. The criteria that have been developed as a result of the process of applying TCE to this sector of the transport industry could be applied to other countries internationally.

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APPENDICES

I LIST OF INTERVIEWS

II INTERCONTAINER-INTERFRIGO (ICF) S.C.: GENERAL CONDITIONS APPLICABLE TO COMBINED TRANSPORT (GTB FOR INTERCONTAINER CONTRACT)

III ALLGEMEINE GESCHÄFTSBEDINGUNGEN DER KOMBIVERKEHR DEUTSCHE GESELLSCHAFT FÜR KOMBINIERTEN GÜTERVERKEHR MBH & CO KG FÜR IHRE INLANDVERKEHRE (GTB FOR KOMBIVERKEHR CONTRACT)

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APPENDIX I:
LIST OF INTERVIEWS

1. People Interviewed

Person Interviewed	Duration	Interview Date
Juri Cavanak, ICF, Basle/CH	30 min 30 min	23.10.2000 21.06.2000
Gabriele GERBER, Transfracht Deutsche Transportgesellschaft mbH, Frankfurt am Main	30 min	14.05.1999
Peter HAFNER, Hupac Intermodal S.A., Chiasso/CH	30 min 30 min 30 min	27.09.2000 20.06.2000 22.08.1995
Juergen HIPP, Division KLV, DB Cargo AG, Mainz/D	30 min	29.05.2000
Rainer MERTEL, Kombiverkehr Deutsche Gesellschaft für kombinierten Güterverkehr mbH & Co. KG, Frankfurt am Main	30 min 60 min 60 min 60 min 60 min	08.12.2000 17.04.2000 18.06.1999 30.09.1993 11.12.1991
Reinhild PRIEBE, Kombiverkehr Deutsche Gesellschaft für kombinierten Güterverkehr mbH & Co. KG, Frankfurt am Main	60 min 30 min	17.04.2000 23.02.2000
Dr. Albert RICHEY, Geschäftsbereich Ladungsverkehr, Deutsche Bahn AG, Frankfurt am Main	30 min	21.06.1999
Horst SCHULZ, Kombiverkehr Deutsche Gesellschaft für kombinierten Güterverkehr mbH & Co. KG, Frankfurt am Main	30 min	14.05.1999

II. Information Contacts

Relevant date of contact is listed in text footnotes.

Theo ALLEMANN, Hupac SA, Chiasso/CH
Werner BACK, Ministerium für Wirtschaft und Technik des Landes Hessen, Wiesbaden/D
Francois BEAU, Novatrans, Paris
Dr. Hans-Jörg BERTSCHI, Bertschi AG, Dürrenäsch/CH
Theo CONVENT, Convent Spedition + Transport GmbH, Emmerich/D
Luc DE DEYNE, Combi-Delta SA, Brussels
Herbert ESSLER, DB Cargo AG, Mainz/D
Filip D'HOSE, Combi-Delta SA, Brussels
Bill HEDRICK, Road Railer Corporation, Chicago/USA
Dr. Hasso HÖLTERLING, Schenker-Rhenus AG, Frankfurt am Main
Bernhard JUDITH, Geschäftsbereich Ladungsverkehr, Deutsche Bahn AG, Frankfurt am Main
Prof. Dr. Guy KIRSCH, Institut für Finanzwissenschaft, Université de Fribourg/CH
Prof. Peter KLAUS, D.B.A./Boston Univ., Lehrstuhl für Betriebswirtschaft, insb. Logistik, Universität Erlangen-Nürnberg, Nuremberg/D
Henner KLEIN, A. T. Kearney, Munich/D
Dr. Bernd H. KORTSCHAK, Wien
Dr. Hans-Wilhelm KREFT, Bundesverband des Deutschen Güterfernverkehrs (BDF) e.V., Frankfurt am Main
Prof. Dr. Fritz KÜBLER, Institut für Arbeits-, Wirtschafts- und Zivilrecht, Universität Frankfurt am Main, Frankfurt am Main
Eckhard KUHLA, Bayerische Trailerzug Gesellschaft für bimodalen Güterverkehr mbH, Munich/D
Roy A. LAWRENCE, British Rail Research, Derby/GB
Guy LIPPERT, ICF, Basle/CH
Serge MOREAU, Union Internationale des sociétés de transport combiné Rail-Route (UIRR), Brussels
Horst NEUROTH, Danzas GmbH, Frankfurt am Main
Michael PROBST, Deutsche Umschlaggesellschaft Schiene-Straße (DUSS) mbH, Mannheim/D
Thomas RÜEGGER, ICF, Basle/CH
Bernd SALB, Deutsche Lufthansa AG, Frankfurt am Main
Markus SCHMIDLE, ICF, Basle/CH
Dr. Christoph SEIDELMANN, Studiengesellschaft für den kombinierten Verkehr e.V., Frankfurt am Main
Silvan VON ROHR, SBB Cargo AG, Bern/CH
Werner WAGNER, Kombiverkehr Deutsche Gesellschaft für kombinierten Güterverkehr mbH & Co. KG, Frankfurt am Main
Hans WENGER, Kombiverkehr Deutsche Gesellschaft für kombinierten Güterverkehr mbh & Co. KG, Frankfurt am Main
Werner ZEHNDER, ICF, Basle/CH

APPENDIX II:
INTERCONTAINER-INTERFRIGO (ICF) S.C.:
GENERAL CONDITIONS APPLICABLE
TO COMBINED TRANSPORT
(EDITION OF 03.01.2000)

Intercontainer-Interfrigo (ICF) s.c.: International Company for the development of combined and temperature-controlled transport

Contents

Preamble

§ 1

Intercontainer-Interfrigo (abbreviated to ICF) is a forwarding agent under Belgian law. It organises its activities with the railways, road hauliers, inland waterway or marine shipping companies and suppliers of ancillary services by the intermediary of its local representatives, a list of whom is obtainable on request.

§ 2

These General Conditions apply to combined transport and ancillary services marketed under the name of "Intercontainer".

§ 3
"Combined transport" comprises all transport of UTI (Unité de Transport Intermodal = intermodal transport unit): large containers or swap bodies of all types, containers or swap bodies fitted for controlled temperature (particularly mechanically refrigerated, refrigerated and insulated), similar units, semitrailers, etc.

§ 4
Ancillary services" comprise in particular terminal services inherent in combined transport (handling and road haulage); provision of UTI; information concerning any irregularity occurring during transport of UTI fitted for controlled temperature; supervision of the working of the machinery and maintenance of the required temperature of mechanically refrigerated UTI during transport.

§ 5
The terms "principal" (party giving the order) and "receiver" (beneficiary) refer to the principal and receiver themselves or to any agent they may appoint.

§ 6
The term "client" denotes the freight payer, who, except with the prior agreement of ICF, can only be the principal or the receiver.

Article 1: Offers and agreements

§ 7
Unless otherwise stipulated by ICF, its offers shall remain valid for thirty days from the date of sending, subject to the provisions of §§ 9 and 10.

These offers shall not be binding on ICF unless it has received the express acceptance of the client during the period of validity or the client has handed over a UTI to ICF within the same period, which implies acceptance of the ICF General Conditions by the client.

§ 8
All offers and agreements, even all-inclusive, are based on the tariffs of transport and ancillary services applicable to ICF as well as all other technical and commercial factors prevailing on the date of their compilation.

§ 9

If economic, political or technical circumstances, unforeseeable by ICF at the time of compilation of the offers and agreements and entirely beyond its control, subsequently occur and upset the balance of the above offers or agreements, thus placing an excessive burden on ICF in the discharge of its contractual obligations, ICF may require the client in writing to adjust the offers or agreements, indicating the precise circumstances and giving the reasons for its request. If, in spite of an adjustment of the offers or agreements, it appears economically impossible to maintain them, ICF may cancel them with effect on the seventh day after giving notice of cancellation in writing. This provision does not concern force majeure referred to in § 10.

§ 10

The clause of force majeure of the International Chamber of Commerce (ICC publication No. 421) applies to these General Conditions.

Article 2: Orders and instructions

§ 11

Before UTI are entrusted to ICF, details of the composition of the consignment (length and weight of the UTI) shall be communicated to the ICF agent in good time, so that he can take the necessary steps for furnishing the services requested (provision of wagons, handling, road haulage, etc.).

§ 12

For each consignment to be entrusted to ICF, the principal shall complete a form entitled "Transfer Note" (obtainable on request from ICF local agents) and attach all the documents required by Customs and other administrative authorities for the transport.

The handing over of UTI, accompanied by signed and dated Transfer Note(s), constitutes the transport order.

§ 13

Before completing the Transfer Note, the principal shall ensure that the conditions of acceptance and delivery requested in the Transfer Note can be provided by consulting the "list of terminals and stations open to Intercontainer traffic", obtainable from ICF on request.

§ 14
The principal shall be responsible for entries made by him on the Transfer Note. He shall bear any consequences arising from incorrectness, inaccuracy, incompleteness or absence of such entries. The same grounds for responsibility of the principal as well as delay in handing over the documents shall apply to documents required by Customs and other administrative authorities for transport. Without prior agreement, ICF shall not involve itself in the carrying out of these formalities and shall not be responsible for the erroneous raising of duties, taxes, charges etc. by these authorities.

§ 15
Division of charges and special prepayment provisions are not allowed, and consignments may not be made subject either to declarations of cash on delivery or disbursements.

§ 16
ICF is not required to verify the accuracy of information given on the Transfer Note or in the instructions or other documents submitted separately.

§ 17
Alterations to orders and instructions entered on the Transfer Note shall be accepted only if they are requested in writing from the ICF local agent in good time and in the manner required by ICF ("Request for Modification to the Instructions of the Transfer Note"). Only written acceptance of this request shall mean that ICF will endeavour to carry it into effect, taking into account the capabilities and regulations of each carrier. Only the principal shall be authorised to modify the instructions. However, these may also be modified by the receiver if the receiver is also a client of ICF for the transport in question and provided that the new station of destination is situated in the same country of destination. The client shall bear the costs arising from such alterations.

Article 3: Dangerous goods

§ 18
Before entrusting consignments of dangerous goods to ICF, it is mandatory to give at least 24 hours' notice.

§ 19
For consignments of dangerous goods, the principal is required to make all the necessary declarations and to comply with all the conditions prescribed by the

prevailing national and international regulations, particularly the RID, ADR and CSC international conventions, with a view to taking the special measures required for this type of transport.

§ 20

The principal shall bear all the consequences for failure to make such declarations and non-compliance with these conditions. Furthermore, he shall be responsible for any loss or damage, any delays or costs that may result from the acceptance of these goods, their transport and any related service.

Article 4: Provision of UTI

§ 21

ICF shall endeavour to meet orders for UTI necessary for transport. Without a formal undertaking on its part, ICF shall assume no responsibility if UTI are unavailable or are provided late or if they are refused in accordance with § 22. Provision of UTI shall entitle ICF to raise a charge or is subject to special conditions determined in each case.

§ 22

The user (principal or ordinary hirer or legally entitled parties) shall inspect the UTI before loading. This inspection must also include checking the working of the refrigerating system of UTI fitted for controlled temperature.

The equipment may be refused if it is defective or unfit for conveyance of the merchandise to be loaded therein. Failing such refusal, the equipment supplied shall be deemed in good condition and fit for the transport in question. If the refusal is not communicated in the 24 hours (Sundays and public holidays excluded) following the supply of the equipment, the user shall be liable for possible demurrage charges as well as a daily compensation based on the daily rent applicable to this type of UTI, and if applicable, on the daily wagon standage charge.

§ 23

The user shall be responsible for the careful treatment of the equipment placed by ICF at his disposal. He shall be responsible to ICF for any damage to said equipment while it is in his custody or in the custody of entitled parties, and he shall be required to compensate ICF for the replacement value of the UTI in the event of its destruction or loss.

Any UTI not returned within three months of the date of provision or by the end of the period of hire shall be considered lost. The aforementioned damages comprise direct damage to the equipment and loss of income due to repairs.

§ 24
The user shall make every effort to return the UTI to ICF in good condition, cleaned and, if necessary, disinfected or deodorised, with the motors stopped and the doors closed, either by the receiver after unloading or by the user at the end of the period of hire. If the user fails to comply, ICF shall have the aforementioned work undertaken at the user's expense. A daily compensation corresponding to the daily rent applicable to this type of UTI shall be payable to ICF for late restitution of UTI.

Article 5: Use of wagons

§ 25
If the principal requires a specific type of wagon or placing of UTI on wagons in a particular fashion, ICF shall endeavour to satisfy such requests without formal undertaking.

§ 26
If the principal or the receiver loads or unloads the UTI from the wagon himself, he shall be required to comply with all the railway regulations and to bear all the consequences of inadequate loading or unloading.

§ 27
If the loading or unloading periods allowed by the tariffs of the railways are exceeded before or after railway transport, the party responsible (principal or receiver) shall pay "demurrage charges" directly to the railways for their wagons or to the wagon owner for privately owned wagons.

If demurrage charges are debited to ICF by the railways or other wagon owner, because ICF appears as consignor/consignee in the consignment note, ICF shall pass them on to the client.

§ 28
On the other hand, when transport is effected with wagons from the ICF fleet and the loading and unloading periods mentioned in § 27 are exceeded, or if such wagons are delayed in transit through the fault of the principal or the receiver,

ICF shall invoice "private wagon standage charges", the rates of which will be communicated to the principal on request.

Demurrage charges for wagons parked on railway lines shall be based on the prevailing tariffs of the railways.

Article 6: Condition, loading, storage of UTI

§ 29
UTI shall undergo inspection before they are handed over to ICF by the principal. This is a purely external inspection carried out from the ground with the doors closed. Consequently, ICF is under no obligation to detect possible roof or floor damage or to examine the loading of the goods in the UTI.

§ 30
The principal shall be liable for any consequences arising from the inadequate condition or overloading of the UTI. He shall guarantee to ICF that the UTI and its loading comply with all the applicable standards and regulations and that it is resistant enough to satisfy the requirements both of transport safety and handling.

§ 31
The principal shall bear any consequences of inadequate loading of the UTI or packing of its contents. UTI loaded with goods subject to special regulations or packaging techniques must comply with these regulations or techniques.

§ 32
The principal shall bear any consequences, even indirect, in the event of loss, shortage or theft of goods arising from failure to lock and seal the UTI properly or from a defect in the locks or seals.

§ 33
If UTI are left by the receiver on the installations or wagons after delivery, typically in the case of delivery on a private siding, immediate instructions for their reforwarding shall be given. Storage charges for UTI arising from the absence of instructions shall be passed on by ICF to its client.

Article 7: UTI fitted for controlled temperature

§ 34

This concerns transport of insulated, refrigerated or mechanically refrigerated UTI. Such transports can be effected with or without temperature supervision and with or without transport supervision. It is understood that the transport of the UTI without temperature or transport supervision is assimilated to the transport of UTI not fitted for controlled temperature.

The provisions of §§ 29 to 34 shall apply by analogy.

§ 35

Concerning transport of UTI with temperature and transport supervision, this service comprises:

transport by fast and priority services,
supervision of the working of the machinery and level of the temperature required,
informing the principal of any irregularity occurring during transport.

This service applies to:

all mechanically refrigerated UTI of the self-refrigerating type for which temperature supervision has been requested.

This service presupposes:

the possibility of reading the control instruments by a person standing beside the wagon,
sufficient mechanical autonomy for the whole duration of the transport.

§ 36

Concerning transport of UTI without temperature supervision but with transport supervision, this service comprises:

transport by fast and priority services,
informing the client of any irregularity occurring during transport.

This service applies to:

any insulated, refrigerated or mechanically refrigerated UTI for which transport supervision has been requested.

§ 37
The principal must ensure that:

the machinery is switched on,
there are sufficient fuel and additives for the whole duration of the transport, and
the temperature is correctly adjusted.

Article 8: Impediments to transport and delivery

§ 38
If circumstances prevent continuation of transport according to instructions received from the principal, ICF shall take any steps it considers useful or expedient. In all cases, such steps shall be considered as having been taken with the principal's consent. Any additional costs, particularly those incurred in protection or preservation of UTI and their contents, shall be charged to the principal.

§ 39
If impediment to delivery arises, ICF shall notify the principal who, on his own responsibility, must issue instructions to ICF without delay as to the steps to be taken (reforwarding, measures for preserving the goods, etc.). All resultant costs shall be charged to the client.

Article 9: Responsibility

§ 40
The responsibility of ICF begins with the handing over of the UTI and ends with the unqualified acceptance of the UTI by the receiver.

Assessments of damage or loss are only binding on ICF to the extent that ICF has been duly summoned to participate in them.

§ 41
If damage to/loss of UTI and/or goods or detriment occurs and can be localised on the rail-based portion of the journey of a combined (multimodal) shipment, the liability of ICF is subject, as the case may be, to the provisions of:

the Berne Convention concerning the International Carriage of Goods by Rail (CIM),
the SMGS Agreement between several Central and Eastern European and Asian States concerning international shipments of goods by rail,
the national legislation applicable to the railway company, for national rail shipments.

§ 42
If damage to/loss of UTI and/or goods or detriment occurs and can be localised on any other non-rail-based portion of the journey (road, non-CIM shipping line, etc.) of a combined (multimodal) shipment, the liability of ICF is subject to the provisions of the Geneva Convention concerning international shipments of goods by road (CMR).

The same applies when the portion of the journey in which damage to/loss of UTI and/or goods or detriment have occurred cannot be determined.

§ 43
ICF as a forwarding agent under Belgian law is responsible for ensuring that the order issued by the principal in the Transfer Note is executed properly.

In the event of a purely financial loss directly involving the liability of ICF through proven fault in the execution of the aforementioned order, ICF shall be liable for compensation only to a maximum of EUR 100,000 for each proven and documented financial loss.

§ 44
If a delivery period for an entire multimodal shipment is guaranteed by a special written agreement, the provisions of the CMR shall apply should the delivery period be exceeded.

Article 10: Financial provisions

§ 45
All amounts due to ICF are payable on presentation of an invoice.

During a period of twelve months from the principal invoice, ICF reserves the right to send an additional invoice for costs unknown at the time of the principal

invoice. All taxes, duties and charges applicable to the services provided by ICF shall be stated on the invoice.

§ 46

Except by special agreement, invoices shall be issued in Euro and payable in Basle.

The bank transfer charges are payable by the client.

The currency conversions necessary for invoicing are based on the exchange rates applied by the Swiss Federal Railways on the date of the invoice.

§ 47

Invoices are payable without discount or deduction within 30 days of the date of issue.

Any default in settling within this period shall lead to the invoicing of interest on arrears calculated at the rate of 12% per annum.

Any delay in settling shall cause the agreed period to lapse, and all the amounts invoiced shall become payable immediately.

Setting off claims against payment is not permitted.

§ 48

Without prejudice to § 6, the principal is jointly liable with any freight payer designated by him, and in the event of default in settling by the last mentioned, ICF reserves the right to recover its debt from such principal.

§ 49

ICF reserves at all times the right to require the freight payer designated by the principal or the principal himself to give a guarantee for payments due and to stipulate the form and amount of this guarantee.

§ 50

ICF has a lien on all property, documents and monies handed to it for carriage or other operations, for all debts due from the freight payer designated by the principal, from the principal himself or the owner of the goods.

Article 11: Claims

§ 51
All claims for damage/loss/detriment shall be submitted within six months of delivery to the receiver.

All claims for exceeding the delivery period affecting the purely rail-based portion of the journey are to be submitted within 6 weeks of delivery to the receiver.

These claims should be quantified and submitted in writing, clearly indicate the object of the claim and include a copy or the number of the Transfer Note.

ICF reserves the right to a six-month period for handling such claims.

§ 52
All claims concerning invoices must be submitted within six weeks of the date of each invoice. ICF shall issue a credit or debit note or a new invoice for any invoice amendment.

§ 53
The submission of a claim does not dispense with settlement of the invoice.

Article 12: Final provisions

§ 54
The principal is deemed to act validly on his own behalf and on behalf of the legally entitled parties. He expressly recognises the General Conditions in force at the time of the consignment, which are assumed to be known to and accepted by the client.

§ 55
In the event of non-compliance with these General Conditions, particularly article 10, ICF reserves the right to cancel all offers and agreements and demand payment of all charges, invoices, fees and indemnities due, with effect on the date when notification of such action is sent by ICF.

§ 56
No derogation of these General Conditions shall be binding on ICF unless it is based on a written agreement signed by two Directors of ICF.

§ 57

These General Conditions are governed by Belgian law. Only the courts in the country of the defendant's domicile or registered office shall be competent.

§ 58

These General Conditions are published in Dutch, English, French and German and each version shall have equal validity.

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APPENDIX III:

ALLGEMEINE GESCHÄFTSBEDINGUNGEN DER KOMBIVERKEHR DEUTSCHE GESELLSCHAFT FÜR KOMBINIERTEN GÜTERVERKEHR MBH & CO KG FÜR IHRE INLANDVERKEHRE (STAND: 1. JULI 1999)

§ 1 Vertragsgegenstand

Die Kombiverkehr Deutsche Gesellschaft für kombinierten Güterverkehr mbH & Co KG, nachfolgend Kombiverkehr genannt, ist als Zwischenspediteur tätig. Für die Speditionsverträge mit dem Kunden gelten die gesetzlichen Regelungen, insbesondere die §§ 453 ff. HGB, soweit die nachfolgenden Regelungen keine Abweichungen vorsehen.

Kunde von Kombiverkehr und Rechnungsempfänger ist, wer Kombiverkehr den Auftrag zur Versendung von Ladeeinheiten erteilt.

Der zwischen dem Kunden und Kombiverkehr geschlossene Speditionsvertrag umfaßt die Besorgung der Versendung von beladenen und unbeladenen Ladeeinheiten im Rahmen des nationalen Kombinierten Ladungsverkehrs Schiene/Straße.

§ 2 Verpflichtungen der Vertragsparteien

Aufgrund des Speditionsvertrages verpflichtet sich Kombiverkehr, die Versendung von Ladeeinheiten über die Schiene zum vereinbarten Empfangsort und den erforderlichen Umschlag zu besorgen. Der Umschlag umfaßt das Auf- und Abladen der Ladeeinheit auf und vom Waggon. Kombiverkehr verpflichtet sich darüber hinaus, Informationen an den Kunden weiterzugeben, die sie im Fall einer Unregelmäßigkeit bei der Beförderung erhalten hat.

Der Kunde ist zugleich Absender und Empfänger der Ladeeinheit. Er hat diese selbst oder durch einen von ihm benannten Vertreter (Auflieferer) am Versandtag bei der für den Versand vorgesehenen Umschlaganlage aufzuliefern und am Bereitstellungstag bei der Umschlaganlage des vereinbarten Empfangsortes selbst oder durch einen von ihm benannten Vertreter (Abholer) abzuholen.

§ 3 Inkrafttreten des Vertrages, Abstellung

Der zwischen dem Kunden und Kombiverkehr zu schließende Speditionsvertrag tritt mit beiderseitiger Unterzeichnung des Versandauftragsformulars in Kraft. Die Unterzeichnung kann durch einen Stempelaufdruck, einen maschinellen Buchungsvermerk oder in sonst geeigneter Weise ersetzt werden.

Das Versandauftragsformular dient bis zum Beweis des Gegenteils als Nachweis für den Abschluß und Inhalt des Speditionsvertrages sowie für die Übernahme der Ladeeinheit. Es begründet nur die Vermutung dafür, daß der Kunde die Ladeeinheit äußerlich in einem für den Eisenbahntransport sicheren Zustand aufgeliefert hat. Eine weitergehende Vermutungswirkung hinsichtlich des äußeren Zustandes der Ladeeinheit und des in der Ladeeinheit befindlichen Gutes besteht nicht.

Vor dem vereinbarten Versandtag aufgelieferte Ladeeinheiten werden in der Umschlaganlage kostenpflichtig abgestellt. Die Abstellung kann auf Grundlage eines gesonderten Lagervertrages erfolgen. Der Kunde gestattet in diesem Fall ausdrücklich die Lagerung bei dem jeweiligen Betreiber der Umschlaganlage (§ 472 Abs. 2 HGB). Die Abstellung endet mit der Öffnung der Umschlaganlage am Versandtag.

§ 4 Vertragsende

Der Speditionsvertrag endet mit der Übergabe der Ladeeinheit an den Kunden oder seinen von ihm benannten Vertreter (Abholer) am Empfangsort.
Am Bereitstellungstag nicht abgeholte Ladeeinheiten werden bei Betriebsschluß in der Umschlaganlage kostenpflichtig abgestellt. Die Abstellung kann ohne vorherige Einholung von Weisungen auf der Grundlage eines gesonderten Lagervertrages erfolgen. Der Kunde gestattet in diesem Fall ausdrücklich die Lagerung bei dem jeweiligen Betreiber der Umschlaganlage (§ 472 Abs. 2 HGB).
Wird eine abgestellte Ladeeinheit nicht innerhalb von 10 Werktagen nach dem Bereitstellungstag abgeholt, ist Kombiverkehr dazu berechtigt, weitere Maßnahmen gem. § 419 Abs. 3 HGB zu ergreifen, ohne zur vorherigen Einholung von Weisungen verpflichtet zu sein.

§ 5 Beschaffenheit von Ladeeinheit und Gut

Mit der Übergabe der Ladeeinheit haftet der Kunde dafür, daß diese und das darin geladene Gut für den Kombinierten Verkehr geeignet und transportsicher sind, ohne daß es auf sein Verschulden ankommt[1].
Kombiverkehr kann die Ladeeinheit bei der Übernahme, während sich diese auf dem Auflieferfahrzeug befindet, von außen vom Boden aus besichtigen. Sie ist nicht verpflichtet, das Gut, dessen Verpackung, Stauung und Befestigung sowie die dazu vom Kunden gemachten Angaben oder die übergebenen Dokumente zu überprüfen.

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[1] Einzelheiten regeln die Verladerichtlinien der DB Cargo. Vgl. auch die von Kombiverkehr und DB Cargo herausgegebenen "Empfehlungen für die Ladungssicherung im Kombinierten Verkehr".

Der Kunde haftet für die Richtigkeit und Vollständigkeit seiner für das Versandauftragsformular gemachten Angaben, ohne daß es auf sein Verschulden ankommt.

§ 6 Gefährliches Gut

Das gefährliche Gut ist vorzeitig anzumelden, wenn dies in den Fahrplänen oder auf andere Weise bekanntgemacht ist.

Eine Ladeeinheit, die mit zugelassenem gefährlichen Gut beladen ist, muß den Normen entsprechen, die für die Beförderung auf Schiene und Straße durch gesetzliche oder behördliche Vorschriften festgelegt sind.

Soweit zwingende oder AGB-feste Rechtsvorschriften nichts anderes bestimmen, haftet der Kunde mit der Übergabe der Ladeeinheit für

die Einhaltung der in § 6 Abs. 2 genannten Vorschriften,

die vollständigen Angaben über das Gut und die nach den speziellen Gefahrgutvorschriften richtige Bezeichnung im Versandauftragsformular,

die Übergabe der richtigen Unfallmerkblätter und erforderlicher weiterer Unterlagen,

die Mitteilung von Vorsichtsmaßnahmen, soweit diese behördlich vorgeschrieben oder sonst erforderlich sind.

Der Kunde ist verpflichtet, die Ladeeinheit erst am Tage des Versands aufzuliefern und am Bereitstellungstag abzuholen. Ist dieses nicht der Fall, so kann Kombiverkehr gem. § 410 Abs. 2 HGB das gefährliche Gut auf Kosten des Kunden ausladen, einlagern, zurückbefördern oder, soweit erforderlich, vernichten oder unschädlich machen, ohne hierfür ersatzpflichtig zu werden.

§ 7 Zahlung, Aufrechnung

Die Zahlung des Entgeltes für die durch Kombiverkehr besorgten Leistungen erfolgt durch das Kombifrachtkreditverfahren entsprechend den für dieses Verfahren festgelegten Bedingungen der Deutschen VerkehrsBank AG (DVB).

Jede Aufrechnung oder Zurückbehaltung gegenüber Forderungen aus dem Speditionsvertrag wird ausgeschlossen, ausgenommen bei rechtskräftig festgestellten oder von Kombiverkehr nicht bestrittenen Gegenforderungen.

§ 8 Haftung

Die Haftung von Kombiverkehr gegenüber dem Kunden für Schäden durch Verlust oder Beschädigung der Sendung oder wegen Überschreitung der Lieferfrist ergibt sich aus § 459 in Verbindung mit §§ 425 ff. HGB. Abstellungen aufgrund eines gesonderten Lagervertrages richten sich nach den §§ 467 ff. HGB. Die bekanntgegebenen Fahrpläne sind keine Lieferfristen.

Die Haftung ist begrenzt

bei Verlust und Beschädigung des Gutes gem. § 431 HGB auf 8,33 SZR für jedes Kilogramm des Rohgewichts der beschädigten oder verlorenen Sendung,

bei Verlust oder Beschädigung des Gutes während einer Abstellung, auch in den Fällen einer gesonderten Lagerung, auf 2 SZR für jedes Kilogramm des Rohgewichts der beschädigten oder verlorenen Sendung,

bei Überschreitung der Lieferfrist auf den dreifachen Betrag des Entgeltes.

Die Haftung hinsichtlich aller sonstigen Ansprüche, insbesondere gem. § 461 Abs. 2 HGB, ist begrenzt auf den dreifachen Betrag des Entgeltes, soweit zwingende oder AGB-feste Rechtsvorschriften nichts anderes bestimmen.

Die Haftung ist begrenzt auf 2 Millionen DEM je Schadensfall und 10 Millionen DEM je Schadensereignis oder auf 2 SZR für jedes Kilogramm der verlorenen und beschädigten Güter, je nachdem, welcher Betrag höher ist. Bei mehreren Geschädigten aus einem Schadensereignis haftet Kombiverkehr anteilig im Verhältnis der einzelnen Ansprüche.

Diese Haftungsbegrenzungen gelten auch für außer-vertragliche Ansprüche.

Die vorstehenden Haftungsbefreiungen und-begren-zungen gelten nicht, wenn der Schaden verursacht worden ist,

durch Vorsatz oder grobe Fahrlässigkeit der Kombiverkehr oder ihrer leitenden Angestellten;

in den Fällen der §§ 425 ff., 461 ff. HGB durch Kombiverkehr oder die in §§ 428, 462 HGB genannten Personen vorsätzlich oder leichtfertig in dem Bewußtsein, daß ein Schaden mit Wahrscheinlichkeit eintreten werde.

§ 9 Schadensanzeige

Es obliegt dem Kunden, bei der Abholung der Ladeeinheit Vorbehalte wegen Beschädigungen oder Fehlmengen gem. § 438 HGB entweder gegenüber dem örtlichen Vertreter von Kombiverkehr anzumelden oder gegenüber demjenigen, der das Gut abliefert. Erfolgt kein Vorbehalt, so wird vermutet, daß die Ladeeinheit in einem vertragsgemäßen Zustand abgeliefert worden ist.

Vorbehalte wegen äußerlich nicht erkennbarer Beschädigungen oder Fehlmengen sind innerhalb von fünf Tagen anzumelden.

§ 10 Schlußbestimmungen

Alle Ansprüche aus dem Speditionsvertrag verjähren gem. § 439 HGB in einem Jahr.

Der Gerichtsstand für alle Rechtsstreitigkeiten, die aus dem Speditionsvertrag oder im Zusammenhang mit diesem entstehen, ist für alle Beteiligten Frankfurt am Main. Der Kunde kann auch an seinem Gerichtsstand verklagt werden.

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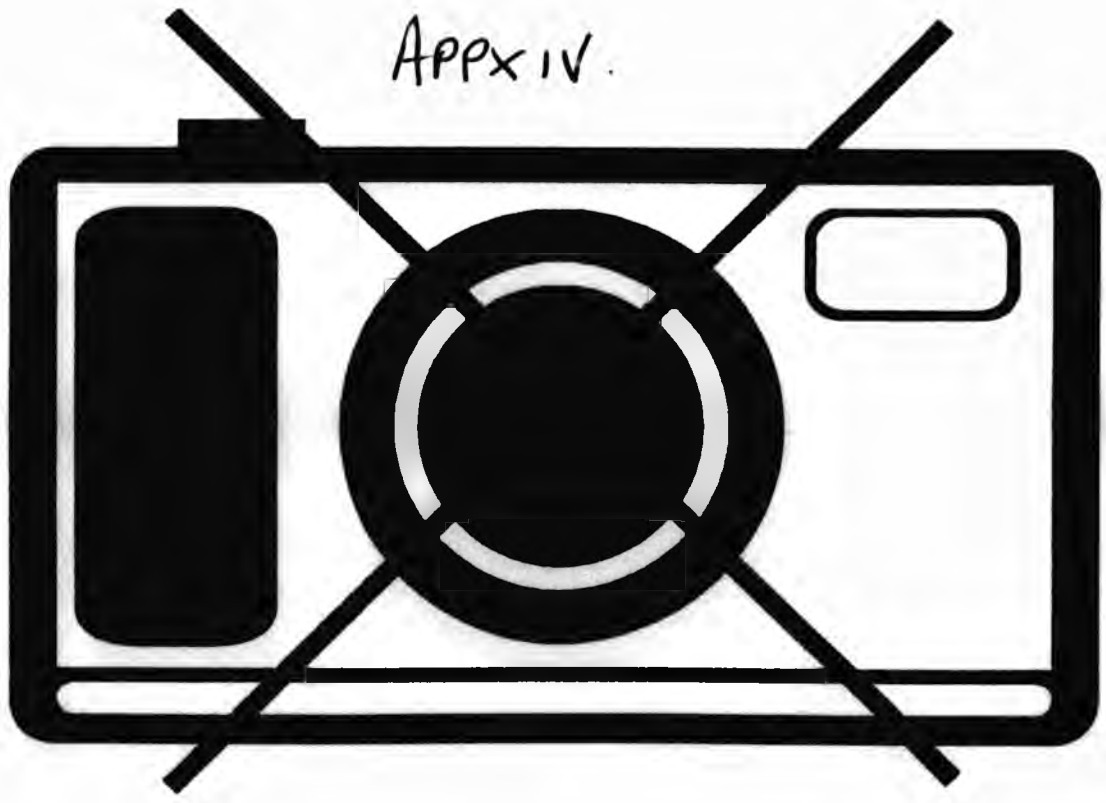

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