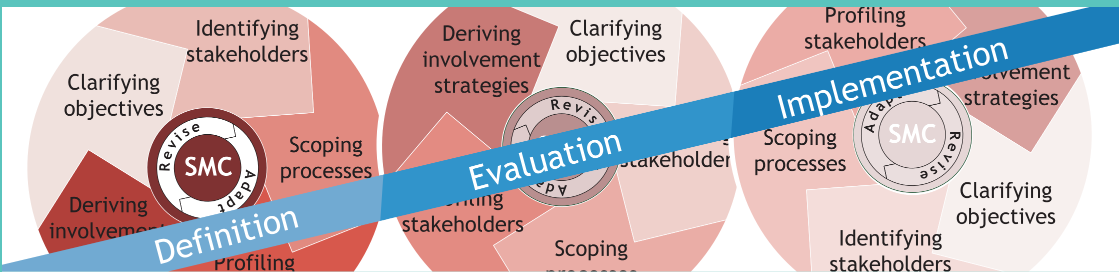
Jutta Wolff

Stakeholder management along maritime container transport chains

Development of a framework and exemplified application in empty container logistics



Band 11
Harburger Berichte zur Verkehrsplanung und Logistik

Schriftenreihe des Instituts für Verkehrsplanung und Logistik

Herausgegeben von
Heike Flämig und Carsten Gertz
Technische Universität Hamburg-Harburg

Stakeholder management along maritime container transport chains

Development of a framework and exemplified application in empty container logistics

Vom Promotionsausschuss der
Technischen Universität Hamburg-Harburg
zur Erlangung des akademischen Grades
Doktor-Ingenieurin (Dr.-Ing.)
genehmigte Dissertation

von
Jutta Wolff

aus
Siegen

2014

Jutta Wolff
Stakeholder management along
maritime container transport chains

Gutachter

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Tag der mündlichen Prüfung: 11.12.2013

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»Stakeholder management along maritime container transport chains«
© 2014 der vorliegenden Ausgabe:
Verlagshaus Monsenstein und Vannerdat OHG Münster
www.mv-wissenschaft.com

Satz: Institut für Verkehrsplanung und Logistik
Umschlag: Institut für Verkehrsplanung und Logistik
Druck und Bindung: MV-Verlag

ISBN 978-3-95645-359-5

Foreword

Die Logistikbranche ist für Volkswirtschaften eine wichtige Voraussetzung, um am globalen Welthandel teilhaben zu können. Dabei erfolgt der Großteil des weltweiten Handels über den Seeweg und zunehmend in Containern. Die maritime Containertransportkette weist jedoch große Ineffizienzen auf. Diese zeigen sich auch im Bereich des Leercontainertransports, der weder ökonomisch noch ökologisch sinnvoll erscheint. Hier liegen gute Ideen vor allerdings bleibt die Umsetzung aus oder erfolgt nur begrenzt. Das Maßnahmenwissen, also was zu tun wäre, ist vorhanden, jedoch fehlt es am Handlungswissen, wie der Umsetzungsprozess erfolgreich zu gestalten ist. Dabei wird eine dynamische Prozessorientierung in den Handlungssystemen umso wichtiger, wenn Veränderungsprozesse angestoßen werden sollen, die zu einer neuen Bedeutung oder auch zur Einbindung weiterer Stakeholder in den betrachteten Prozessen führen.

Als Jutta Wolff ihre Forschungsarbeiten im Jahr 2011 begann, sollte im Hamburger Hafen das größte Leercontainerdepot geschlossen werden. Die zentralen Akteure sahen negative ökonomische aber auch betriebliche Folgen auf sich zukommen. Es kam zu Spannungen, insbesondere zwischen der Hafenverwaltung, den Terminalbetreibern, den Reedern und den Depotbetreibern, da zwar verschiedenste Handlungsoptionen vorgeschlagen wurden, jedoch keine umsetzbare und von allen Seiten getragene Lösung verfolgt wurde. Diesen Konflikt wollte die Hafenverwaltung auflösen und suchte nach einer geeigneten Vorgehensweise.

Das Themenfeld erwies sich aus verschiedenen Gründen als sehr komplex. Insbesondere da sich die maritime Containertransportkette durch das ihr inne liegende Prozesshafte von vielen anderen Anwendungsdomänen eines Stakeholder Management unterscheidet. Eine Vielzahl an verschiedenen beteiligten und betroffenen Akteure mit unterschiedlichen Interessen, bestehende Flächenengpässe im Hamburger Hafen, Anwohnerbeschwerden und nicht zuletzt fehlende Kenntnisse über Leercontainerströme erforderten die Entwicklung einer methodischen Vorgehensweise, die hilft, das Feld zu systematisieren und zu strukturieren, die betroffenen und beteiligten Akteursgruppen zu identifizieren und Strategien im Umgang mit den verschiedenen Interessenlagen abzuleiten.

Die von Jutta Wolff entwickelte Vorgehensweise, der so genannte „Stakeholder Management Cycle“ prüft die Eignung vorhandener Stakeholder Management Ansätze für das Themenfeld der Maritimen Containertransportkette, integriert eine systemische und dynamische Perspektive und liefert Arbeitshilfen für die praktische Anwendung. Der „Stakeholder Management Cycle" hebt sich von anderen Stakeholder Management Ansätze durch folgende Bausteine ab:

- Aus der System- bzw. Prozessanalyse integriert Jutta Wolff das Prozessmapping, um der Besonderheit der Flussorientierung der Transportkette gerecht zu werden. Dadurch wird nicht nur eine erhöhte Transparenz geschaffen, sondern es liegt gleichzeitig eine wichtige Arbeitshilfe vor, um in Diskussionen mit Stakeholdern, in Interviews oder Workshops ein gemeinsames Verständnis für den Gegenstand entwickeln zu können.
- Für die Analyse des Verhältnisses der Marktteilnehmer zueinander, wird die Transaktionskostentheorie herangezogen und praktisch durch die Analyse der Aufbau- und die Ablauforganisation berücksichtigt.
- Die Veränderungen der Stakeholder Zusammensetzung, Bedeutung und des Umsetzungsfortschritts werden im zeitlichen Verlauf berücksichtigt, indem der Stakeholder Management Cycle durch die Integration in die verschiedenen Phasen des Veränderungsprozesses als iteratives Vorgehen dynamisiert wird.

Als Ergebnis liefert die Arbeit eine detaillierte Darstellung der Bedeutung einzelner Akteursgruppen und deren mögliche funktionaler Einbindung in den Veränderungsprozess. Diese Darstellung begrenzt sich nicht nur auf die direkt an der Erstellung der Transportleistung beteiligten Akteure, sondern thematisiert auch diejenigen Stakeholder, die durch diesen Erstellungsprozess betroffen sind oder diesen beeinflussen können.

Durch die nahezu zur Dissertationserstellung parallele Bearbeitung des anwendungsorientierten Projekts „Transbaltic - Towards an integrated transport system in the Baltic Sea Region" konnte Jutta Wolff wesentliche „Feinheiten" für die praktische Anwendbarkeit gewinnen und in der entwickelten methodischen Vorgehensweise berücksichtigen, indem beispielsweise für die einzelnen Phasen konkrete Arbeitshilfen zur Informationsgewinnung angeboten werden. Die Auswertung und visuelle Darstellung der Rohdaten der Leercontainerströme zwischen Hamburg und dem Baltischen Raum war beispielsweise ein wesentlicher Schritt, um die Brisanz einer veränderten Depotstruktur zu verstehen und auch zu kommunizieren. Gleichzeitig bot sie erste Ansatzpunkte für eine Lösungsfindung.

Das gewählte Thema der Arbeit ist hoch aktuell und bisher nur rudimentär bearbeitet. Jutta Wolff leistet mit dem gewählten Zugang einen wichtigen Beitrag zur Diskussion der zukünftigen Gestaltung der Leercontainerlogistik und der Einbindung der Stakeholder in die dafür notwendigen Veränderungsprozesse.

Mit dem entwickelten Vorgehen zum Management von Stakeholdern entlang der Maritimen Containertransportkette und der Anwendung für Hamburg und dem Baltischen Raum liegt erstmalig die notwendige Methode und Transparenz vor, die Prozesse nicht nur zu verstehen, sondern auch aktiv unter Berücksichtigung der Stakeholder gestalten zu können.

Im August 2014, Prof. Dr.-Ing. Heike Flämig

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List of abbreviations

3PL	Third party logistics (Provider)
Abbr.	Abbreviation
ARIS	Architecture of integrated information systems
BCE	Before common era
BMT	Baltic Maritime Outlook
BPMN	Business process model and notation
BSR	Baltic Sea Region
c.	Lat.: circa (around, about)
CDO	Container depot operator
cf.	Lat.: confer (compare)
CFS	Container freight station
CH	Carrier's haulage
CP	Cooperative potential
CSR	Corporate social responsibility
CT	Competitive threat
DAKOSY	Port community system of the Port of Hamburg (Datenkommunikationssystem)
DIN	German industry standards body (Deutsches Institut für Normung)
DK	Denmark
e.g.	Lat.: exempli gratia (for example)
EC	Empty container
EDI	Electronic data interchange
EE	Estonia
et al.	Lat.: et alii/alliae/alia (and others)
etc.	Lat.: et cetera (and the rest/and so on)
EU	European Union
F	Forwarder
ff.	and the following (pages)
FI	Finland
GIZ	Germany Association for International Cooperation (Deutsche Gesellschaft für Internationale Zusammenarbeit)
GTZ	German Agency for Technical Cooperation (Deutsche Gesellschaft für Technische Zusammenarbeit)
HPA	Hamburg Port Authority
i.e.	Lat.: id est (that is)
IBM	International Business Machines Corporation
ICT	Information and communication technology
IDEF	Integration definition for function modelling
ISM	Intervention strategy model
ISO	International Organisation for Standardisation
IT	Information technology
ITO	Inland transport operator
IWW	Inland waterway
LASH	Lighter aboard ship
Lat.	Latin

LT	Lithuania
LV	Latvia
MCTC	Maritime container transport chain
MH	Merchant's haulage
MTO	Multi transport operator
No.	Number
NVOCC	Non-vessel-operating-common-carrier
O	Others
ODA	Overseas Development Administration
p.	Page
PCS	Port community system
PDF	Portable document format
PL	Poland
PLINS	Planning and information system of the HPA (PLanungs- und INformationsSystem)
PoH	Port of Hamburg
pp.	Pages
PTA	Potential to affect
PTC	Potential to collaborate
resp.	Respectively
RFID	Radio-frequency identification
RoRo	Roll on/Roll off
RQ	Research question
RU	Russia
SADT	Structured analysis and design technology
SAP	Systems, applications and products in data processing
SAST	Strategic assumption surfacing and testing
SE	Sweden
SH	Stakeholder
SIG2	WCTRS-Special Interest Group for Maritime Transport and Ports
SL	Shipping line
SMC	Stakeholder management cycle
SRI	Stanford Research Institute
SRM	Stakeholder relations management
SSA	Structured systems analysis
STO	Sea terminal operator
TEU	Twenty-foot equivalent unit
UK	United Kingdom
UML	Unified modelling language
UNCED	United Nations Conference on Environment and Development
UNCTAD	United Nations Conference on Trade and Development
USA	United States of America
VCY	Virtual container yard
WCTRS	World Conference on Transport Research Society
WFMS	Working flow modelling software

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1 Background, objective and design of research work

This thesis develops a framework for stakeholder management as a tool to deal with stakeholders along maritime container transport chains during change processes.

1.1 Derivation of research needs

The maritime transport chain takes place in a complex multi-stakeholder environment. Various stakeholders, such as shippers, shipping lines, terminal operating companies, hinterland transport providers, inland terminal operators, forwarders, port authorities, planning authorities, customs etc. (Bichou & Gray, 2005, p.417; Rodrigue, 2012i), are involved. The complexity of behaviour is mainly due to the different short-term strategies adopted by the market players (Meersman et al. 2009, p.145). Dominant players improve efficiency and effectiveness of their own business, leaving only little room for other actors and their efforts to develop their assets and operations (Meersman et al., 2009, p.156). Moreover, '*actors affect and are affected by relationships along a single chain and by interactions with actors of other chains,*' thus complicating co-ordination (Heaver, 2011, p.159). These public and private sector stakeholders have different scopes of action (Martino et al., 2012, p.73) within local or regional boundaries up to and including a European or even a global dimension (Musso, 2009, pp.58, 66).

The transport chain in general and likewise the maritime transport chain is characterised by a volatile environment. One driving aspect for the changing environment is the fact that transportation is a derived activity resulting from market demand for trade in goods (Blauwens et al., 2006, p.251 ff.; Rodrigue et al., 2009, p.2; Nöll, 2009, p.45). However, '*transport is more than a derived activity*' (Notteboom & Winkelmans, 2007, p.9). The transport sector has facilitated global trade by successful efforts in scale increases in the maritime and port sector, thereby enabling cheaper transportation so that the transport sector and international trade influence each other. In recent years, internationalisation and deregulation have fostered prolonged economic growth leading likewise to growth in the transport sector (Meersman et al., 2009, p.143; Langfeldt, 2006, p.9 ff.; Zachcial & Lemper, 2006, p.24; Heideloff, 2006, p.59). Nevertheless, trade has '*witnessed dramatic events in the growth and volatility of international trade*' during the first decade of the twenty-first century such as the boost of the dot com bubble in 2001 and the financial crises in 2008 with partially huge impacts on the transport sector (Heaver, 2012, pp.1-3). Likewise the 9/11 assassinations caused a *shock* in international trade (Lemper, 2009, p.18). Regulations governing safety and security or policies to mitigate environmental or social impacts of transportation are also a changing factor that influences conditions in the transport market (Ewert, 2008, p.81; Meersman, 2009, p.3; Meersman et al., 2009, p.149). Moreover, technological enhancements (e.g. in ship design or port infrastructure) have an impact on the logistics chain (Ewert, 2008, p.73 ff.; Rodrigue et al., 2009, p.64) and require adaptation of related processes (Meersman et al., 2009, p.149). Furthermore the transport sector is determined by strong competition leading to great efforts to achieve greater efficiency (de Langen 2008, p.15 ff., Meersman, 2009, p.3).

The complex stakeholder environment of maritime transport chains implies conflicting interests of the stakeholders involved. Conflicts may arise between individual stakeholders due to diverging interests in optimising the use of their respective assets (Bichou & Gray, 2004, p.51) and resulting non-convergent objectives (Martino & Morvillo, 2008, p.571). Very often firms are rather focusing on individual issues than on the chain as a whole (Horst & de Langen, 2008, p.111). In particular, individual conflicting interests came to be relevant during change processes in ports as nodal points in the maritime transport chain. Conflicts occur due to diverging stakeholder objectives of port development and urban development, environmental protection, labour conditions, residents' interests or overall economic development (de Langen, 2007, p.460 f.).

Numerous stakeholders are likewise affected by changes in the transport chain such as policy or project implementation. In general, projects as well as policies often fail because of opposition and non-cooperation by stakeholders (Grimble & Chan, 1995, p.115; Bichou & Gray, 2005, p.416 f.), thus the success of any undertaking along the transport chain is very much dependent on the support of the relevant stakeholders. Stakeholder and organisational dynamics play a '*critical role*' in determining the initiation and implementation of changes (Hall et al., 2013, p.9).

The literature outlined above indicates the relevance of stakeholder orientation along maritime transport chains. **Various stakeholders** from both the public and private sector with different reaches of influence can affect the design of maritime transport chains. Moving goods comprises interaction between the private transport sector realising the flow by offering its various services according to market demand and the public sector providing the necessary infrastructure embedded in related policy settings. Further transportation takes place on different geographical scales, enabling local exchange of goods up to global trade. **Volatile environments** due to economic changes, policy implementation or technological enhancements determine the interaction of actors along transport chains. Change processes along transport chains very often face **conflicting interests** of involved or affected stakeholders which can become a relevant obstacle during implementation. In particular, the complexity of intermodal transport chains as well as the international context in which implementation is embedded are push factors for conflicts. However, the success of change processes is very often dependent on the **support of relevant stakeholders**.

Moreover, several authors in related literature even indicate the necessity to enforce stakeholder analysis followed by adequate involvement. Meersman et al. (2009) refer to maritime transportation and claim to '*analyse the strategic behaviours and possible actions of players individually*' and that '*all this information needs to be brought together in an integrated whole*' (Meersman et al., 2009, p.159). The United Nations Conference on Trade and Development (2012) states that measures to achieve more sustainable freight transport require '*a holistic approach where the perspective of all private and public stakeholders in the system must be considered and integrated, inclusive of all modes and activities*' (UNCTAD, 2012, p.129). The need for dealing with stakeholders is particularly indicated in port-related literature. Meersman et al. (2009) state that there is no awareness of port stakeholders' relative importance due to a lack of insight into their main characteristics (Meersman et al., 2009, p.155). Martino et al. (2008) note that there is a lack of frameworks capable of representing the complexity of the community (Martino & Morvillo, 2008, p.577). Notteboom and Winkelmans (2002) conclude that developments in the port environment '*urge a well-balanced SRM [stakeholder relations management]*' including identification and classification of stakeholders as well as an evaluation of their influence on the port. They define SRM as '*keystone*' in a port's functioning and development (Notteboom & Winkelmans, 2002, p.19). Henesey et al. (2003) state that port managers seldom have a comprehensive picture and stakeholder management tends to be of an ad hoc nature without relying on '*any kind of framework that could help to assess possible action/reaction patterns in stakeholder relations*' (Henesey et al., 2003, p.6). Dooms et al. (2013) stipulate a diversified port stakeholder management enabling the port to monitor its dynamic stakeholder environment (Dooms et al., 2013, p.24).

Stakeholder management offers a possibility to deal with the issues described above. In basic literature of stakeholder management it is considered an answer to changing or volatile environments (Mason & Mitroff 1981, p.3 ff.; Freeman 1984, p.3 ff.; Dill 1975, p.58) because it reveals conflicting interests of the involved stakeholders (Rhenman 1968, p.36 f.; Fox 1971, p.57 ff.; Clarkson 1995, p.106 ff.). Further experiences in the management of complex and international projects show that stakeholder management is a prerequisite for planning and successful implementation of any kind of undertaking relevant for and depending on various stakeholders (Ellmann, 2008, p.162 ff.,417 ff.; Lindenberg & Crosby, 1981, p.xi; Cleland 1986, p.38). Stakeholder management creates transparency on stakeholder interests and influence and helps to find adequate involvement strategies.

Many different approaches to stakeholder management are specified for corporate management, policy development and implementation, development cooperation or project management. The specification of these approaches takes the form of, for example, classifications and analysis schemes explicitly addressing the stakeholder environment of a corporation, a project etc., for a facilitated application by potential users. However, no formal approaches are known to address explicitly change processes along the (maritime container) transport chain. In order to accommodate stakeholder management in the context of maritime container transport chains and also enable a facilitated usage a reasonable specification is required that must also include classifications and analysis schemes.

Classifications that elaborate transport chains from a systems perspective likewise imply the validity of systems theoretical assumptions for transport chains (Ihde, 2001, p.42 f.; DIN, 1989a, p.3; Wolf, 1997, pp.1089-1090). According to Bertalanffy (1968) the systems perspective implies similar characteristics and behaviour of systems of different kinds. He defines a system as '*a set of elements standing in interrelations*' (Bertalanffy, 1968, p.55). Elements and their interrelations build the structure and relations that determine the system's function (Bossel, 2004, p.35). Following Wolf (1997) this is applied to transport chains such as in that source and destination of the transport chain are considered as primary elements and secondary or linking elements refer to a functional and institutional perspective. The functional perspective thereby results from a process perspective and includes logistics nodes, the means of transport as well as all transport related transfer processes along the flow of goods. The institutional perspective focuses on organisations involved in the transport chain and their interrelation. In this context the author stresses the relevance of the influence exerted by involved organisations to determine the logistical scope of action (Wolf, 1997, pp.1089-1093).

Thus the stakeholder perspective is already included in the formal classification of transport chains. Likewise the functional result of the process perspective is emphasised as a relevant focus.

The process perspective implies a flow-oriented view. Process orientation evolved in strategic and organisational management and also became important in logistics. Hence, process management is one of the main strategies in logistics (Delfmann, 2008, pp.927-933; Baumgarten, 2008, p.15). A basic part of process management is process analysis to create process transparency by outlining and documenting the relevant process elements and their interrelations (Delfmann, 2008, pp.928-932). The main focus of process analysis is thus usually on costs, time and quality. Even though the importance of stakeholders, players or actors is mentioned by several authors (Kuhn, 1995, p.13; Baumgarten & Wiegand, 1996, p.53; Weber, 1992, p.885 ff.) no methodological approaches specifically elaborate this perspective.

1.2 Objective of this thesis and derivation of the research-leading questions

The overall objective of this thesis is to develop a stakeholder management framework for improving change processes along the maritime container transport chain.

A framework will therefore be developed which constitutes a specification of stakeholder management for an application in change processes along the maritime container transport chain. The main specification of stakeholder management developed within this thesis is to accomplish needs from the maritime transport chain background by integrating process analysis. Process analysis thus integrates the flow character inherent in the (maritime) transport chain and reveals for each stakeholder their influence on respective processes as well as interactions and interfaces between involved stakeholders. Moreover, accommodated classifications and analysis schemes will be developed within the framework to enable a focused and easy application by potential users. By combining both approaches - stakeholder management and process analysis - a useful tool will be developed to accompany the implementation of change processes along the maritime container transport chain and to ensure conscientious dealing with stakeholders' needs and influence.

The framework developed will be applied and exemplified within a case study on empty container logistics along maritime container transport chains in the study area Hamburg - Baltic Sea Region. In the context of a preparatory study, the importance of empty container logistics as a key challenge in maritime container transport chains as well as the relevance of this field of action in the study area will be portrayed.

The focus on the *maritime **container** transport chain* is due to its high level of integration with respect to functional and institutional elements, its importance for international trade and its need for smart management.

In order to accomplish the objective the following research-leading questions (RQ) are posed to guide the work in this thesis.

- What are the main characteristics of change and of the maritime container transport chain? What are the resulting implications for framework development? (RQ1)
- What are the theoretical considerations on stakeholder and process oriented thinking, as well as the fields of application and methodological approaches to both perspectives? What are the resulting implications for framework development? (RQ2)
- What are the fundamental constituent parts of a stakeholder management framework and their configuration for change processes along the maritime container transport chain? (RQ3)
- What are the resulting implications from an application of the developed stakeholder management framework in the field of transport and logistics? (RQ4)

1.3 Research design

This subchapter aims at allocating this thesis briefly in the scientific context by discussing and presenting the applied research design.

'*The research design is the blueprint for fulfilling objectives*' (Blumberg et al., 2008, p.69). Generally it is concerned with finding answers to research questions (Lee & Lings, 2008, p.180) and is very much dependent on the underlying research philosophy.

With Kotzab et al. (2005) a comprehensive analysis of research methodologies in supply chain and logistics research has been published. Several conceptual contributions deal in it with how research in supply chain management can be conducted (Kotzab et al., 2005, p.3). According to Golicic et al. (2008) there is a demand for a more balanced research approach combining inductive research methods (typically qualitative) with deductive methods (typically quantitative). Referring to preceding studies, the authors claim that logistics and supply chain management are governed by a positivist paradigm and that past research is primarily normative (theoretical models and literature reviews) and quantitative (modelling and surveys). Qualitative research studies such as grounded theory, ethnography, phenomenology, semiotics, and historical analysis are thus neglected and lead to an imbalance in catching complex phenomena which are typical in logistics and supply chain environments. '*Researchers who exclusively choose one approach or the other seriously delimit the scope of their inquiry and, thereby, their ability to contribute to the body of knowledge'* (Golicic et al., 2005, p.16).

The research design applied here follows this idea by combining deductive and inductive reasoning or quantitative and qualitative methods in order to find answers to the research questions posed. It is discussed in the following.

The literature review provides an insight into the state of the art of relevant fields in theory and serves as a basis to stress the necessity for the methodological development within this thesis. The object of research is thus change and the maritime container transport chain. Stakeholder and process orientation have been chosen as relevant research perspectives. These four fields of theory are to explore by a literature review. Based on this the focus of the own research will be extracted by deriving underlying definitions and determining relevant implications for the development of the framework. Likewise based on the literature review a deductive analysis of existing stakeholder management and process modelling methodologies will be conducted to derive a suitable framework enabling stakeholder involvement in change processes along the maritime container transport chain. Therefore different methodologies will be presented and discussed so that the final choice and shaping of the developed framework will be comprehensible.

The intention of the empirical part is to gain insights into the consistency and feasibility of the developed framework as well as on its contribution for improving change processes along maritime container transport chains. Two research methodologies were considered reasonable for an application in practice: action research and case study research. Within action research the researcher is part of the research and not apart from it (Lee & Lings, 2008, p.201), i.e. action research combines research and intervention intending to improve practice and create theoretical knowledge (Bichou & Gray, 2005, p.415). Action research requires a deep involvement of the researcher in the explored context as an '*agent of* *change*' and necessarily requires her/him to '*take action*' (Müller, 2005, p.354). In particular the latter requirement could not be ensured in context of the empirical part. Hence, the case study approach was chosen for the empirical part of the thesis.

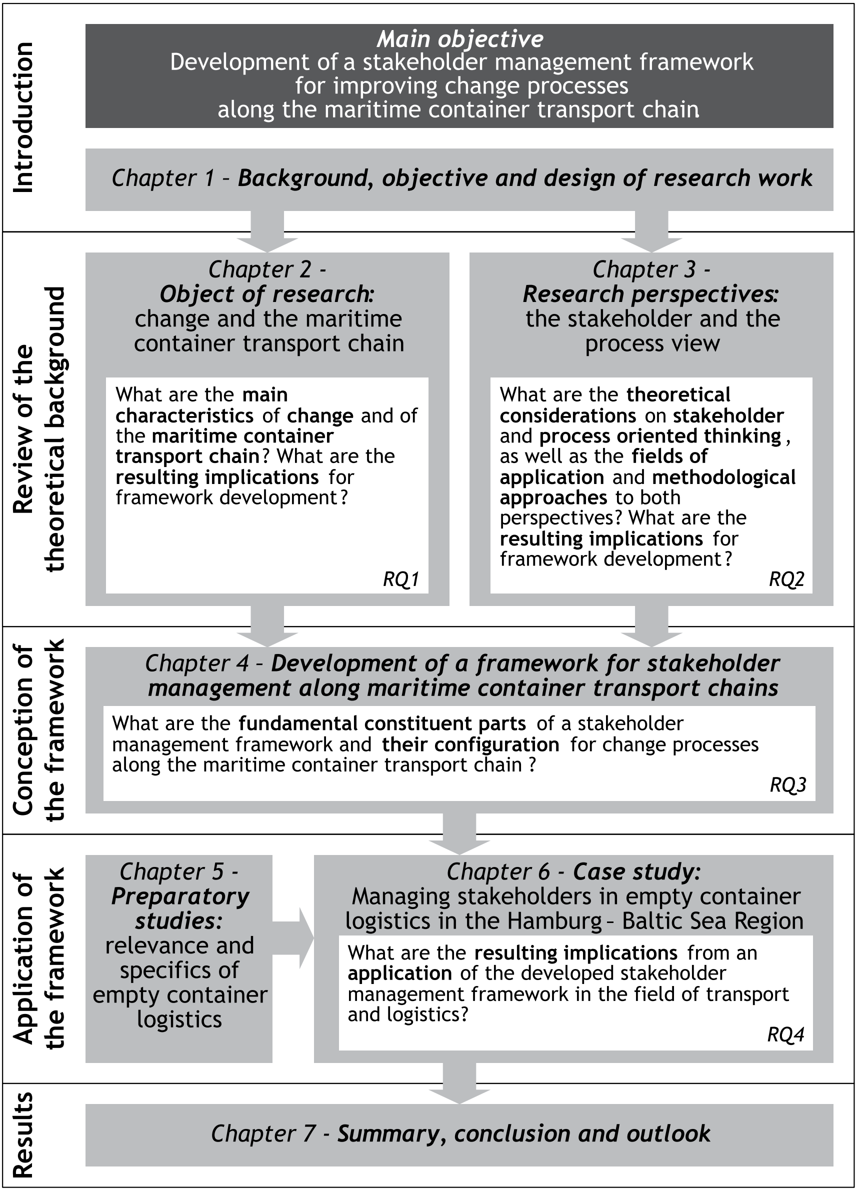
According to Yin (2003) '*A case study is an empirical enquiry that (1) investigates a contemporary phenomenon within its real life context, especially when (2) the boundaries between phenomenon and context are not clearly evident*' (Yin, 2003, p.13). Following Yin (2003) the case study conducted in context of this thesis is *explorative* by '*determining the feasibility of the desired research procedure*'. By applying the stakeholder management framework in practice its consistency and feasibility is tested and critical reflection is facilitated. Due to the fact that the framework is developed during this thesis, it naturally could not be applied so far. Conclusively the case study can be called *critical*, as here the opportunity was taken '*to observe and analyze a phenomenon so far inaccessible to scientific investigation*' (Yin, 2003, pp.14 f., 39-42; Seuring, 2005, p.238).

For applying the stakeholder management framework during the case study different data collection methods are used such as qualitative interviews and a survey. A detailed description of the methods applied can be found in chapter 6.1. Furthermore preparatory studies were conducted to show the relevance of empty container logistics in general and in particular in the study area. A qualitative study of empty container logistics in general is portrayed in chapter 5.1. The Hamburg - BSR study area is explored in chapter 5.2. Therefore a quantitative analysis of data on empty flows between Hamburg and the BSR was performed. Finally experience gained during the case study will serve for an inductive analysis of the developed framework. For each framework step a critical reflection of the applied framework will be executed.

The resulting structure of this thesis is described hereinafter. By means of a literature review the object of research, namely change and the maritime container transport chain, are outlined in *chapter 2.* Also by a literature review the theoretical embedding and approaches of stakeholder management and analysis will be elaborated as well as the principles behind process thinking and approaches to process modelling will be presented in *chapter 3.* Resulting implications from the literature review will determine the framework development. The stakeholder management framework will be developed in *chapter 4* showing how to apply stakeholder management for the underlying purpose. Therefore methodological approaches for stakeholder management and process analysis that were identified during the literature review will be analysed. For each step origins and reasons are discussed leading to the developed approach and ways to perform each step are suggested. *Chapter 5* serves as a preparation for the case study focusing on empty container logistics in general and in the case study area Hamburg – BSR. In *chapter 6* a case study is portrayed in which the stakeholder management framework is applied to empty container logistics in the study area Hamburg - BSR. This case study was realised as part of the TransBaltic project funded by the EU's Baltic Sea Region Programme. *Chapter 7* will give answers to the research-leading questions, draw the main conclusions and provide an outlook for further research.

The objective, structure and research questions of this thesis are illustrated in Figure 1.1.

Figure 1.1: Objective, structure and research questions of this thesis



RQ: Research question

Source: Own design

2 Object of research: change and the maritime container transport chain

The compilation of the main characteristics of change as well as of the maritime container transport chain intends to explore the object of research in detail in order to derive relevant implications for the development of the stakeholder management framework.

The *change process* is therefore described with reference to a general typology of changes and the phases of the change process as a framework for the implementation of changes along the maritime container transport chain (chapter 2.1). Furthermore, this chapter includes a *classification of the maritime transport chain* in general (chapter 2.2) and the derivation of the research focus on the maritime container transport chain in the context of *containerisation* (chapter 2.3). Then the *functional perspective* (chapter 2.4) as well as the *institutional perspective* (chapter 2.5) of maritime container transport chains is portrayed with regard to the research perspectives (stakeholder and process oriented thinking) applied in this thesis. The last chapter comprises the resulting *implications for framework development* (chapter 2.6).

2.1 The change process

'*The only constant is change*' was already recognised by Heraclitus in 500 BCE and this perception is even more formative in modern times (Gleser, 1999, p.19). Likewise the maritime transport chain is exposed to changes emerging from internal and external developments as outlined in chapter 1.1.

Change is not an unexplored phenomenon and has been considered in many different disciplines such as psychology, political science, business science etc. In particular, organisational change or development has been widely explored. Change management is thus the discipline dealing with the implementation of changes and provides guidance on change strategies, typologies, processes, etc.

Change can be understood as concrete *activity* aiming at change, the *process* that encompasses change or the *result* of a change (Baumöl, 2008, p.70)[1]. Here the fo-

1 A detailed discussion on definitions in different fields of theory such epistemology, psychology, systems theory, business economics and informatics, and engineering can be found in Baumöl, 2008, pp.70-78.

cus will be on the change process. Therefore different types of changes will first be outlined to enable a classification of situations triggering the change process. Then the different phases of the change process will be portrayed.

Typology of change

With reference to organisational change Nadler and Tushman (1995) differentiate between incremental and discontinuous change (Nadler & Tushman, 1995, pp.21-25). Incremental change is focusing on '*doing things better*' or on efficiency through a continuous process of adaptation and modification (Hayes, 2010, p.24-26). However, incremental changes are not necessarily small changes, moreover incremental change can be cumulative and, over time, can lead to a transformation of deep structures (Nadler & Tushman, 1995, p.22). Discontinuous change, also called transformational changes by Hayes (2010), tends more to imply '*doing things differently*'. The change is performed in one step (Hayes, 2010, p.24-26) and is understood as a break with the past that fundamentally changes deep structures (Nadler & Tushman, 1995, p.22).

Nadler and Tushman (1995) add timing to respond to changes as additional perspective (Nadler & Tushman, 1995, p.23). Hayes (2010) picks up that idea and specifies timing as the capability to anticipate change and to respond to it either proactively or reactively. Finally, he proposes a typology of changes that is portrayed in Figure 2.1 (Hayes, 2010, p.26-28 adapted from Nadler & Tushman, 1995, p.24).

Figure 2.1: Typology of changes according to Hayes (2010)

	Incremental	Transformational
Proactive	**Tuning**	**Reorientation**
Reactive	**Adaption**	**Re-creation**

Source: Own design based on Hayes, 2010, p.26

Tuning is change when there is no immediate need to change. Organisations are usually engaged in tuning most of the time. This approach to change is initiated internally and aims at maintaining alignment between internal elements and toward the external environment (Hayes, 2010, p.26). Nadler and Tushman (1995) exemplify possible areas of tuning change such as the improvement of policies, methods and procedures, the introduction of new technologies, improvement of quality, enhancement of coordination, etc. (Nadler & Tushman, 1995, p.25). *Adaption* means an incremental and adaptive response by virtue of a pressing external demand and thus tends to be driven externally. It exhibits, for example, responses to the competitive environment by adapting to a competitor's new strategy. Incremental change *'is not about doing things in fundamentally different ways or about doing fundamentally different things'* (Hayes, 2010, p.27). Both tuning and adaption are bounded by the same frame, they keep to within the existing paradigm and the focus is more on individual parts or subsystems.

In contrast to this, reorientation and re-creation break with existing paradigms by doing things differently or doing different things. The goal is to change the frame and the focus is on the overall system (Nadler & Tushman, 1995, p.29 f.; Hayes, 2010, p.27). *Reorientation* implies a redefinition of e.g. an organisation. The organisation's identity, vision and strategy are thereby changed and likewise require a change of formal structures and processes. It is an internally initiated process in anticipation of future opportunities or threats. However, it is done '*before the change imperative has hit*'. Thus it allows time for change and the occasion to determine the direction of change internally. However, reorientation is rather rare. The argumentation for a transformational change without the explicit need to change although it leads to fundamental changes within the organisation is hard to establish (Nadler & Tushman, 1995, p.26 f.). In contrast to this, *re-creation* is change due to external pressure that transforms an organisation through a fast and simultaneous change of all its basic elements (Hayes, 2010, p.27 f.). Re-creation often occurs if organisations face fundamental crisis. The changes are more sudden and severe, implemented in a short period of time (Nadler & Tushman, 1995, p.30).

Nadler and Tushman (1995) name intensity referred to as level of stress, trauma and dislocation as an important factor that determines how changes will be managed (Nadler & Tushman, 1995, p.32). Transformational change is more intense than incremental change because people involved in transformational change processes are detached from their old familiar structures and may experience uncertainty, often accompanied by powerful emotions (Hayes, 2010, p.29). An imposed change can reduce the perceived autonomy or self-control (Morris &

Raben, 1995, p.48). Furthermore, it is argued that reactive change is more intense than proactive change (Hayes, 2010, p.29) in particular, as during reactive change, the people involved are aware that failure may threaten their survival (Nadler & Tushman, 1995, p.32). When the need for change during proactive change processes is not obvious to all, it may, however, be difficult to '*create a sense of urgency and gain widespread acceptance of the need to prepare for change*' (Hayes, 2010, p.27). As change processes affect performance, commitment and the physical and psychological wellbeing of people involved, the intensity of changes must be dealt with consciously (Hayes, 2010, p.31)[2].

Transferred to the transport chain, changes are more incremental than transformational. With reference to the effect of change – either concerning the overall system (transformational) or just parts of it (incremental) –, transformational changes are rare. Rodrigue (2009, 2012), for instance, declares the prominence of a new transport system e.g. the completion of significant rail infrastructure projects in the USA in 1836 (Rodrigue et al., 2009, p.65) or containerisation (Rodrigue, 2012b) as paradigm shifts. Both examples were not initiated due to external pressure but proactive, thus they were a *redefinition* of its basic elements. Most examples for the changing environment of maritime transport chains given in chapter 1.1 can be defined as incremental change. Regulations governing safety and security are thus usually reactive e.g. legislation to protect against terrorism became particularly relevant after the 9/11 assassinations. Also, policies mitigating environmental or social impacts of transportation can be reactive, e.g. attempts to reduce greenhouse gas emissions in transportation due to global warming. Moreover, they impose external pressure on and require *adaption* from affected organisations. Technological enhancements and measures to increase efficiency allow organisations to *tune* in order to have a competitive advantage. Likewise they can be an *adaption* as reaction to the competitive environment.

Phases of the change process

The change process is often referred to Lewin (1963) who explored changes in light of group dynamics and organizational development. He defines three steps within the change process: *unfreeze*, *move* and *freeze* (Lewin, 1963, p.262 f.). *Unfreezing* breaks with organisational equilibrium (Hayes, 2010, p.29) and aims at the willingness to change of affected individuals by overcoming their inertia and creating the conviction for the necessity to change. Therefore actual habits,

2 A comprehensive analysis of socio-psychological aspects of change can be found in Gleser (1999).

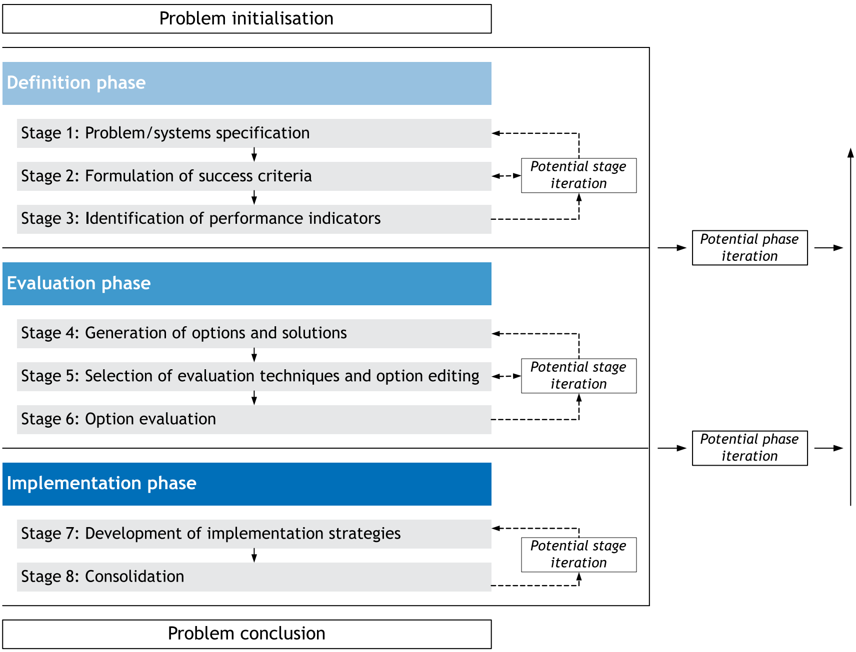
rules and behaviour as an underlying mindset have to be dismantled (Gleser, 1999, p.29). The *move* outlines the change itself which usually is characterised by new rules and which have to be internalised by affected individuals (Gleser, 1999, p.29). *Freezing* finalises the change and describes the state where the new mindset is crystallized and equilibrium is recovered (Gleser, 1999, p.30). Lewin's change process model is widespread and served as a basis for manifold models describing change in organisations (Gleser, 1999, p.31; Pescher, 2010, p.93).

Other authors propose a less abstract approach and provide a more operational instrument that clearly defines steps which are to be taken to implement the change, although the three phases of Lewin's model still are recognisable.

Hayes (2010) for instance describes a generic process model for corporate change. Starting with *recognising* the need for change and by this initiating the change process, the *diagnosis* helps in a second step to evaluate the status quo and predict what kind of interventions will produce the desired change. In a next step the *plan* for change has to be developed involving the intervention strategy and plan. *Implement* is the next step in the change process that involves taking action to realise the desired change. The change process is finalised by the step *sustain* that is referred to in Lewin's third step of freezing, to prevent life from returning to the way it was before. Hayes (2010) further includes *managing the people issues* and *reviewing the change* as parallel steps to above change process steps (Hayes, 2010, pp.1-13).

Paton and McCalman (2008) argue that change situations need means of handling that analyse and implement change situations. They therefore provide the intervention strategy model (ISM). An intervention strategy is defined as '*procedural methodology for successfully intervening in the working processes of the original system*' (Paton & McCalman, 2008, p.106). The ISM consists of three phases: *definition*, *evaluation* and *implementation*. The authors state that most system intervention models share this basic three-phase approach, though phases are termed and emphasised differently. Within the ISM the three basic steps are framed by problem initialisation and problem conclusion as the starting and finalising point respectively (Paton & McCalman, 2008, p.108 ff.). In this framework the steps resemble the approach by Hayes (2010) and stress the argument of Paton and McCalman (2008) that change processes are usually built up in the same way. The authors underline the dynamic nature of change environments and conclude the necessity of internal review but also the engagement of external stakeholders. This also leads to the necessity of iteration as essential feature of a change process. '*At any point it may be necessary to iterate back to an earlier* *stage for the purpose of incorporating a new development, or factor, which may influence the validity of original outcomes*' (Paton & McCalman, 2008, p.109). Furthermore, the authors stress that distinction between the phases is rather blurred in terms of concrete allocation of stages to the three phases. For instance they state that for effective implementation it must itself already be considered during evaluation (Paton & McCalman, 2008, p.111). The ISM is depicted in Figure 2.2.

Figure 2.2: Intervention strategy model according to Paton and McCalman (2008)



Source: Own design based on Paton & McCalman, 2008, p.111

In the following the different phases according to Paton and McCalman (2008) are described.

Definition phase

The definition phase includes the in-depth specification and study of the change situation with its nature, impact and repercussion. An accurate description of the change allows the managing team addressing the change holistically including relationships, attitudes, causes etc. During this phase key stakeholders should be highlighted. The first phase involves three stages: these are problem/systems specification and description (stage 1), formulation of success criteria (stage 2) and the identification of performance measures (stage 3). Within the first stage the managing team develops a deep understanding of the change situation. The change ought to be defined in systems terms to reduce the complexity and to determine systems interactions and relationships. Here Paton and McCalman (2008) refer to the *unfreeze* phase of Lewin's change process model in terms of unfreeze the present system to create an atmosphere of cooperation and support. They stress that this step requires cooperation and that '*defining the change must be seen as a group/stakeholder activity*'. Formulating success criteria involves the setting of objectives and constraints and eventually the generation of options tagging the original objective. Finally the definition phase includes the identification of performance measures that reflect defined objectives or objective hierarchies (Paton & McCalman, 2008, pp.112-115).

Evaluation phase

During the evaluation phase potential solution options are generated and evaluated. Here the authors mention that stakeholders who were identified during the definition phase should be revised for evaluation as some may have to be added or dropped. This phase of the ISM includes three stages: the generation of options or solutions (stage 4), the selection of appropriate evaluation techniques (stage 5) and option editing and option evaluation (stage 6). For the generation of options the authors recommend the involvement of stakeholders and underline the effectiveness of collective solution methodologies to ensure support and a positive stance. At this stage all possibilities and opportunities should be considered even though options may appear not to be relevant. The second stage is the definition of the evaluation dimension for generated options such as risk, environmental impacts etc. The last stage constitutes the final step before implementation. Different options are evaluated according to chosen dimensions and finally the option(s) for implementation are selected. Here a forward loop to the implementation phase is recommended to ensure practicability for the ensuing phase (Paton & McCalman, 2008, pp.115-118).

Implementation phase

The implementation phase builds up on a defined and understood system, clarified objectives and reviewed and selected options. It involves the development of implementation strategies (stage 7) and the consolidation of the change introduced (stage 8). As for strategies the authors provide recommendations for different kinds of implementation such as pilot studies, parallel running and the '*big bang*'. Here the authors emphasise that '*to gain a shared perception of a problem and commitment for its solution it is essential to involve those affected by it in the decision-making process*'. The final stage includes the discussion and communication of the lessons learnt during implementation in order to stabilise the new system (Paton & McCalman, 2008, pp.118-121). This last stage resembles Lewin's third phase of freezing.

2.2 Classification of the maritime transport chain

Many German authors in defining the transport chain refer to the definition by DIN (Deutsches Institut für Normung), the German industry standards body (e.g. Wolf, 1997, p.1090; Franke, 1999, p.633; Vastag, 2008, p.408; Pfohl, 2010, S.151). There the transport chain is defined as '*a sequence of technically and organisationally linked processes in which persons or goods are moved from source to destination'* (DIN, 1989a, p.3). Technical linkage requires compatibility of the physical resources used. Organisational linkage will be achieved by coordinating information and steering systems and legal and commercial areas (DIN, 1989a, p.3). Furthermore, it is differentiated from transportation, which extends over activities enabling the movement of goods, whereas the transport chain also includes the technical and organisational links between these activities (DIN 1989b, p.3).

Wolf (1997) likewise stresses that the common understanding of the term transport chain is beyond transportation, i.e. the movement of objects, and includes all transport-related transfer processes between source and destination. These are logistical processes such as packaging, storage, transshipment, picking and transportation itself as well as non-logistical processes such as customs procedures. So he understands the transport chain as a determined part of the logistics chain and states that the overall transport chain perspective aims at overcoming an isolated optimisation of single processes in order to achieve an integrated design and realisation. By means of this interface problems will be avoided and efficiency will be increased (Wolf, 1997, pp.1089-1090).

Rodrigue (2012) differentiates the term transport chain from the supply chain and logistics chain by the focus of each. According to the author the supply chain focuses upon a product and encompasses logistics and transport chain activities. It thereby includes the different actors, activities and resources required for making the product available at the place of consumption. With regard to the logistics chain he states it focuses on an item as part of an inventory and includes activities from when the item number is created until it is dissolved. With regard to the transport chain he states that the focus is on a consignment and includes movement, physical handling and activities directly related to transport (Rodrigue, 2012h). He further states that transport cannot be considered as a response to supply and demand but that the integrated transport chain has to be integrated into the entire supply chain system (Rodrigue, 2012a). '*The physical realization of international trade requires a transport chain which is a series of logistical activities that organize modes and terminals […] and thus the continuity along the supply chain through a set of stages*' (Rodrigue, 2012e).

A similar principle can be found in DIN (1989). There it is said that the transport chain is to be seen as a system and is in relation to neighbouring systems such as the production or consumption of goods (DIN 1989a, p.3). The perspective of the integrated system can thus be called *transport chain* when focusing on the linkage of transportation, storage and transshipment or *material flow* when focusing on the flow of goods through the procurement, production and distribution system of a company (DIN 1989b, p.3).

Ihde (2001) points out that the transport chain is a functional meta-system of the logistics system. He refers to Pfohl (1988[3]), who defines meta-logistical systems as inter-organisational systems including the collaboration of several institutions in the transfer of goods (Pfohl, 2010, p.15). According to Ihde (2001) the cross-system character of logistics requires the elaboration of meta-systems in order to incorporate all institutions that participate and exert any impact on the transfer processes between source and destination (Ihde, 2001, p.42 f.).

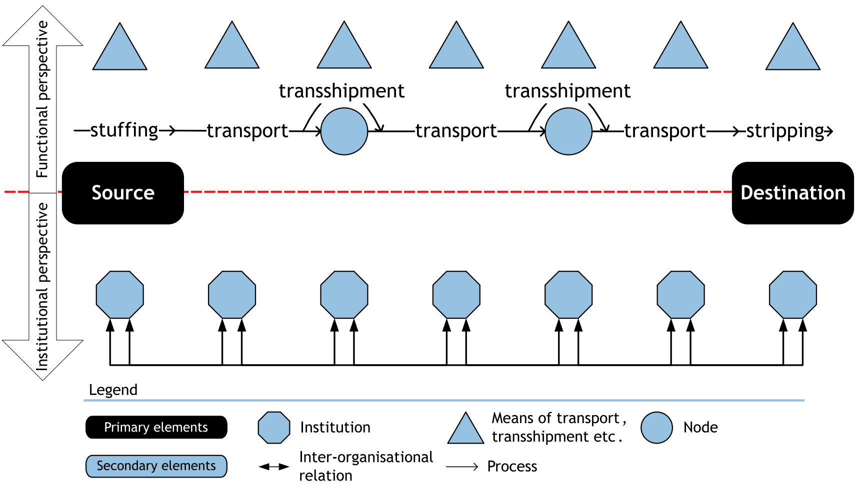
Lucke (2012) expands on the systems characteristics of logistics chains with transport chains as an integrated part. He points out that the chain character in practice is rarely seen to be strongly linear but usually as a network including subsystems that are linked in different structures (Lucke, 2012, p.53). Nevertheless the term chain with respect to transport, logistics or supply chain is common in usage and so it will be applied here.

3 Ihde refers to the third edition of the monograph 'Logistiksysteme' by Pfohl (1988), whereas the present (8th) edition is dated 2010, though with the same statement in this respect.

According to Bertalanffy (1968) the systems perspective implies similar characteristics and behaviour of systems of different kinds. The author defines a system as '*a set of elements standing in interrelations*' (Bertalanffy, 1968), p.55). Elements and their interrelations build the structure and relations that determine the system's purpose (Bossel, 2004, p.35).

Wolf (1997) states that transport chains can be classified from a functional and institutional perspective[4] (see Figure 2.3). The author expands on the systemic character (according to DIN) of transport chains by defining source and destination of the transport process as primary elements. Secondary or linking elements are either functional or institutional. The functional perspective includes the transshipment nodes, the means of transport (implying the mode of transport) as well as all transport-related processes. The institutional perspective focuses on involved organisations such as logistics or transport service companies. Wolf (1997) further mentions the flow of goods and information as an additional perspective (Wolf, 1997, p.1090). Swinarksi (2005), who generally follows Wolf's classification of transport chains, integrates this perspective in the functional view (Swinarski, 2005, p.33) and so it is applied here.

Figure 2.3: Functional and institutional perspective on the maritime container transport chain



Source: Own design adapted from Swinarski, 2005, pp.30-41, 141

4 An analysis of different approaches on structuring transport chains can be found in Swinarski, 2005, p.30-34.

In Swinarski (2005) the term sea-based transport chain is concretised and here seen as synonymous to the term maritime transport chain. So a transport chain can be called maritime if the transfer process is executed at least at one part by means of maritime transport (Swinarski, 2005, p.23; cf. Dora, 1976, p.60).

To summarise, it is stated that the maritime transport chain is a logistical meta-system that focuses on the integrated design and realisation of logistical processes as well as on the linkages of involved institutions to enable transportation. The maritime mode is thus used in the pre-, main or on-carriage.

2.3 Containerisation

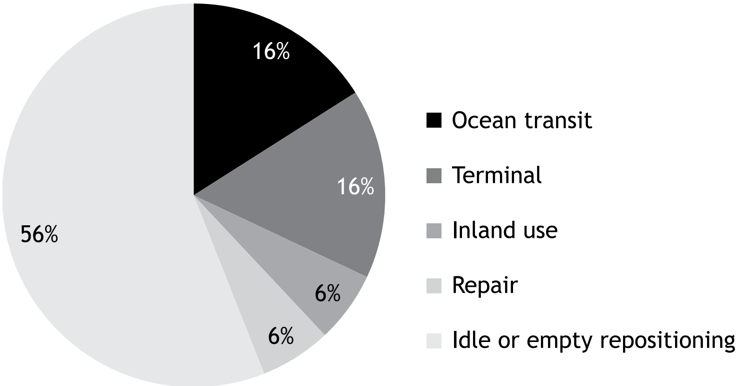
Wolf (1997) refers the development of an integrated design and realisation of transport chains to containerisation (Wolf, 1997, p.1090). Likewise Witthöft (2004) credits this progress to the container (Witthöft, 2004, p.14). The same can be found in Rodrigue (2012) who says that '*containerization and intermodalism have helped improved the efficiency of transport chains and consequently of supply chains'* (Rodrigue, 2012h).

Simply described, a container is a large standard size metal box into which cargo is packed for shipment. Moreover the meaning of containers and containerisation is included in what it permits (Levinson, 2006, p.1 f.). Containerisation enables the transport chain for mechanised handling of cargoes of diverse types and dimensions that are placed into boxes of standard sizes (Witthöft, 2004, p.13). It results in a nearly seamless system of shipping freight around the world (Levinson, 2006, p.7). The maritime sector was thus the first mode that pursued containerisation although other modes likewise established standardised containers for easier handling, such as air freight transportation (Rodrigue et al., 2012, p.150 f.; Rodrigue, 2012d).

The development of containerisation is closely related to intermodalism. Intermodalism is a concept in transportation whereby two or more modes of transport are used to transport the same loading unit in an integrated manner in a transport (Witthöft, 2004, p.14). The container as standardised unit allowed an effective sea-land transport system from producer to consumer (Broeze, 2002, p.9). Thus the emergence of intermodalism can be referred back to the development of the container in maritime transportation in the late 1960s (Rodrigue, 2012d).

The lifetime of a container covers a range between 10 to 15 years depending on the usage conditions it has been exposed to (Rodrigue, 2012c). Containers, he writes, spend 56% of their lifetime idle or for empty repositioning. The time for loaded over sea transportation as well as the time at the terminal each amount to each 16%. Inland use and time for repair each represent 6% of the lifespan (Crinks, 2000, p.2; Rodrigue, 2012c; see Figure 2.4).

Figure 2.4: Container usage during its life time



Source: Own design based on Crinks, 2000, p.2; Rodrigue, 2012c

According to Rodrigue et al. (2009) there are several advantageous and challenging specifics related to the maritime container transport chain (Rodrigue et al., 2009, pp.147-150). The container permits a *standard transport product* due to its standardised dimensions in ISO (International Organization for Standardization) standard. Standardisation refers to all mobile and immobile equipment that are manipulating the container such as vehicles, transshipment cranes etc. The container includes *flexibility of usage* as it can transport a wide range of goods from raw materials (dry and liquid), manufactured goods as well as frozen products. Therefore specialised containers have been constructed, such as for liquids or the refrigerated container (or reefer) for perishable goods, but still with the same dimensions. Containers facilitate the *management* of transportation as they can be identified by a unique identification number referring to the owner, product type, registration number as well as size and type. Information and communication technology (ICT) assists in locating the container and assigning it according to priority, destination and available transport capacities. Moreover, container transportation has significantly reduced transportation costs by *economies of scale*. The increase in *speed* mainly in transshipment operations leads to better utilisation of the mobile assets. Furthermore the container serves as *warehouse* in terms of resistant packaging against weather and shocks. Likewise, it has improved the *security* of goods. In spite of numerous advantages in the use of containers, some challenges are also evident. Container transshipment is very space-consuming and consequently poses *site constraints* to possible terminals in the port and hinterland. Furthermore, container handling suprastructure requires huge *investment* that is sometimes difficult to afford with local capital. In operations *stacking* of containers (landside and seaside) is a complex task due to the fact that the way of stacking implies last-in first-out in terminals and also on vessels calling at numerous ports this requires conscious loading and unloading. Even though *thefts* are mitigated due to the freight anonymity that a container bears, it still is an issue when the final destination can be referred to the container in inland transportation. *Losses* are a further issue. Although the rate is very low in comparison to the number of containers in transit it is estimated that around 10,000 containers a year are lost by falling overboard on container ships. Another important topic is *empty travel*. Due to a divergence between production and consumption, the imbalance of trade, empty repositioning is required to provide containers where they are needed for export. Last but not least, *illicit trade* benefits from the confidential character of containers, so they are used for smuggling drugs and weapons as well as illegal immigrants. Being used to promote terrorism, this issue creates concerns in trade. However, the advantages prevail and so containerisation is transforming the global freight transport system and along with it the global economy (Rodrigue et al., 2009, pp.147-150).

Doubtless the container has become the '*working horse*' of international trade (Rodrigue, 2012d). However, the technology of the container itself is the same as 40 to 50 years ago. Though they are carrying contemporary global supply chains, these global supply chains exert a strong pressure on the container system demanding smart management of the system and its related networks (Notteboom & Rodrigue, 2008, p.156 f.). Thus Notteboom and Rodrigue (2008) place the main potential for innovation in the way in which containerised logistics is managed (Notteboom & Rodrigue, 2008, p.156 f.).

Due to the high level of integration in terms of functional and institutional elements of container transport chains, their importance for international trade and their need for smart management the focus of this thesis and thus in the following will be on *maritime* ***container*** *transport chains*.

In reference to the understanding of the maritime transport chain the maritime container transport chain is a logistical meta-system that focuses on the integrated design and realisation of logistical processes as well as on the linkages of involved institutions to enable seamless container transportation by using the maritime mode in the pre-, main or on-carriage.

2.4 Functional perspective on maritime container transport chains

The functional perspective on transport chains deals with the spatial and chronological sequence of transport and transshipment processes as a detailed description of the transfer process (see Figure 2.3). The functional transport chain can be classified by the number of transshipments, the type of handling, the type of load unit, the type of goods and the number of transport modes involved. This perspective is important for technical or cost-related issues (Swinarski, 2005, p.34 ff.; Wolf, 1997, p.1090).

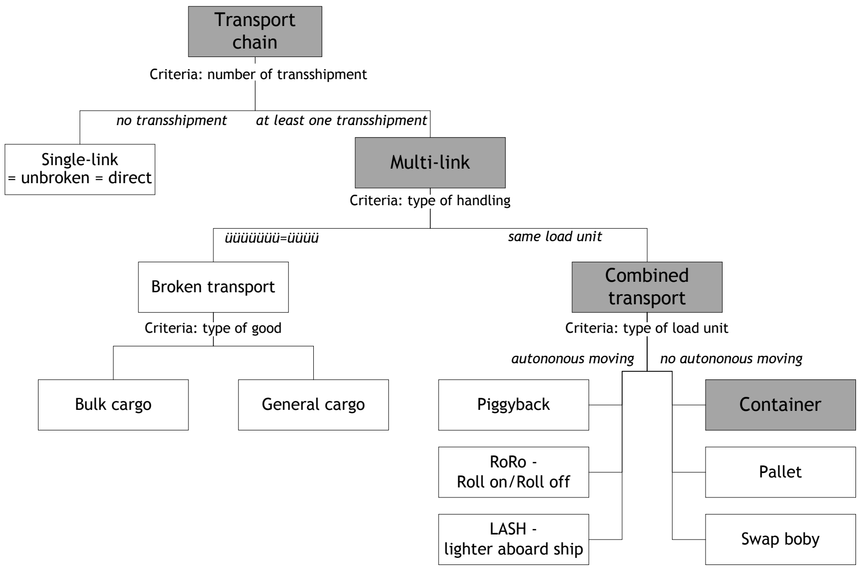
Depending on the number of transshipments transport chains are differentiated in single-link and multi-link transport chains. The first implies that transportation is direct and no transshipment is needed whereas the latter indicates that one or more transshipments take place. According to the type of handling, multi-link transportation is further differentiated in broken and combined transport. In broken transport the load unit is changed or no load unit is used during transportation. Then broken transportation can be differentiated due to the type of goods in bulk or general cargo. In case of combined transport the load unit remains the same during transportation. The type of load unit can finally be differentiated in autonomously moving load units such as in piggyback, RoRo (Roll on/Roll off) or LASH (lighter aboard ship) transportation whereas container, pallets or swap bodies are not able to move autonomously (Schieck, 2008, p.172; Wolf, 1997, p.1091). The classification of the container transport chain in this structure of the transport chain is marked accordingly in Figure 2.5.

Within this structure the differentiation by type of goods is placed under broken transport, which may lead to the wrong conclusion that this differentiation only is related to broken transport. However, this is more to be seen that the type of goods is not necessarily important if it is packed in a steady load unit. Bulk cargo can be transported in single-link or multi-link, broken or combined transport as well as in containers, by RoRo or LASH transportation and as general cargo. This allocation is more related to the requirements that different types of goods pose on transportation and transshipment, e.g. in terms of equipment.

Further transport chains can be unimodal, i.e. transportation by one single mode, or multi-modal, i.e. transportation by at least two different transport modes, depending on the number of transport modes used (Wolf, 1997, p.1090 f.)

Multi-link transportation usually consists of pre-, main or and on-carriage, in maritime transport chains one leg - usually the main leg - is performed by over sea transportation. The pre and subsequent leg are performed by road, rail or inland shipping. The spreading of hinterland transportation on these different means of transport is called modal split (Will, 2011, p.11 f.).

Figure 2.5: Classification of container transportation in the structure of the functional transport chain

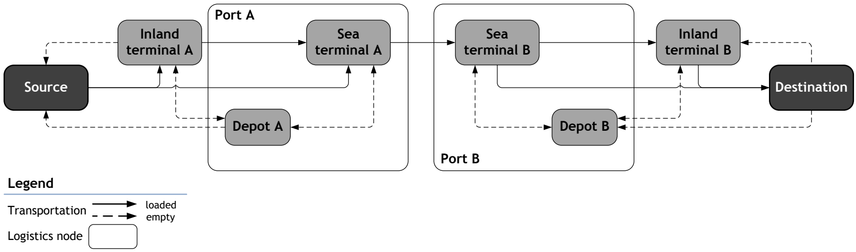


Source: Own design based on Schieck, 2008, p.172; Wolf, 1997, p.1091

As mentioned above, the functional perspective on transport chains includes the following elements: logistics nodes, the means of transport as well as all transport-related processes. A simple container transport chain is sketched in Figure 2.6.

First, the empty container is provided from a terminal or depot at the source of the transport chain where the container is stuffed. From there the container is then usually transported to a sea terminal as a transshipment node. In case of combined transport another transshipment process takes place, e.g. at an inland terminal usually from road to rail or inland waterway (IWW). From the sea terminal the container is then transported over sea to another sea terminal. From there processes are mirror-inverted until the container reaches its final destination. There the container is stripped and the empty container is transported back to a terminal or depot where potentially maintaining, cleaning and repair processes take place. Empty containers are also transported between terminals and depots. At any node in the transport chain containers can be temporarily stored.

Figure 2.6: Functional maritime container transport chain



Source: Own design

Depending on the execution of stuffing and stripping Schieck (2008) distinguishes four different types of container transportation (Schieck, 2008, pp.183-190). Basically there are two different options – FCL (full container load) and LCL (less than container load) (Ihde, 2001, p.54) – building these four alternatives. Thereby the degree of container load – either a full or less than container load – refers to the share of the container load sent by the shipper or received by the consignee. In case of LCL, a full container load is built by several shippers or resolved and distributed to several consignees.

- FCL/FCL: the container is stuffed at the shipper's site and stripped at the consignee's site; this alternative is also called *door-to-door* transportation.
- FCL/LCL: the container is stuffed at the shipper's site and stripped at a container freight station (CFS); this alternative is also called *door-to-pier* transportation.
- LCL/FCL: the container is stuffed at a CFS and stripped at the consignee's site; this alternative is also called *pier-to-door* transportation.
- LCL/LCL: the container is stuffed and stripped at a CFS; this alternative is also called *pier-to-pier* transportation.

Within the functional perspective ports are the key nodes in the container transport chain. Apart from their traditional nodal role as sea – land interface covering the transshipment function, they are logistics centres where value-added services are offered to a broad range of customers (Bichou & Gray, 2004, p.53; Bichou & Gray, 2005, p.414).

2.5 Institutional perspective on maritime container transport chains

The institutional perspective refers to the interrelations of legally and economically independent companies that enable transport activities. It is important for analysing the structure of markets with regard to concentration and cooperation (Swinarski, 2005, p.40; Wolf, 1997, p.1092). Freichel (1992) refers to the systemic character of the institutional perspective and includes the elements in terms of institutions themselves (or smaller units) as well as their relations as relevant for analysis. Thus actors of the maritime container transport chain are introduced first and followed by a description of their relations (Freichel, 1992, p.47 ff.).

Will (2011) provides a structured overview of actors of the container transport chain based on logistics activities. However, he stresses that this attempt is somewhat theoretical because when considering a single company it is rather difficult to allocate it only to one segment even though business units of companies probably will fit this structure. He allocates actors to different types of services and modes of transport. First, in terms of the types of services he differentiates between logistics service providers offering transport services and infrastructure providers offering the required infrastructure. The group of logistics service providers comprises third party logistics providers (3PL), who offer logistical added value services embedded in long-term customer contracts and outsourcing solutions, freight forwarders, who trade mobile assets for logistics services, and capacity providers, who offer mobile assets for logistics services. Infrastructure providers provide immobile assets for logistics services such as logistics nodes and transport infrastructure. Thus they are distinguished in handling operators and route operators (Will, 2011, p.12 f.; based on Notheis, 2003, pp.509; Lorenz, 2003, pp.136, 312, 394-400, 400-490).

Grig (2012) divides actors of the maritime transport chain by activities in carriers, forwarders[5] and terminal operators. Carriers offer owned or chartered and leased mobile assets for performing transport services. They include e.g. road or railway operating companies and shipping lines/ocean carriers. Forwarders do not offer mobile assets but fulfil organising, planning and marketing of transport services. They comprise e.g. sea freight forwarders, road forwarders, combined transport operators. Terminal operators operate terminals in the port or inland (Grig, 2012, p.54 f.).

5 Grig (2012) uses the term broker instead of forwarder, though he refers brokerage of planning, organising and marketing of transport services to forwarding activities later in the text (Grig, 2012, p.54).

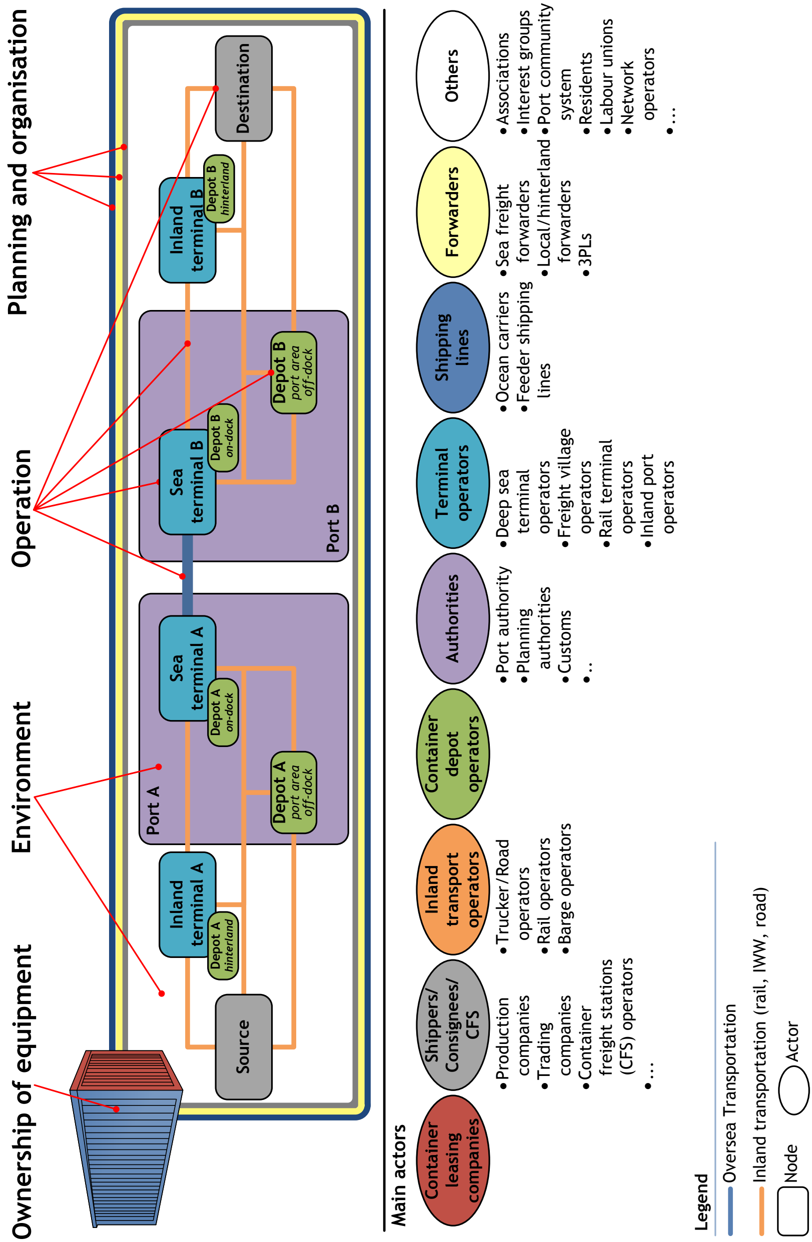
Beyond these theoretical and top-down structured attempts, here the functional perspective will be taken as a basis in order to extract different actors of the maritime container transport chain. For a comprehensive compilation of actors the planning and organisation of the maritime container transport chain, its operation and its environment as well as the ownership of equipment are considered. Actors will be introduced along the exemplified functional chain already portrayed in Figure 2.6.

Figure 2.7 portrays a simple maritime container transport chain as already shown for the functional perspective amended with the institutional perspective. Colours in the figure are referred to the colours of the main actors illustrated below the chain. Different nodes in the transport chain are depicted by rectangles. They are operated by terminal operators (turquoise) or container depot operators (green). Source and destination of the container transport chain can be shippers or consignees and container freight station operators (grey). The port (purple) clusters nodes in the port area. Lines connecting the nodes to a chain are over sea and inland transportation and either performed by shipping lines (blue) or inland transport operators (orange). The operational chain is surrounded by its environment including a broad range of different actors here subsumed under others (white). The whole chain is framed by planning and organisation performed by shippers/consignees (grey), shipping lines (blue) or forwarders (yellow). Finally, the container as a physical flow unit along the depicted chain is considered by equipment ownership of either container leasing companies (red) or shipping lines (blue).

This colour setting will be used throughout the whole thesis. For easier reading/writing the term *maritime container transport chain* will be abbreviated by MCTC in the following description of the different actors[6].

6 This section partially was published as part of the project TransBaltic deliverables: Wolff et al. (2011) and Wolff et al. (2012).

Figure 2.7: Institutional maritime container transport chain



Source: Own design

Equipment owning actors

The ownership of marine (ISO) containers is mainly shared by **shipping lines** (56.6%) and **container leasing companies** (43.4%) (UNCTAD, 2011, p.40; these figures are for 2010). A very small share is held by depot operators, large shippers and transport operators (Theofanis & Boile, 2009, p.54) and this share is so small that it is not considered in related statistics (cf. UNCTAD, 2011, p.40).

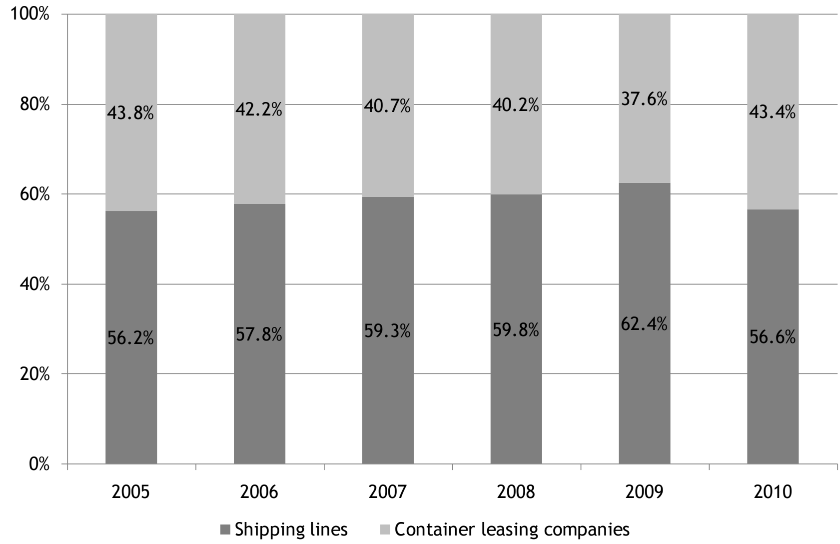
Container leasing companies' business is to lease containers (mainly) to shipping lines. They thereby provide a certain flexibility in the management of containerised assets in terms of the temporal and geographical dynamics of demand. They are globally operating companies. Five leasing companies control about 60% of leasable container equipment. The 13 largest leasing companies account for about 90% of the global container leasing market, equivalent to 10.7 million TEU (Rodrigue, 2012g).

In this context, the different kinds of leasing arrangements should be considered first: there are master leases, long- or dry-term leases and short-term leases. Normally a new built container is leased by long-term or dry lease. Dry leases last over 5 to 8 years. The lessor purchases the containers, but the shipping line performs all the management activities. After this first period the container usually passes over to a master lease contract. Master leases are short- to medium-term and fleet management responsibilities are completely covered by the lessor. Furthermore, master leases comprise complex arrangements concerning on-hire and off-hire of equipment, as well as debits and credits depending on the location and the equipment's condition at the time of interchange (Theofanis & Boile, 2009, pp.55-56). Sometimes containers are leased for a short period like a single trip or a round trip. These short-term leases or spot market leases serve acute demands of operators. If the container is leased one-way for repositioning this is called cabotage. The empty container has to be repositioned either by the lessor or the shipping line and to avoid empty transportation the container is offered to the cabotage market. Sometimes forwarders or inland transport operators are acting as caboteur companies actively demanding these cabotage containers (Theofanis & Boile, 2009, p.60).

Differences between leasing contracts mainly relate to the arrangement's duration, responsibilities for repositioning and for maintenance and repair. Crucial conditions are the location to drop off and to pick up the container. To avoid containers being off-hired at a place that is not favoured by the lessor, especially in a surplus area, drop-off and pick-up charges are part of the leases as well as a specific quota to determine the number of containers that can be off-hired at a certain place (LeDam Hanh, 2003, p.17).

The two main owner groups pursue different and in some cases conflicting goals. Carriers consider containers as transportation equipment and their decision making in equipment management focuses on facilitating cargo flows and reducing transportation and handling costs. In contrast to this perspective, containers are the core competence of leasing companies. Ocean carriers increased their ownership in the years before the economic crisis in the year 2008 following increasing integration tendencies and the use of tight management approaches like revenue management in their operations. This phenomenon can be explained by the growing level of intermodal integration, meaning that shipping lines collaborate closer with terminal operators as well as with inland operators (Rodrigue, 2012g). In addition to this, some of the main ocean carriers have launched activities in the container manufacturing industry, underscoring the argument of intermodal or vertical integration. In terms of the ownership structure of the world container fleet between 2005 and 2009, a steady decrease in lessor ownership can be observed (see Figure 2.8). This was due to the vertical or intermodal integration of shipping lines. Other reasons were the increase in cost of new containers, the

Figure 2.8: World container fleet ownership



Source: Own design based on UNCTAD, 2011, p.40

repositioning of empties and, in part, very low freight rates. As a consequence the container leasing business became less profitable (Rodrigue, 2012g). After the economic crisis the situation changed. During 2009 container production almost came to a standstill. When trade demand recovered a shortage of containers was observed as production facilities could not serve the increased demand and slow steaming was continued. Leasing companies increased their share of the world container fleet while shipping lines maintained their absolute container numbers (UNCTAD, 2011, p.39 ff.).

The relationship between shipping lines and leasing companies is obviously very close. There is a significant difference in the cost of repositioning of empty containers depending on whether the shipping or the leasing companies bear it, because the latter has to hire container slots from the carrier for these transports. Even though shipping companies may try to pass repositioning costs on to the lessors, it is quite evident that this is not a long-term policy as they are somehow dependent on the services of the lessors. In return, leasing companies are closely related to the carriers being their main client (Konings, 2005a, p.86).

Planning and organising actors

Overall there is the planning and organisation of the MCTC for door-to-door transportation by either the **shipper/consignee**, the **shipping line** or the **sea freight forwarder**.

Transportation results from market demand for trade in goods. So, initially, **shippers** demand transport services to send freight to a desired destination. The shipper can either be the producer or the supplier of the freight to be shipped. If the delivery terms are ex works, receiving parties, i.e. consignees, can also demand transport services (Schieck, 2008, p.59). Thus the shippers and consignees are manufacturing, trading or other companies demanding transportation (Talley, 2009, p.69 ff.) to realise the import and export of their goods. The demand for shipping poses requirements underlying to the design of the maritime transport chains (Hildebrand, 2008, p.69).

Forwarders organise over sea and/or hinterland transportation in charge of the shipper, other forwarders or rarely of consignees. The forwarders thus cover services such as cost calculation, customs clearance and provision of documents required. Transport, transshipment and other logistics activities required are usually purchased by the corresponding companies or the forwarder itself contracts in its own name as a carrier. The other way round it is quite usual for carriers e.g. over sea carriers or road operator also to offer forwarding services to their customer (Hildebrand, 2008, p.67 f.; Aberle, 2000, p.23). Aberle (2000) differentiates different kinds of specialised forwarders, such as the export and import forwarder, sea freight forwarder, customs forwarder etc. (Aberle, 2000, p.23.). In context of this thesis the sea freight forwarder and hinterland forwarder are relevant. Hinterland forwarders organise the pre- and on-carriage to over sea transportation, whereas sea freight forwarders are in charge of the whole MCTC (Hildebrand, 2008, p.68). The transport capacity for the maritime leg is purchased from shipping lines, usually in frame of period-wise contracts at more favourable terms (Grig, 2012, p.85).

Shipping lines provide maritime transportation services and transport freight between ports via waterways. Shipping lines crossing oceans are also called **ocean carriers**, whereas short sea shipping carriers offer waterborne freight transportation that does not transit oceans (Talley, 2009, p.13 ff.). In container shipping the shipping lines offer liner services with own and/or chartered vessels. Usually the container shipping lines offer at least pier-to-pier transportation and require marine container as transport equipment or load unit (Grig, 2012, p.71). Beyond pier-to-pier transportation shipping lines move inland and offer door-to-door logistics services (Martin & Thomas, 2001, p.285; Heaver, 2002, p.221) in order to become independent of sea freight forwarders and access customers at the source of freight (Grig, 2012, p.75) and increase control over the transport chain (Araujo de Souza et al., 2003, p.396). Due to this vertical or intermodal integration, shipping lines are involved for instance in operating terminals, depots etc. (Heaver et al., 2001, p.294 ff.; Rodrigue & Notteboom, 2012, p.18, Araujo de Souza et al., 2003, p.401). Some of the largest container shipping lines are also engaged in horizontal cooperation and form strategic alliances. These enable them to reduce operating costs without sacrificing frequency of service, while retaining their independence (Talley, 2009, p.14; Heaver, 2002, p.211). In recent years concentration in the shipping line industry could be observed such as assets and services being consolidated into the hands of fewer shipping lines resulting in a concentration of purchasing power with strong bargaining position vis-à-vis terminal and inland transport operations (Araujo de Souza et al., 2003, p.402). The ocean carrier market can be called oligopolistic as the three big ocean carriers (APM-Maersk, Mediterranean Shipping Company (MSC), CMA CGM Group) transported 33.5% of world maritime shipping in 2009. Moreover, the top 10 ocean carriers covered 57.7% of world maritime shipping (Lee et al., 2012, p.1081).

With regard to planning and organisation of the MCTC are some relevant terms and specifics are outlined in the following.

If the whole chain is organised the actor is called a *multi-transport operator* (MTO) (Biebig et al., 2008, p.193). An MTO acts as a single contractual party with the customer and offers a complete transport package. If the MTO does not own or charter the vessel, it is referred to as a *non-vessel-operating-common-carrier* (NVOCC) and is otherwise known as a *vessel-owning MTO* (Pawlik, 1999, p.8).

Moreover, the responsibility for pre and on-carriage makes a difference in organising MCTCs. If the ocean carrier organises the pre- and on-carriage in addition to the maritime leg, a door-to-door MCTC, it is called *carrier's haulage*. The **shipping line** offers the complete package as carrier-MTO to its customer, '*produces*' the maritime transport service and demands other operators' services such as road or rail operation to complete the transport package. Container equipment is either owned or leased (Grig, 2012, p.57 f.).

Otherwise, if the **sea freight forwarder** being charged by the shipper/consignee organises the pre- and on-carriage this is called *merchant's haulage*. Again, the transport service is offered as complete package to the customer. The sea freight forwarder demands all operational services and acts as a *non-vessel-owning MTO*. The shipping line performs the maritime leg as *pier-to-pier* transportation. It is also possible for sea freight forwarders to demand *pier-to-door* or *door-to-pier* transportation from the shipping lines in merchant haulage if their own systems do not provide for *door-to-door* transportation (Ihde, 2001, p.54; Grig, 2012, p.58 f.). If the **shippers/consignees** themselves remain in control of organising the transport and subcontract all involved transport operators this is also called *merchant's haulage* (Veenstra, 2005, p.66).

There are also mixed arrangements, e.g. if the transportation of a full container is organised by a forwarder and the ocean carrier organises the positioning of the empty container (Hildebrand, 2008, p.47).

Operational actors

Following the operational processes sketched in Figure 2.7, the empty container is first positioned by an **inland transport operator** at the **shipper's** site or the **CFS**, depending on whether it is FLC or LCL transportation. There the empty container is stuffed. In a next step the inland transport operator takes over the container and transports it either direct to the deep sea terminal in the port or via an inland terminal by combined transport in a mix of road, rail and/or barge transportation. In the terminal the **terminal operators** are responsible for the transshipment from one mode to another and maybe intermediate storage. Sea transportation is then performed by an **ocean carrier** or **feeder shipping line**.

In the port of destination the container is unloaded aboard the ship by the **terminal operator** or **stevedoring company.** Eventually the container has to undergo **customs** procedures. The further transportation is again performed by an **inland transport operator** in direct or combined transportation to the **consignee** or **CFS** where the container is stripped. If the empty container cannot be used for an export shipment it is usually shipped to an empty depot where the **container depot operator** is in charge of cleaning, repair and maintenance or simply storage until the container is needed for the next shipment.

In the following the actors which have not been described above are portrayed in brief.

Inland transport operators in seaports' hinterland are **road, rail or barge operators**. They operate as carriers for the hinterland transportation of the MCTC.

Road operators transport containers by truck (Hildebrand, 2008, p.66). They can be differentiated in harbour drayage carriers who serve the local hinterland of the port and over-the-road truck carriers who serve the farer hinterland (Talley, 2009, p.21).

Rail operators or railway undertakings process rail haulage. Transport capacity has to be purchased by rail infrastructure providers. Thus rail operators in contrast to road or barge operators are in competition for determined transport capacities (Hildebrand, 2008, p.66). Grig (2012) differentiates rail operators from rail undertakings. According to the author operators are in charge of marketing rail transportation to forwarders and carriers. They offer a strongly focused service e.g. to a specific cargo, load unit, relation or network. Usually they were founded by railway undertakings who are still shareholders. Some operators dispose of own vehicles, wagons and also terminals. Other operators pursue a more asset-light approach and assert themselves by means of know-how, ICT competence and yield management. Operators purchase transport capacities by railway undertakings (Grig, 2012, pp.86-89.). Schwarz (2006) further states that operators focus on combined transport (Schwarz, 2006, p.19). Railway undertakings are in charge of provisioning wagon transport capacities, demanding access to the rail infrastructure by the infrastructure provider, building trains, as well as performing the rail traction (including the tractive unit and driver) (Grig, 2012, pp.89-91).

Barge operators are inland waterway shipping lines that focus on the marketing and processing of inland waterway transportation. They maintain their own barge vessel and/or lighter fleet or subcontract associated independent barge owners (Hildebrand, 2008, p.66).

Container freight station operators provide a consolidation and deconsolidation point in the MCTC. In LCL transportation freight is transported in other transport/load units than containers to/from the CFS to be there packed/unpacked in/from containers (Büter, 2010, p.254 f.). Originally stuffing and stripping of containers was a service offered at the sea terminal but due to the increasing importance of door-to-door transportation, these services play a minor role at the terminal (Brinkmann, 2005, p.238 f.) and tend to be offered at separate locations (FIS, 2013).

Terminal operators offer transshipment between transportation of one or more transport modes. Sea or deep sea terminals are thus differentiated from inland or hinterland terminals (Schwarz, 2006, p.18).

The **sea terminal operator** is responsible for loading and unloading ships and thereby creating port throughput. Depending on the port's size and functions, one or several terminals can be sited in a port (Talley, 2009, p.94). They are in charge of the organising and scheduling ship loading and unloading as well as of intermediate storage of containers. Operators are the port operator/authority[7], specialised terminal operators, a shipping line or an alliance of several shipping lines, or a joint venture of shipping line and a specialised terminal operator. In recent years two concepts have been established in the market: transnational terminal operating companies that offer their services to multi-users as well as shipping line affiliated terminal operators with carrier-dedicated terminals (Grig, 2012, pp.77-80). Dedicated terminals are a widespread phenomenon (Álvarez-SanJaime et al., 2013, p.52) and offer the option of a long-term relationship to the shipping line for the port (Biebig et al., 2008, p.228). Vertical integration has been pursued in recent years by terminal operators to increase their influence along the MCTC (Grig, 2012, pp.77-80). They therefore additionally offer stuffing/stripping in CFSs, repair, empty handling as well as getting involved in intermodal hinterland transportation and inland terminals (Araujo de Souza et al., 2003, p.401 ff.). It can be that the actual moving of cargo to and from vessels is carried out by private cargo-handling firms, **stevedoring companies,** who are contracted by shipping lines (Talley, 2009, p.127).

Inland terminal operators provide transshipment between road and rail and/or barge in the hinterland of the port. Beyond transhipment they usually offer e.g. storage, container maintenance and repair, customs services, and road haulage to their customers. Operators are specialised inland terminal operators (e.g. freight village operators, inland port operators), rail operator or shipping lines and al-

7 The port authority is introduced in detail in the next section.

liances (Grig, 2012, pp.98-100). Rodrigue et al. (2010) state that major actors involved in inland port development in Europe are port authorities and terminal operators whereas in North America rail operators and real estate managers are more prevalent (Rodrigue et al., 2010, p.528).

Customs are authorities that are responsible for controlling prohibitions or other restrictions on import and export trade (Büter, 2010, p.31).

Feeder shipping lines are shipping lines that serve feeder routes, i.e. they connect hub and feeder ports in a hub-and-spoke system. Cargo is transported in relatively large vessels on the mainline hub port network and then in relatively small feeders to and from the connecting (or feeder) port. If cargo is transferred directly from one vessel to another, the cargo is referred to as transshipment cargo. They offer common user service or are dedicated to a shipping line or alliance (Talley, 2009, p.3; Martin & Thomas, 2001, p.285).

Container depot operators offer a storage service for transport operators along with services like maintenance, cleaning and repair. Empty depots are located either '*on-dock*' inside the port terminal complex, '*off-dock*' in the port area, or in the port hinterland, usually at an inland terminal (Brito & Konings, 2007, p.4). These players have access to important information on empty container shortages and surpluses (Veenstra, 2005, p.70). In times of increasing vertical or intermodal integration of shipping lines, it is not uncommon for them to operate these depots themselves, hence empty depots are operated by independent depot operators or by operators affiliated to shipping lines (Lun et al., 2010, p.163). This also applies to terminal operators (Brinkmann, 2005, p.238).

Actors in the environment of maritime container transport chains

Though not directly involved in the functional chain there are important actors in the environment of the MCTC.

First is the **port authority**. The term *port* or *port authority* is used in different ways. According to Talley (2009) there are four different port types to distinguish between: service port, tool port, landlord port and private port. Port authorities thus play different roles in terms of port management, ownership of infrastructure and suprastructure and service provision (see Table 2.1) (Talley, 2009, p.126 f.).

Table 2.1: Types of ports

Activity / Port type	Port management	Ownership infrastructure	Ownership suprastructure	Service provision
Service port	Port authority	Public (government)	Public (government)	Port authority
Tool port	Port authority	Public (government)	Public (government)	Port authority operates port-owned equipment. Further services (e.g. stevedore) provided by private companies
Landlord port	Port authority	Public (government)	Private companies or public	Private companies
Private port	Private companies	Private companies	Private companies	Private companies

Source: Own design based on Talley, 2009, p.126 f.

Cullinane and Song (2002) classify ports in a simpler way in accordance with ownership and provision of facilities and services into two distinct categories: the comprehensive and the landlord port. The *comprehensive port* implies that the public port authority provides and maintains direct responsibility for the management and operation of all port services and facilities. This also means that private operators are not allowed to undertake any port activity. In contrast to this model, the port authority in a *landlord port* is limited to providing and maintaining the basic infrastructure and essential services such as fire or security services. All other facilities and services (e.g. the superstructure and stevedoring labour) are provided by independent private (or public) companies (Cullinane & Song, 2002, p.60 f.). De Langen (2008) categorizes landlord port's activities in traffic, customer, and stakeholder management (de Langen, 2008, p.16). Cullinane et al. (2002) further state that there are hardly any examples of the above extreme positions and most ports are placed somewhere in between, leading to a wide range of different types of port organisation. So no standard model exists for the best possible form of ownership and organisational structure because ports have developed under manifold social, political, cultural, geographical, commercial and military influences (Cullinane & Song, 2002, p.60 f.).

In contemporary literature it is stated that port authorities should play an important strategic role involving sea and inland transportation in supply chains (Song & Panayides, 2008, p.84.). De Langen (2008) argues that port authorities increasingly act beyond the landlord mode and get involved in improving the transport chain and thereby the competitiveness of the port (de Langen, 2008, p.7). According to Wilmsmeier et al. (2011) port authorities should extend their influence into the hinterland as opportunity to intervene and better influence future developments (Wilmsmeier et al., 2011, p.1380).

In the context of this thesis the term port authority is referred to as landlord port if nothing else is mentioned.

In terms of port operations there are also other **authorities** (local, national and European) that can be of interest for the MCTC. Notteboom and Winkelmans (2002) state that the '*public sector has its role to play in a market-oriented port industry*'. It is evident that the public sector is still involved in the port industry although the trend is toward quite extensive privatisation schemes. These public bodies include government departments responsible for transport and economic affairs at a local, regional, national, European as well as at a supranational level. Furthermore, sensitisation for scarce resources such as land and nature has led to environment-related departments and spatial planning authorities becoming part of decision processes (Notteboom, 2001, p.13; Notteboom & Winkelmans, 2002, p.5). As a result, port authorities are often embedded in political organisations due to the fact that '*ports are often considered as strategic assets in the process of community welfare creation*' (Notteboom & Winkelmans, 2002, p.5).

Further **associations and interest groups** are actors in the environment of the MCTC. Associations are representing a branch organisations or specific industries (Notteboom & Winkelmans, 2002, p.4), e.g. the container owners' association, forwarders or liner associations. Moreover, there are local residents' groups, consumers/taxpayers, environmentalist groups on a local, regional or global scale or the press, summarised under community groups in Notteboom & Winkelmans, 2002, p.6. Likewise **labour unions** can have an impact on transport chains, in particular in ports (Turnbull, 2006, p.320 f.). Further **network operators** such as operators of the road, railway or waterway network are actors providing essential infrastructure for the MCTC (Will, 2011, p.12 f.) in particular in the hinterland.

Inter-organisational relationships

The institutional perspective as depicted in Figure 2.3 also covers inter-organisational relationships. The descriptions of MCTC actors have already included hints on different forms of inter-organisational relations subject to this subchapter and portrayed hereinafter.

Organisations along the MCTC and their business units undertake different tasks to fulfil the purpose of the transport chain such as the transfer of goods. Therefore which tasks are performed by the institution itself or in collaboration with others and what legal basis there is for possible collaboration must first be determined (Freichel, 1992, p.49).

In this context transaction cost theory, which is mainly referred to Oliver E. Williamson, is quite often taken as explanatory approach (cf. e.g. Grig, 2012; Hildebrand, 2008; Freichel, 1992; Kummer, 2010; Wolf, 1997).

Transaction cost theory is a discipline of so-called '*new institutional economics*' that combines concepts of microeconomics, organisation theory and law and adopts a microanalytic approach to the study of economic organisation (Williamson, 1985, p.ix, 1). In practice it deals with different ways of coordinating economic performance (Kummer, 2010, p.324). The basic unit is the transaction, which '*occurs when a good or service is transferred across a technologically separable interface*' (Williamson, 1985, 1). It is thus not referred to as the exchange of goods but as the transfer of property rights. The transfer of goods and performance is based on legal contracts that are considered as the basis of every transaction. The process of coordinating the transfer of property rights is thus called a transaction (Freichel, 1992, p.50). Transaction cost theory deals with transaction costs and their minimisation as efficiency criteria (Grig, 2012, p.113). These costs include costs ex-ante to the transaction such as search and information costs to sound out the market and find transaction partners as well as bargaining costs to negotiate the contractual commitments. Further there are costs ex-post to the contractual arrangement including monitoring costs to control compliance with contractual arrangements, policing and enforcement costs resulting from disputes and possible consequences to enforce contractual arrangements as well as adaptation costs that result from subsequent changes of contractual arrangements (Ebers & Gotsch, 2006, p.278). Williamson (1985) names two major basic behavioural assumptions underlying the transaction cost theory. They are bounded reality and opportunism in respect of the people involved in transactions (Williamson, 1985, p.30). Bounded reality implies that most transactions occur with limited information, i.e. there are boundaries of gathering and processing information in preparation of transactions. The second assumption is that human behaviour tends to maximise one's own benefit, leading to opportunism (Williamson, 1985, pp.45-50; Semlinger, 2010, p.43).

The core interest of transaction costs theory deals, as mentioned above, with different ways of coordinating economic performance. *'Discrete market exchange'* and *'centralized hierarchy'* organisation are defined as extreme poles of it (Williamson, 1985, p.16). *Market coordination* implies that all tasks are undertaken by legally and economically independent companies by means of spontaneously and freely negotiated purchase and service contracts (Freichel, 1992, p.49 f.)

according to underlying pricing mechanisms of open competition (Semlinger, 2010, p.42). Market relations are characterised as transient and competitive (Balling, 1997, p.57). *Hierarchic coordination* assumes that all tasks are undertaken by one functional organisation according to underlying long-term contracts (Freichel, 1992, p.49 f.) and are performed to explicit instructions (Semlinger, 2010, p.42). Hierarchic relations are characterised as permanent and cooperative (Sydow, 1992, p.98). However, market and hierarchy are not to be seen as actual existing forms of coordination. '*There are strong elements of markets within hierarchies. On the other hand, markets have strong elements of hierarchy within them.*' (Perrow, 1986, p.255 quoted in Sydow, 1992, p.101). Moreover, hierarchy should not be interpreted as a more developed form of organisation than the market. Both extremes are understood more as an explanatory framework in transaction cost theory (Sydow, 1992, p.102) that span the range of different forms of cooperation as economic organisation (Balling, 1997, p.59).

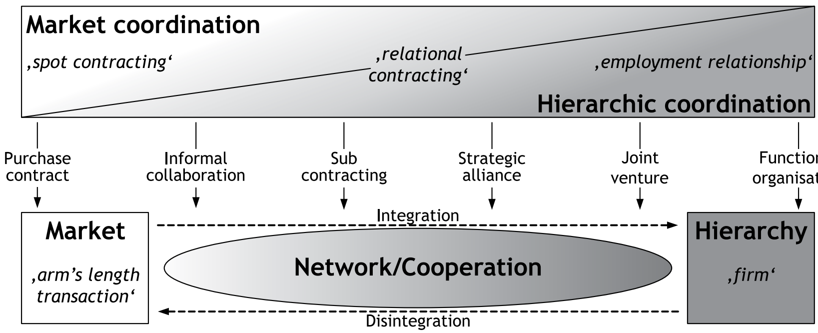
A multitude of hybrids serve as coordinating instruments between the extremes outlined above (Williamson, 1985, p.16): market and hierarchy respectively between '*spot contracting*' in markets and the coordination in hierarchies by '*employment relationships*' (Sydow, 1992, p.103). These hybrids are called networks or cooperation in related literature (e.g. Sydow, 1992, p.104; Balling, 1997, p.60; Kummer, 2010, p.324; Siebert, 2010, p.9; Hildebrand, 2008, p.81). The range of cooperation is '*from loose to tight, from arm's length bargaining to total integration*' in a firm (Thorelli, 1986 quoted in Sydow, 1992, p.103). Cooperation disposes of both market- and hierarchy-related characteristics (Hildebrand, 2008, p.81).

The definition of one common purpose and the subordination of individual goals to the collective goal are mentioned as main characteristics of collaboration (Siebert, 2010, p.9; Freichel, 1992, p.57). Furthermore, collaboration differentiates between market coordination by emphasising on cooperative instead of competitive mechanisms (Siebert, 2010, p.10) and steady and conscious interaction between cooperating parties (Freichel, 1992, p.57) framed by '*relational contracting*' (Sydow, 1992, p.103). Compared with hierarchy, collaborations differ in terms of flexibility (Siebert, 2010, p.10) and the opportunity to withdrawal from cooperation without threats to survival (Freichel, 1992, p.57). A significant criterion between market and hierarchies is independence, which is differentiated by Freichel (1992) as economic and legal independence. In pure market coordination economic and legal independence is given. Economic interdependencies can be consequences of collaboration in different degrees of cooperation, although legal independence of cooperating parties is usual. During merger and acquisition activities of different companies as extreme shaping of hierarchies, both economic and legal independence are dissolved (Freichel, 1992, p.55 f.).

An intensification of collaboration is called internalisation or integration, the opposite accordingly externalisation or disintegration (Balling, 1997, p.60). Moreover, cooperation is differentiated with respect to the direction of collaboration along the supply chain into vertical and horizontal cooperation. Horizontal cooperation aims at identifying and exploiting win-win situations between companies that are active at the same level of the supply chain in order to increase performance (Cruijssen, 2006, p.21). Vertical cooperation means collaboration between companies of different levels of the supply chain. Backward or forward directed vertical cooperation further indicate the scope of the cooperation which is either in direction to suppliers (backward) and aims at minimising risks in procurement or in direction to the demand (forward) in order to ensure sales. Moreover, there is diagonal or transversal cooperation between organisations of different industries (Kummer, 2010, p.322).

Several authors state difficulties in providing a structured and profound description of different forms of cooperation along with an allocation in the range from market to hierarchy (Hildebrand, 2008, p.78; Balling, 1997, p.39). Nevertheless Hildebrandt (2008) provides different examples for hybrids in the range from market to hierarchy in relation to maritime container transport chains that are included in Figure 2.9.

Figure 2.9: Forms of cooperation between market and hierarchy



Source: Own design adapted from Sydow, 1992, p.104; Balling, 1997, p.60; Hildebrand, 2008, pp.80-83)

The loosest form of collaboration is *'informal cooperation',* which is without any contractual arrangements and may take the form of an exchange of information or common implementation of ICT systems (Hildebrand, 2008, pp.80-83; 146 f.). *'Subcontracting'* is based on temporary contractual arrangements. It includes the delegation of subtasks being part of one's own performance to other legally independent entities that carry out agreed performance according to given instructions (Sydow, 1992, p.103 ff.). Parties are not equal in this collaboration and the cooperation is more of a regulated relation of dependency. It ensures more advantageous purchasing conditions for the client and permits better utilisation of capacities for the contractor (Hildebrand, 2008, pp.80-83; 146 f.). *'Strategic alliances'* are based on a contractual framework that intends to ensure mid- to long-term collaboration. For the specific purpose of cooperating, resources are shared or consolidated. Usually strategic alliances are built in order to create competitive advantage of companies in horizontal cooperation (Schmoll, 2001, p.35 f.). The three latter forms of cooperation are characterised by the share of benefits meanwhile eventual risks or costs of collaboration are taken individually (Hildebrand, 2008, pp.80-83; 146 f.). The *'joint venture'* is also framed by contractual arrangements but furthermore by the foundation of a new company. Resources that are required for the purpose of collaboration are thereby consolidated. Benefits and risks are shared by cooperating parties (Hildebrand, 2008, pp.80-83; 146 f.). The contractual arrangement of a joint venture is more complex than that of strategic alliances, which is mainly due the desire to avoid contractual conflicts between partners (Schmoll, 2001, p.40).

2.6 Implications for framework development

This chapter is intended to explore the object of research, namely change and the maritime container transport chain. By compiling their main characteristics, implications for the development of the stakeholder management framework can be derived.

The change process as the greater context for the stakeholder management framework is portrayed in terms of different types of changes and the different phases of the change process.

Change firstly differs in its immediate effect by being either incremental or transformational. The latter type of change is a fundamental break with an existing paradigm performed in one step whereas the former aims at a stepwise change within existing frames. Second, timing plays a role in terms of the capability to anticipate change and to respond to it by being either proactive or reactive. Crossing each two options of the immediate effect and timing leads to four different types of change. Each type includes specific characteristics leading to typical reactions in the stakeholder environment of the change. Finally, considering the type of change at the beginning of the change process is recommended in order to evaluate the intensity of change and potential barriers due to the resulting reactions of stakeholders.

The change process as by Paton and McCalman (2008) comprises different phases inherent in change: definition, evaluation and implementation. During the change process the stakeholder setting might change as well because, for example, stakeholders gain in or loose importance, the reference point of their evaluation might be revised. Thus, the framework developed should be repeated and applied in all phases of the change process to ensure following and recording developments in the stakeholder environment that are inherent to change. So contributions of the framework are to be outlined for each of the portrayed phases to embed the framework in the change process as its greater context.

The object of research was determined to the *maritime container transport chain* due to its high level of integration in terms of functional and institutional elements, its importance for international trade and its need for smart management. The maritime container transport chain is thereby understood as a logistical meta-system that focuses on the integrated design and realisation of logistical processes as well as on the linkages of involved institutions to enable seamless container transportation by using the maritime mode in the pre-, main or on-carriage.

With respect to its main characteristic the maritime container transport chain was classified from a functional and institutional perspective in a systems context, i.e. by defining elements standing in interrelations. Thereby functional elements include logistics nodes, the means of transport as well as all transport-related processes along the flow of goods. Transport-related processes comprise logistical processes such as packaging, storage, transhipment, picking and transportation itself as well as non-logistical processes such as customs procedures. Institutional elements comprise involved organisations such as logistics or transport service companies. They were outlined based on the functional perspective by describing the main actors of the container transport chain and their tasks along the chain. For a comprehensive compilation of actors the planning and organisation of the maritime container transport chain, its operation and its environment as well as the ownership of container equipment were considered. Further interrelations between these institutional elements were explored in context of transaction cost theory as explanatory approach and possible interrelations were structured according to the degree of cooperation on the range between market and hierarchy.

Stakeholder management was derived as an answer to face outlined challenges along the maritime transport chain. Moreover, the integrated view in a functional and institutional perspective that is inherent in the underlying understanding of maritime container transport chains emphasised the stakeholder perspective as relevant to focus on and additionally led to process orientation as second research perspective. The framework should consider and integrate both perspectives in order to comply with maritime container transport chains specific needs. Therefore the outlined characteristics will serve as point of reference for framework development.

3 Research perspectives: the stakeholder and the process view

In previous chapters the two research perspectives for the maritime container transport chain were defined as the stakeholder and the process perspective. In this chapter, both perspectives are explored in terms of their theoretical evolution and approaches for an application. Relevant implication for framework development will be developed by insights gained in the following and by reflecting them with the elaborated characteristics of the functional and institutional perspective on the maritime container transport chain.

Therefore the *theoretical embedding and application of stakeholder orientation* is outlined in chapter 3.1[8], the *theoretical embedding and application of process orientation* in chapter 3.2[9]. Chapter 3.3 comprises the resulting *implications for framework development*.

3.1 Theoretical embedding and application of stakeholder orientation

Within this chapter theoretical reflections will be presented which are important to reproduce the development and necessity of stakeholder management and to derive an underlying stakeholder definition (chapter 3.1.1). Approaches for the application of stakeholder orientation will then be outlined in general (chapter 3.1.2) and with special emphasis on transport chain-related approaches (chapter 3.1.3).

8 This section partially was published at the WCTRS-SIG2 conference (May 2012 in Antwerp): Wolff & Flämig (2012).

9 This section partially was published at the 13th World Conference on Transport Research (July 2013 in Rio de Janeiro): Wolff & Flämig (2013).

3.1.1 Theoretical embedding of stakeholder orientation

The development of the stakeholder concept

The first emergence of the stakeholder concept[10] cannot be allocated clearly to one source in literature but can be traced back to the context of strategic management and organisation theory literature in the 1930s to 1960s. Relevant authors refer in this connection to different first sources: Ansoff (1965) refers to Abrams (1951) and Cyert and March (1963), whereas Ackoff (1974) refers to Ansoff (1965) and to Cyert and March (1963). Freeman (1984) refers to a 1963 internal memorandum at the Stanford Research Institute (SRI) and due to the fact that Freeman is very often considered as the '*founder*' of the stakeholder concept (Elias & Cavana, 2000; Walsh, 2005; Littau et al., 2010; Gärtner, 2009) many authors follow this explanation (Slinger, 1998; Eden & Ackermann, 1998). Preston and Sapienza (1990) credit the '*formal introduction of the stakeholder concept, although not the term, into the management literature*' to Dill (1958), with regard to the stakeholder term to the SRI memo, but - followed by Donaldson and Preston (1995) and Schmid (1998) - sees the sources of the concept in a 1932 statement by the Harvard law professor Merrick Dodd. Gärtner (2009) sees the roots of the stakeholder concept in American management literature of the 1930s. In it the consideration of several demand groups was claimed by Means and Berle (1932) and Barnard (1938). However, he likewise states that the temporary understanding of the stakeholder concept, i.e. corporations' responsibility for all stakeholder groups, was manifested by the SRI in 1963 by defining the term stakeholder management as well as by the later work of Ansoff (1965).

In the following, relevant literature dealing with the stakeholder concept is presented chronologically and outlines exemplarily the development of the stakeholder concept from the pure recognition that there are demand groups who are to be considered, moving to stakeholders claiming their interests to an organisation or policy, firstly focusing on internal then also integrating external stakeholders up to the insight that integrating stakeholders means a benefit for designing change processes.

In American management literature of the 1930s the consideration of several demand groups is claimed in statements on the corporation, the organisation's or management's task. Means and Berle (1932) understand the corporation as

10 Following Gärtner (2009) the term stakeholder concept is referred to as the recognition and claim to consider several demand groups (Gärtner, 2009, p.34 f.).

institution that involves a concentration of power but also a diversity of interest – from owners, workers and consumers – that have to be served (Means & Berle, 1932, p.353). Dodd (1932) states that managers are '*trustees for an institution [with multiple constituents] rather than attorneys for the stockholders'* (Dodd, 1932 quoted in Donaldson & Preston, 1995, p.65). Barnard (1938) defines an organisation as a system of cooperative activities of two or more contributors to the organisation with contributors including members of the organisation but also other groups. The power of cooperation depends on the willingness of individuals to cooperate and the efforts they contribute to the organisation on the basis of incentives (Barnard, 1938, p.75, 141).

In the 1950s, the stakeholder concept was considered in the context of a firm's responsibility and of decision making in organisations.

Simon et al. (1950) define *'organizational equilibrium'* as the dynamic balance between individuals' contributions to an organisation and their inducements received from the organisation. Furthermore it is stated that the equilibrium between contributions and inducements is also valid for external participants such as governmental organisations, clientele groups and the general public vis-à-vis the organisation. They name the process of maintaining organisational equilibrium as a '*struggle for existence*' within a changing environment that results in a dynamic composition of (conflicting) interests (Simon et al., 1950, pp.381-382).

Abrams (1951) states the enterprise management's responsibility is to '*maintain an equitable and working balance among the claims of the various directly interest groups',* these being stockholders, employees, customers, and the public at large (Abrams, 1951, p.29 f.). The first three groups represent people '*that are directly interested in the affairs of business*'. However, the general public likewise has a very deep interest in, and is affected by what is going on (Abrams, 1951, p.32). He claims that business management has to serve individual objectives by equating them with the common good (Abrams, 1951, p.34).

March and Simon (1958) outline participation in an organisation (in reference to Simon et al., 1950) as all individuals who '*receive inducements from the organization and provide contributions to its existence*' though they limit '*principal participants*' to employees (including management), investors, suppliers, distributors, and consumers (March & Simon, 1958, p.89).

Dill (1958) defines the task environment of an organisation as stimuli that the organisation might respond to and that is relevant to goal setting and goal attainment (Dill, 1973[11], p.105). In this context he states that the '*elements of task environment that had greatest impact on goal attainment included customers [...], suppliers, [...], competitors [...], and regulatory groups [...]*' (Dill, 1973, p.115).

Previous authors had already stated a certain importance of considering demand groups or stakeholders respectively. Authors in the following develop the stakeholder concept further by giving more consideration to the stakeholders and how to integrate them in decision-making processes in the context of corporate planning, development cooperation, organisational theory, project management and public planning.

Cyert and March (1963) deal with the organisational decision-making process. They define the organisation as a '*coalition of individuals, some of them organized into subcoalitions*' (Cyert & March, 1963, p.27). Furthermore, they state that '*people (i.e., individuals) have goals; collectivities of people do not*' and that *'[a]ny theory of organizational goals must deal successfully with the obvious potential for internal goal conflict inherent in a coalition of diverse individuals and groups*' (Cyert & March, 1963, p.26 f.). Thus the authors conclude that defining the organisation as a coalition implies the expectation that individual participants in the coalition may have different goals, which has to be dealt with consciously when defining organisational goals (Cyert & March, 1963, p.27). Moreover the authors provide guidance on how to form objectives through bargaining within the coalition, the stabilisation and elaboration of objectives as well as the process of adjustment by which coalition agreements are altered in response to changes in the organisational environment (Cyert & March, 1963, p.29 ff.).

Ansoff's (1965) approach to the stakeholder concept is embedded in the decision-making process to business strategy formulation in the social-economic environment of a firm. He introduces the '*stakeholder theory of objectives*' requiring that '*the objectives of the firm should be derived balancing the conflicting claims of the various "stakeholders" in the firm: managers, workers, stockholders, suppliers, vendors.*' (Ansoff, 1965, p.34). He interprets reflections of Cyert and March (1963) such as that the '*objectives of a firm are in reality a negotiated consensus of objectives of the influential participants.*' (Ansoff, 1965, p.35). Contrary to the assumptions of Cyert and March (1963), he declares that business firms may have objectives that are different and distinct from individual objectives of the participants. According to the author a firm has economic and social objectives. The economic objective aims at '*optimizing the efficiency of its*

11 Reprint from 1958 by permission from ‚Administrative Science Quarterly' (March 1958), pp.409-443.

total resource conversion process' and '*exerts the primary influence on the firm's behaviour*', whereas social objectives are '*the result of interaction among individual objectives of the firm*'s *participants*' and only '*exert a secondary modifying and constraining influence on management behaviour*' (Ansoff, 1965, p.36 ff.).

Thompson (1967) picks up the idea of Cyert and March (1963) that organisational goals are built through coalition behaviour. He asserts that '*organizational goals are established by individuals – but interdependent individuals who collectively have sufficient control of organizational resources to commit them in certain directions and to withhold them from others*' (Thompson, 1967, p.128). Interdependence is thereby recognised between the organisation and its task environment (here Thompson follows the view of Dill (1958), see above) as well as between organisational components (Thompson, 1967, p.132).

Rhenman (1968) discusses stakeholder orientation in the realm of industrial democracy and the stakeholder concept to explain how management formulates goals and rules in changing situations. According to Rhenman (1968), '*Relations between stakeholders are [...] characterized by the simultaneous existence of conflicting and common interests. The common interests will result in attempts towards cooperation and coordination. The existence of a conflict of interests will often complicate and sometimes even obstruct cooperation.'* (Rhenman, 1968, p.37). Further he depicts three ways of institutionalised conflict resolution. The first is the (free) market, i.e. competition between different e.g. suppliers, customers ensures cooperation and thereby solves conflicts. Secondly, joint decision-making is described as a method to settle conflicts by an exchange of information, i.e. negotiations with stakeholders to make a joint decision. Finally, cooptation is designated to resolve conflicts of various stakeholders. It means that stakeholders are represented in the board of the company (Rhenman, 1968, pp.38-40).

In the late 1960s the idea of involving demand groups emerged in the field of public planning even though the term stakeholder was not explicitly mentioned. Arnstein (1969) developed the *'Ladder of Citizen Participation*' as a proposal for stakeholder participation in public planning processes. She claimed that '*citizen participation is a categorical term for citizen power*' (Arnstein, 1969, p.216). The ladder of participation has eight rungs corresponding to the extent of citizens' power and clustered in three types of participation. At the bottom are manipulation and therapy, describing levels of '*non-participation*' that are '*to enable power holders to educate or cure the participants'*. The next type of participation is called '*tokenism*' and comprises three rungs: informing, consultation and placation. In this context Arnstein still claims that participants have '*no muscles*' and cannot await a follow-up. The highest degree of participation is '*citizen power*' with the rungs partnership, delegated power and citizen control at the top (Arnstein, 1969, p.217).

Fox (1971) looked into the stakeholder idea in the context of sociology of work. In the monograph '*A sociology of work in industry*' he suggests a theoretical framework in thinking about work relations and resulting social structures and mechanisms. In it he examines the social organisation of work, so his reflections on stakeholders can also be settled in the realm of organisation theory. Referring to Rhenman (1968) the author suggests seeing *'the organization as coalition of stakeholders*' with different interests in and aspirations towards the organisation. Furthermore he states that stakeholders' participation *'rests upon their receiving certain minimum inducement and upon their making a certain minimum contribution.*' (Fox, 1971, p.58). In detail, he takes the stakeholder concept to explain sources of normative conflicts of an organisation with special focus on the stake of managers and employees (Fox, 1971, p.57 ff.).

In '*Redesigning the future*' Ackoff (1974) places the stakeholder concept in a system thinking approach with regard to the environmentalisation of corporations. He states that '*environmentalization is the process of putting into a system's mind its relationship to the whole of which it is part. It is the converse of humanization in which system's relationship to its parts is put into its mind. Humanization efforts are based on the conviction that every system should assume a larger responsibility for the welfare of its parts. In environmentalization there is a complementary conviction that the parts should assume a larger responsibility for the welfare of the whole*' (Ackoff, 1974, pp.55-56). Based on this he distinguishes four different attitudes in corporate responsibility towards the present and future: reactive, inactive, preactive and interactive views. The first two positions are based on the conviction that increased social responsibility harms the corporation's profit whereas the preactive is based on the belief that improving the corporation's physical and social environment contributes, however indirectly, to its profit and is not a legitimate corporate objective in its own right. The interactive position is to be realised by including representatives of each stakeholder group on the corporation's board to ensure that stakeholder interests are integrated into decision-making processes (Ackoff, 1974, pp.56-66).

Dill (1975) expands on public participation in corporate planning. He states that one challenge that organisations face is their environment, '*which is made up of individuals and organizations intervening and seeking direct influence on enter-*

prises' strategic decisions. Each enterprise has a broad aggregation of people outside, call them stakeholders, who have ideas about what the economic and social performance of an enterprise should include.' (Dill, 1975, p.58). He further claims to move from '*stakeholder influence toward stakeholder participation*' (Dill, 1975, p.58) to face that challenge.

Huse (1975) deals with managed change in organisation development (organisational change management). He recommends principles which have to be taken into account when attempting to change attitude and behaviour of individuals or groups in an organisational setting. He thus stresses the success of change processes arising from the involvement and reactions of users. He names factors that increase resistance as well as consequences of resistance and proposes factors that decrease resistance to change (Huse, 1975, pp.110-115). With regard to factors decreasing the resistance to change he states that *'[a]ny change process needs to take into account the needs, attitudes, and beliefs of the individual(s) involved*' (Huse, 1975, p.113). Furthermore, he classifies different degrees of participation in change processes. First there is complete participation by all the members of the group, which is deemed to be the most effective. The next degree of participation includes representatives of the group and the supervisor. Last, there is the participation of a supervisor only, which may decrease acceptance of change processes but likewise reduces the amount of open opposition (Huse, 1975, p.114).

Lindenberg et al. (1981) take up the stakeholder[12] concept in the realm of development cooperation, which they call development administration, in order to assist those engaged in development cooperation in political analysis and strategy design (Lindenberg et al., 1981). They define administration as '*the attempt to elicit cooperative action to implement government policy in an uncertain environment where divergent subgroups both in and outside the organization may have widely different objectives*' and state that '*administration is a process which involves clever bargaining with other actors*' (Lindenberg et al., 1981, p.5 f.). Development administrators depend on critical support from key actors outside the immediate organisation and therefore need to examine the organisation's environment by identifying actors, their objectives and the way in which they bargain (Lindenberg et al., 1981, p.25). Aiming to improve managerial performance

12 The authors use the term actor instead of stakeholder defined as '*specific individual (or group) who makes direct or indirect decisions critical to the outcomes desired by the [development] manager*' (Lindenberg et al., 1981, p.65).

in development cooperation, the authors suggest a model for political analysis (Lindenberg et al., 1981, p.25 f.)

Mason and Mitroff (1981) deal with the stakeholder concept in context of the '*Strategic Assumption Surfacing and Testing (SAST)*' planning process, a broad methodology to uncover and challenge assumptions every plan, strategy or policy is based on or derived from. The area of application chosen by the authors is corporate strategy making although they stress that it is transferable to other areas. According to the authors problems of organised complexity require all individuals or groups who have an interest in the problem to be part of the solution. Their argumentation for stakeholder orientation is mainly derived from the presumption that '*a strategy may always be thought of as a set of assumptions about the current and future behaviour of an organization's stakeholders*.' (Mason & Mitroff, 1981, p.43). The authors make use of the SAST method to surface these assumptions. Mitroff (1983) later adopts the stakeholder term to the individual psyche saying that personality of individuals is construed as miniature social system with different stakeholder claims. He states that there is a constant interaction between stakeholders internal and external to the individual and that these internal stakeholders are important to consider when understanding the organisational mind (Mitroff, 1983, p.4 ff.).

A landmark for the development of the stakeholder concept was published by Freeman (1984) in his book '*Strategic management: A stakeholder approach*'. Freeman (1984) summarises the history of the stakeholder concept through several research areas. He states that the conceptual shift from strategic planning to strategic management includes an important move towards an action orientation (Freeman, 1984, p.43 f.). Changes in the external environment of business require a new conceptual approach to the way corporations interact with external groups (Freeman, 1984, p.27). His conceptual approach builds a *'[...] framework and a strategy for managing diversity and turbulence, to get out of the crisis-reaction-crisis cycle*' (Freeman, 1984, p.4). So he outlines necessary building blocks of such a framework, which need to cover a rational, process and transactional level of analysing stakeholder issues. These three levels cover relevant stakeholders and their interest (rational level), organisation processes to manage stakeholder relationships (process level) as well as the way the organisation interacts with its stakeholders (transactional level) (Freeman, 1984, p.52 ff.). He goes on to explain how such a framework can be integrated into existing strategic management processes and examines implications for the structure of managerial work as a result of choosing the stakeholder approach. Finally, he states that '*if business* *organizations are to be successful in the current and future environment then executives must take multiple stakeholders into account* (Freeman, 1984, p.52).

Already beforehand but even more after the contribution of Freeman (1984) the stakeholder concept has permeated different scientific disciplines resulting in a multitude of contributions that cannot be presented comprehensively here but are shown exemplarily in the following.

Cleland (1986) introduced the stakeholder concept in project management by the project stakeholder model process. Because projects are impacted by their systems environment, project managers need to interact with key institutions and individuals in the environment. He states that '*[f]ailing to recognize or cooperate with adverse stakeholders may well hinder a successful project outcome*' (Cleland, 1986, p.38). The significance of the stakeholder concept has increased and expanded since 1984 and should be considered as an important trend in project management (Littau et al., 2010, p.25).

In the field of public planning citizen participation became more and more important: awareness raising in the late 1960s, the integration of local perspectives in data collection and planning in the 1970s, the development of techniques that incorporate the local knowledge of rural people in the planning and management of development projects and programmes such as the participatory rural appraisal in the 1980s (Reed, 2008, p.2418). In 1992 the Agenda21 as an action plan for global sustainable development was published as a result of the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro. Its implementation was mainly allocated to national governments with the help of international cooperation and United Nations. In this context, it is stated that *'[t]he broadest public participation and the active involvement of the non-governmental organizations and other groups should also be encouraged*' (UNCED, 1992, paragraph 1.3). Davidson (1998) replaces Arnstein's 1969 *ladder of participation* by the *wheel of participation* in order to make use of more positive terms and to avoid the understanding that '*the aim is always to climb to the top of the ladder'* (Davidson, 1998, p.14), meaning that different forms of participation are not mandatorily hierarchical. The author replaces the terms used by Arnstein (non-participation, tokenism and citizen power) to describe different types of participation by information, consultation, participation and empowerment (Davidson, 1998, p.15). Hage et al. (2010) present participatory approaches in environmental knowledge production in the Netherlands and related strategies for stakeholder participation in public planning. They claim '*that the joint knowledge production and mutual learning of science and society are necessary to* *foster the transition to a sustainable society*' (Hage et al., 2010, p.256). They propose different levels of stakeholder participation and stress that '*less can be more, depending on the context'* (Hage et al., 2010, p.262)[13].

Carroll (1991) discusses the contribution of the stakeholder concept to the idea of corporate social responsibility (CSR). He states that '*the concept personalizes social or societal responsibilities by delineating the specific groups and or persons business should consider in its CSR orientation*' and that the '*stakeholder nomenclature puts "names and faces" on the societal members who are most urgent to business, and to whom it must respond.*' (Carroll, 1991, p.43). Furthermore, he stresses the usefulness of stakeholder management by providing conceptual and analytical concepts for diagnosing, analysing and prioritising an organisation's relationships (Carroll, 1991, p.48). Clarkson (1995) stresses using the stakeholder framework as established by Freeman (1984) to analyse and evaluate corporate social performance. According to the author this framework is more appropriate to evaluate corporate social performance than other methodologies based on concepts related to CSR and responsiveness. He defines the corporation '*as a system of primary stakeholder groups, a complex set of relationships between and among interest groups with different rights, objectives, expectations, and responsibilities.*' (Clarkson, 1995, p.106 f.). Recent publications (e.g. Neßler, 2012; Buchholtz & Carroll, 2012; Lindgreen, 2012; Bhattacharya et al., 2011; Fryzel, 2011) show a rising interest as also stated in Pedersen (2011): the stakeholder concept is central to the CSR debate (Pedersen, 2011, p.187 f.).

In the field of corporate management Preston and Sapienza (1990) state that '*the stakeholder perspective can best be regarded as an application of socio-economic thinking in an organizational setting*' (Preston & Sapienza, 1990, p.367). Donaldson and Preston (1995) deal with the blurred character of the stakeholder concept and clarify essential contents. They conclude that the '*ultimate justification for the stakeholder theory is to be found in its normative base*' (Donaldson & Preston, 1995, p.87 f.). Morris and Raben (1995) refer to organisational changes and identify strategies such as the participation in planning and implementation to motivate constructive behaviour of people involved in change processes (Morris & Raben, 1995, pp.51-54). Liebl (1996) amends strategic issue management with stakeholder management, presuming on the one hand that the stakeholder perspective reveals relevant insights for the recognition of issues and on the other hand that relevant issues are the basis for the formation of stakeholder coalitions (Liebl, 1996, p.117 f.). Eden and Ackerman (1998) argue for the

13 Reed (2008) outlines a comprehensive history of the development of participation.

management of stakeholder as means to pursuing strategic ends. Furthermore, they state that '*stakeholders are not treated as having rights, only having power and interests'* (Eden & Ackermann, 1998, p.118). Johnson et al. (2008) also place the stakeholder concept in this context. According to the authors stakeholders are those whom the organisation serves and whose expectations, power and interest have to be transparent to the corporation to define their strategies (Johnson et al., 2008, p.132). In '*Redefining the corporation: Stakeholder management and organizational wealth*' Post et al. (2002) assert the corporation's dependence on its stakeholders. Noting that the corporation's purpose is to create wealth (Post et al., 2002, p.35), they state that *'mutually beneficial stakeholder relationships can enhance the wealth-creating capacity of the corporation*' (Post et al., 2002, p.36) but also that '*the failure to establish and maintain productive relationships with all the firm's stakeholders is a failure to effectively manage the organization's capacity to generate future wealth'* (Post et al., 2002, p.53). Phillips (2003) expands on '*stakeholder theory and organizational ethics*'. He distinguishes between normative (those stakeholders to whom the organisation has a moral obligation) and derivative stakeholders (those groups whose actions and claims must be accounted for by managers due to their potential effects on normative stakeholders) (Phillips, 2003, pp.124-127). In conclusion, he explicitly declares that '*stakeholder theory is not intended as a comprehensive moral theory*' (Phillips, 2003, p.142). Hayes (2010) points out with respect to organisational change management that *'change managers need to be alert to the identity of important stakeholders and their predisposition to either support or resist the change.* (Hayes, 2010, p.143 f.).

In Freeman et al. (2010) the stakeholder concept and its development in the preceding 25 years is presented, discussed and amended with new insights for strategic management such as that *'[...] if we put stakeholder theory at the centre of our thinking about business we can avoid the mindless pursuit of gains for shareholders at the expense of other stakeholders, a pursuit which ultimately destroys both shareholder and stakeholder value.'* (Freeman et al., 2010, p.267 f.). These ideas are also to be found in Parmer et al. (2010). According to the authors the relevance of this topic relies mainly on three questions to be answered or problems to be solved that can be understood as a cascade of questions: *'The problem of value creation and trade: In a rapidly changing and global business context, how is value created and traded? The problem of the ethics of capitalism: What are the connections between ethics and capitalism? The problem of managerial mindset: How should managers think about management to: (1) Better create value, and (2) Explicitly connect business and ethics?*' (Parmer et al., 2010, p.405). In order to face these problems Freeman (2010) proposes a framework of principles stressing cooperation among stakeholders, their engagement, their willingness to accept responsibility for the consequences of their actions, their complexity[14], their continuous involvement and emergent competition[15] (Freeman 2010, p.280 ff.). The author introduces that as *stakeholder capitalism* (Freeman et al., 2010, p.268).

By virtue of the strong interrelation of the transport chain as a logistical metasystem for the supply chain (see chapter 2.2) and due to the fact that supply chain related research also includes the field of supply chain relationship it appears to be important to refer to it here. According to Harland et al. (2004) (supply chain) relationships are processes that *'consist of interwoven elements of short-term exchanges of materials, services, information, payments, and social interaction, as well as long-term adaption and institutionalization*' (Harland et al., 2004, p.222). Despite this broad understanding the literature mostly focuses on supplier and customer/buyer relations (see e.g. Rinehart, 2007; Sheth & Sharma, 2007; Nyaga et al., 2010). Nevertheless, the stakeholder term can be found for instance in discussions on sustainability (in general) and supply chains (e.g. Carter & Rogers, 2008; Seuring & Müller, 2008) green supply chains (e.g. Vachon & Klassen, 2008), or CSR in supply chains (e.g. Roberts, 2003; Walker et al., 2008). Harland et al. (2004) state that the '*consideration of stakeholders and other richer elements of exchange indicates some integration of social aspects of relationships*' in supply chain management (Harland et al., 2004, p.214). Haunhorst and Willers (2011) assert the necessity for sustainable management and claim that sustainable management can be achieved by '*sustainability, supply chain, stakeholders*' (Haunhorst, 2011, p.13 ff.).

Definition of the stakeholder term

The literature review shows differences in the underlying understanding of what a stakeholder actually is.

The designation of the stakeholder term is supposed to have been an allusion to the over-emphasized attention to corporate shareholders and disregard for other interest groups (Liebl, 1996, p.97). Etymologically, the term stakeholder can be

14 *'[...] human beings are complex psychological creatures capable of acting from many different values and points of view.'* (Freeman 2010, p.283)

15 *'[C]ompetition emerges from a relatively free society so that stakeholders have options. Competition is an emergent property rather than a necessary assumption to capitalism.'* (Freeman 2010, p.284)

referred to '*stake a claim*', i.e. marking its territory, what is also related to '*have a stake in something*', i.e. showing an interest in a business or a given situation. Moreover, the term '*to be at stake*' expresses that something is at risk.

Mitchell at al. (1997) elaborate relevant characteristics to differentiate organisational stakeholder definitions and derive the following pairs of characteristics (Mitchell et al., 1997, p.855-862):

- Broad versus narrow.
- Claimants versus influencers.
- Actual versus potential relationship.
- Power versus dependence (or reciprocity).

In the following these characteristics are transferred from a purely organisational understanding to the broader range of reviewed literature that further includes project and policy settings for stakeholder definitions.

Broad or narrow perspectives refer to the relationships with stakeholders that the definition implies. Narrow definitions focus on stakeholders that have an influence on or interest in an organisation, project or policy, or on stakeholders on whom an organisation, project or policy depend. The narrow perspective is '*based on the practical reality of limited resources, limited time, and attention, and limited patience of managers for dealing with external constraints*'. Thus only the most pressing relation is considered and is usually unidirectional. In contrast, broad definitions can be unidirectional and bidirectional without requiring reciprocity. The broad perspective is '*based on the empirical reality that companies can indeed be vitally affected by, or they can vitally affect, almost anyone'*. The broad perspective is much more complex in application but enables managers to recognise and respond effectively to the comprehensive set of stakeholders (Mitchell et al., 1997, p.856-859). The same principle of differentiation can be found in Littau et al. (2010), who investigated stakeholder definition in project management literature or in Friedman & Miles (2006) who explored corporate stakeholder definitions. A broad definition is for instance the one made by Freeman (1984) taking into account the stakeholder '*who can affect or is affected by the achievement of the organization's objective*' (Freeman, 1984, p.46) whereas, for example, the definition by Savage et al. (1991) focuses on stakeholders '*who have an interest in the actions of an organization*'. Motivation for a broad view can be in terms of either economic or social interest (Mitchell et al., 1997, p.856-857). Other authors also draw a distinction here and consider stakeholders as constraints or as essential parts of the organisation or with regard to a project or a policy. Hayes (2010) distinguishes between underlying *normative* positions and *instrumental* positions. Normative or ethics-based positions imply an intrinsic value of stakeholder interests that has to be taken into account. He argues that moral commitments '*should provide the basis for managing stakeholder relationships than the desire to use stakeholders to promote managerial interest*.' In contrast to this, instrumental positions suppose that managers only consider stakeholder interests in case they may affect their interests (Hayes 2010, p.146).

Another difference is inherent in a more focused view on stakeholders and their capabilities and demands towards an organisation, project or policy. The differentiation divides into *claimants and influencers*. There are stakeholders that have a legal, moral, or presumed claim or stakeholders that can influence behaviour, direction, process or outcome. Hence, influencers have power over the organisation, whether or not they have valid claims and whether or not they wish to press their claims. Claimants may have or not have legitimate claims and may or may not have the power to exert influence (Mitchell et al., 1997, p.859). Definitions that explicitly include both perspectives are the ones by Savage et al. (1991) and Varvasovszky and Brugha (2000). The differentiation between influence- or claim-based stakeholder relationships is also broadly discussed in Schuppisser, 2002, pp.15-33.

A third difference is the recognition of the actuality of relationships from stakeholders to an organisation, project or policy: whether it is an *actual or potential relationship*. The crucial question is whether an entity can be considered a stakeholder without being in an actual relationship. Mitchell et al. (1997) argue for doing so, as potential relationships can be as relevant as actual ones (Mitchell et al., 1997, p.859). Among the stakeholder definitions reviewed those of Honadle and Cooper (1989), Crosby (1991), as well as Varvasovszky and Brugha (2000) also take into account potential relationships, whereas others only include actual relationships.

Finally, Mitchell et al. (1997) point out the difference in terms of the direction of influence such as power on, dependence of or reciprocity (Mitchell et al., 1997, p.859-632). As a consequence there are definitions that emphasise the organisation, projects or policy's dependence on stakeholders or stakeholder's influence respectively, whereas some focus on the stakeholder's dependence or the organisation, projects or policy's influence respectively. Other definitions consider both directions such as Rhenman (1968), Fox (1971), Freeman (1984), Grimble and Chan (1995), Varvasovszky and Brugha (2000), and Johnson et al. (2008).

Stakeholder definitions from reviewed literature are fully classified to the characteristics as by Mitchell et al. (1997) and listed chronologically in Table 3.1.

Table 3.1: Stakeholder definitions: author, year, publication, field of application, evaluation

Author	Year	Publication (Field of application)	Stakeholder definition	Broad/ narrow	Claimants/ influencers	Actual/ potential relationships	Power/ dependence/ reciprocity
Stanford Research Institute	1963	Internal memorandum, quoted in Freeman 1984, (Corporate management)	*'…those groups without whose support the organization would cease to exist.'* (quoted in Freeman, 1984, p.31)	Narrow	Influencers	Actual	Dependence
Rhenman, Eric	1968	Industrial democracy and industrial management, (Organization Theory)	*'The stakeholders in an organization are the individuals or groups dependent on the company for the realization of their personal goals and on whom the company is dependent for its existence.'* (Rhenman, 1968, p.25)	Broad	Influencers	Actual	Reciprocity
Fox, Alan	1971	A Sociology of Work in Industry, (Organization Theory)	*'Stakeholders are defined as individuals or groups who depend on the organization for the realization of their goals and on whom in turn, the organization is dependent for its continuance.'* (Fox, 1971, p.58)	Broad	Influencers	Actual	Reciprocity
Ackoff, Russell L.	1974	Redesigning the future, (Corporate management)	*'These participants [employees, customers, suppliers, investors, debtors and the public] in corporate affairs are the stakeholders. […] All the participants and those affected by it invest some type of resources (including themselves) in it.'* (Ackoff, 1974, p.63)	Broad	Claimants	Actual	X

Author	Year	Publication (Field of application)	Stakeholder definition	Broad/ narrow	Claimants/ influencers	Actual/ potential relationships	Power/ dependence/ reciprocity
Dill, William R.	1975	Public participation in corporate planning, (Corporate management)	*'…individuals and organizations intervening and seeking direct influence on enterprises' strategic decisions. Each enterprise has a broad aggregation of people outside, call them stakeholders, who have ideas about what the economic and social performance of an enterprise should include.'* (Dill, 1975, p.58).	Narrow	Influencers	Actual	Power
Mason, Richard O.; Mitroff, Ian I.	1981	Challenging strategic planning assumptions, (Policy development)	*'Stakeholders are all those claimants inside and outside the firm who have a vested interest in the problem and its solution.'* (Mason & Mitroff, 1981, p.43)	Narrow	Claimants	Actual	X
Lindenberg, Marc; Crosby, Benjamin	1981	Managing Development: The Political Dimension, (Development cooperation)	*'Actor - Specific individual (or group) who makes direct or indirect decisions critical to the outcomes desired by the manager.'* (Lindenberg et al., 1981, p.65)	Narrow	Influencers	Actual	Power
Freeman, R. Edward	1984	Strategic management-A stakeholder approach, (Corporate management)	*'A stakeholder in an organization is (by definition) any group or individual who can affect or is affected by the achievement of the organization's objective.'* (Freeman, 1984, p.46)	Broad	Influencers	Actual	Reciprocity
Honadle, George; Cooper, Lauren	1989	Beyond coordination and control - An interorganizational approach to structural adjustment, service delivery, and natural resource management, (Development cooperation)	*'A stakeholder is defined as an individual or a group which can have an impact, either positive or negative, on a given situation. That is, a stakeholder either has access to resources that are needed to carry out an activity, or has resources that can be mobilized to prevent the activity from being performed'.* (Honadle & Cooper, 1989, p.1532)	Narrow	Influencers	Actual/ potential	Power

Author	Year	Publication (Field of application)	Stakeholder definition	Broad/ narrow	Claimants/ influencers	Actual/ potential relationships	Power/ dependence/ reciprocity
Crosby, Benjamin L.	1991	Stakeholder Analysis: A Vital Tool for Strategic Managers, (Development cooperation)	*'…only those groups or actors with real and mobilizable resources that can be applied for or against the organization and its interests to the issue at hand should be included. They are the ones that have the capacity to directly influence policy outcomes.'* (Crosby, 1991, p.2)	Narrow	Influencers	Actual	Power
Brinkerhoff, Derick W.	1991	Improving development program performance - Guidelines for managers, (Development cooperation)	*'…actors in the proximate environment who are interested in and/or value or oppose what the program does or does not produce.'* (Brinkerhoff, 1991, p.16)	Narrow	Claimants	Actual	X
Savage, Grant T.; Nix, Timothy W.; Whitehead, Carlton; Blair, John D.	1991	Strategies for Assessing and Managing Organizational Stakeholders, (Corporate management)	*'Stakeholders include those individuals, groups, and other organizations who have an interest in the actions of an organization and who have the ability to influence it.'* (Savage et al., 1991, p.61)	Narrow	Claimants/ influencers	Actual	Power
Donaldson, Thomas; Preston, Lee E.	1995	The Stakeholder Theory Of The Corporation: Concepts, Evidence, And Implications, (Corporate management)	*'Stakeholders are persons or groups with legitimate interests in procedural and/or substantive aspects of corporate activity. Stakeholders are identified by their interests in the corporation, whether the corporation has any corresponding functional interest in them.'* (Donaldson & Preston, 1995, p.67).	Narrow	Claimants	Actual	X

Author	Year	Publication (Field of application)	Stakeholder definition	Broad/ narrow	Claimants/ influencers	Actual/ potential relationships	Power/ dependence/ reciprocity
Overseas Development Administration (ODA)	1995	Guidance note on how to do stakeholder analysis of aid projects and programmes, (Development cooperation)	*'Stakeholders are persons, groups or institutions with interests in a project or programme. Primary stakeholders are those ultimately affected, either positively (beneficiaries) or negatively (for example, those involuntarily resettled). Secondary stakeholders are the intermediaries in the aid delivery process. This definition of stakeholders includes both winners and losers, and those involved or excluded from decision-making processes.'* (ODA, 1995a, p.2)	Narrow	Claimants	Actual	X
Grimble, Robert; Chan, Man-Kwun	1995	Stakeholder analysis for natural resource management in developing countries, (Development cooperation)	*'By stakeholders is meant all those who affect, and/or are affected by, the policies, decisions and actions of the system; they can be individuals, communities, social groups or institutions of any size, aggregation or level in society.'* (Grimble & Chan, 1995, p.114)	Broad	Influencers	Actual	Reciprocity
Clarkson, Max B. E.	1995	A stakeholder framework for analyzing and evaluating corporate social performance, (Corporate management)	*'Stakeholders are persons or groups that have, or claim, ownership, rights, or interests in a corporation and its activities, past, present, or future. Such claimed actions rights or interest are the result of transactions with, or actions by, the corporation, and may be legal or moral, individual or collective'.* (Clarkson, 1995, p.106)	Narrow	Claimants	Actual/ potential	X

Author	Year	Publication (Field of application)	Stakeholder definition	Broad/ narrow	Claimants/ influencers	Actual/ potential relationships	Power/ dependence/ reciprocity
Varvasovszky, Zsuzsa; Brugha, Ruairi	2000	How to do (or not to do)...A stakeholder analysis, (Policy development)	*'Stakeholders can be defined as actors who have an interest in the issue under consideration, who are affected by the issue who – because of their position – have or could have an active or passive influence on the decision-making and implementation process.'* (Varvasovszky & Brugha, 2000, p.341)	Broad	Claimants/ influencers	Actual/ potential	Reciprocity
Post, James E.; Preston, Lee E.; Sauter-Sachs, Sybille	2002	Redefining the corporation: Stake-holder management and organizational wealth, (Corporate management)	*'The stakeholders in a corporation are the individuals and constituencies that contri-bute, either voluntarily or involuntarily, to its wealth creating capacity and activities, and that are therefore its potential beneficiaries and/or risk bearers'.* (Post et al., 2002, p.19)	Broad	X	X	Power
Johnson, Gerry; Scholes, Kevan; Whittington, Richard	2008	Exploring corporate strategy, (Corporate management)	*'Stakeholders are those individuals or groups who depend on the organisation to fulfil their own goals and on whom, in turn, the organisation depends.'* (Johnson et al., 2008, p.132)	Broad	Influencers	Actual	Reciprocity
Cleland, David I.; Ireland, Lewis R.	2010	Project manager's portable hand-book, (Project management)	*'Project stakeholders are those individuals, organizations, institutions, agencies, and other organizations that have, or believe that they have a claim or stake in the project and its outcome.'* (Cleland & Ireland, 2010, p.134)	Narrow	Claimants	Actual	X

X: Not applicable

Source: Own compilation, own evaluation according to attributes specified by Mitchell et al. 1997

The stakeholder management approach developed in this thesis is aimed to be at most comprehensive and the same applies to the stakeholder definition. This is because the reference point of the stakeholder management framework developed – being change processes along maritime container transport chains – is rather vague and cannot be outlined in a precise and defined manner like, for example a corporation. A narrow and focused definition could omit relevant stakeholders from the outset. By using a very broad and comprehensive definition of what a stakeholder actually is, the framework developed makes it possible to consider all kinds of potentially relevant stakeholders. Moreover, the framework will include means to prioritise and profile stakeholders, thus a potentially broad starting point can be channelled to conscious decisions on adequate stakeholder involvement that will be inherent in the framework developed.

The most comprehensive definition among those reviewed in the literature is that of Varvasovszky and Brugha (2000) in that their definition includes bidirectional relationships, considers claimants and influencers as well as actual and potential relationships, and takes into account the influence on stakeholders as well as their (potentially) exerted influence. According to them stakeholders are understood as '*actors who have an interest in the issue under consideration, who are affected by the issue, or who [...] have or could have an active or passive influence on the decision-making and implementation process*' (Varvasovszky & Brugha, 2000, p.341).

The definition of Varvasovszky and Brugha (2000) includes the reference point *'issue under consideration'* without further concretising the term issue. So, an issue is here referred to as an '*unsettled matter which is ready for decision*' (Chase, 1984, p.38 quoted in Wadenpohl, 2011, p.14). In order to be more precise regarding the *change process* as reference point in the context of this thesis, the definition will be slightly adapted. As a consequence the following definition for the term *stakeholder* is taken as underlying:

> Stakeholders are defined as actors who have an interest in the issue under consideration, who are or will be affected by the change process dealing with that issue or could have an active or passive influence on decision-making and implementation encompassing the change process.

3.1.2 Application of stakeholder orientation

Kinds of approach

In research literature there are several approaches to dealing with stakeholders that are named stakeholder analysis, mapping, management or participation. The difference between these terms is not clearly distinguished. Table 3.2 lists several definitions of these terms starting with Freeman (1984) as the first among reviewed literature to provide a definition.

Table 3.2: Definitions of stakeholder analysis, mapping, management or participation

Author (Year)	Publication (Field of application)	Definition
Freeman, R. Edward (1984)	Strategic management, (Corporate management)	***Stakeholder management*** refers to the necessity to manage relationships with specific stakeholder groups in a way to be aware of the stakeholder map, to reflect the organizational processes for stakeholders and to interact with them. (Freeman, 1984, p.53 ff.)
Cleland, David I. (1986)	Project Stakeholder Management, (Project management)	*'PSM [Project **stakeholder management**] is designed to encourage the use of proactive project management for curtailing stakeholder activities that might adversely affect the project and for facilitating the project team's ability to take advantage of opportunities to encourage stakeholder support of project purposes.'* (Cleland, 1986, p.38)
Crosby, Benjamin L. (1991)	Stakeholder Analysis: A Vital Tool for Strategic Managers, (Development cooperation)	The purpose of ***stakeholder analysis*** is to indicate whose interests should be taken into account when making a decision. At the same time, the analysis ought to indicate why those interests should be taken into account. (Crosby, 1991, p.1)
Overseas Development Administration (ODA) (1995)	Guidance note on how to do stakeholder analysis of aid projects and programmes, (Development cooperation)	*'**Stakeholder analysis** is the identification of a project's key stakeholders, an assessment of their interests, and the ways in which these interests affect project riskiness and viability. It is linked to both institutional appraisal and social analysis: drawing on the information deriving from these approaches, but also contributing to the combining of such data in a single framework. Stakeholder analysis contributes to project design through the logical framework, and by helping to identify appropriate forms of stakeholder participation.'* (ODA, 1995a, p.2)

Author (Year)	Publication (Field of application)	Definition
Overseas Development Administration (ODA) (1995)	Technical note on enhancing stakeholder participation in aid activities, (Development cooperation)	*'This note defines* ***stakeholder participation*** *as a process whereby stakeholders -those with rights (and therefore responsibilities) and/or interests - play an active role in decision-making and in the consequent activities which affect them.'* (ODA, 1995b, p.2)
Grimble, Robert; Chan, Man-Kwun (1995)	Stakeholder analysis for natural resource management in developing countries, (Development cooperation)	*'****[S]takeholder analysis*** *is an approach and procedure for gaining an understanding of a system by means of identifying the key actors or stakeholders in the system, and assessing their respective interest in that system.'* (Grimble & Chan 1995, p.114)
Grundy, Tony (1998)	Strategy implementation and project management, (Corporate management)	*'****Stakeholder analysis*** *is the systematic identification of key stakeholders and appraisal of their influence on, and posture towards implementation. It may also involve creating a strategy to reshape the influence of these or new stakeholders.'* (Grundy, 1998, p.47)
Brugha, Ruairi; Varvasovszky, Zsuzsa (2000)	Stakeholder analysis: a review, (Policy development)	*'****Stakeholder analysis*** *aims to evaluate and understand stakeholders from the perspective of an organization, or to determine their relevance to a project or policy.'* (Brugha & Varvasovszky, 2000, p.239)
Karlsen, Jan Terje (2002)	Project Stakeholder Management, (Project management)	*'The reasons for performing a* ***stakeholder management*** *process are several: First, to become acquainted with the projects' stakeholders; second, it is important for ensuring the balance between contribution and reward; third, it is a basis for managing the stakeholders; Fourth, it is a basis for deciding who should be involved in determining the project goals and how success should be measured.'* (Karlsen, 2002, p.23).
World Bank (2006)	Social Analysis in Transport Projects, (Development cooperation)	*'****Stakeholder analysis*** *reveals the nature and magnitude of social actors' interest and influence in a project'.* (World Bank, 2006, p.21)
Johnson, Gerry; Scholes, Kevan; Whittington, Richard (2008)	Exploring corporate strategy, (Corporate management)	***Stakeholder mapping*** identifies stakeholder expectations and power and helps in understanding political priorities. (Johnson et al., p.156)
Cleland, David I.; Ireland, Lewis R. (2010)	Project manager's portable handbook, (Project management)	*'The* ***process of dealing with stakeholders*** *focuses around the allocation of the* ***management*** *functions (planning organizing, motivating, directing, and controlling) to potential stakeholder issues.'* (Cleland & Ireland, 2010, p.135)

Source: Own compilation

Reviewing literature dealing with the definition of stakeholder analysis, mapping, management or participation, it can be stated that the terms are often used for similar procedures. Karlsen (2002) or Winch (2007) naming their approach *stakeholder management* are not that different with regard to the suggested steps or more comprehensive than, for instance, Brugha and Varvasovszky (2000) or Zimmermann and Maennling (2006) who name their approach *stakeholder analysis*. Gärtner (2009) determines stakeholder management as follow-up to the stakeholder analysis aiming to elaborate how to deal with stakeholder claims (Gärtner 2009, p.30). According to Jones and Fleming (2003) stakeholder analysis includes the identification of relevant stakeholders involved in specific situations, whereas stakeholder management is concerned with '*incorporating the interests and anticipated reactions of these stakeholders into the decision-making process'* (Jones & Fleming, 2003, p.431 f.). Motzel (2010) sees stakeholder analysis and stakeholder management as synonymous (Motzel, 2010, p.220). This ambiguity and fuzziness is also emphasised by Gärtner (2009) pointing out that terms used in the stakeholder concept are not used in a consistent way (Gärtner, 2009, p.34). Even though the literature review did not lead to a clear distinction regarding the investigated terms the following summary aims to do so:

- *Stakeholder mapping* can be seen as a part of stakeholder analysis: the process of visualising stakeholders and their interactions according to selected attributes.
- *Stakeholder analysis* is a systematic investigation according to selected attributes enabling an understanding and comparison of different stakeholders.
- *Stakeholder management* appears to be a more holistic approach aiming at accomplishing classical management functions such as planning, directing, and controlling with stakeholder analysis as integrated part.
- *Stakeholder participation* appears in context of development cooperation, policy implementation or public planning processes and intends to stress the positive ambitions to involve stakeholders in decision making processes and due to this rather focuses on different kinds of involvement.

This thesis introduces a framework that aims to provide guidance on how to involve stakeholders in an adequate way into change processes along maritime container transport chains. According to the above comparison of the different stakeholder approaches, stakeholder analysis or even mapping can help to investigate stakeholders without, however, deriving stakeholder involvement in this investigation. Stakeholder participation focuses more on different ways of involvement and reasoning without a broad analysis basis. Finally, stakeholder management as comprehensive approach seems to be most appropriate for meeting this aim. It can incorporate stakeholder analysis and mapping and can also place emphasis on stakeholder participation such as different forms of involvement that can be proposed and discussed.

Referring to the traditional definition of management as '*planning, steering and control*' Cleland and Ireland (2010) replaces the term steering by '*organizing, motivating and directing*'. This appears to be a meaningful accentuation of the subject of management addressed here: the stakeholder. In consequence the following definition will be taken as underlying for this thesis based on Cleland & Ireland, 2010, p.135 amended with Brugha & Varvasovszky, 2000, p.239:

> Stakeholder management aims at planning, organising, motivating, directing, and controlling stakeholders by understanding and evaluating them, to determine their relevance to, as well as to derive adequate involvement strategies for, the change process.

Methodological approaches in different fields of application

In order to understand the rationale behind the application of the stakeholder concept it is worth taking a closer look at the different fields of application and the main underlying objectives.

Stakeholder management first emerged in the context of corporate management and organisation theory, and the first methodological approaches can also be found in this area. McConnell (1971) introduces a workable approach intended to determine corporate objectives as part of strategic management. Slatter (1980) and his approach is aimed at influencing corporation stakeholders by means of public relations. Freeman (1984) proposes a stakeholder framework and constructs strategic programs for stakeholders as part of strategic management. Eden and Ackermann (1998), Grundy (1998) or Johnson et al. (2008) propose approaches to guide strategy implementation in corporations. Bourne (2009) provides a comprehensive guide for organisational stakeholder relationship management.

The importance of stakeholders in development cooperation was already acknowledged from the early 1980s and introduced by Lindenberg et al. (1981). The issue has since been picked up by several authors and organisations. Honadle and Cooper (1989) as well as Grimble and Chan (1995) aim to facilitate natural resource management in development cooperation. Brinkerhoff (1991) and his approach aim to identify what development programmes need from stakeholders in order to be implemented successfully. The approach of Crosby (1991) deals with the implementation of policy change projects in development cooperation. MacArthur (1997) points out that stakeholder participation is a prerequisite for success in development cooperation (MacArthur, 1997, p.1 ff.). Several organisations involved in development cooperation contributed with methodological approaches to promote participatory development in this area, such as the Overseas Development Administration (ODA), the World Bank or the German Association for Technical Cooperation[16] (GTZ) (ODA, 1995a; ODA, 1995b; World Bank, 2003; World Bank, 2006; Zimmermann & Maennling (for GTZ), 2006).

The importance of stakeholder involvement in project management literature was mainly introduced by Cleland (1986). The Project Management Institute integrated the stakeholder approach into project management as part of the communication process in 2004 (Ellmann, 2008, p.159). Today almost every guide on project management includes one or more sections on the importance of stakeholders for project implementation, stakeholder analysis or stakeholder management (cf., for example, Project Management Institute, 2008; Pinto, 2010).

Furthermore, several approaches deal with stakeholder management in policy development and public planning, such as Mason and Mitroff (1981), Varvasovszky and Brugha (2000), Oxley-Green and Hunton-Clarke (2003) or Hage et al. (2008).

According to Brugha and Varvasovszky (2000) the background to systematic stakeholder approaches can be located in management (strategic management from the perspective of a corporation), policy (policy development and implementation) and development (in the sense of development cooperation) (Brugha & Varvasovszky 2000, p.240 ff.). It has to be stated that this distinction neglects the importance of stakeholder analysis in the realm of project management (see above). Thus four different categories are stated here. They are: corporate management, policy development and implementation, development cooperation and project management.

In the following the approaches are briefly outlined. Table A.1 provides a more structured and detailed overview in particular comprising included steps. Reviewed approaches serve as a pool for potential steps and their configuration that build a point of reference and will be used for framework development.

16 The GTZ later became part of the German Agency for International Cooperation (GIZ).

McConnell (1971) introduces stakeholder analysis as part of the determination of corporate objectives. According to him stakeholder analysis has to investigate balance and reconciliation of stakeholders' interests, consider conflicting interests and expectations as well as assess relevant changes that will impact their future attitude.

Slatter (1980) considers stakeholder analysis as one relevant element of strategic planning for public relations. According to him corporations can influence their pressure groups or stakeholders through public relations. This requires a stakeholder analysis to analyse expectations of various groups with which the company interacts.

Embedded in strategic management thinking, Freeman (1984) outlines an approach for analysing stakeholders in the context of building a stakeholder framework and for the purpose of constructing strategic programmes for stakeholders. With regard to stakeholder framework building he argues for analysing stakeholders from three different levels: rational, process and transactional.

Mitchell et al. (1997) developed the so-called theory of stakeholder identification and salience. The authors do not provide a structured process for analysing stakeholders but give advice on stakeholder classification along defined attributes. They develop principles to identify stakeholders and derive three attributes to assess the relationship to the organization: power, legitimacy and urgency. Based on this concept they define a typology of stakeholders clustering them into eight different groups such as dormant, dominant or dangerous stakeholders etc. Different types induce different kinds of stakeholder involvement.

Eden and Ackerman (1998) develop a stakeholder approach to corporate strategy aiming to manage stakeholders with the power to sabotage or support the corporation's strategic aims. They provide several tools to test emergent corporate strategies against responses and aspirations of powerful stakeholders. Thus the process for stakeholder analysis and management suggested by the authors is more of a set of techniques to gather, visualise and interpret information on stakeholders comprising the power/interest grid, the power/interest star diagram and the actor/influence network map. Furthermore, they provide guidance on how to deal with the results of stakeholder analysis in stakeholder management.

Johnson et al. (2008) developed an approach to map stakeholder to derive their expectations and power with regard to corporation strategy. They name their approach *stakeholder mapping,* which provides guidance on how to complete and interpret a power/interest matrix.

Görgen and Klien (2009) transferred the development cooperation approach of Zimmermann and Maennling (2006) for change management in organisations.

Bourne (2009) proposes a stakeholder circle for stakeholder management as part of organisational maturity. In it she combines five steps to identify, prioritise, visualise, engage and monitor stakeholders. Furthermore, she provides guidance on how implement stakeholder management in an organisation.

Hayes (2010) integrates stakeholder management as one important step of change management in corporations. He argues that change objectives have to be defined by taking into account the concerns of stakeholders and recognise their ways to contribute toward or sabotage the change process (Hayes, 2010, p.5).

Policy development and implementation

Mason and Mitroff (1981) developed an approach to analyse stakeholders in context of the '*Strategic Assumption Surfacing and Testing (SAST)*' planning process. SAST proposes to derive fundamental premises for a plan, strategy or policy by generating assumptions with the help of the '*inverse optimal question*', i.e. '*what must be assumed about each stakeholder so that these assumptions logically make your strategy optimal?*' (Mason & Mitroff, 1981, p.44).

Varvasovszky and Brugha (2000) provide a practical guide with a scientific background on how to perform a stakeholder analysis in the context of healthcare policy. This guide gives advice on how to prepare an analysis including determining the aim, time dimension, context and geographical focus. Furthermore it outlines how to conduct the analysis as well as presenting and using findings. Finally, limitations, validity and reliability issues are presented.

Oxley-Green and Hunton-Clarke (2003) derive different strategies for stakeholder participation for companies from approaches in public planning. They typecast different levels of participation in informative, consultative and decisional (Oxley-Green & Hunton-Clarke, 2003, p.295 f.).

Hage and Leroy (2008) provide guidance for stakeholder participation in public planning processes for environmental knowledge production. They propose stakeholder selection methods as well as different levels of participation and adequate methods to realize the desired participation. Their proposed approach to select stakeholders can be considered as stakeholder analysis comprising steps such as stakeholder mapping and argumentative analysis.

Development cooperation

Lindenberg et al. (1981) develop an approach to policy analysis that is an actor-based approach to improve managerial performance in development cooperation. It consists of three main questions: '*What do I want?*' (i.e. specifying problems, objectives, outcomes, and processes) – '*Who has it?*' (i.e. the actor resource inventory, mapping the actors) – '*When and how can I get it?*' (i.e. designing and implementing strategy and tactics, implementation and evaluation) (Lindenberg et al., 1981, p.25 ff.).

Honadle and Cooper (1989) propose performing a stakeholder analysis for the purpose of facilitating sustained institutional development by strengthening local inter-organisational networks. The authors provide the approach as an instrument to make cooperation strategies in particular for areas that are out of the applying manager's control.

In Brinkerhoff (1991), stakeholder analysis is one component of (development) programme management in order to identify what a programme needs from its stakeholders to be successfully implemented.

Crosby (1991) derives an approach to process a stakeholder analysis for the application in '*Implementing Policy Change Projects*' for the U.S. Agency for International Development. In it he reviews some former endeavours by, for instance, Honadle and Cooper (1989), Brinkerhoff (1991) Lindenberg et al. (1981).

The Overseas Development Administration (now the UK's Department for International Development) published a '*Guidance note on how to do stakeholder analysis of aid projects and programmes*' in 1995. This guidance note addresses the practicalities of consensus building and developing a workable project by jointly working out solutions to the underlying problem (ODA, 1995a). This guidance note supplements the '*Technical note on enhancing stakeholder participation in aid activities*' (ODA, 1995b). Stakeholder participation in particular is addressed with respect to ways and the degree of participation.

Grimble et al. (1995, 1997 and 1998) develop stakeholder analysis for natural resource management in development cooperation (Grimble & Chan, 1995; Grimble & Wellard, 1997; Grimble, 1998). The particular focus of this approach is to unpack economic interests and inherent conflicts of stakeholders in the field. The basic assumption is that '*understanding the underlying problem is of primary importance, and only from this prospects and ideas evolve for its sustainable management*' (Grimble & Wellard, 1997, p.186).

Zimmermann and Maennling (2006) develop an approach for the GTZ, today's GIZ. For this approach to stakeholder analysis the core and focal point is the change objective of a system intervention in the realm of development cooperation. The methodology is structured by building blocks that can be chosen independently without fixed order and must be adapted to the specific purpose of application.

Project management

Grundy (1998) places stakeholder analysis in the process of strategy implementation projects in corporations.

Karlsen (2002) introduces a process for stakeholder management in the context of projects primarily realised in corporations. Based on a survey which provided the result that project managers require a formal and systematic approach to realise stakeholder management, he develops a six-step process.

Winch (2007) introduces stakeholder management in the realm of project management as a central and crucial tool to manage complexity of projects. He suggests stakeholder management to reduce complexity in projects.

Cleland and Ireland (2010) provide a practicable guide for managing stakeholders and define the so-called '*project stakeholder management process*' for the strategic context of the project (Cleland & Ireland, 2010, firstly mentioned in Cleland, 1986). In addition they allocate the steps to the following management functions: planning, organizing, motivating, directing, and controlling.

3.1.3 Stakeholder orientation in a transport context

There are a few approaches to stakeholder management dealing with transport issues. The approaches shown here are not necessarily defined as stakeholder analysis or management but share a common basis of stakeholder involvement in the field of implementation in transport planning and logistics. The approaches of the World Bank and Wadenpohl present a concrete stakeholder framework for transportation issues. The World Bank deals with transport projects in development cooperation and Wadenpohl with large transport infrastructure projects. Others only apply elements of stakeholder analysis in a transportation context.

The World Bank (2003, 2006) developed a framework for social analysis in bank-supported projects (World Bank, 2003) and published guidelines for the application in transport projects (World Bank, 2006). Social analysis in this context is intended to provide a holistic framework to analyse and address the social dimension of transport projects or programmes. Five so-called entry points for carrying out a social analysis are suggested and stakeholders represent one of those. An approach to perform a stakeholder analysis is suggested as well aiming to ensure that stakeholders' interests can be taken into account during preparation and implementation of the project.

Wadenpohl (2011) develops a framework for coping with stakeholder issues in large transport infrastructure projects. His argumentation for applying stakeholder analysis is mainly derived from the increasing degree to which large transport infrastructure projects face expectations and requirements of society.

Schwartz and Eichhorn (1997) propose the use of multi-attribute utility analysis as basis for collaborative decision-making in transport investment decisions. The suggested process is carried out by a task force representing the full range of stakeholder interests related to the transport investment decision.

Hensher and Brewer (2001) describe the process of developing a freight strategy by means of a collaborative learning process to ensure stakeholder input. They therefore combine the stakeholder with the action learning approach as a moderated workshop involving stakeholders from the public and private sector (Hensher & Brewer, 2001, p.9).

De Langen (2007) applies an approach to classify stakeholders in port clusters by so called accommodations, defined as (temporary settlements of conflicts). These accommodations are based on two variables: the stakeholder's behaviour and the interaction with the port authority.

Roh et al. (2007) use the structured analysis and design technique (SADT) methodology to model a port cluster system. They create figures showing actors and processes in an unstructured cluster map (Roh et al., 2007, p.288 ff.).

Notteboom and Winkelmans (2007) consider different kinds of stakeholder involvement in appraisal of transport infrastructure projects and related decision-making (Notteboom & Winkelmans, 2007, pp.16-18).

Brucker and Verbeke (2007) present the eclectic multi-criteria analysis that combines the social cost-benefit analysis and multi-criteria analysis for evaluating transport policies. This quantitative methodology also takes into account stakeholders' preferences.

Macharis et al. (2010) develop and make use of Multi-Actor Multi-Criteria Analysis (MAMCA), which is a quantitative methodology to evaluate different transport policy measures that takes into account different stakeholders' opinions.

Although there are only a few methodological approaches or researchers that followed a structured approach to explore stakeholders in a transport context, some research activities in recent years have addressed interaction of actors, players or stakeholders along the maritime transport chain, focusing mainly on ports and their community.

Notteboom and Winkelmans (2002) investigate stakeholder relations management (SRM) by landlord port authorities. They first cluster port stakeholders into internal, economic/contractual external, public policy, and community stakeholders. Second, they classify stakeholders according to their involvement in and impact on port decisions. This analysis serves as a basis to stress the importance of SRM for landlord port authorities to face recent challenges such as competition of ports as nodal point in supply chains, increasing pressure on local resources, financing of port infrastructure etc.

Henesey et al. (2003) propose a multi-agent based simulation to mode stakeholders' behaviour in policy development of the port terminal community.

Dooms et al. (2004) portray a planning methodology that involves stakeholders in a port master plan development process exemplified for the inland port in Brussels. Different kinds of stakeholder involvement are described, such as by validation committees (soft involvement) or in-depth interviews contributing to strategy development (hard involvement).

Bichou and Gray (2004, 2005) investigate port performance measurement in the context of logistics and supply chain management. They state that the multi-firm dimensions, i.e. identifying and accessing the range of port supply chain actors, is one major difficulty in related research (Bichou & Gray, 2005, p.417). Furthermore, they claim that there are '*diverging attitudes and conflicting operational viewpoints*' among actors in the port supply chain (Bichou & Gray, 2005, p.425).

De Langen (2007) explores stakeholders, conflicting interests and governance in port clusters. He states that ports are characterised by conflicting interests of relevant stakeholders. As particularly relevant he elaborates port stakeholders' general interests and different sources of influence to derive conflicts of interest. He derives five relevant conflicts of interest in the port cluster emerging from stakeholder interests that clash with the main interest of port actors in what he calls the economic development of the port cluster. They are environmental protection, urban development, labour conditions, residents' interests and overall economic development. Furthermore, he presents a classification of port stakeholders according to their interests and interaction with the port authority. Regarding stakeholders' influence he explores stakeholder configurations in different ports, which means that he depicts the power balance of stakeholders to compare the focus of the port (de Langen 2007, p.459 ff.). Horst and de Langen (2008) investigate co-ordination in port enterprise communities. According to the authors there are five general conditions for co-ordination problems in transport chains. First there is the unequal distribution of costs and benefits of investments in improving co-ordination in such a way that some actors may not be compensated by benefits. Second, some actors, especially small firms, lack resources to participate. This is especially valid in fragmented industries such as road haulage. Third, a highly competitive market prevents actors from starting action or for not investing in undertakings that benefit competitors. Fourth, some companies focus on short-term undertakings and, being risk-averse, are not willing to invest in long-term or uncertain strategies. Finally, the lack of a dominant actor prevents the development of strategic initiatives (Horst, de Langen 2008, p.110 ff.; de Langen 2008, p.8 ff.). The authors further derive coordination mechanisms that are the introduction of incentives, the creation of an inter-firm alliance, changing scope (e.g. vertical integration or introducing new markets), or creating collective action (Horst & de Langen, 2008, p.118). De Langen (2008) states that firms would rather focus on their own processes than on devoting efforts to resolving the coordination problem. According to the author, coordination in transport chains does not emerge spontaneously but leads to more efficient supply chains (de Langen, 2008, p.3).

Martino and Morvillo (2008) investigate systematically the integration of port community actors as a source of competitive advantage for ports. Therefore the authors aim at designing port development strategies embedded in a supply chain management context understanding the port as a proactive actor in the supply chain. The authors state that this occurs '*within a context characterized by an increasing complexity, in which the actors are involved are very often motivated by opposing interests and non-convergent objectives*' (Martino & Morvillo, 2008, p.571). Presuming that competition is not between individual companies but between supply chains, the entire port becomes a crucial factor in competition in terms of infrastructure, suprastructure and services (Martino, Morvillo 2008, p.572 ff.). In Martino et al. (2012) the authors address supply chain integration and port competitiveness. They design a model aiming at identifying the sources of value creation in port environments. The model therefore explains the port as being a network of actors, resources and activities. The authors conclude that '*collaborative spirit and mutual trust are fundamental in order to create reciprocal benefits and higher level of involvement of the port actors in the network*' (Martino et al., 2012, p.72).

Heaver (2011) investigates co-ordination in multi-actor logistics at the port interface. He amends the list of Horst and de Langen (2008) by the following: the division of responsibility among private and public actors along the logistics chain leads mainly to problems at their interfaces due to the fact that planning and physical requirements are cross-institutional. The mismatch of transport capacities and the operation of terminals as the interface among various modes as well as different practices in operation, e.g. working hours, lead to further co-ordination problems. Another reason mentioned is the complexity caused by the number of parallel logistics chains. Additionally, the information exchange between actors is inadequate even though visibility along the logistics chain is a crucial factor. Lastly, the author names the effects of traffic growth and resulting challenges for ports as reasons for co-ordination problems and in particular the interaction of gateway logistics with local communities facing negative impacts of growing traffic such as congestion, emissions, noise and land use. The author states that coordination among actors is further complicated by the number and complexity of relationships (Heaver 2011, p.157 ff.). In Heaver (2012) the author explores the growing role of collaborative relationships in international logistics. He states that *'the interdependent nature of many stakeholders in transportation systems was recognised as giving rise to barriers'* (Heaver, 2012, p.6).

Denktas-Sakar and Karatas-Cetin (2012) explore port sustainability and stakeholder management within a resource-dependency theory context. They thus develop a conceptual framework that classifies interdependencies between port supply chain stakeholders. They identify stakeholder consultation and involvement as key to establishing the social dimension of sustainability in port-related decisions (Denktas-Sakar & Karatas-Cetin, 2012, p.302 ff.).

The literature reviewed above shows a certain stakeholder awareness along the transport chain. Formal and structured approaches to it were found only with respect to transport infrastructure projects, transport policy development and/or in development cooperation. However, the consideration of stakeholders and their interaction can be found in some more transport-related sources of literature. With respect to maritime transportation stakeholders are considered exclusively with respect to ports, port authorities, in particular in literature focusing on ports and their role in the supply chain.

3.2 Theoretical embedding and application of process orientation

In the following the evolvement of process-oriented thinking and different approaches to process analysis will be outlined as well as the understanding of relevant terms (see chapter 3.2.1). Due to the fact that process modelling will play an important role as part of process analysis as applied in this thesis, this aspect will be presented in greater detail (see chapter 3.2.2).

3.2.1 Theoretical embedding of process orientation

Evolution of process-oriented thinking

Process-oriented thinking implies a strong emphasis on how work is done in contrast to a product focus' emphasis on what is done (Davenport, 1993, p.5). According to Davenport and Stoddard (1994) process analysis can be traced back to Taylor (1911) and his work on '*The Principles of Scientific Management*'. The author states that Taylor was the one who first '*advocated the systematic studies of work procedures*' (Davenport & Stoddard, 1994, p.122).

Several authors refer the main basics of process thinking in German-speaking organisation theory – the dualistic view of structures and procedures – back to Nordsieck (1934), Hennig (1934) and on to Kosiol (1962) (Rosemann, 1996, p.6 ff.; Baumgarten, 1999, p.227; Becker & Kahn, 2005, p.5; Weske, 2007, p.68).

Nordsieck's (1934) main enhancement in the field of organisation theory was the dualistic view of structures and procedures in organisations. He stresses that considering structure and working procedures are two perspectives of one entity: the organisation (Nordsieck, 1934, p.119 ff.). The same can be found in Henning (1934). He points out that the organisation of a corporation is the sum total of regulations determining life within a corporation or exchange between corporations. The structure of work determines the elements of the corporation to pursue its objective and the flow of work determines the order of activities (Hennig, 1934, pp.3-8, 70 ff., 140 ff.). In Kosiol (1962) organisation is explained as structured design of corporations. Structure thus refers to both the composition of the corporation and the working procedures (Kosiol, 1962, p.20, 32). According to the author the composition of a corporation aims at setting goals whereas working procedures directly realise the achievement of these goals (Kosiol, 1962, p.185)[17].

The process view in organisational thinking was also influenced by Mintzberg (1979) who defines organisation as the *'system of flows'*. He structures the organisation and its working areas in five basic parts: the operating core, strategic apex, middle line, technostructure and support staff. He points out that these five parts given '*are joined together by different flows – of authority, of work material of information and decision processes*' (Mintzberg, 1979, p.35).

A deep impact on process thinking originated from Porter (1985) and his theory development on value chains due to the fact that his understanding of a value

17 A comprehensive discussion of above literature can be found in Gaitanides (1983).

chain implied process characteristics (Delfmann, 2008, p.927; Rosemann, 1996, p.8 ff.; Klaus, 1998, p.66; Davenport & Stoddard, 1994, p.143). According to Porter (1985) the value chain of a firm is a system of interdependent activities that are the building blocks by which a firm creates a product. These activities require resources and use or create information. Furthermore, the value chain is embedded in a larger stream of activities which is termed a value system and comprises the firm's value chain as well as the value chains of upstream suppliers or downstream channels and buyers (Porter, 1985, p.33 ff.).

Rosemann (1996) states that the explicit focus of process-oriented thinking in organisations was established by business process reengineering which aims at better customer response based on enhanced process orientation (Rosemann, 1996, p.6 ff.). According to Becker (2008) there are three main concepts for optimising processes: continuous improvement, business process reengineering and business process improvement (Becker, 2008, p.20 ff.). The continuous improvement process was established in the course of Kaizen, which follows a process-oriented way of thinking in contrast to an innovation- and results-oriented thinking (Imai, 1986, p.xxix). The main idea is to continuously achieve small improvements in the status quo as a result of ongoing efforts (Imai, 1986, p.6). Thus '*Kaizen means ongoing improvement involving everyone, including both managers and workers.*' (Imai, 1986, p.3). Hence improvement is initiated from all working levels. Due to the fact that there are various small improvement activities the related risk is very low but nevertheless the sum total of activities can have a most positive impact (Becker, 2008, p.21 ff.). In contrast to this, business process reengineering means a *'fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed*' (Hammer & Champy, 1993, p.32). The idea is not to improve existing processes but to define them completely anew. Here the change process is initiated by the top management and due to the radical impact of change the risk is very high (Becker, 2008, p.20). Business process improvement is described in Harrington (1991) as a '*systematic methodology to help an organization make significant advances in the way its business processes operate*' (Harrington, 1991, p.20). Business process improvement is a compromise between the above-mentioned concepts for optimizing processes. Optimization starts with based existing processes but improvement intends to be achieved by several big changes and does not accompany everyday business (Becker, 2008, p.20 ff.). A comparable approach is described by Gaitanides et al. (1994). However, they stress that effective process management must consist of both continuous improvement and - if necessary - process redesign.

According to Gaitanides et al. (1994) process management is both the way and the aim. Its main motivation is customer orientation based on the three process parameters quality, time and costs (Gaitanides et al., 1994, p.11 ff.).

First established for production companies, process management and analysis became similarly important for logistics in the 1990s and has been discussed in the corresponding literature.

Christopher (1992) declares logistics and the way the supply chain is managed to be a vital source of competitive advantage for organisations. For this purpose he claims that organisations have to pass several paradigm shifts in order to successfully achieve logistics excellence. One required paradigm shift is '*from functions to processes*'[18]. Flows of information and material that link firms and their markets have to be managed in an integrated way, challenging the classical idea of a management on a functional basis. Process management aims at a '*smooth-flowing*' logistics pipeline by enabling a holistic management that overcomes '*piecemeal improvements*' within a narrow functional area (Christopher, 1992, pp.187 f., 211).

Weber (1992) states that logistics is characterised by a flow-oriented perspective and is responsible for the coordination of the entire process chain at a strategic and operative management level. The process chain[19] involves various actors such as external logistics service providers, suppliers, distribution channels etc. (Weber, 1992, p.885 ff.). From this process chain perspective and responsibility of logistics Weber (1992) further derives the task of total cost orientation and control. The department responsible for material flows along the transport chain should likewise remain focused on total costs. In addition he mentions reduction of running time and improvement of logistics service quality as objective dimensions, nevertheless the emphasis is set on costs (Weber, 1992, p.886 ff.).

According to Baumgarten (1993) the integrated and comprehensive consideration of logistics processes is an important prerequisite for companies in particular

18 Due to the orthographic proximity of *functions* and *functional perspective* inherent in the transport chain as stated by Wolf (1997) the following differentiation in understanding should be stated. The term function in the context of process-oriented thinking is understood as a structure of organisations according to their divisions and departments. Process orientation aims at overcoming this narrow view by *'thinking in flows'*. In contrast to this, the functional perspective in terms of transport chains is meant to focus on functional elements enabling the transfer of goods such as transport-related processes, the means of transport and the logistics nodes of the transport chain.

19 Weber (1992) points out that due to integration of material flows the term process net should be used (Weber, 1992, p.893).

when it comes to make-or-buy decisions (Baumgarten, 1993, p.14). Furthermore, Baumgarten (1996) states that only efficient process management can avoid an isolated improvement at departmental level that hampers an integrated optimisation along the logistics chain. He suggests understanding the logistics chain including supplier and customers as an overall system targeting time, costs and quality improvements (Baumgarten & Wiegand, 1996, p.53). To facilitate this mindset Baumgarten (1993) introduced the so-called logistical process analysis resulting in process cost and process sequence analysis. This approach is intended to identify potential for optimisation, specifically for time and cost reductions (Baumgarten, 1993, p.14). The approach consist of five building blocks as follows: outline the boundaries of investigation, breakdown of quantity structure, costs analysis, sequence analysis (including the physical and informational flow and the organisational analysis) as well as identification of weak points and derivation of optimisation potential (Baumgarten, 1993, pp.14-17). In Baumgarten (1999) this process was amended to include two additional building blocks: the development of target concepts for each weak point and the integration of these target concepts in process chains. Furthermore, he stresses the importance of aligning process optimisation on the three target parameters costs, quality and service (Baumgarten, 1999, pp.233-236).

Klaus (1993) states that logistics is developing towards the management of flow systems (Klaus, 1993, p.3 ff.). A few years later Klaus (1998) declares that even though logistics claims to be a holistic discipline it still lacks an overall integration. He identifies three areas of integration which, however, are detached from each other or one-dimensional. They are the integration of organisational structures, of technologies, especially information technologies, and the integration of behaviour in the course of lean management principles, which implies effective cooperation between teams or companies to build up reliable customer-supplier relationships (Klaus, 1998, p.61 ff.). To overcome this lack of integration Klaus (1998) introduces the system of flows (in German '*Fließmodell*') as an expansion of the underlying mindset and identifies three main elements. These are the network of resources, the network of flows and processes and the objects of flow. Identifying and integrating these three elements is seen as the basis of logistical integration and optimisation (Klaus, 1998, p.66 ff.).

According to Kuhn (1995) logistics is the linking discipline within and between companies. The main requirement for these business alliances along the supply chain is precise coordination and information exchange. Thus planning and steering of logistics systems have to be made transparent and rateable by process models (Kuhn, 1995, p.9). The process analysis approach developed by Kuhn

– called in German the '*Prozessketten-Instrumentarium*' (in English process chain instrumentation) – aims at visualising the flow of material and information in order to identify potential for optimisation. Processes are defined as object-transforming activities between which material and information are exchanged (Kuhn, 1995, p.39). Process elements can depict processes on a normative level as well as on an operational level, thus processes can have a different degree of specification or aggregation. Every process element can be described according to a defined structure. These structural elements comprise information on the source and sink of the process, on processes at a higher or lower level of specification, on the level of management, on required resources and on the structure (e.g. regarding company structure, facility layouts). All of these structural elements are both describing attributes and potential fields of optimisation in terms of quality, time and costs (Kuhn, 1995, p.39 ff.). Kuhn (2002) describes and exemplifies these potential fields as a systemised way for optimisation (Kuhn, 2002, p.68 ff.).

Delfmann (2008) gives an overview of process management as logistics strategy (Delfmann, 2008, pp.927-933). First he emphasises the importance of process orientation for recent enhancements in planning, management and steering of supply chains. He defines process management as strategy-oriented analysis, evaluation, design, steering and control of value-added processes within and between organisations (Delfmann, 2008, p.929). He points out that tools for modelling processes as well as process-based information systems are basic premises for process management and process optimisation in logistics networks (Delfmann, 2008, p.928). He outlines process management as a repeating cycle of process analysis and evaluation, process design as well as process steering and control. According to him the main objective of process analysis is to create process transparency. Process analysis thus serves as a basis for continuous improvement or radical process optimisation but also for process oriented instruments of evaluation, monitoring and steering (Delfmann, 2008, p.930). According to Delfmann (2008) process analysis includes outlining and documenting the relevant process elements and their interrelations. Especially relevant is the documentation of the processes' sequence and their causal interrelations. He further mentions the importance of identifying responsibilities (Delfmann, 2008, p.931).

In Wildemann (2009) the author describes different design principles for logistics. Firstly he discusses logistics from a system thinking point of view in terms of the holistic view in thought and action. He derives a theoretical argumentation for the integrating function of logistics by a basic assumption of system thinking that refers to Aristotle's '*the whole is greater than the sum of its parts'*. He interprets this assumption as meaning that the integration of isolated parts creates additional achievement potential. Furthermore he expands on the importance of the optimisation of flows for achieving time efficiency and customer orientation (Wildemann, 2009, p.16 ff.).

Pfohl (2010) likewise places great emphasis on systems thinking in logistics, understanding a system as a set of related elements. He points out that Klaus (1998) and his process perspective as well as Weber (1992) and his coordination perspective on logistics amount to system thinking in logistics (Pfohl, 2010, p.26). He states that flow-oriented or process thinking substitutes costs for autonomy by costs for coordination and thereby enables shorter lead times and greater flexibility in terms of quality of service. He understands flow-oriented thinking as shaping of systems thinking, stressing the time dimension in contrast to capacity (Pfohl, 2010, p.29).

Understanding of relevant terms

Within the literature reviewed the term process is defined or explained in different ways. In this thesis it is not intended to extensively analyse these definitions but rather to discuss the understanding of the term as applied in the context of this work.

A comprehensive investigation into the term *process* was undertaken by Schuderer and Klaus (1994), who analysed process definitions in management literature. They revealed core terms that are used in most of the reviewed definitions and classification attributes that further refine definitions. The literature review included definitions from German organisation literature, Japanese management literature and process and value chain literature. The core terms are the following. A process has to be a *succession of activities*. Each activity requires a defined *input* and *output*. Furthermore the activity transforms an input into an output, so the *transformation* is not determined by the value but can also transform in terms of space or time. The process has to be related to an *object* that can be a physical (e.g. material) or a logical (e.g. electronic information) object. Last but not least, the authors expand on *customer orientation* in terms of *internal and external customers*. They stress the importance of customer orientation to achieve process objectives (Schuderer & Klaus, 1994, p.23 ff.).

As the term business process is used by many authors, it is briefly discussed here. Schmelzer and Sesselmann (2006) for instance explain the differences between processes and business processes. They point out that processes are defined as ordered activities which are getting input, transforming it and generating output. In contrast to this definition, business processes amend this understanding by adding value creation as well as customer and business strategy orientation (Schmelzer & Sesselmann, 2006, p.63-65).

The term working flow also appears in many literature sources and is therefore discussed here too in order to determine the use of terms. Gadatsch (2000) comprehensively analyses the terms business process and workflow. He concludes that the main differences are the perspective on procedures that are either business strategy oriented or organisation oriented with the focus on data processing. Business processes deal mainly with a rough description of '*what to do'* whereas workflow descriptions specify with a high level of detail the '*how'* and '*by what means'* procedures are to be done (Gadatsch, 2000, p.11 ff.).

However, in this thesis the term process will be used instead of business process as the purpose of investigating processes here leaves behind embedding in one organisation and thus the simpler understanding is sufficient for this context. Even farer is the term work flow, which focuses more on a too detailed and specified level. For this thesis the understanding of what a process is follows Davenport (1993) by combining different explanatory statements about processes. According to Davenport (1993) *'[A] process is simply a structured set of activities designed to produce a specific output for a particular customer or market.'* Furthermore he states that a process is *'a specific ordering of work activities across time and place, with a beginning, an end, and clearly identified input and outputs: a structure for action*' (Davenport, 1993, p.5).

As presented above, Delfman (2008) integrates *process analysis* as an essential part of process management along with process design and process steering and control in a repeating cycle that are premises for process management and optimisation in logistics networks. According to the author the main objective of process analysis is creating process transparency. It therefore includes the *identification of relevant process elements and their interrelations* (Delfmann, 2008, p.931).

Hence it has to be defined what *relevance* implies with respect to *process elements* in the context of this thesis. Rosemann (1996) emphasises the importance of the process model providing adequate transparency regarding anticipated usage (Rosemann, 1996, p.51). Thus the relevance is determined by the anticipated application of the process model. Here the process perspective ensures considering the functional perspective of the maritime container transport chain and by integrating the flow character of the chain into the stakeholder management framework. Finally, it is of relevance to reproduce and comprehend this flow character. Thus other aspects such as costs, quality and time that are usually considered relevant in context of process analysis (e.g. as by (Delfmann, 2008, p.930; Baumgarten, 1993, p.14; Gaitanides, 1983, p.63; Kuhn, 2002, p.59) are not included here.

The analysis of the *flow* is termed sequence analysis by Baumgarten (1993) and includes the analysis of the physical and informational flow as well as of the organisational arrangement with reference to the physical and informational flow (Baumgarten, 1993, p.15). Delfmann (2008) further points to the importance of documenting the processes' sequence and their causal interrelation. Resembling the analysis of organisational arrangement he mentions the importance of identifying process responsibilities (Delfmann, 2008, p.931).

With regard to the functional maritime container transport chain portrayed in chapter 2.4, functional elements were assigned to logistics nodes, the means of transport as well as all transport-related processes. Transport-related processes are thus relevant to reproduce and comprehend the physical and informational *flow* along the maritime container transport chain. They comprise logistical processes such as packaging, storage, transhipment, picking and transportation itself as well as non-logistical processes such as customs procedures. Their interrelations are represented by the sequence flow and their causal interrelation. Also, the organisational arrangement should be integrated by identifying process responsibilities. Furthermore, process analysis should cover other functional elements such as the logistics nodes of transport and the means of transport.

Finally, the following definition outlines the underlying understanding of process analysis in this thesis:

> Process analysis aims to create process transparency by identifying and documenting relevant process elements and their interrelations. Along the maritime container transport chain process elements include the logistics nodes, the means of transport as well as all transport-related processes covering the physical and informational flow under responsibilities to be determined. Interrelations are represented by the sequence flow and causal relationship of processes.

3.2.2 Process modelling

According to Delfmann (2008) process analysis comprises two steps: collection of required data and information and modelling of gathered insights in a process model (Delfmann, 2008, p.931).

A model is a simplified representation of a subject of interest. It is always a reduced perspective on or image of reality. Models are built with a specific purpose and the subject of interest is reduced to its interesting segments for gaining insights according to the predefined purpose (Bossel, 2004, p.51).

Stachowiak (1973) defines three main model characteristics. First a model is an *image*, i.e. a picture of a natural or artificial original. So it is always a *reduction* of reality that usually does not incorporate all of the original features, only those that are relevant for the model user. Finally he identifies *pragmatism*, i.e. models are not clearly allocated to their originals. They substitute the original for certain subjects, for a certain period of time and for a certain purpose (Stachowiak, 1973, pp.131-133).

Rosemann (1996) defines a process model as an image of the chronological and logical sequence a process object passes through. It is developed by virtue of a subjective purpose and serves as basis for explaining and designing systems. The overall objective is to gain transparency. He concludes that process models constitute an essential means of applying process management concepts (Rosemann, 1996, p.18 ff., 39). Delfmann (2008) likewise stresses that tools for modelling processes are basic premises of process management and optimisation (Delfmann, 2008, p.931 f.).

Various methodologies exist for process modelling. Several authors provide a more or less structured overview of these methodologies.

An extended analysis of existing process modelling methodologies was undertaken by Gadatsch (2000). He compares and thus structures existing methodologies according to several criteria such as the possibility of specifying the flow of control and data, process hierarchies (vertical process relations), horizontal process relations, organisational elements, structures of data and information and resources. Furthermore the criteria include the way activities are modelled, the perspectives on processes (see below), the possible link to user interfaces such as forms and the underlying meta-model (Gadatsch, 2000, p.113 ff.).

Ferstl (2008) introduces process modelling and related methodologies by differentiating between perspectives and processes according to function, dataflow, interaction and transaction. The functional perspective focuses on the execution of an activity, the data perspective on activity-related attributes and the interaction perspective describes communication relationships between activities. These three perspectives are static whereas the transaction perspective integrate the order of activities as well as the time reference, which makes it a dynamic perspective (Ferstl, 2008, p.186). Based on four perspectives the author clusters existing methodologies as follows. Functionally oriented approaches only include the functional perspective. Data modelling likewise only includes the data perspective. In data flow oriented approaches the interaction perspective is considered in addition to the functional perspective, and potentially the transaction perspective might also be included. A more comprehensive approach is the object oriented one integrating at least the functional, data and interaction as well as, potentially, the transaction perspective. According to the author the business process oriented approach includes all perspectives (Ferstl, 2008, p.187).

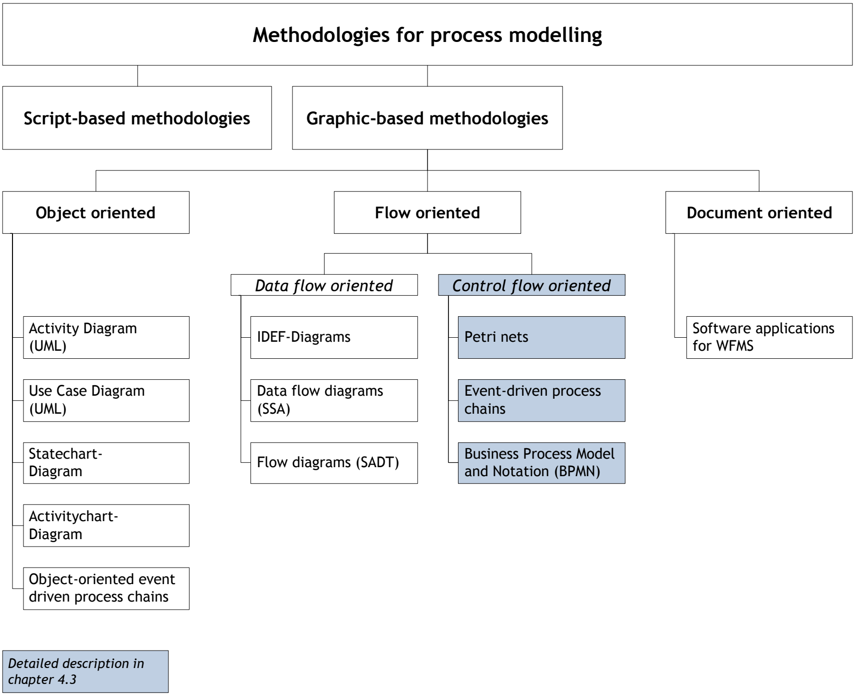
Gehring and Gadatsch (1999), expanded by Gadatsch (2010) analysed several authors (e.g. Weske, 2007; Scheer, 2001; Österle, 1995), and their respective methodology according to concepts of perspectives. Among all criteria that were part of the extended analysis of methodologies in Gadatsch (2000), the perspective on processes was picked out as explicitly relevant. Additional (to Ferstl 2008) perspectives are the organisation, resources, steering, performance, and IT landscape. It is not useful to integrate all perspectives in one single view, but to have all perspectives in different views (Gehring & Gadatsch, 1999, pp.8-9; Gadatsch, 2010, pp.67-70).

According to Gadatsch (2000) formal methodologies to model processes can be divided into graphic and script-based methodologies. The latter make use of a formal notation inspired by programming languages and enable a very precise specification of modelled processes but without any graphic illustration these methodologies lack clarity and also require a profound methodical knowledge on the part of the user. Graphic methodologies can be divided into object oriented, flow oriented, and document oriented. The flow orientation is data or control flow oriented (Gadatsch, 2000, p.109 ff.).

Document oriented methodologies are determined by a description of the processing of documents and not related to other processes. They are applied in workflow modelling software (WFMS) (Gadatsch, 2000, p.110 ff.). Object oriented methodologies originate from software development and develop process and data models separately, which impedes following the control flow or the order of activities (Gadatsch, 2010, p.99 ff.). Flow oriented methodologies model the process as the core element that transfers data steered by organisational units

(Rosemann, 1996, p.13; Gadatsch, 2010, p.70 ff.). Data flow oriented methodologies thus emphasise the exchange of data objects whereas control flow oriented methodologies tend to accentuate the order of underlying functions (Rosemann, 1996, p.13; Keller et al., 1992, 1). An overview is provided in Figure 3.1, with methodologies that are described in greater detail in chapter 4.3 shown in grey.

Figure 3.1: Overview of process modelling methodologies



Source: Own design based on Gadatsch, 2000, p.112, and Gadatsch, 2010, p.71

Some authors provide guidance on how to develop process models and emphasise the importance of developing and approving process models jointly with process owners. According to them, process models represent an important communicative basis (Delfmann, 2008, p.931 f.; Gaitanides, 2006, p.305).

3.3 Implications for framework development

The review of stakeholder-oriented literature has shown that the stakeholder concept is of high actuality in many different fields of research. Its development was outlined from the pure recognition that there are demand groups - later defined as stakeholders - claiming their interest in an organisation, first focusing on stakeholders internal to the organisation and then also integrating externals, up to the insight that involving stakeholders is crucial for the survival of an organisation. At the beginning developed in the realm of corporate management, the stakeholder concept also became relevant in other disciplines such as project management, public planning, development cooperation, and was further refined in fields related to corporate management such as change management, CSR, strategic management, supply chain management, etc.

The examination of the stakeholder concept's evolution revealed the main reasons prompting a conscious exploration of stakeholders in different fields of application. Three capabilities appear to be relevant with reference to the challenges along maritime transport chains outlined (see chapter 1.1) and reveal stakeholder management as an answer to:

- Changing or volatile environments and complexity of the implementation background (Simon et al., 1950, p.387; Mason & Mitroff 1981, p.3 ff.; Freeman 1984, p.3 ff.; Dill 1975, p.58).
- Conflicting interests of the groups involved (Rhenman, 1968, p.36 f.; Fox, 1971, p.57 ff.; Dill, 1975, p.63; Clarkson, 1995, p.106 ff.).
- Reliance of the organisation's or undertaking's success on the support of various stakeholders (Huse, 1975, p.111 f.; Lindenberg et al., 1981, p.xi.; Cleland, 1986, p.38; Post et al., 2002, pp.36, 53).

Several approaches to stakeholder management, analysis, mapping and participation have been reviewed in different fields of application such as corporate management, policy development and implementation, development cooperation and project management. There are a few approaches dealing with transport issues but they tend to focus more on large infrastructure transport projects than on the transport chain or even the maritime container transport chain.

Hence the need to develop a stakeholder management framework for the application along maritime container transport chains can be based on three arguments. First, challenges emerging along maritime transport chains reflect a certain awareness of stakeholder oriented thinking and indicate the need for a conscious and structured dealing with stakeholders. In addition, capabilities of stakeholder management meet portrayed challenges (see above) and are thus found to be an adequate research approach. Second, the review of stakeholder oriented literature showed that there is no adequate framework for stakeholder management along transport chains or even maritime container transport chains. Third, by developing a framework specified for an application along maritime container transport chains, generally valid classifications and analysis schemes can be developed for facilitated application by potential users. Consequently there is a need to develop a stakeholder management framework that considers the specifics of maritime container transport chains.

Reflecting the derived stakeholder definition on the institutional perspective or the actors of the maritime container transport chain (portrayed in chapter 2.5), it becomes evident, that actors comply with the underlying understanding of stakeholders. Involved in either planning and organisation, operation or the ownership of equipment, these actors can have an interest in the issue under consideration, can be affected by the change process dealing with that issue or can have an active or passive influence on decision-making and implementation encompassing the change process. Likewise, actors in the environment of the maritime container transport chain can become stakeholders due to their interest in the issue, the influence they exert or the impact the change situation imposes on them.

In reference to systems thinking on transport chains, portrayed stakeholders are the institutional elements that must be considered for framework development. Furthermore, stakeholders' relations must be structured according to the degree of cooperation among them on the range between market and hierarchy (outlined in chapter 2.5). This classification should likewise be included in framework development to emphasise interrelations between institutional elements.

The review of process-oriented literature showed its enhancements and wide acceptance. The dualistic view of organisations incorporating structures in processes paved the way for process oriented thinking. By means of Porter's value chain as well as by different approaches to process optimisation such as business reengineering, continuous improvement and business process improvement it became widely spread and accepted in particular in production companies. Likewise it was adopted in logistics research practice as it emphasised the flow-oriented perspective inherent in logistics.

Process management was thus established as strategy-oriented analysis, evaluation, design, steering and control of value-added process within and between organisations. Furthermore, it was shown that process analysis as part of process management is a common tool used in organisations and logistics systems to create a transparent basis for improvement. It thereby reveals that the focus of process analysis is on costs, quality and time. Even though the importance of actors is mentioned by several authors (Kuhn, 1995, p.13; Baumgarten & Wiegand, 1996, p.53; Weber, 1992, p.885 ff.) this perspective is not specifically elaborated in this context. In process-oriented literature institutional aspects are inherent in the structural view incorporated in the dualistic view of organisations. However that does not comply with the understanding of stakeholders as outlined above, as only actors involved in the processes or the organisation are considered and thus stakeholders that can take influence or are influenced outside the organisation are not included.

Likewise to the institutional perspective, the framework should consider the functional perspective of maritime container transport chains. This will be realised by integrating process analysis that aims to create process transparency by identifying and documenting relevant process elements and their interrelations. Process elements thus include the logistics nodes, the means of transport as well as all transport-related processes covering the physical and informational flow under responsibilities to be determined. Interrelations are represented by the sequence flow and causal relationship of processes. Integrating the process perspective ensures that the stakeholder management framework considers the flow character inherent in the maritime container transport chain. Appropriate tools to model respective processes should be part of the framework to enable the user to create process transparency. The process model should be usable as a common basis of understanding for the issue under consideration.

The framework ought to integrate the stakeholder and the process perspective. The two perspectives take different views of the same object that can be understood either as a '*system of stakeholders*' or a '*system of flows*'.

The framework should thus comply with the defined understanding of stakeholder management as enabling the user to plan, to organise, to motivate, to direct and to control considered stakeholders. That is to be achieved by understanding and evaluating them using appropriate analysis and management tools. Formal steps of conducting the framework are of importance for planning, organising, directing and controlling stakeholders. But ways of interacting with considered stakeholders and to create a common understanding of the issue under consideration together with them are also important to focus on. These aspects should be taken into account to realise the remaining management aspects such as motivating what is supposed to be more efficiently realised by participatory approaches. Stakeholder management - as defined here - aims at determining the relevance of stakeholders for the issue under consideration and based on this to derive adequate involvement strategies for the change process. Finally, the framework developed should enable the user to evaluate the stakeholders' relevance for the change process and provide guidance on how to adequately involve these stakeholders in accordance with that relevance.

Moreover, stakeholder management is an iterative process (Karlsen, 2002, p.22 ff.; Wadenpohl, 2011, p.22 ff.), i.e. each step in some cases has to be revised and adapted. This aspect should also be considered in framework development.

Derivation of framework steps

The derivation of framework steps was undertaken by an evaluative comparison of approaches presented in chapter 3.1.2, for a more detailed description see Table A.1.

Several authors state that defining the focus of the stakeholder management process is an important initial task. According to Grimble (1998) the first step in a stakeholder management process is to clarify the objective of the analysis, Karlsen (2002) suggests initiating the entire stakeholder management process by defining its purpose (Karlsen, 2002, p.23) and Görgen and Klien (2009) stress that defining the scope of the analysis is a very crucial point in the whole process: neglecting precise formulation at this stage leads to unfocused follow-up processes (Görgen & Klien, 2009, p.88). Lindenberg et al. (1981) start by specifying the problem as a basis for defining objectives and outcomes (Lindenberg et al., 1981, p.27). Thus it can be concluded that **clarifying objectives** builds the foundation of the whole stakeholder management framework.

If not starting by the clarification of the objective the identification and mapping of stakeholders including an initial evaluation of their relevance is the starting point in almost all approaches (see Table A.1). This appears quite logical as stakeholders are the subject of analysis and have to be identified before investigating them more closely. Finally, **identifying stakeholders** becomes the second step in the stakeholder management framework.

Some authors suggest gaining transparency of the stakeholders' fields of action as an analysis step. Lindenberg et al. (1981) specify processes and conduct a resource inventory to make them more transparent (Lindenberg et al., 1981, p.27 ff.). Similarly, Brinkerhoff (1991) proposes describing stakeholders according to the resources they control (tangible and intangible) (Brinkerhoff 1991, p.32 ff.) while Slatter (1980) aims to gain greater transparency on stakeholders' resources and constraints (Slatter 1980, p.58). Grimble and Chan (1995) claim to get '*a holistic understanding of how the overall system operates*' (Grimble & Chan, 1995, p.118). Grimble (1998) suggests developing an understanding of the stakeholder system. The stakeholders' system boundaries and the decision-making framework are therefore of interest for the analyst as well as factors that are perceived as lying within or without the stakeholders' control (Grimble, 1998, p.5).

The main progress of stakeholder management developed in this thesis is an adequate specification of it to be applied along maritime container transport chains. In order to comply with the functional and institutional perspective of the chain the integration of process analysis into stakeholder management was identified in chapter 1.1 as adequate specification. Authors from stakeholder-related literature presented above show intentions that emphasise the anticipated progress by investigating fields of action controlled by stakeholders. With reference to the underlying understanding, process analysis aims to create process transparency by identifying and documenting relevant process elements and their interrelations with reference to process responsibilities. Thus **scoping processes** is the third step in the stakeholder management framework.

The focal point of many approaches to stakeholder management that are considered here is the allocation of stakeholders to an evaluation scheme as basis for deriving involvement strategies. Allocation is mostly done according to two attributes visualised by a matrix. These steps serve to classify stakeholders in different involvement groups and are necessary for deriving involvement strategies. Many authors directly complete such a matrix, e.g. the power/interest grid of Eden and Ackermann (1998), the influence/interest matrix of the World Bank (2006) and the power/interest-matrix of Johnson et al. (2008). Other approaches prepare the completion of the matrix by analysing the considered attributes in detail beforehand, e.g. ODA (1995) or Zimmermann and Maennling (2006). This approach is also applied here: to consider first both aspects detached from another and due to this gain a more profound picture. Thus **profiling stakeholders** will be the fourth step in the stakeholder management framework, including attitude as well as power profiles that are eventually converged into a power-attitude matrix.

Finally the main purpose of the stakeholder management framework – to derive appropriate involvement strategies for stakeholders – must be pursued. Consequently the last step is that of **deriving involvement strategies**. This is also the case in many of the approaches considered (see Table A.1).

Summarising the above argumentation, the following steps form part of the stakeholder management framework developed:

- Clarifying objectives.
- Identifying stakeholders.
- Scoping processes.
- Profiling stakeholders.
- Developing involvement strategies.

4 Development of a framework for stakeholder management along maritime container transport chains

This chapter is the core of the thesis as it describes the development of a framework for stakeholder management that can be applied to change processes along the maritime container transport chain.

The necessity for developing a framework, general implications for framework development and the derivation of framework steps were portrayed in the previous chapters. In the following chapters 4.1 to 4.5 the detailed configuration of each step is outlined[20]. For each step the literature sources considered are summarised as a basis for the approach chosen for the stakeholder management framework. The self-developed approach then includes the specification for application along maritime container transport chains and a description of how each step should be performed.

Stakeholder management is intended to be an iterative process and hence the iteration of the framework is described in chapter 4.6.

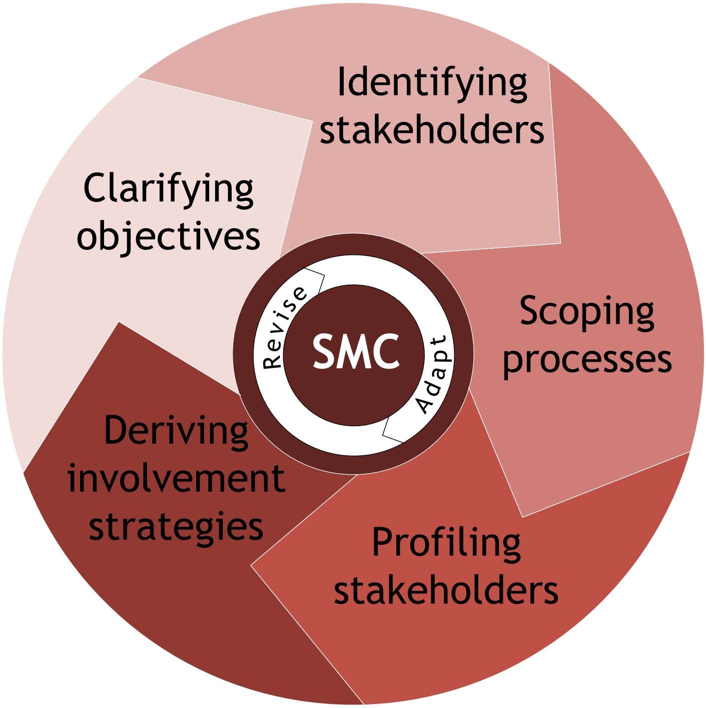
Moreover, the need for accompanying the change process in different phases and the resulting repetitive character of the framework developed were derived from the literature review. Hence the embedding of the stakeholder management framework in the change process and the repetition of its application are outlined in chapter 4.7.

Due to the fact that the framework is iterative and repetitive it will be named **stakeholder management cycle (SMC).** Derived steps are (1) clarifying objectives, (2) identifying stakeholders, (3) scoping processes, (4) profiling stakeholders and (5) developing involvement strategies. They are illustrated in Figure 4.1, with the inner circle of *revise and adapt* indicating the SMC's interconnectivity.

A brief summary of the framework is given in chapter 4.8.

20 This section partially was published at the 13th World Conference on Transport Research (July 2013 in Rio de Janeiro): Wolff & Flämig (2013).

Figure 4.1: Stakeholder management cycle



Source: Own design

4.1 Clarifying objectives

4.1.1 Literature source considered

Many authors stress the importance of taking this step for the ensuing analysis but provide no further guidance on how to do it (Varvasovszky & Brugha, 2000, p.338; Karlsen, 2002, p.23; Görgen & Klien, 2009, p.88). Zimmermann and Maennling (2006) do not directly provide help on how to perform this step but indirectly refer in almost every building block of their approach to the objective of the change process or change objective, which consequently ought to be defined at the beginning. Lindenberg et al. (1981) start by specifying the problem. Based on the refined understanding of the problem they define objectives and outcome of the process (Lindenberg et al., 1981, p.27). According to Grimble

(1998) clarifying the objective of the stakeholder analysis requires a definition of the underlying problem to be addressed, the objectives of the analysis, the main decision-makers, the expected or intended outputs, and how they will be targeted. The author further states that in a second step system boundaries have to be defined in order to develop an understanding of the system (Grimble, 1998, p.4-5). In Grimble and Chan (1995) the authors raise questions, intending to clarify considered aspects (Grimble & Chan, 1995, p.118).

Furthermore, it is crucial at this stage to include planning activities and e.g. define a working plan with an underlying time schedule, to plan efforts for each step in the SMC, to build a team and allocate tasks, and to define necessary documentation etc. (Karlsen, 2002, p.23).

4.1.2 Configuration in the SMC

Refining the above-mentioned ideas for the SMC, it seems reasonable to define the objective of the SMC in order to determine expected results of the SMC with which to target this objective. Referring to the underlying stakeholder definition this will depend on the issue under consideration and the resulting objective of the change process. Furthermore, different phases of the change process may have different objectives so that the particular phase objective has to be adapted for each phase of the change process. As for system boundaries, the relevant parts of the transport chain have to be identified, which likewise depends on the issue considered and on the change objective. In particular, the definition of system boundaries will later determine the identification of relevant stakeholders.

In consequence, the following questions are to be posed to derive the objective:

- What is the issue under consideration?
- What is the objective of the change process dealing with that issue?
- What is the objective of the particular phase of the change process?
- What is the objective of the SMC?
- What are the system boundaries of the SMC with regard to the transport chain?

Moreover, during the definition phase considering the kind of change according to the typology of changes (see chapter 2.1) is recommended in order to evaluate the intensity of change and potential barriers due to the resulting reactions of stakeholders. During this step, the organisational frame should also be fixed in terms of the schedule, task allocation, team building etc.

By virtue of the importance for subsequent steps in the SMC, including all people that are involved in the application of the SMC is recommended to ensure a common understanding of the objective. Thus, this step ought to be performed by the SMC team. Furthermore, realising this in the context of a workshop is suggested because workshops or moderated group interviews aim to reach consensus and elaborate structured results (Bortz & Döring, 2006, p.319).

The fact that here no sub-steps are provided (in contrast to subsequent steps) is due to the open nature of these questions. The target of this step is to answer the above-mentioned questions. There will be different ways to reach the position of being able to answer them and the choice of how to get there is left to the user. However, the application in context of the case study will exemplify potential ways.

4.2 Identifying stakeholders

4.2.1 Literature sources considered

Different approaches for identifying stakeholders are suggested in the literature. Mason and Mitroff (1981) provide seven different approaches to generate a list of stakeholders in context of the SAST method: they are imperative, reputational, social participation, opinion leadership, organisational, positional and demographic. The imperative approach identifies statements of dissatisfaction and the actors behind them. In the reputational approach experts are interviewed to nominate those who have a stake in the issue. Social participation in this context means that all stakeholders are listed who have an observable behaviour in public (e.g. at meetings, in the media) on the issue. The opinion leadership approach assumes that stakeholders can be grouped according to opinions and picks out those who shape the opinions of other stakeholders. The organisational approach identifies the focal organisation with regard to the issue under consideration and in a second step stakeholders with a relevant relationship to the focal organisation are listed. The positional or demographic approach is related to policymaking processes (Mason & Mitroff, 1981, p.95 ff.).

Honadle and Cooper (1989) recommend a very simple approach that recommends listing all problems faced by the project and then listing all stakeholders who could provide help to resolve the problems (Honadle & Cooper, 1989, p.1532 ff.).

Other authors (Grimble, 1998, p.6; Varvasovszky & Brugha, 2000, p.341) follow the underlying stakeholder definition to create a stakeholder list by transferring the definition to questions posed to a group of experts.

Many authors develop a list of stakeholder groups for the specific application purpose. In the context of strategic management in corporations almost every stakeholder analysis/management approach includes a list of stakeholder groups such as stockholders, employees, customers etc. (e.g. Rhenman, 1968, p.25; Ackoff, 1974, p.63). Approaches in the field of development cooperation also provide such a list that facilitates stakeholder listing. Liebl (1996) calls it a generic stakeholder list which then has to be specified (Liebl, 1996, p.105).

For further evaluation of their importance, stakeholders are clustered according to their relevance. Rogall (2003) distinguishes between direct and indirect actors depending on their influence on the policy process (Rogall, 2003, p.81). A more common way to categorise stakeholders is to distinguish between primary and secondary stakeholders (for corporations see e.g. Clarkson, 1995; Freeman et al., 2010; for projects see e.g. ODA, 1995a and 1995b; Winch, 2007 or Cleland & Ireland, 2010). Cleland and Ireland (2010) or Winch (2007) distinguish primary and secondary stakeholders according to their contractual or legal obligation to the project team: primary stakeholders have this obligation whereas secondary stakeholders have no formal relationship '*but have or believe that they have a stake in the project or its outcome*' (Cleland & Ireland, 2010, p.135). ODA (1995a) defines primary stakeholders as those people and groups who are affected by the projects (in either a positive or a negative way), whereas secondary stakeholders are described as being intermediaries in the process of delivering aid to primary stakeholders (ODA, 1995a, p.3). Görgen and Klien (2009) distinguish between key players, primary and secondary players depending on the influence of the stakeholders on the change process (Görgen & Klien, 2009, p.88).

Several authors cluster stakeholders into relevance groups in a more structured way by means of attributes.

Brinkerhoff (1991) suggests analysing and describing them according to the resources they control (tangible and intangible) (Brinkerhoff, 1991, p.32 ff.). Mason and Mitroff (1981) classify stakeholders according to various attributes such as purpose and motivation, beliefs, resources, special knowledge, commitments and relationships with other stakeholders. For further consideration, stakeholders have to have at least one important property of one of these attributes (Mason & Mitroff, 1981, p.97 ff.).

Mitchell et al. (1997) provide a very detailed approach to evaluate stakeholders by means of attributes. Embedded in theoretical reflections they derive *power, legitimacy* and *urgency* as attributes. *Power* from a party to a relationship is defined as having access to coercive, utilitarian or normative means to assert its will in the relationship (Mitchell et al., 1997, p.865 ff.). Further *legitimacy* is understood as '*generalised perception or assumption that actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions'* (Suchmann, 1995, p.574 quoted in Mitchell et al., 1997, p.866 ff.). The third attribute *urgency* is described '*as degree to which stakeholder claims call for immediate attention,'* which is complied with when a relationship or claim of a stakeholder is time-sensitive and considered by the stakeholder to be important or critical. Evaluating stakeholders by these three attributes enables one to classify them with respect to their salience regarding the parameters considered. *Latent (or low salient)* stakeholders are identified by their possession of one of the attributes as perceived by the analyst. *Expectant* stakeholders (moderately salient) possess two attributes and *highly salient* stakeholders comply with all three attributes. Based on these three classes a typology of stakeholders has been developed which is described later in the text and shown in Figure 4.5 (Mitchell et al., 1997, p.867 ff.).

The same methodology of classifying stakeholders but with respect to different attributes is applied by Zimmermann and Maennling (2006) in development cooperation (Zimmermann & Maennling, 2006, p.11 ff.). Here *legitimacy*, *resources* and *connections* are attributes used to identify key stakeholders. *Legitimacy* in this context is described as stakeholders' power and influence on the realisation of the change objective. Furthermore, identifying the players who are mandatory for the realisation of the change objective is recommended: the so-called veto stakeholders who have the power to either enable or prevent realisation. Stakeholder *resources* are defined as their knowledge, competences and material resources. Regarding the stakeholder attribute *connections,* the quantity as well as the quality of relationships with other stakeholders is of interest. To evaluate the stakeholder's legitimacy, resources and connections, the qualitative shaping attributes strong, medium or weak are used and summarised in a matrix (see Table 4.1). The authors further suggest declaring them as key stakeholders with a strong evaluation of at least two aspects. The other stakeholders should be ranked as primary and secondary stakeholders accordingly.

Moreover the authors define *veto stakeholders* as stakeholders '*without whose explicit consent the reform process cannot be initiated [...]. They can build the momentum and the space to the intervention to develop, but they can also block it.*' (Zimmermann & Maennling, 2006, p.12).

Table 4.1: Sample stakeholder classification table

Stakeholder	Legitimacy	Resources	Connections
	Shaping of attributes		
Stakeholder 1	Medium	Strong	Strong
Stakeholder 2	Low	Low	Medium
Stakeholder 3	Medium	Strong	Strong
Stakeholder 4	Low	Low	Low
Stakeholder 5	Low	Low	Low
Stakeholder 6	Low	Low	Medium

Source: Own design based on Zimmermann & Maennling, 2006, p.13

Zelewski and Hügens (2006) state that if the number of identified stakeholders becomes too complex and confusing, stakeholders can be aggregated in stakeholder groups (Zelewski & Hügens, 2006, p.370 ff.).

Karlsen (2002) proposes techniques to identify stakeholders such as interviews with experts, brainstorming in group meetings and the use of checklists. He points out that if stakeholder identification takes place in a group of participants with different backgrounds this will improve the support for and ownership of the stakeholder management process (Karlsen, 2002, p.23).

The identification of relevant stakeholders is frequently further refined by creating a stakeholder map visualising their role and interaction. Several authors suggest different techniques and cover different aspects with stakeholder mapping. Freeman (1984) provides a very simple stakeholder map that is realised as a table comprising all stakeholders and bringing them into relation with their stake in the corporation (Freeman, 1984, p.54 ff.). Eden and Ackermann (1998) introduce the so-called '*actors influence network map*' as a means by which to capture any formal or informal link existing between the various stakeholders in the form of a drawing. They propose using different symbolisms for different kinds of relationships between the stakeholders and arrows to indicate the direction. Furthermore, they suggest analysing interrelations according to very active and more passive roles as well as bridges between unconnected stakeholders (if necessary with the help of software) (Eden & Ackermann, 1998, p.349 ff.). Winch's (2007) stakeholder map points out whether stakeholders are opponents or proponents and whether they contribute to solutions or have a problem with the project mission (Winch, 2007, p.275, referring to Bonke, 1996). Based on Winch (2007), Wadenpohl (2010) creates the so-called stakeholder-issue map linking relevant stakeholders with relevant issues addressed by the project (Wadenpohl, 2011, p.166).

Zimmermann and Maennling (2006) present an approach to map stakeholders by displaying veto, key, primary and secondary stakeholders and showing relationships between them. They propose using different graphic elements to express the degree of influence and different kinds of relationship between stakeholders, such as strength of relationship, alliances, cooperation, and conflict. In this context the authors stress the need to keep in mind that each stakeholder map represents the perspective of the person/group creating it (Zimmermann & Maennling, 2006, p.14 ff.). Görgen and Klien (2009), following the approach of Zimmermann and Maennling (2006), further stress that neutral moderation of this process is crucial (Görgen & Klien, 2009, p.91).

4.2.2 Configuration in the SMC

From approaches in literature the following sub-steps can be extracted for application to the SMC:

- Listing stakeholders.
- Classifying stakeholders.
- Mapping stakeholders.

Listing stakeholders

The SMC follows the approach of Liebl (1996) by first generating a list of generic stakeholders. The main stakeholders along the maritime container transport chain have already been introduced and described in chapter 2.5. Thus the generic list of stakeholders in the maritime container transport chain includes:

- Shippers or consignees.
- Inland transport operators (rail, road or barge).
- Forwarders.
- Container depot operators.
- Terminal operators/stevedores.
- Shipping lines.
- Container leasing companies.
- Port authorities and other formal authorities.
- Others (e.g. associations, interest groups, residents, labour unions, network operators).

Nevertheless it has to be specified on the one hand which kinds of stakeholders are relevant with regard to the purpose of the SMC and on the other hand which specific companies or organisations belong to the different kinds of stakeholders.

Listing of stakeholders will be based on the underlying stakeholder definition. Thus the following questions need to be asked for every generic stakeholder group:

- Who has an interest in the issue under consideration?
- Who is or will be affected by the change process dealing with that issue?
- Who could have an active or passive influence on the change process?

The approach for gathering relevant information to list stakeholders can be performed in different ways: by a literature review analysing industry and trade as well as scientific literature possibly amended with data analysis of e.g. transport volumes or by a workshop. If experts are involved in the SMC team that cover a holistic view on the issue under consideration the list can be created by an internal workshop. Otherwise a workshop including external experts should be held. It is also possible to combine both, by for instance preparing a draft list out of literature analysis and submitting it for decision during a workshop.

Classifying stakeholders

The approach for clustering stakeholders developed for the SMC framework is adapted from the above approach of Zimmermann and Maennling (2006). As the term legitimacy reflects acceptance by public consent, only the notion role will be used with respect to the maritime container transport chain. The role of stakeholders is interpreted as their influence with respect to the problem addressed and the realisation of the change objective.

Transferred to the maritime container transport chain, stakeholders with a strong steering influence and market position are considered as having a strong role (Wolf, 1997, p.1091). Resources in context of the maritime container transport chain are understood as assets, financial resources and human resources (including the corresponding know-how) (Hildebrand, 2008, pp.166-168). Furthermore, the connections of stakeholders and whether and how they are connected to other stakeholders are of interest. Applied to the maritime container transport chain, this is understood as the variety, quantity, and quality of relations with other stakeholders. In this context different forms of cooperation can be considered. In terms of the degree of cooperation they are informal relations without a contractual basis, subcontracting, strategic alliances and joint ventures etc. (see chapter 2.5). In terms of the direction of cooperation, vertical and horizontal cooperation as well as mixed forms are distinguished along maritime container transport chains (Hildebrand, 2008, pp.78-81).

This stage of the process is aimed at singling out primary and secondary stakeholders. The aspects considered do not have to be investigated in detail as they will be picked up again for profiling the stakeholders in terms of their power. Thus a rough estimation will be sufficient at this stage. However, the ensuing analysis can thereby be carried out with a stronger focus on the relevant stakeholders.

Following Zimmermann and Maennling (2006) a matrix is created (see Table 4.1) that serves as a basis for identifying key, primary and secondary stakeholders for the change objective by evaluating stakeholders with regard to the their role, resources and connections by the shaping strong, medium or weak. The allocation of stakeholders to the different classes of key, primary and secondary stakeholders should be undertaken logically and according to the underlying conditions. One suggestion is as follows: stakeholders complying with a strong shaping to all three attributes are key stakeholders. If there are either two attributes with the shaping strong or three attributes with the shaping medium, then stakeholders are considered to be primary stakeholders. Others are considered to be secondary stakeholders. Moreover, veto stakeholders are to be identified during this step.

This step can again be performed by a literature review or during a workshop with the same remarks as for listing stakeholders (see above).

Mapping stakeholders

The visualisation approach chosen here to visualise stakeholders and their relations is likewise inspired by Zimmermann and Maennling (2006). With regard to the application along the maritime container transport chain in particular, the interrelations have to be revised. According to the collaborative relationships introduced and described in chapter 2.5 differentiating between the following kinds of relation is recommended:

- Joint ventures, alliances, subcontracting or other kinds of long-term based contractual cooperation.
- Strong relation according to information exchange or physical processes based on short-term contractual cooperation and market oriented transaction.
- Weak or no relation according to information exchange or physical processes.

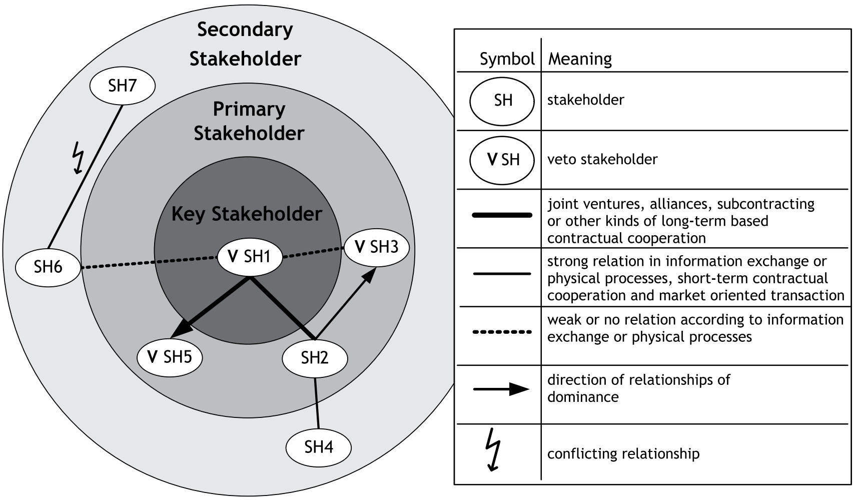
Furthermore, it is useful to identify and visualise

- Relations of dependency or
- Conflicting relations.

A sample map with related legend and kinds of relations is shown in Figure 4.2. It is assumed that if there is a large number of stakeholders this illustration will lead to confusion rather than to greater transparency. Picking out a sample group or design the map for aggregated stakeholder groups as suggested by Zelewski & Hügens, 2006, p.370 ff., is then recommended.

Stakeholder mapping first displays results from classification, thus allocating stakeholders to different classes such as key or primary stakeholders, this being the conclusion from the former step. Consequently it can be done by desktop work. Second, the relationships between stakeholders are included in the map. Information about relationships can again be collected from a literature analysis or during a workshop. However, if it is possible to conduct an interview series with different stakeholders, including questions on relationships to refine the stakeholder map is recommended. For this step, valuable input will also be generated during scoping processes as relationships are encompassing or rather emerging from the physical and informational flow between the stakeholders involved.

Figure 4.2: Sample stakeholder map



Source: Own design based on Zimmermann & Maennling, 2006, p.15

4.3 Scoping processes

4.3.1 Literature sources considered

According to Delfmann (2008), process analysis includes the collection of required data and information as well as the documentation of gathered insights in a process model (Delfmann, 2008, p.931).

For required data and information the derivation of the underlying understanding of process analysis already included that aspect (see chapter 3.2.1). Furthermore, Delfmann (2008) states that usually the analysis of documents, reports and computing systems is not sufficient for creating a comprehensive picture. So he recommends developing and approving process models together with process owners in personal enquiries for better quality of process models. Moreover, he suggests undertaking both parts in parallel in order to enable direct verification of the processes' plausibility and consistency. He defines process models as a communicative basis for all parts of process management (Delfmann, 2008, p.931 f.). Gaitanides (2006) emphasises the importance of processes as a basis for communication. He states that process models obtain their validity through communication. By discussing about processes and their design they become real: a collectively created and socially constructed reality. Thus processes are social constructions and subjective models at the same time (Gaitanides, 2006, p.305).

In terms of process modelling a multitude of methodologies is used. Gadatsch (2010) provides a structured overview of different methodologies for process modelling (see chapter 3.2.2). In general he differentiates between script-based and graphic-based methodologies. Script-based methodologies enable a description of processes by means of programming languages but do not offer a visualisation in contrast to graphic-based methodologies which beyond describing processes also aim to visualise them. Furthermore, he expands on these graphic-based methods, so-called diagram languages. According to Gadatsch (2010) diagram languages are divided into document, data or control flow as well as object oriented methodologies (see Figure 3.1).

For the underlying purpose, control flow oriented methodologies seem to be most appropriate as the main focus is on the processes and their sequence flow, which would appear to be more useful than a focus on the data flow, objects or documents. Furthermore, the aim is to investigate the scope of action controlled by each stakeholder by identifying process responsibilities. Due to this, only control flow oriented methodologies are described in the following[21].

Petri nets are a common tool for process modelling originating from Carl Adam Petri who developed Petri nets in his doctoral thesis (see Petri, 1962). In this new modelling approach he combined graphical representation with an equivalent mathematical formalisation. The Petri net itself is a static model, but it can be used to model dynamic systems by the so-called token play (Weske, 2007, p.149). Petri nets are directed graphs consisting of nodes and edges. Basically, *places* represent static conditions of processes, *transitions* symbolise transformation of processes and directed *edges* or *arches* represent the control flow in between places and transitions. On this static net the tokens are the dynamic part steered by switching rules of the system. Over the years very simple nets have developed and expanded their possibilities. A main enhancement was the development of coloured Petri nets that first enabled the user to distinguish between tokens. Other aspects of development were weighted edges, or taking time and hierarchies into consideration (Gadatsch, 2000, p.121 ff.). Petri nets are often considered to be too complex for inexperienced users and difficult to understand so that they are not recommended for use in business process modelling and discussions with process owners (Gadatsch, 2010, p.84).

Based on Petri nets event-driven process chains were developed in the early 1990s at the University of Saarbrücken by Gerhard Keller, Markus Nüttgens and August-Wilhelm Scheer. They became part of a holistic modelling approach, the so-called ARIS framework (ARIS stands for Architecture of Integrated Information Systems) and are used by the SAP system R/3 (Gadatsch, 2000, p.129). The focus of event-driven process chains is on the depiction of the control flow (Keller et al., 1992, p.1). The main components of event-driven process chains are *events*, *functions*, *connectors*, and *control flow edges*. Events indicate the occurrence of a business-relevant state (e.g. 'order received'). They thereby trigger functions that represent activities transforming input to output. Unlike events, functions are active and can make decisions. A completed function again triggers an event. Connectors are used to represent the process logic serving as split or join nodes (Weske, 2007, p.161 ff.). Control flow edges connect events, functions and connectors. The usage of event-driven process chains as part of the ARIS framework is very common. The ARIS framework offers the use of different perspectives on processes, these being organisation, data, control, function,

21 A comprehensive presentation of methodologies shown in Figure 3.1 can be found in, for instance, Gadatsch (2000), Weske (2007), Gadatsch (2010) or in the original sources of literature.

and performance – together the so-called ARIS house (Scheer, 2001, p.21; Seidlmeier, 2010, p.12 ff.). Given that event-driven process chains are intended for use in intra-corporate modelling, they are less useful for modelling the interplay of several companies (Kocian, 2011, p.26). Gadatsch regularly conducts a study on the status quo of process management in Germany, Switzerland and Austria and results show that event-driven process chains are a very common modelling tool (Gadatsch & Schnägelberger, 2009, p.27).

The Business Process Model and Notation (BPMN) methodology was developed by Stephen White, an IBM employee, and published in 2004 by the Business Process Management Initiative, later the Object Management Group dealing with development of standards independently of a specific manufacturer (White, n.d., p.1). The primary goal of BPMN is to be understood and accepted by different stakeholders. Swimlane elements constitute the core of the methodology (Kocian, 2011, p.6-7). They '*organize activities into separate visual categories in order to illustrate different functional capabilities or responsibilities*' (White, n.d., p.4). Basically the core elements of the BPMN are flow objects (events, activities, gateways), connecting objects (sequence and message flow or association), swimlanes to group other elements, and artifacts that do not affect the flow but provide additional information (data objects, group, and annotation) (Chinosi & Trombetta, 2012, p.126).

4.3.2 Configuration in the SMC

Referring to the above-mentioned sources in literature the modelling of processes requires the adequate collection of relevant data and information. Thus this step in the SMC includes the following sub-steps:

- Collecting data and information.
- Modelling processes.

Collecting data and information

The purpose of anticipated use of the process models determines the amount of data and information required. The process model as part of the SMC aims at creating transparency on the functional transport chain. During the literature review it already became clear which process elements are relevant for the context of this thesis. Hence, according to the underlying understanding of process analysis, process elements include all transport-related processes covering the physical and informational flow under responsibilities to be determined. They comprise logistical processes such as packaging, storage, transhipment, picking and transportation itself as well as non-logistical processes such as customs procedures. Interrelations are represented by the sequence flow and causal relationship of processes. Other functional elements of the chain such as logistics nodes as well as the means of transport are to be covered as well.

Responsibilities are an especially important aspect. Processes should be referred to responsible stakeholders to connect the functional and the institutional perspective on transport chains and to disclose their control over processes.

Collecting of data and information should be undertaken by means of personal interviews with process owners. Preparation includes the choice of interview partners as well as the eventual preparation of a draft version of the process model. The draft version can, for example, be based on insights gained from relevant literature. The choice of interview partners should be referred to the previous step in the SMC. It is thus recommended to involve stakeholders from different generic stakeholder groups to ensure a certain neutrality. It is difficult to determine a specific number of interviews; this should be made conditional to the progress of the process model in terms of quality. During each interview the processes' plausibility and consistency is verified and the quality progress can thereby be evaluated.

Modelling processes

Regarding process modelling, an appropriate modelling methodology must be chosen. Authors modelling processes in a maritime transport chain context use a self-developed modelling notation adapted to the focus of their research (e.g. Swinarski 2005, p.141) or choose a formal methodology and refer their choice to the specific subject of investigation (e.g. Will, 2011, p.94; Schwarz, 2006, p.66ff.).

The latter approach will be followed here. The determination to control flow-oriented methodologies already was discussed above. As the main focus is on the processes and their sequence flow and the target to explore stakeholders' scope of action, control flow oriented methodologies were chosen as most appropriate. Among the control flow oriented methodologies presented the BPMN methodology is proposed for SMC use. Basically the elements of the BPMN are flow objects (events, activities, gateways), connecting objects (sequence and message flow or association), swimlanes to group other elements, and artifacts that do not affect the flow but provide additional information (data objects, group, and annotation) (Chinosi & Trombetta, 2012, p.126). As different actors can be grouped by swimlanes the focus of this study on different stakeholders can be emphasised by visualisation. The BMPN integrates the functional and institutional perspective of the maritime container transport chain. In addition, the whole SMC is based on strong interaction with stakeholders and discussions with different stakeholders are facilitated by means of BPMN process models due to the comprehensibility of the methodology.

However, the chosen process modelling methodologies should also fit the environment of the change process. If other methodologies are used in, for example, the focal organisation or the SMC team is more familiar with another methodology, using an approach other than the approach outlined is also an option.

Scoping processes is crucial for the ensuing analysis as it builds the basis for a profound information exchange with stakeholders. As emphasised by Gaitanides (2006) the process model will be taken as a communicative basis for the change process and is thus intended to serve as a basis for discussions during interviews or workshops with relevant stakeholders. So it is important for the interviewees to easily understand the process charts and identify their area of intervention. Discussion along the processes is aimed at creating a common understanding of the issue under consideration. Framed by a common understanding, the ensuing aspects of the analysis such as issues, attitudes and power factors can be discussed more easily and in a more focused manner. Furthermore, stakeholders are sensitised for a holistic view of the chain. Finally, the development of the process as well as the process model itself integrates the flow character inherent in the maritime container transport chain.

A specific reference to an application along maritime container transport chains is not proposed for this step in the SMC. Concretisation will be achieved by application to a specific change process.

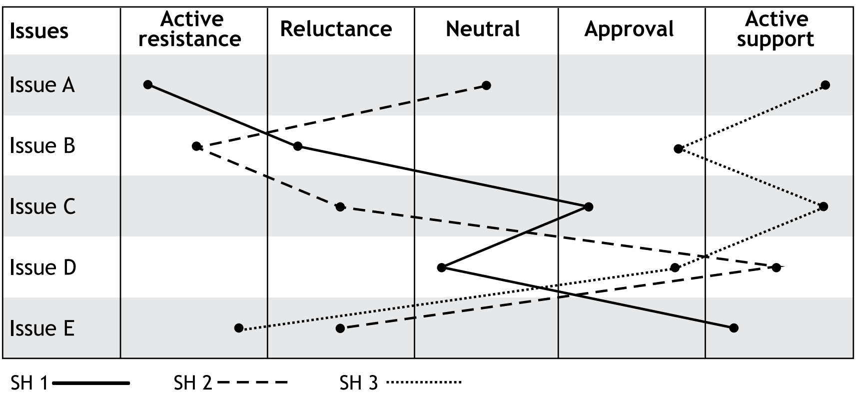
4.4 Profiling stakeholders

4.4.1 Literature sources considered sources

As argued above, profiling stakeholders includes the development of attitude and power profiles with reference to the issue under consideration.

As to attitude profiles, several authors suggest evaluating stakeholders according to issues that aim to create transparency about the stakeholders' concerns and benefits (Freeman, 1984; Liebl, 1996; Schwartz & Eichhorn, 1997; Karlsen, 2002; Wadenpohl, 2011). Freeman (1984) suggests first developing a list of key concerns or issues. In a second step all stakeholders are to be evaluated in terms of how important each issue is seen by the stakeholder, such as *critically*, *somewhat important* and *not very important*, or whether the stakeholder is not concerned with the issue at all. Issues and evaluation are converged into a stakeholder-issue matrix (Freeman, 1984, p.113 ff.). Other authors follow this approach to evaluate stakeholders in relation to selected issues (Schwartz & Eichhorn, 1997, p.173 f.; Karlsen, 2002, p.23; Winch, 2007, p.275; Wadenpohl, 2011, p.166 ff.). Liebl (1996) proposes to evaluate the expected behaviour of stakeholders to an identified issue to derive their stake (Liebl, 1996, p.114). ODA (1995a) chose the approach to draw out stakeholders' interest in the problem(s) that the project intends to address and to evaluate the potential impact on the project (ODA, 1995a, p.4 f.). Görgen and Klien (2009) develop a table which summarises the stakeholders' attitude towards a change objective (Görgen & Klien, 2009, p.90). Johnson et al. (2008) record stakeholders' interests (Johnson et al., 2008, p.156). Zimmermann and Maennling (2006) generate stakeholder profiles to identify differences and commonalities among them and to cluster various stakeholders. This step first requires a list of items or criteria that are relevant for the issue under consideration and an evaluation of how each stakeholder corresponds to those criteria. One approach presented to develop such a stakeholder profile consists of formulating different statements and the agreement of each stakeholder to the single statement (Zimmermann & Maennling, 2006, p.16). A sample attitude profile is shown in Figure 4.3.

Figure 4.3: Sample attitude profile



Source: Own design based Zimmermann & Maennling, 2006, p.16

For creating the list of issues Freeman (1984) suggests interviewing individual stakeholders or stakeholder experts (Freeman, 1984, p.114). Grimble (1998) stresses the usefulness of semi-structured interviews for this purpose (Grimble, 1998, p.6).

Qualitative interviews are a communication approach in order to collect primary data. Depending on the underlying purpose qualitative interviews can be structured, semi-structured or unstructured (Blumberg et al., 2008, p.385; Schnell et al., 1999, p.300). Structured interviews are useful if the study or part of the study is explanatory or descriptive. Questions and answer possibilities are predefined by the researcher. Unlike semi-structured or completely unstructured interviews enable the interviewer to identify the respondent's viewpoints on the context investigated and permit explorative research. If several people are interviewed, developing an interview guide to ensure consistency in posing questions is, however, recommended (Blumberg et al., 2008, p.385 f.).

In terms of power profiles several authors in the stakeholder management literature name different sources of power when expanding on stakeholders' power. Freeman (1984) defines power as '*the ability to use resources to make an event actually happen*' (Freeman, 1984, p.61), meaning voting, economic and political power. Liebl (1996) refers to and further refines Freeman's perspective by naming parameters of power as substitution power, formal or legal power and retaliation power (Liebl, 1996, p.108 ff.). These parameters can be augmented by Lackmann (2010) who further names bonding and coalition power (Lackmann, 2010, p.16). Johnson et al. (2008) define power as '*the ability of individuals or groups to persuade, induce or coerce others into following certain courses of action*' (Johnson et al., 2008, p.160). The authors deduce sources of power within an organisation that are hierarchy, influence, control of resources, possession of knowledge or skills, control of the human environment and involvement in strategy implementation. For external stakeholders the following sources of power are named: control of strategic resources, involvement in strategy implementation, possession of knowledge or skills and internal links (informal influence) (Johnson et al., 2008, p.161). Winch (2007) refers to Handy (1993) in his remarks on power of project stakeholders. According to Handy (1994) there are five man sources of power in organisations. They are physical, positional, resource, expert and personal power (Handy, 1993, p.133).

A more abstract view of power detached from the organisational perspective is provided by Mitchell et al. (1997). According to them '*a party to a relationship has power, to the extent it has or can gain access to coercive, utilitarian, or nor-*

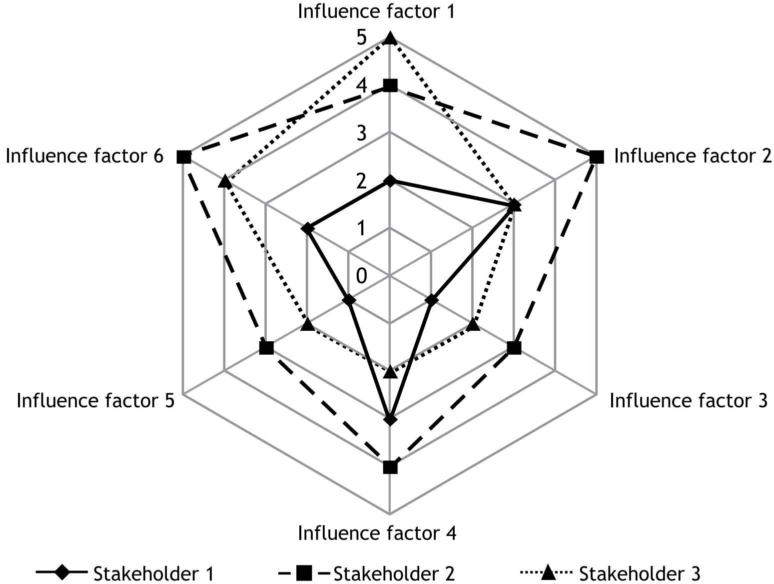
mative means, to impose its will in the relationship' (Mitchell et al., 1997, p.865). So coercive means are physical resources of force, violence, or restraint, utilitarian power is based on material or financial resources, and normative power consists of symbolic resources. Furthermore, the authors state that power is not a steady state but transitory and can therefore be both gained and lost (Mitchell et al., 1997, p.865 f.).

The stakeholder's power also has been analysed in development cooperation literature. In ODA (1995a) the term influence is used in this context and is defined as '*the power stakeholders have over a project'* (ODA, 1995a, p.6). For assessing influence they introduce various variables affecting stakeholders' power and influence. Within and between formal organisations they specify legal hierarchy, authority of leadership, control of strategic resources, possession of specialist knowledge and negotiating position. For informal interest groups and primary stakeholders they specify status (social, economic and political), degree of organisation, consensus and leadership, degree of control over strategic resources, informal influence and degree of dependence on other stakeholders (ODA, 1995a, p.6).

According to Zimmermann and Maennling (2006) power or influence can be expressed by various resources that constitute the overall authority of a specific stakeholder, such as information, communicating and negotiating, specialised knowledge and expertise, practical relevance, creativity and social relations (Zimmermann & Maennling, 2006, p.28 ff.). The authors propose using a radar chart/hexagram to visualise the origins of the stakeholder's power (see Figure 4.4). So each stakeholder has to be ranked according to his/her strength with regard to each source of power. The procedure can thus include self-assessment as well as external assessment. Beyond the evaluation of individual stakeholders, the differences and commonalities between various stakeholder profiles as well as the differences and commonalities between self and external assessment are enlightening for the profiling procedure (Zimmermann & Maennling, 2006, p.29).

Zelewski and Hügens (2006) propose several approaches for profiling stakeholders. Beyond the analysis of information that is available anyway, they name creative techniques such as brainstorming and brainwriting as well as semi-structured interviews (Zelewski & Hügens, 2006, p.371). Evaluation can also be realised by a survey. Survey research allows to inquiry about subjects that are internal to the participants such as attitude, opinions, expectations or intentions (Blumberg et al., 2008, p.278). This communication approach is highly structured as all respondents are asked the same questions with the same wording and answers are predetermined by the researcher (Blumberg et al., 2008, p.385), which facilitates the evaluation of results and ensures the comparability of responses (Schnell et al., 1999, p.301).

Figure 4.4: Sample power profile



Source: Own design adapted from Zimmermann & Maennling, 2006, p.29

4.4.2 Configuration in the SMC

Profiling stakeholders includes the following sub-steps:

- Developing attitude profiles.
- Developing power profiles.

Developing attitude profiles

In order to develop attitude profiles, the approach pursued for the SMC will follow the authors referred to above. Again the approach of Zimmermann and Maennling (2006) gave inspiration to the suggested course of action. First, a list of relevant issues will be created. In a second step all stakeholders will be evaluated according to these issues. The importance of a selected issue has to be recorded as well as the attitude of the stakeholder regarding that issue. As a result the list of issues can be ranked in terms of their importance and an attitude profile can be developed for each stakeholder. A sample attitude profile was shown in Figure 4.3.

A specific reference to an application on maritime container transport chains is not provided here as this step in the SMC is determined by the change objective that serves as focal point for concrete issues.

The SMC is based on a strong interaction with stakeholders as suggested by Freeman, 1984, p.114 and Grimble, 1998, p.6. It seeks to combine the development of the process model with the identification of issues, attitudes and power factors in the context of personal interviews with stakeholders. Here, semi-structured or completely unstructured interviews seem to be most suitable as they allow the respondent's viewpoints on the context investigated to be established.

Logically the steps creating a list of issues and evaluating the stakeholders according to that list have to be separated as only in that way can all stakeholders cast their vote on all issues. The evaluation can then be realised by a survey in order to facilitate the evaluation of results and to ensure the comparability of responses. In order to gather information on the stakeholders' attitude with regard to selected issues the issues must have a direction, i.e. potential future development has to be expressed (an issue like e.g. '*data exchange*' is difficult to refer to in terms of attitude whereas '*enhancing information exchange*' enables one to question an attitude).

However, conducting interviews and surveys is not always possible. Though basing this step on a strong interaction with stakeholders is recommended, it is also possible to make use of related literature if there are sources that allow conclusions to be drawn on the stakeholder's attitude.

In order to portray the result, a diagram like the one in Figure 4.3 can be used. These results are later merged with results of the power profile into the power-attitude matrix.

Developing power profiles

With regard to the development of power profiles the following approach was chosen for the SMC. Transferring insights gained in relevant literature to the SMC the definition of Johnson et al. (2008) will be pursued, defining power as '*the ability of individuals or groups to persuade, induce or coerce others into following certain courses of action*' (Johnson et al., 2008, p.160).

Power in terms of transport chains in general is described as the range of logistical control exhibited as steering influence on relevant transport parameters by institutions offering transport services and the market situation and corresponding market power of institutions demanding these transport services (Wolf, 1997, p.1091; Swinarski, 2005, p.40).

Beyond these general sources of power in transportation, other sources of power can be determined by applying insights from stakeholder-related literature to the underlying purpose. The aspects hierarchy, negotiation position and degree of dependence on other stakeholders are also related to different forms and degrees of cooperation (Hildebrand, 2008, pp.78-81). Control of resources can be referred to the control of assets, financial resources, human resources and what is further linked to specialist knowledge (Hildebrand, 2008, pp.166-168). Management of information is a crucial factor for maritime transport chains (Grig, 2012, p.50-54) and consequently the control of the informational flow can also be considered a source of power. Practical relevance could be transferred to a kind of operational influence, i.e. the influence exerted by terminal, depot or transport operators etc. in operational procedures.

This proposal only names possible power sources and should be seen as an impulse for a more focused discussion. It has to be revised and amended during application of the SMC to a concrete subject. Here the second step in the SMC already sensitised for the role, connectivity and resources of the stakeholders considered.

With regard to the procedure of developing power profiles it is argued logically that power sources must first be specified. This step in the SMC likewise relies on a strong interaction with stakeholders as recommended by Freeman, 1984, p.114 and Grimble, 1998, p.6. Thus personal interviews with stakeholders are to be used to refine insights on stakeholders' power, in particular to identify power factors. Moreover, the process model structuring functions and responsibilities are a valuable input for this step in the SMC and serve as a basis for discussion. In a second step each stakeholder has to be evaluated according to these sources of power in terms of the shaping of strength in each source. As proposed by Zimmermann & Maennling, 2006, p.29, the procedure can include self-assessment as well as external assessment. Self-assessment can take the form of a survey, as it is again important to ensure comparability of responses (see above). For external assessment it is also possible to conduct a workshop in which stakeholders are evaluated in comparison.

As mentioned above, it is also possible to make use of related literature if sources allow conclusions to be drawn as to the stakeholder's power, though strong interaction with stakeholders is to be preferred.

Power profiles can be illustrated as shown in Figure 4.4. Like attitude profiles, they also contribute to creating the power-attitude matrix as the last step in the SMC.

4.5 Deriving involvement strategies

4.5.1 Literature sources considered

Literature sources reviewed adopt different approaches to stakeholder involvement.

Honadle (1991) argues that control mechanisms do not work in the relationship to all stakeholders so that means other than control – influence and appreciation – must be integrated. The so-called Appreciation–Influence-Control framework further comprises different coordination means that are adequate for the Appreciation–Influence-Control situation. These coordination means are information sharing, resource sharing or a joint venture depending on the level of possible and desired integration. For example, information sharing in an appreciate situation can be realised as seminar, meeting, report distribution etc. whereas in an influence situation it can be achieved in workshops, incentives or a penalty or supervision in a control situation (Honadle & Cooper, 1989, p.1534 ff.).

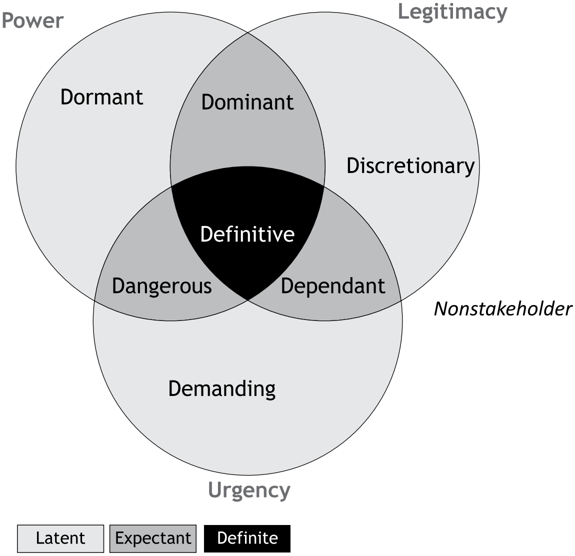
ODA (1995b) distinguishes between different degrees of participation or stakeholder involvement that can be adapted during the project or programme development. They are inform, consult, partnership and control (ODA, 1995b, p.11).

Mitchell et al. (1997) also introduce involvement strategies by means of their stakeholder typology (see Figure 4.5). Roughly, they cluster stakeholders as being latent, expectant or definite, as already noted above. By means of the three classifying attributes (power, legitimacy and urgency) they further refine and develop a typology of eight classes with resulting involvement strategies (Mitchell et al., 1997, p.874 ff.):

- Dormant: they are powerful but not active and should remain cognisant by the management.
- Discretionary: no need for an active relationship.
- Demanding: not warranting more than passing management attention, if any at all.

- Dominant: expect and should receive much of manager's attention.
- Dangerous: have to be considered with care by the management.
- Dependent: can only gain attention either by the advocacy by a more powerful stakeholder or by internal management values.
- Definitive: clear priority of management efforts.
- Non-stakeholder: not of interest.

Figure 4.5: Stakeholder typology according to Mitchell et al. (1997)



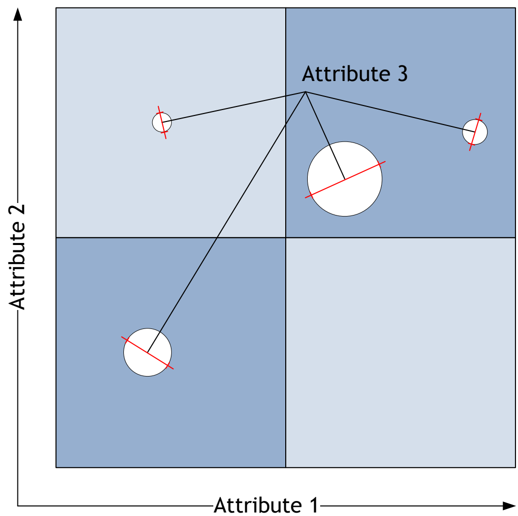
Source: Own design based on Mitchell et al., 1997, p.874 ff.

A comprehensive discussion on stakeholder involvement can be found in literature dealing with policy development. Oxley-Green and Hunton-Clarke (2003) present different strategies for stakeholder participation. *Informative participation* includes one-way communication from the company while stakeholders stay passive. At the level of *consultative participation* stakeholders are asked for their attitude on issues and their opinions are fed back to decision-makers. Decisional participation includes the stakeholders participating directly in the decision-making process (Oxley-Green & Hunton-Clarke, 2003, p.295 ff.). Hage and Leroy (2008) distinguish between interactive approaches including *co-decide*, *co-produce* and *take advice/consult* and non-interactive approaches including *listen, study, inform* and *no participation* (Hage & Leroy, 2008, p.15). Referring to Hage et al. (2008, 2010), Rotter et al. (2013) as well as Hoffmann et al.

(2012) arrive at the following levels of participation: *co-decision, co-production, consultation* and *communication*. The latter summarises the non-interactive approaches but excludes *no participation* as according to the authors this is not a participation level (Hoffmann et al., 2012, p.9; Rotter et al., 2013, p.6 f.).

Several authors derive involvement strategies based on a previous analysis. They cluster the analysed stakeholders by means of a matrix, classifying them by two attributes. Depending on the shaping (mostly high and low), stakeholders are classified in four groups (equalling four quadrants) leading to four different involvement strategies. Bourne and Weaver (2010) summarise the following typical attributes: power, support, influence, interest and attitude. Further they mention the possibility to add a third attribute (Bourne & Weaver, 2010, p.102, see Figure 4.6). There is also a three-dimensional stakeholder cube that is used in stakeholder management and also illustrates three attributes, but the nature of this visualisation makes it difficult to allocate or draw stakeholders in the cube (Bourne, 2009, 74 f.).

Figure 4.6: Dimensions of stakeholder mapping



Source: Own design based on Bourne & Weaver, 2010, p.102

Freeman (1984) divides stakeholders into four groups leading to different involvement strategies depending on their relative cooperative potential (CP) (i.e. to what extend a stakeholder can help to achieve the firm's objective) and relative competitive threat (CT). *Swing stakeholders* (high CP and high CT) require changing the rules by which the firm interacts with the stakeholder (e.g. decisions, transaction process). *Defensive stakeholders* (low CP and high CT) are best involved by means of defensive programmes (e.g. reinforce beliefs about the firm, let stakeholders drive transaction processes). *Offensive stakeholders* (high CP and low CT) are best treated in an offensive way by exploiting any opportunities to gain their support for the firm's objective (e.g. trying to change their objective, change transaction processes). The fourth group are the *hold stakeholders,* who require less attention than the other groups and just have to be monitored (Freeman, 1984, p.141 ff.). The strategies derived by Freeman (1984) are very generic and enable classification of stakeholders without considering their actual interest or attitude towards the reference point of analysis (here the firm's objective).

In reference to Savage et al. (1991), Karlsen (2002) develops an approach that divides stakeholders into four groups depending on the stakeholder's potential to affect (PTA) and to collaborate (PTC) with the project. *Mixed blessing stakeholders* (high PTA and high PTC) are requiring collaboration involving administrative and operative levels based on mutual trust and benefits. *Supportive stakeholders* (high PTA and low PTC) should be informed and involved in relevant issues whereas *non-supportive stakeholders* (high PTA and low PTC) are best managed by using a defensive strategy aiming to keep the stakeholders satisfied at all times. *Marginal stakeholders* (low PTA and low PTC) should just be monitored. To summarise, the involvement strategies are involve, collaborate, monitor or defend (Karlsen, 2002, p.23 ff. adapted from Savage et al., 1991, p.65 ff.). Varvasovszky and Brugha (2000) and Winch (2007) also follow this proposal, adopting the four different degrees of stakeholder involvement (Winch, 2007, p.284, Varvasovszky & Brugha, 2000, p.344). Johnson et al. (2008) follow the same principle but use different terms. They first cluster stakeholders according to the *power* they hold and the extent to which they are likely to show *interest* in a particular strategy. They distinguish between '*minimal effort*' stakeholders (low interest and low power), '*kept informed*' stakeholders (low power and high interest), '*keep satisfied*' (high power and low interest) stakeholders and '*key players*' (high power and high interest) (Johnson et al., 2008, p.156 ff.).

Zimmermann and Maennling (2006) assess the influence on and attitude towards the change objective of each stakeholder as well by means of a four-quadrant matrix. Intending to transfer preceding results of their approach to stakeholder analysis to a quantitative scheme, the underlying assessment is as follows: '*approval*'/'*strong influence*' equals '2', '*rejection*'/'*no influence*' equals '-2', '*indifference*'/'*medium influence*' equals '0' and other assessments have to be ranked accordingly. Results can then be displayed in an influence-attitude matrix. Stakeholders situated in quadrant A (rejection and strong influence) are challenging for the success of implementation. For adequate involvement, their reasons and arguments for reluctance have to be investigated and possibilities to dissolve their concerns should be figured out. One option is to bring them into quadrant B via stakeholders from quadrant B having a strong relationship to them. Stakeholders from quadrant B (approval and strong influence) are crucial but not challenging for the implementation process, they must be involved actively and should be part of the planning and decision-making processes. Stakeholders in quadrant C (approval and little influence) should be monitored and informed regularly on the progress of the project. As for stakeholders in quadrant D (rejection and little influence), they should be informed regularly about the progress and be adequately involved in the decision-making processes to ensure that the reasoning for their critical stance can be integrated (Zimmermann & Maennling, 2006, p.28 ff.).

Based on Grundy (1998), Hayes (2010) evaluates all stakeholders who can affect or might be affected by the outcome of a change according to their *attitude* and *power* as displayed in the so-called stakeholder grid (Hayes, 2010, p.149 ff.). Furthermore, he provides recommendations – also inspired by Grundy (1998) – on how to influence stakeholders to support the change (see Table 4.2).

Wadenpohl (2010) develops an interest-impact matrix with 25 fields resulting from 5 different shapings in interest and impact (very high, high, neutral, low and very low). He does not, however, derive involvement strategies for every field but indicates an approach on how to derive the degree to satisfy stakeholder needs (Wadenpohl, 2011, p.168).

4.5.2 Configuration in the SMC

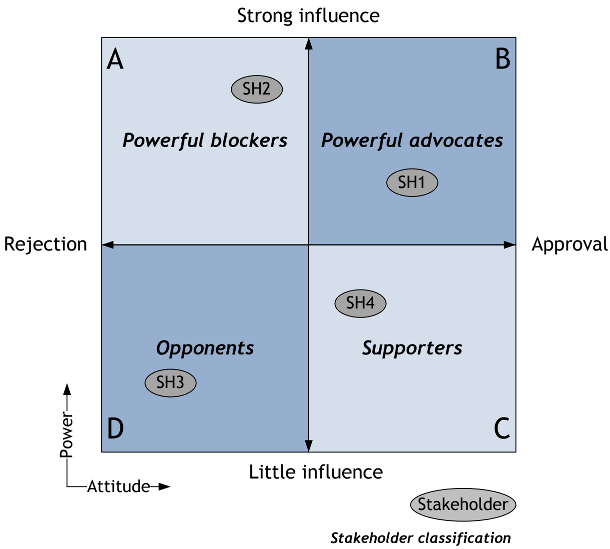
The approach chosen for the SMC follows the matrix approach presented above. Stakeholders are thus clustered by means of a matrix classifying them in accordance with two attributes: attitude and power. Depending on the shaping (high and low), stakeholders are classified in four groups (equalling four quadrants) based on the attitude and power profiles developed in the previous steps. Finally, the four quadrants lead to four different involvement strategies. Thus the following sub-steps are included

- Creating the power-attitude matrix.
- Developing involvement strategies.

Creating the power-attitude matrix

Based on the stakeholder profiles introduced in the previous step in the SMC a matrix reflecting power and attitude will be developed. It was inspired by the approaches of Grundy (1998), Zimmermann and Maennling (2006), Johnson et al. (2008) and Hayes (2010), who all developed power or influence and attitude or interest as shaping criteria. Thus all stakeholders must be ranked according to their power and attitude. The resulting matrix is presented in Figure 4.7. In the SMC the following cluster names have assigned to four classes: stakeholders in quadrant A are named *powerful blockers*, in quadrant B they are *powerful advocates*, in quadrant C *supporters*, and in quadrant D *opponents*.

Figure 4.7: Sample power-attitude matrix



Source: Own design adapted from Grundy, 1998, p.47; Zimmermann & Maennling, 2006, p.29; Johnson et al., 2008, p.156; Hayes, 2010, p.152

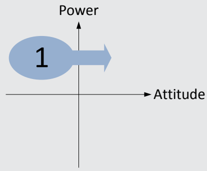
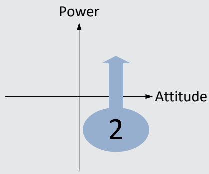
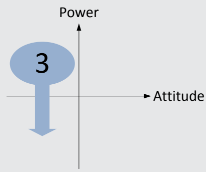
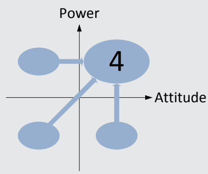
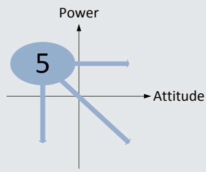
This step in the SMC is based on stakeholder profiles created in previous steps and thus can be performed as deskwork.

Developing involvement strategies

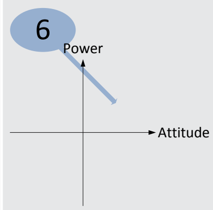
Depending on the stakeholder classification intervention might be necessary to attempt changing the constellation of stakeholders to a more promising one.

If veto stakeholders are allocated to quadrant A, the powerful blockers, the involvement has to focus on changing the stakeholder's attitude and gain his support because veto stakeholders are mandatory for the change process. Strategies to influence stakeholders by Hayes (2010) are thus considered helpful (see Table 4.2) if the context situation allows such an intervention.

Table 4.2: Strategies to influence stakeholders according to Hayes (2010)

<table>
<tr><th>Strategy</th><th>Visualisation</th></tr>
<tr><td>'Winning the support of those who oppose the change and who have the power to influence the outcome: Changing powerful blockers into sponsors might be achieved by providing them with information that could persuade them to be more supportive, involving them in the change process in order to give them more control over the outcome, or bargaining with them to win their support. Listening to why they oppose the change and indicating a willingness to at least consider revising the change can be an effective way of winning their support.'</td><td>
</td></tr>
<tr><td>'Increasing the influence of those stakeholders who are already supportive: This might be achieved, for example, by working to secure their appointment to decision-making groups that regulate matters related to the proposed change.'</td><td>
</td></tr>
<tr><td>'Reducing the influence of powerful blockers: This might be achieved in a number of ways. For example, managers can challenge the argument blockers use to oppose the change. They can also take steps to marginalize them from the decision-making process by working to ensure that they are not members of the committee or group that has to sanction the change.'</td><td>
</td></tr>
<tr><td>'Building a coalition of supportive stakeholders who will be prepared to work together: This might involve communicating an inspiring vision that highlights mutual benefits and encourage independent groups of stakeholders to align themselves with the change manager's purpose.'</td><td>
</td></tr>
<tr><td>'Fragmenting existing coalitions who are antagonistic towards the change: This might involve picking off key players in the coalition and providing them with information that could persuade them to be more supportive, or bargaining with them to win their support (as in 1 above) or undermining their case (as in 3 above).'</td><td>
</td></tr>
</table>

'**Bringing new sponsors or champions into play**: This could involve persuading players who have not been proactive to take a more active part in influencing events. It may also involve publicising the proposed change a wider community, via the media, in order to seek support from powerful individuals or groups who may be unknown to the change manager. However, this kind of intervention is not without risk, because it could also attract the attention of unknown others who may be opposed to the change.'



Source: Own design based on Hayes, 2010, p.153

Beyond the attempt to change the stakeholder constellation, involvement strategies must be drawn up for every stakeholder class. Involvement strategies were allocated to the four quadrants of the power-attitude matrix presented above. Thus four types of stakeholder involvement were derived from Rotter et al. (2013) and Hoffmann et al. (2012) with the strategy communication renamed information in order to emphasise the one-way direction of information exchange (Hoffmann et al., 2012, p.9; Rotter et al., 2013, p.6 f.).

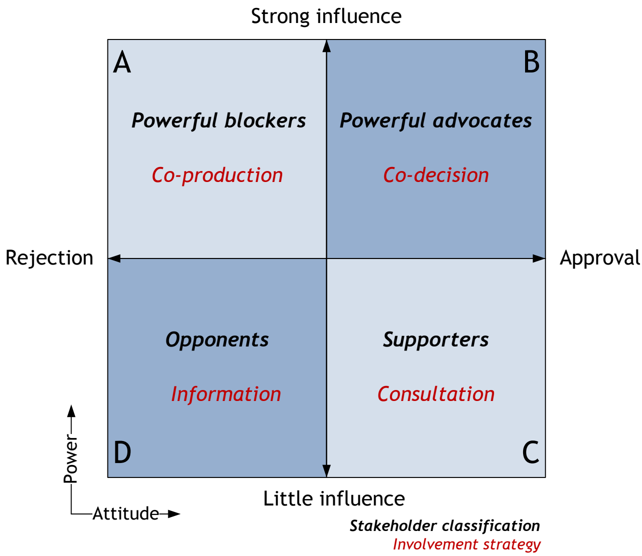
- **Co-decision**, i.e. common design of and decision on change processes: stakeholder and initial decision-maker are involved in a joint analysis and joint action planning.
- **Co-production**, i.e. involvement in creating knowledge bases: here stakeholders are integrated into processes of knowledge production in preparation of decision-making.
- **Consultation**, i.e. selective involvement of stakeholders in change processes by the decision maker: stakeholders are asked for their opinions on proposals at various stages of the process. The decision maker is free to take the stakeholder's advices into account or not.
- **Information**, i.e. regular reports on the development of change processes by the decision maker: there is only a one-way flow of information from decision-maker to stakeholder.

If the stakeholder has no interest in taking part in the change process or the decision maker decides to exclude a stakeholder from involvement, non-participation has to be mentioned as well.

In general, careful consideration should be given for every stakeholder as to what the best involvement strategy might be and the willingness of the different stakeholders should be requested not to demand an involvement that is not desired. Here the stakeholder interviews will provide an insight into the stakeholders' interest in being involved.

The allocation of involvement strategies to the classification by means of the power-attitude matrix are proposed as follows. Stakeholders in Quadrant A – the *powerful blockers* – should be involved by means of *co-production* if this way of collaboration seems to be helpful and reluctance of stakeholders regarding the change does not lead to reluctance to collaborate at all. If such a way of collaboration succeeds, their reasons for reluctance can be considered and maybe mitigating measures can be undertaken. Stakeholders in Quadrant B – the *powerful advocates* – should be involved by *co-decision* to generate a strong base of stakeholders who are supporting the change. This co-decision naturally also includes co-production. Stakeholders in Quadrant C – the *supporters* – should be involved by *consultation* if this is desired and a helpful contribution can be produced. Stakeholders in Quadrant D – *opponents* – should at least *be informed*. If their reasons for reluctance seem to be of special importance, consultation may also be considered.

Figure 4.8: Strategies for stakeholder involvement



Source: Own design

Depending on the object of change, the involvement of several stakeholders by way of co-production can always be considered or may even be required. In general, sharp allocation can look as depicted in Figure 4.8. However, stakeholder involvement should always be reflected in context and not follow methodological advice aimed at being simple and understandable.

Performing this step by an internal workshop with the SMC team to generate a more profound discussion on stakeholder involvement is recommended. Otherwise this step can also be performed as desktop work.

A specific reference to an application along maritime container transport chains is not proposed for the last step in the SMC. Concretisation will be achieved by application to a concrete change process.

4.6 Interconnectivity within the stakeholder management cycle

The SMC is iterative and steps can be revised and adapted during the change process as indicated by the inner circle (see Figure 4.1). Steps can thus provide input for subsequent but also for previous steps.

The first step of *clarifying objectives* determines the system boundaries for the whole framework, but in particular for the following two steps: identifying stakeholders and scoping processes. Giving input to both steps ensures that system boundaries are also applied to other steps in the SMC as these steps concretise the functional and institutional system boundaries.

By the second step of *identifying stakeholders* the conscious choice of stakeholders considered in the SMC, including the process owners for scoping processes, is provided as input for subsequent steps. Furthermore, the power-attitude matrices can be verified by insights gained here.

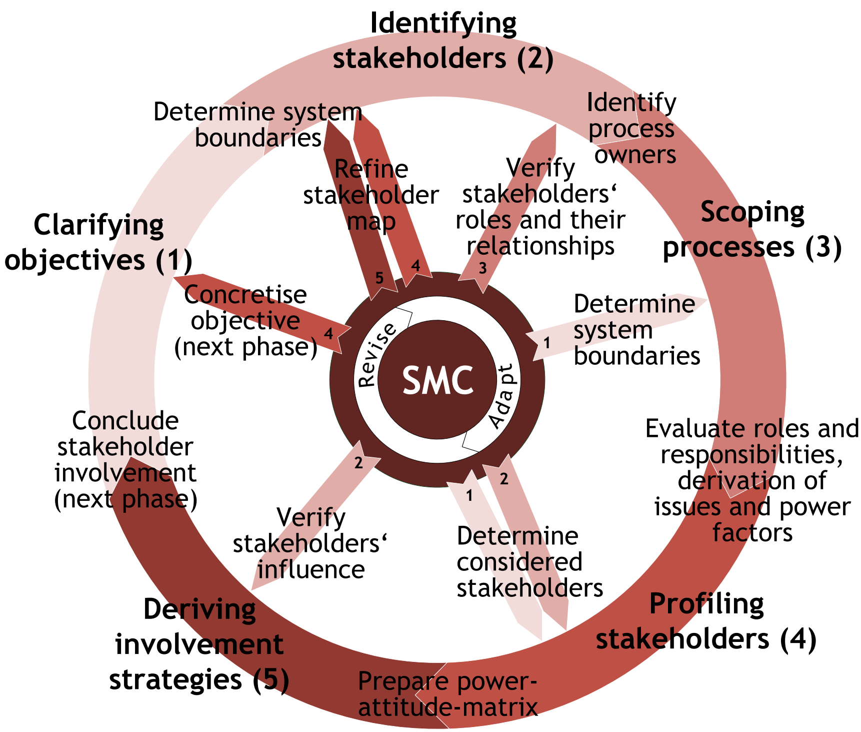
Scoping processes is a basis for communication and interaction with stakeholders for e.g. the derivation of issues and power factors. Further roles and responsibilities are made transparent for the subsequent step of profiling stakeholders. Moreover, during this step insights from the previous step of identifying stakeholders can be refined regarding completeness and as verification of relationships that are depicted in the stakeholder map.

By *profiling stakeholders* the power-attitude matrix is prepared for the ensuing phase. Furthermore, the stakeholder map of the second step may be refined with respect to stakeholders' roles by detailed analysis of stakeholders' influence for the power profiles. With regard to the next phase in the change process, information that is also relevant for concretising the objective of the ensuing phase can be gained from a detailed study of stakeholders' attitudes.

Likewise the last step of *deriving involvement strategies* might help to refine the stakeholder map. Furthermore, the stakeholder involvement for the eventual next phase of the change process is determined here.

The interconnectivity such as contributions of individual step to previous and subsequent steps is outlined in Figure 4.9. Colours and numbers of arrows starting in the inner circle of revise and adapt indicate the origin step of input.

Figure 4.9: Interconnectivity within the stakeholder management cycle



Source: Own design

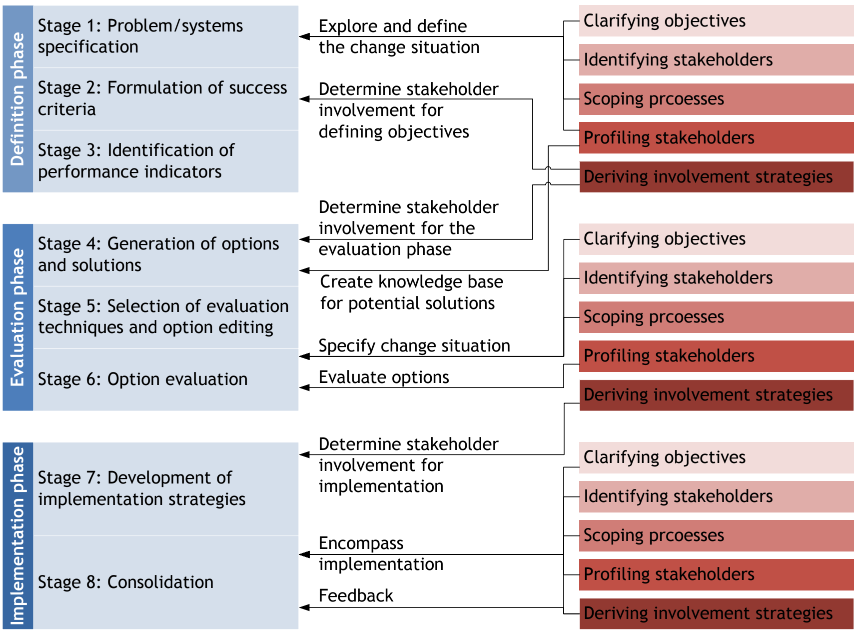
4.7 Embedding in the change process

The ISM change process model of Paton and McCalman (2008) was introduced in 2.1. The authors accentuate the importance that stakeholders are '*kept in the loop and their visible support secured and managed*' (Paton & McCalman, 2008, p.112). They further underline the need for stakeholder management from the beginning of the change process: the definition phase (Paton & McCalman, 2008, p.115). Thus involving stakeholders during the evaluation or even implementation phase appears to be too late. The integration of stakeholder management in the definition phase ensures the basis for a change process with full awareness of its strengths and weaknesses, opportunities and constraints with respect to its stakeholders.

Accordingly, the SMC is integrated to define the change situation (definition phase), in the planning of solutions (evaluation phase), and in the implementation phase.

The SMC is repeated in all three phases. Thereby it contributes directly to most, but not all, stages of the change process. In the following the embedding of the SMC in the change process is outlined (see Figure 4.10). Direct contributions are portrayed for all phases as follows.

Figure 4.10: Contribution of SMC steps to different phases in the change process



Source: Own design

It should be mentioned that the division in the chosen change phases according to Paton and McCalman (2008) is one option among a multitude of change process structures. However, in chapter 2.1 it was already stated that these phases are principally the same in most intervention models and thus it is assumed that they are also valid and transferable to other structures.

4.7.1 Definition phase

According to Paton and McCalman (2008) the definition phase involves the in-depth specification and study of the change situation and the setting of objectives. They stress the need for the definition of change to be realised as stakeholder activity to avoid resistance and non-cooperation (Paton & McCalman, 2008, pp.113).

This is exactly what the SMC framework focuses on. It enables development of the in-depth specification of the change situation as well as the resulting change objectives together with stakeholders. The integration of stakeholders creates a common basis for understanding and identification with the issue under consideration and the commonly chosen course of change. The initial identification and classification of stakeholders provides the range of stakeholders to be considered. By scoping the processes, integrating them in the development of issues and by recording their evaluation of the importance of issues, the SMC provides the opportunity to benefit from diversified knowledge and competences along the transport chain. The change situation can be explored and defined comprehensively by the different stakeholder perspectives. The derivation of involvement strategies serves for a focused stakeholder involvement in the definition of objectives and constraints as well as for the ensuing evaluation phase. Moreover, scoping processes and profiling stakeholders – if realised by interviews/workshops – will create a knowledge base for the generation of options in the ensuing evaluation phase.

During the definition phase the SMC creates the baseline for stakeholder involvement for the whole change process. By virtue of the eventual broad perspective during this phase, the amount of relevant stakeholders and respective analysis are expected to require great efforts.

4.7.2 Evaluation phase

During the evaluation phase potential solution options are generated and evaluated. Here baselines for implementation of a concrete change option dealing with the issue under consideration are set. According to Paton and McCalman (2008) stakeholders should be involved in the generation of options. They underline the effectiveness of collective solution methodologies to ensure support and positive stance (Paton & McCalman, 2008, pp.115-118).

The broad knowledge basis from the definition phase that creates a diversified picture of the change situation serves as a valuable input for the generation of options and can be expanded during the evaluation phase for formulating concrete options. Stakeholder involvement in the evaluation of different options reveals their benefits and prospects as well as their disadvantages and reservations regarding the change process in general and regarding different options. Knowing these circumstances makes it possible to specify the change situation and eventually adjust the change process to avoid reluctant behaviour that hampers later implementation. Thus stakeholder profiling can be used as valuable input for the evaluation of options.

Insights gained regarding stakeholder involvement from the definition phase are most likely to be revised and adapted. As mentioned by Paton and McCalman (2008) stakeholders who were identified during the definition phase should be revised for evaluation as some may have to be added or dropped. For instance, the relevance of stakeholders might change due to concretisation of the change process by a defined option. By deriving involvement strategies stakeholder involvement is determined for the implementation phase.

Efforts to achieve stakeholder involvement during this phase can still be complex and time-consuming. Faced with concrete options, stakeholders with a reluctant attitude might be revealed and strategies are required to develop balancing and mitigation of their reservations. If these strategies do not succeed and reluctant stakeholders are veto stakeholders the change process must be adapted accordingly. This iteration is an important aspect of the ISM according to Paton and McCalman (2008).

4.7.3 Implementation phase

The implementation phase includes the actual '*move*' anticipated by the change, i.e. the evaluated solutions are realised. Here Paton and McCalman (2008) emphasise that it is essential to involve stakeholders affected by the change process.

Implementation of the change might again require revising and adapting the stakeholder involvement derived in the evaluation phase. For instance, it might happen that the set of relevant stakeholders or just their role changes. It is also possible for stakeholders to change their attitude when faced with action. At this stage the SMC facilitates ongoing transparency on the stakeholder environment of the change process and to maintain adequate interaction with involved stakeholders, thereby encompassing the change process.

This phase also includes an evaluation of the barriers and success factors that occurred and the derivation of recommendations for future undertakings. This step is thus quite important for future undertakings and the opinion of involved stakeholders should also be recorded in some way, such as by interviews or a survey.

It is assumed that efforts during this phase will slightly decrease in comparison to previous phases.

4.8 Stakeholder management cycle overview

By the stakeholder management cycle the framework results in a tool that enables potential users to manage stakeholders in change processes along the maritime container transport chain. The formal steps of conducting the SMC are of importance for planning, organising, directing and controlling stakeholders. Moreover, by creating a common understanding of the issue under consideration together with stakeholders and by sensitising them for it, motivation as a further management aspect can be realised and will supposedly be done more efficiently by means of participatory approaches. The integration of the process perspective and the generation of process models is an important aspect to create a common basis of understanding, and resulting models serve as reference point for interacting with stakeholders as a communicative basis. The integration of the stakeholder and process perspective within the SMC complies with relevant characteristics of the maritime container transport chain and hence it allows a specified dealing with stakeholders for this purpose.

In the following each SMC step is summarised in brief.

(1) The first step in the SMC is aimed at determining its system boundaries by clarifying objectives. A set of questions was therefore developed to sound out relevant aspects that are crucial to define for starting the SMC. This includes a short description of the issue under consideration. Furthermore, the objective of the change process as well as the resulting objective of the SMC and its embedding in the change process have to be defined. Finally, the system boundaries with regard to the transport chain have to be determined. Including the entire SMC team to ensure a common understanding of the objective is recommended. Furthermore, doing so in the context of a workshop to reach consensus and elaborate structured results is advised.

(2) The second step in the SMC aims at identifying the subjects of investigation: the stakeholders. So three sub-steps are included: listing, classifying and mapping stakeholders. First, stakeholders are listed by help of identified generic stakeholder groups in the maritime container transport chain and the underlying stakeholder definition. It must on the one hand be specified which generic stakeholder groups are relevant with regard to the purpose of the SMC and on the other hand which specific companies or organisations belong to the different groups. Listing stakeholders can be realised by a literature review and/or consultation of experts during a workshop. Second, stakeholders are classified according to their role, resources and connections with regard to the maritime container transport chain into key, primary and secondary stakeholders – again by a literature review or during a workshop. Here too, veto stakeholders who are indispensable for the change process must be identified. Finally, results from listing and classifying are summarised in a stakeholder map that further includes relationships between stakeholders according to the collaborative relationships introduced. Information on relationships can be collected from a literature analysis and during a workshop and the ensuing process analysis, although verifying results during interviews is recommended.

(3) The third step in the SMC – scoping processes - aims at creating a basis for communication to interact with stakeholders and, due to this, a common basis for understanding the issue under consideration. It likewise aims at creating process transparency on the physical and informational flow, as well as on the stakeholder's scope of action by revealing process responsibilities. This step thereby ensures that the SMC considers the flow character inherent in the maritime container transport chain. It comprises two sub-steps: collecting data and information and modelling processes. Collecting data and information should include relevant process elements within the system boundaries considered. Process elements thus include all transport-related processes covering the physical and informational flow under responsibilities to be determined. Interrelations are represented by the sequence flow and causal relationship of processes. Other functional elements of the chain such as logistics nodes as well as the means of transport are to be covered as well. By referring processes to responsible stakeholders the functional and the institutional perspective are connected. For process modelling making use of the BPMN methodology is suggested, however, if other methodologies are used that are more familiar to the SMC team or (a) focal organisation(s) they can be used as well. The resulting process models should likewise cover all functional elements referred to above. If possible, process mapping should be undertaken by means of personal enquiries with process

owners to create a common base of understanding and sensitise stakeholders for a holistic view of the chain. Furthermore, involving stakeholders from different generic stakeholder groups is recommended to ensure plausibility and consistency of process maps.

(4) The fourth step serves to profile stakeholders by their attitude toward and their influence upon the change objective and hence includes two sub-steps: developing attitude profiles and developing power profiles. With regard to attitude profiles a list of relevant issues will first be created. In a second step all stakeholders will be evaluated according to these issues. For developing power profiles power sources must first be specified. Possible power sources for the maritime container transport chain were therefore proposed that should be seen as an impulse for a more focused discussion during a specific application. Second, each stakeholder has to be evaluated according to these sources of power in terms of the shaping of strength in each source. This step in the SMC likewise relies on strong interaction with stakeholders and personal interviews or surveys with stakeholders are suggested to gather relevant information. However, it is also possible to make use of related literature if there are sources that permit conclusions on the stakeholder's attitude and power.

(5) The fifth and final step in the SMC aims at deriving involvement strategies for the change process and includes two sub-steps: creating the power-attitude matrix and developing involvement strategies. Following a matrix approach, stakeholders are classified by two attributes: attitude and power. Depending on the shaping (high and low), stakeholders are classified in four groups (equalling four quadrants) based on the attitude and power profiles developed in the previous steps. Finally the four quadrants lead to four different involvement strategies. If the constellation of stakeholders is disadvantageous for the change process, strategies to influence stakeholders moving to a more advantageous position are proposed. Beyond the attempt to change the stakeholder constellation, four involvement strategies are suggested that enable involving stakeholders adequately to their classification. These are co-decision, co-production, consultation and information. These strategies differ in terms of involvement in decision-making, analysis and knowledge production. Performing this step by means of an internal workshop with the SMC team is recommended to generate a more profound discussion on stakeholder involvement.

In Table 4.3 an overview of all SMC steps is provided by naming objectives, participants and methods for each step.

Insights gained in individual steps can thus contribute to previous and subsequent steps. Hence, the SMC is iterative and includes a revise and adapt mechanism to enable potential users to reflect possible iteration relations.

Table 4.3: Stakeholder management cycle: steps, objectives, participants, methods

Step	Substep	Why - Objective	Who - Participants	How- Methods
1 Clarifying objectives		Determine the system boundaries of the SMC by defining the referred issue under consideration, objectives.	SMC team	Workshop or desktop work based on a literature review
2 Identifying stakeholders	Listing stakeholders	Identify the subjects of investigation: the stakeholders	SMC team and external experts or SMC team	Workshop or desktop work based on a literature review
	Classifying stakeholders		SMC team and external experts or SMC team	Workshop or desktop work based on a literature review
	Mapping stakeholders		SMC team	Desktop work based on previous results
3 Scoping processes	Collecting data and information	Create a basis for communication and create process transparency on the physical and informational flow, as well as on responsibilities.	SMC team and process owners or SMC team	Inquiry/interview or desktop work based on a literature review
	Modelling processes		SMC team	Desktop work based on previous results
4 Profiling stakeholders	Developing attitude profiles	Profiling stakeholders regarding their attitude towards and their influence on the change process.	SMC team and stakeholders or SMC team	Interview and survey or desktop work based on a literature review
	Developing power profiles		SMC team and stakeholders or SMC team	Interview and survey or desktop work based on a literature review
5 Deriving involvement strategies	Creating the power-attitude matrix	Deriving involvement strategies for the change process.	SMC team	Desktop work based on previous results
	Developing involvement strategies		SMC team	Workshop or desktop work based on a literature review

Source: Own design

The SMC is not a standalone tool but is embedded in the change process as a wider context. The Paton and McCalman (2008) change process model used here comprises three phases: the definition phase, the evaluation phase and the implementation phase. The embedding of the SMC is realised such as the SMC is repeated in each change phase. Thereby the SMC provides different inputs for the phases to ensure following and recording developments in the stakeholder environment that are inherent in change. Integrating the SMC right from the start of the change process is strongly recommended in order to enable awareness of its strengths and weaknesses, opportunities and constraints with respect to its stakeholders and to allow a conscious dealing with them. The integration of stakeholders in the definition phase can be used to create a common basis for understanding the issue under consideration and the course of change. Moreover, the change situation can be explored and defined comprehensively by the help of stakeholders by making use of their diversified knowledge and competences along the transport chain. Also, strategies are derived to enable a conscious involvement of relevant stakeholders. During the evaluation phase potential solution options are generated and evaluated for the change process. Here, the knowledge basis built during the first phase can serve as a valuable input. Involving stakeholders in the evaluation of different options dissolves their respective perspective and enables a comparison of options in the stakeholder respect. During the implementation phase of the change process the SMC makes it possible to encompass the change process by maintaining transparency on the stakeholder environment and interaction with involved stakeholders.

5 Preparatory studies: relevance and specifics of empty container logistics

This chapter serves as a preparation for the case study in the following chapter. Therefore, first, general principles of empty container logistics are outlined to introduce this field (see chapter 5.1). In this context, the suitability for improving empty container logistics by a stakeholder-oriented approach will be shown. Second, an analysis of empty flows in the study area Hamburg - Baltic Sea Region (BSR) is performed to portray the respective physical flow and to identify hotspots of empty flows for later identification of relevant stakeholders in the context of the case study (see chapter 5.2). In chapter 5.3, the main results are summarised.

The approach to elaborate the following preparatory studies is not part of the SMC. This is for two reasons. First, studies like the ensuing ones, especially the data analysis, require great efforts in time. Though results here serve as valuable input for the case study and data analysis also creates transparency from the perspective of the physical flow, the SMC could also be applied without such preparatory studies. Second, it cannot be presumed that adequate data on the physical flow enabling such a data analysis is always available for SMC users. Studies like the following can, however, become part of the overall change process to explore the change situation in the definition phase.

The preparatory studies and the ensuing case study were mainly elaborated in context of the TransBaltic project. TransBaltic – Towards an integrated transport system in the Baltic Sea Region - is a strategic project co-financed by the EU Baltic Sea Programme 2007-2013. The project lasted from June 2009 to December 2012 with an overall project volume of around 5.5 million Euros. The overall project objective was to provide regional level incentives for the creation of a comprehensive multimodal transport system in the BSR as stipulated by the EU Strategy for the Baltic Sea region by means of joint transport development measures and jointly implemented business concepts. TransBaltic addressed the key challenge for BSR accessibility to accelerate the development of a comprehensive multimodal transport system across the area[22]. The Hamburg University of Technology (TUHH) was the leader of one work package dealing with empty container logistics in the BSR. Work package results became part of the

22 More information can be found on the project website: www.transbaltic.eu.

so-called Macro Regional Action Plan that constitutes the core project outcome. The document primarily intends to facilitate the development of a sustainable multimodal transport system in the Baltic Sea Region by providing a vision for the year 2030, including a number of so-called policy actions, instrumental to pursue this vision.

5.1 Empty container logistics

Principles of empty container logistics outlined in the following include the relevance of empty container logistics for the maritime container transport chain and the reasoning for improvements by stakeholder-oriented approaches, as well as reasons for empty movements and their resulting impact[23].

5.1.1 Relevance of empty container logistics

The necessity for empty container logistics is inherent in the container transport system. Customers of transportation services who want to export their goods by containerised transportation need the provision of an empty container at their site. Customers who import containerised cargo for their commercial activities receive a loaded container, which becomes empty after unloading (Olivo et al., 2005, p.203).

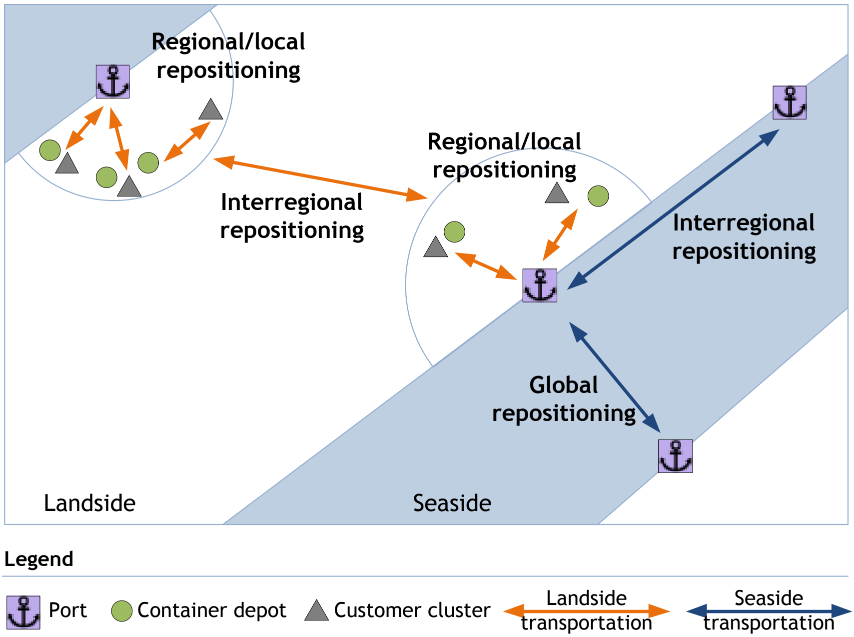
Empty container logistics ensures that empty containers are available at the right place, at the right time, in the right quality, in the right condition, for the right customer and at the right cost (Hüttmann, 2013, p.46). Due to the fact that commercial traffic is never in perfect balance so that every emptied container can be directly filled with cargo again (Olivo et al., 2005, p.203), the repositioning of empty containers represents an essential task to guarantee the appropriate container in terms of the six rights of empty container logistics (Hüttmann, 2013, p.46).

The United Nations Conference on Trade and Development (2012) identifies empty container logistics as a determining factor to develop sustainable freight transport (UNCTAD, 2012, p.129 f.). According to Notteboom and Rodrigue (2008) '*the repositioning of empty containers is one of the most complex problems concerning global freight distribution*' and thus '*a key logistical challenge*' (Notteboom & Rodrigue, 2008, p.167 f.).

23 This section partially was published as part of the project TransBaltic deliverables: Wolff et al. (2011).

Repositioning takes place between areas with a shortage of containers (the demand area) and areas with an excess of empty containers (the surplus area) (Boile, et al., 2006, pp.4 ff.). The need for repositioning thereby occurs on a global, interregional or regional/local level. The global level leads to repositioning over sea from surplus to deficit areas. Repositioning on the interregional level means balancing on the continental level (e.g. repositioning in Europe, North America etc.). Depending on the continent this can also be performed by maritime transportation, or else by landside transportation. The regional and local perspective is very close. Whereas regional empty container patterns balance empty container demand among importers, exporters and marine terminals, the local pattern aims to balance demands from marine terminals and empty depots (see Figure 5.1) (Theofanis & Boile, 2009, p.57 ff.).

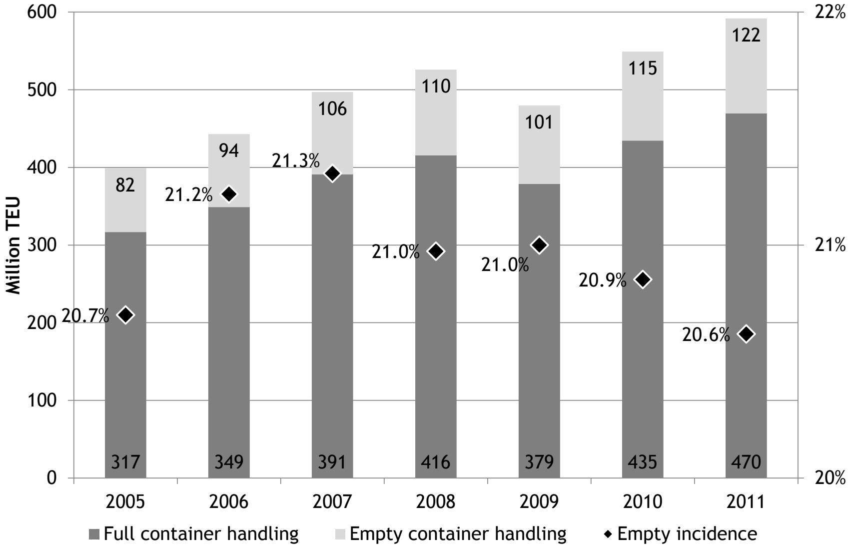
Figure 5.1: Spatial dimensions of empty container repositioning



Source: Own design adapted from Boile et al., 2008 cited in Theofanis & Boile, 2009, p.57 f.

Though worldwide transported container volumes (empty and loaded) have increased constantly, empty container incidence was almost stable between 20% and 21% in recent years (see Figure 5.2). The share of landside empty containers is even higher and estimated to be around 40% of all containers transported (Konings & Thijs, 2001, p.334).

Figure 5.2: Full and empty container handling and empty container incidence worldwide (in million TEU for selected years)



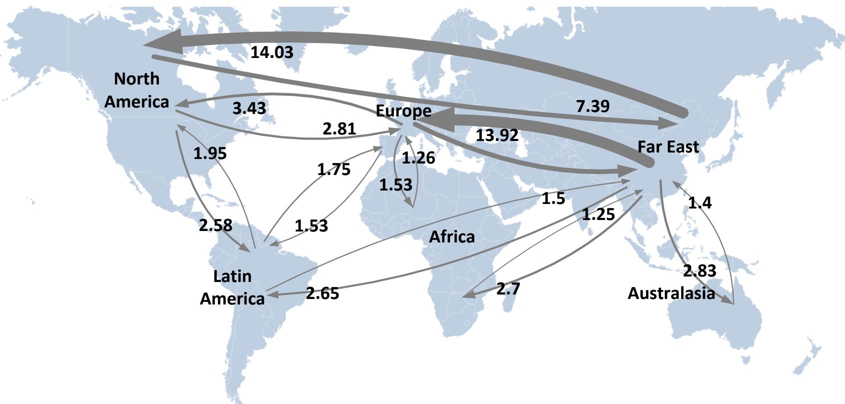
Source: Own design based on Drewry Shipping Consultants Ltd., 2012, p.15

Although measures to mitigate negative effects exist, practical application is often difficult as the empty container transport chain is characterised by a complex multi-stakeholder environment with various reasons for empty repositioning and partially conflicting interests. Boile et al. (2006) state that '*the process is extremely complex and dynamic in nature and the often conflicting interests of the various stakeholders [...] need to be understood if an efficient management is to be attained'* (Boile et al., 2006, p.6). LeDam Hanh (2003) points out that in terms of institutional change the greater burden rests properly with the shipping lines. The geographical scope of optimisation is thus of great importance. Empty container logistics of shipping lines is optimised on a global scale and attempts to achieve optimisation on a regional scale might compromise the performance of the whole system. So addressing regional concerns of empty container logistics also requires the consideration of solutions that can be effective on a global scale (LeDam Hanh, 2003, p.12, 31). With respect to a regional perspective, Hüttmann (2013) claims that port authorities should develop an empty container logistics strategy for the port region with the participation of the major stakeholder groups (Hüttmann, 2013, p.227). Participants' motivations in change processes are commercial not altruistic, so any aspired improvement of empty container logistics must create concrete financial and operational benefits to be successfully implemented (The Tioga Group, 2002, p.9).

5.1.2 Reasons for empty movements

International trade is rarely balanced in terms of volume, value and commodities (Olivo et al., 2005, p.203; Hüttmann, 2013, p.31 f.). Thus trade imbalance is considered as the main cause for the movement of empty containers (Theofanis & Boile, 2009, p.51; Boile, 2006, p.56; Rodrigue, 2012g). In Figure 5.3 the global flow of loaded containers on some of the main trading routes is displayed. It becomes evident that especially between the Far East and Europe (ratio 2.3:1) and the USA (ratio 1.9:1) respectively, this imbalance is very strong.

Figure 5.3: Flow of loaded containers on selected trade routes (in million TEU for the year 2011)



Source: Own design based on Drewry Shipping Consultants Ltd., 2012, p.21

In addition, seasonal effects have an impact on the flow of cargo and the flow of empty containers (Konings & Thijs, 2001, p.335; Fransoo & Lee, 2010, p.10). Seasonality is in connection with agricultural products or special festivals like Christmas or Chinese New Year (Song & Carter, 2009, p.294). Another reason is the imbalance of equipment resulting from different types of goods requiring different equipment distinguished by dimension (e.g. 20 ft, high cube, pallet wide) and the specific application possibilities (e.g. reefers, tankers) (Konings & Thijs, 2001, p.335). Although there is no overall trade imbalance on some routes the need to transport empty containers is, however, significant (Song & Carter, 2009, p.295).

Repositioning costs depend largely on the distances to overcome and on freight rates on the specific route. In the event of high (repositioning) costs this might lead to shortages of empty containers in export markets (Rodrigue, 2012g). Rate imbalances are subject to market dynamics. It appears that in periods of low demand, container freight rates drop to such low levels that it becomes economical for ocean carriers to actively attract shippers that normally use tramp shipping e.g. break bulk commodities are put in bags in containers. However, in periods of high demand, rates on the head haul trade routes such as Far East - Europe westbound or Far East - USA eastbound are at such a high level that shipping lines often prefer to return their empty boxes to the Far East (ESPO, 2007, p.62). Thus, from the perspective of shipping lines – if they are both ship and container owners - revenue generation also plays a role. Instead of parking the empty container somewhere waiting for an export load, the container is shipped back to e.g. Asia using spare capacities of the shipping line's own fleet and is thereby sooner available for being loaded again (Rodrigue, 2012g). Another reason mentioned is the relation of manufacturing or leasing costs to costs of repositioning. If leasing an existing or buying a new container is cheaper than repositioning this will lead to an accumulation of empties in the surplus area whereas inverse requirements have a positive influence on the repositioning (Boile et al., 2006, p.4; Boile et al., 2004, p.7; Rodrigue, 2012g). Further mention must be made of usage preferences (a specific container being owned by a specific shipping line or leasing company). As a result, even if a shipper needs an empty container for a shipment with shipping line A, an empty container of shipping line B in the direct vicinity would not be of much help (Rodrigue, 2012g). Due to rising bunker prices and excess capacities (ships and containers) slow steaming has been favoured by the shipping lines. This measure leads to tight capacities and reduced availability of containers inland (Rodrigue, 2012g).

5.1.3 Impact resulting from empty movements

According to Drewry Shipping Consultants (2012), from a global view there were 61 million TEU seaborne empty container movements, resulting in 122 million TEU empty port movements in 2011. They account $400 per movement covering terminals, restows, hire, damage, storage, transport, administration and agency (see cost compilation in Table 5.1) (Drewry Shipping Consultants Ltd., 2008, p.18 f.).

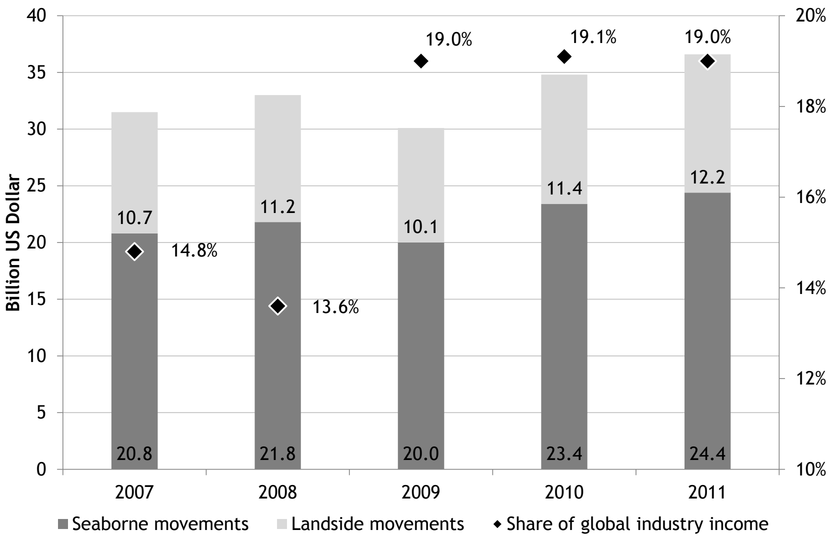
Table 5.1: Components of empty container costs according to Drewry Shipping Consultants Ltd. (2008)

Cost item	Cost per TEU in US dollars
Terminal handling costs	200
Re-stowage costs	20
Transport costs	75
Storage costs	15
Agency and administration costs	25
Container demurrage and detention costs	30
Repair costs	35
Total costs per unit	**400**

Source: Own design based on Drewry Shipping Consultants Ltd., 2008, p.35

That leads to total costs of around $24.4 billion for seaborne empty container movements worldwide. The cost of landside repositioning by rail, road or barge is $75 per loaded TEU and totals up to $12.2 billion. Overall, the cost of worldwide empty container repositioning added up to $36.6 billion in 2011, representing 19% of global industry income (Drewry Shipping Consultants Ltd., 2012, p.18 f.). After the economic crisis in the year 2008, this share was almost stable at around 19% for the last three years although absolute figures increased slightly (see Figure 5.4).

Figure 5.4: Cost for empty container movements worldwide (in billion US Dollar) and share of global shipping industry income (for the years 2007-2011)



Source: Own design based on Drewry Shipping Consultants Ltd., several years

However, these costs are mainly covered by the carriers and are shared out as revenue between terminal operators, port authorities, rail operators, container lessors, container depot operators etc. (Drewry Shipping Consultants Ltd., 2012, p.19).

Furthermore, empty containers tie up storage capacities (Rodrigue & Notteboom, 2009, p.5), which might become a serious problem in places of high demand for space and limited space available. Around 10% of worldwide container assets is empty and 20.5% of port handling can be accounted for by empty movements (Rodrigue, 2012g). In 2007, for example, one of the container terminals in the Port of Rotterdam refused to handle empty containers due to space problems in the terminal area (DVZ, 2007). Likewise, empty containers tie up transport capacities (The Tioga Group, 2002, p.9 ff.; Rodrigue & Notteboom, 2009, p.5). Depending on the transport mode, this might lead to an extra transport process for road transport and to a limited number of available container slots on mass compatible modes such as sea, rail and inland waterway.

It follows that these inefficiencies in transport and storage of empties have negative environmental and social impacts. The transport of empties contributes to emissions, such as green house gas emissions, air pollutants and noise, especially within ports, and leads to congestion (LeDam Hanh, 2003, p.9). In addition, tied-up storage capacities generate land use. The land-intensive storage of empty containers is an additional social dimension. In ports where expansion has reached residential areas or vice-versa, containers can become a point of discussion due to unsightly piles of containers (Boile et al., 2004, p.3 f.; Flämig, 2008, p.48).

5.2 Empty container flows between Hamburg and the Baltic Sea Region

Analysis of empty flows in the study area Hamburg - Baltic Sea Region (BSR) is undertaken to create transparency on the physical flow and to identify hotspots of empty flows for the later identification of relevant stakeholders in context of the case study[24].

24 This section partially was published as part of the project TransBaltic deliverables: Wolff et al. (2012).

5.2.1 Background

The geographical focus of the case study is on the Hamburg - BSR area. Thus, the focal port that is considered is the Port of Hamburg (PoH) and described in the following, in particular with regard to empty container logistics. Afterwards, arguments are presented making the BSR an interesting area in relation to the PoH in terms of empty container logistics.

The PoH is a landlord port and the Hamburg Port Authority (HPA) is responsible for economic and technical port management as well as for port infrastructure on water and on land, port railway, property management and safe maritime traffic. The HPA is an independent public-law institution founded in 2005 (HPA, 2012b; HHM, 2012).

In 2011, the PoH was number 14 in the international ranking of the biggest container ports worldwide. Compared with competitors on the Hamburg-Antwerp range, Hamburg is the second-largest port in terms of TEU after Rotterdam and before Antwerp and Bremen/Bremerhaven (HHM, 2012). In 2012, 130.9 million tons was handled in the PoH (down 1% on 2011), thereof 8.9 million TEU (down 1.7% on 2011) (HPA, 2013a, p.4).

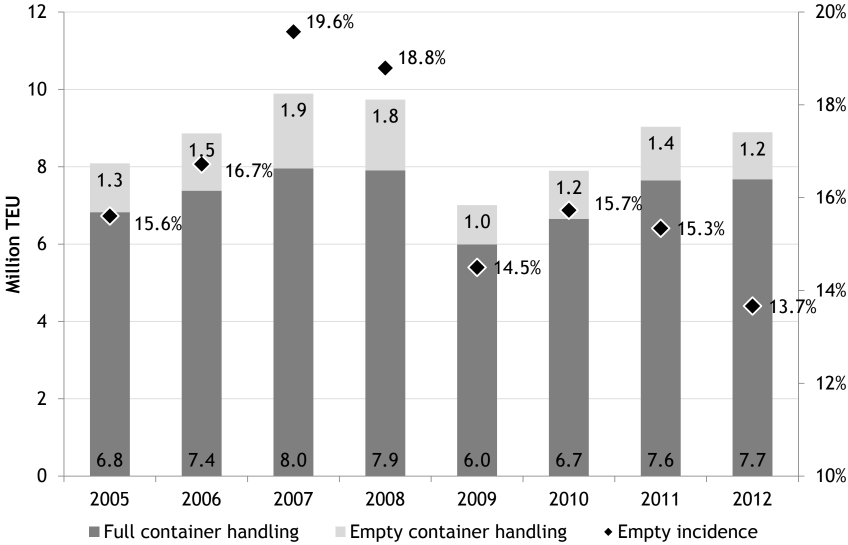
The PoH records relatively high volumes of empty containers. In comparison to other north range ports such as Antwerp and Bremerhaven where empty container volumes doubled from the year 2000 to 2007, empty containers almost quadrupled in volume in Hamburg (Hüttmann, 2013, p.182). In 2007 the empty incidence peaked at 19.6%. Since the economic crisis in the year 2008, however, the empty incidence has fallen continuously and in 2012 the percentage of seaside handled empty containers fell to 13.7% of total seaside container handling (see Figure 5.5).

According to the Hamburg Port Authority (HPA) the recent decrease of empty containers can be attributed to the stagnation of economic development in the Far East and the fact that empty containers are stored overseas (HPA, 2013a, p.4). By 2015 a slight increase to 17% is expected due to the rising number of feeder transports (HPA, 2012a, pp.64-65).

With respect to empty container handling the port has the following characteristics. Many shipping lines use four container terminals in the port as handling, assembly and distribution points for empty containers. Furthermore several empty container depots offer various services for transport, handling, storage and refurbishment processes. According to Hüttmann (2013) container depots have a comparatively scattered structure in Hamburg. There are around 40 empty depots in the port area, including a lot of small depots (Hüttmann, 2013, p.186).

Demand for empty containers is not only located in areas next to the port (loco quote: 30%) but also interregional (HPA, 2012a, pp.64-65).

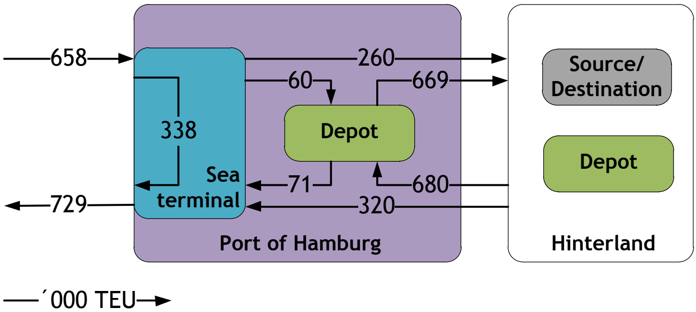
Figure 5.5: Development of loaded and empty container turnover (in million TEU) and resulting empty incidence in Hamburg (for the years 2005-2012)



Source: Own design based on Eurostat, 2013

Directions of empty container flows are illustrated in Figure 5.6. In the year 2011 around 340,000 TEU or 50% of the incoming 658,000 TEU was directly transhipped at the sea terminal(s) and further repositioned overseas. Another 40% was taken directly from the sea terminal to the hinterland, either to empty container depots or to shippers/consignees. The remaining 10% was destined for empty container depots in the port area. With regard to 729,000 TEU outgoing empty containers, around 45% was the directly transhipped empties, 45% originated from the hinterland and the remaining 10% from depots in the port area. Also, depots in the port area provided around 669,000 TEU to the hinterland and got back 680,000 TEU from there (HPA, 2012a, p.64). Circulation of empty containers between depots and customers in the hinterland were not recorded and neither were the flows of containers within the port, e.g. between terminals, depots and/or customers. Furthermore, it was not differentiated which of the containers provided from port depots to the hinterland also originated from the hinterland, hence to allow conclusions on supply and demand that can be served without over sea repositioning.

Figure 5.6: Directions of empty container flows in the PoH (in thousand TEU for the year 2011)



Source: Own design based on HPA, 2012a, p.64

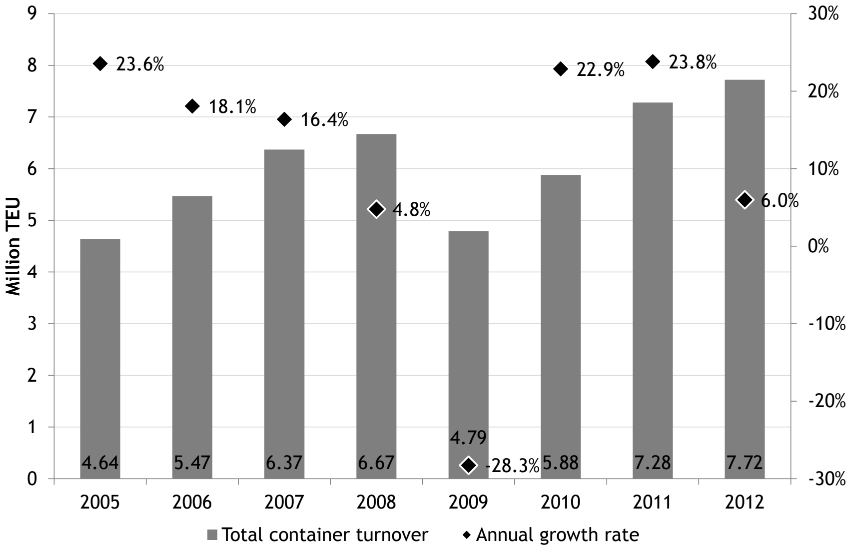
In the year 2011, the formerly largest empty container depot, the *Leercontainerzentrum Unikai,* was closed as the area is designated for further development. As a consequence, empty container logistics is considered in the current port development plan (October 2012 version) of the PoH. In it the extension of areas for empty containers inside and outside of the port is considered as meaningful (HPA, 2012a, p.62). As a result of the expected strong import surplus in the Hamburg metropolitan region the predicted number of empty containers transported in the port, to depots and to the hinterland is expected to total 3.2 million TEU in 2025, a doubling of the current 1.5 million TEU. Also, the number of empty containers transported between depots and hinterland is expected to double by 2025. To face those future prospects the HPA together with involved actors have been assigned to develop an overarching concept for improving empty container logistics, including the organisation of logistics and storage and the transport of empty containers in the port associated with external locations (HPA, 2012a, pp.64-65).

For several reasons the BSR is of special interest with respect to empty container logistics. First, there is the increasing containerisation of goods within the region that has been observed in recent years. Second, container flows are characterised by a significant empty incidence in comparison to the European or worldwide average.

Today, containers are handled in more than 40 ports across the BSR (Breitzmann, 2009, p.27). The BSR has witnessed a constant rise in containerised transport in recent years. In 2007 container turnover in Baltic ports was around 2.5 times higher than in 2000, equalling an average annual growth rate of more than 13%

(Breitzmann, 2009, p.31). One reason for this above-average growth is the growing demand for containerised goods in Russia. Also, traditional bulk and break-bulk cargo such as pulp, paper and timber is increasingly transported by container in Sweden and Finland (BMT, 2006, p.74). In 2008, before the economic crisis strongly influenced trade volumes, 6.7 million TEU was been shipped from and to ports in the Baltic Sea. This trend changed dramatically in 2009 when container turnover fell to 4.8 million TEU. However, a recovery has since occurred and container turnover has risen again to 7.7 million TEU (see Figure 5.7).

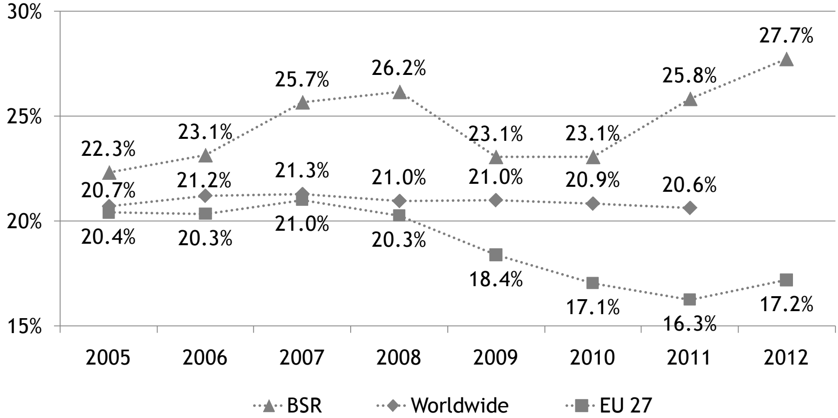
Figure 5.7: Container turnover (in million TEU) and annual growth rate for the BSR (for the years 2005-2012)



Source: Own design based on Eurostat, 2013

Thus the share of empty containers transported in the BSR was between 22% and 28% in the years 2005 to 2012 and thereby exceeds numbers in the European Union (EU, here for the 27 member states (EU 27) between 2007 and 2013) as well as globally (see Figure 5.8). The worldwide share has been around 21% in recent years until 2011 (no figures available for the year 2012). The same applied to the European average until 2008. European empty incidence has, however, been more dynamic since the economic crisis in the year 2008 and fell to 16.3% in 2011.

Figure 5.8: Comparison of empty shares: BSR, worldwide and the EU 27 (for the years 2005-2012)



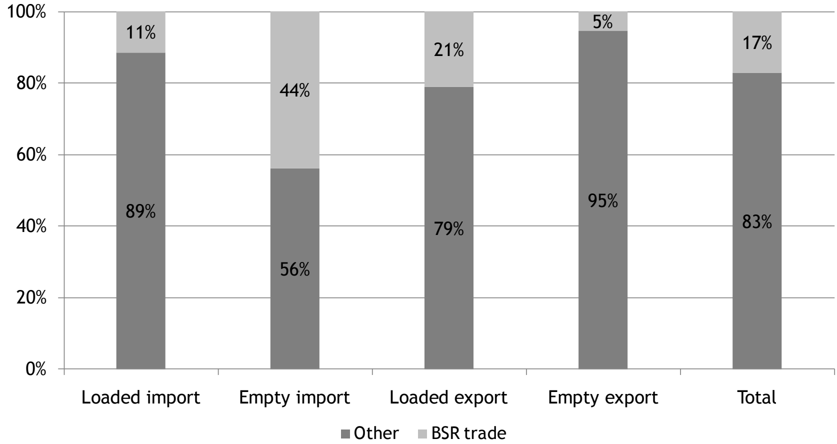
Source: Own design based on Eurostat, 2013; Drewry Shipping Consultants Ltd., 2012, p.15

As an economic area, the BSR is characterised by heterogeneous economic conditions and trade patterns due to the coexistence of geographically central and peripheral regions, structurally weak areas and large consumption centres as well as a wide range of different industries, from raw material producers to high-tech manufacturers. In this setting, container movements of different types, sizes and qualities can be observed while the specific demand for and availability of container equipment can vary significantly between places. To balance supply and demand, empty containers have to be moved both within the region and with adjacent regions, especially from and to the large seaports of the north range.

The PoH is thus strongly linked with the BSR and is a major hub of containerised cargo destined for or returning from the BSR (Hüttmann, 2013, p.184). In particular, the share of empty containers returning to Hamburg from the BSR rose to 44% of total incoming empty containers in the year 2011 (see Figure 5.9).

The arguments referred to above justify the Hamburg - BSR area as an interesting study area in terms of empty container flows. Thus in the following a data analysis is portrayed aiming at elaborating hotspots of empty flows in this area.

Figure 5.9: Share of BSR trade for the PoH (in the year 2011)



Source: Own design based on Eurostat, 2013

5.2.2 Data set

The data set analysed here was provided by the HPA and consisted of a table of raw data extracted from the HPA database PLINS (PLanungs- und INformationsSystem). It comprised all container movements per incoming/outgoing ship further specified by port of loading/unloading for the PoH in relation to all connected ports worldwide over a period of two years (2010 and 2011). The raw data provided comprised 578,338 data records.

First, relations to/from the BSR were extracted from the data set for further analysis (this reduced the data set to 81,446 data records). The extracted data set then included import/export container movements for the PoH in relation to the BSR. Import container movements include arriving containers in Hamburg from the BSR; whereas export data includes containers leaving Hamburg for the BSR. For each data record the following information was given:

- Name of the incoming/outgoing ship.
- Unloading/loading date (day/month/year).
- Direction (import/export).
- The loading/unloading terminal in Hamburg.
- Numbers of loaded and empty containers, specified by
    - container type (standard, reefer or transport stillage) and

    - container size (20'/40').
- The unloading/loading port in the BSR.

The subsequent analysis was conducted with the most recent data for the year 2011.

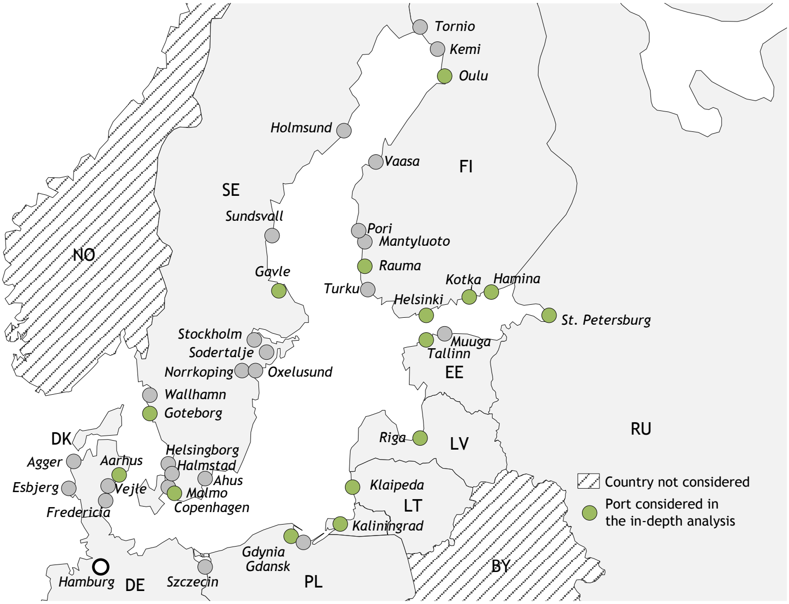
5.2.3 Hotspots of empty flows

In analysis of containerised cargo flows from the PoH to the BSR and vice-versa, 39 ports were identified in the BSR as maintaining container connections with the PoH in 2011 (see Figure 5.10). Total turnover with respect to these ports was 1,852,245 TEU in 2011, thereof 1,481,057 TEU loaded and the remaining 371,188 TEU empty containers.

With regard to the BSR, the PoH is a net importer of empty containers, i.e. the number of empties returning from the region (empty imports) exceeds the number of empties shipped to the region (empty exports). Comparison of import and export numbers of empty and loaded containers to and from the region shows the following: In 2011, around 320,000 TEU were imported empty from the ports in question in the BSR, whereas only 51,000 TEU were exported to the region. The contrary situation can be observed when analysing numbers of loaded containers to and from the region. In 2011, around 570,000 TEU were imported from the BSR to the PoH, whereas around 910,000 TEU were exported from the PoH to the BSR (see Figure 5.11). In the following analysis, imports are marked in red, exports in blue and always refer to the PoH.

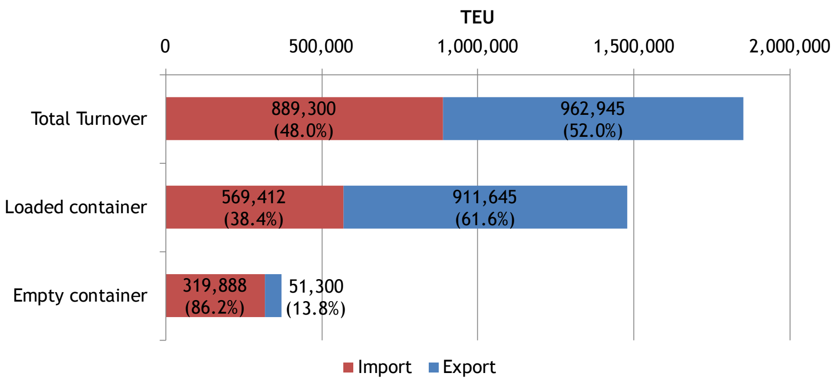
Many of the BSR ports, however, are small ports in terms of overall turnover. For a more concise analysis, therefore, only selected ports have been further analysed in the context of the study. The choice of ports was based on the ranking of ports in terms of empty containers shipped back to the PoH (empty container import in TEU). The procedure of choosing ports was undertaken jointly with the HPA. To ensure a feasible number of ports it was decided to make an in-depth analysis of 15 ports. First the ranking was built for all BSR ports. In addition, areas of special interest beyond the ranking were identified. First it was decided to include Northern Scandinavian ports that are more export-oriented: these were Oulu (FI), Rauma (FI), and Gävle (SE). Second Hamina (FI) was included as well due to the fact that empty containers shipped back from St. Petersburg to the PoH are often transported via the ports of Kotka and Hamina. The ports in question are marked green in Figure 5.10.

Figure 5.10: Ports in the BSR with containerised cargo flows from/to the PoH



Source: Own design

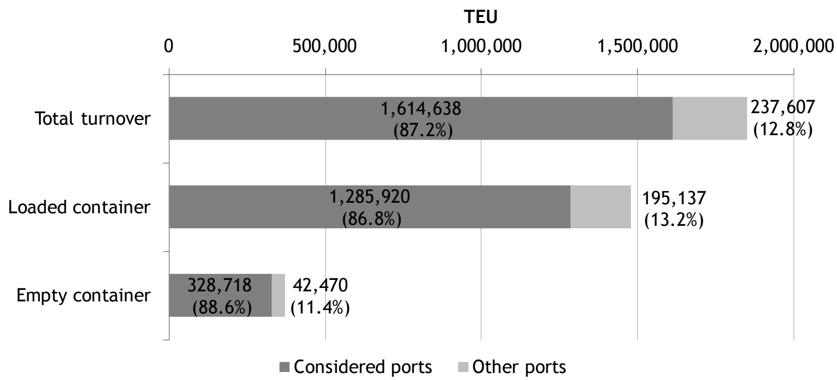
Figure 5.11: Import and export containers in the PoH destined for and returning from the BSR (in TEU for the year 2011)



Source: Own design based on PLINS data set

The chosen ports are, in alphabetical order: Aarhus (DK), Copenhagen (DK), Gavle (SE), Gdynia (PL), Goteborg (SE), Hamina (FI), Helsinki (FI), Kaliningrad (RU), Klaipeda (LT), Kotka (FI), Oulu (FI), Rauma (FI), Riga (LV), St. Petersburg (RU) and Tallinn (EE)25. Compared with all ports in the BSR that have containerised cargo flows from/to the PoH, their total container turnover (in TEU) equalled 87.2% in 2011. As for empty containers (import and export) they even amount to 88.6% (see Figure 5.12). An excerpt of the PLINS data set showing data from the 15 ports considered can be found in Annex B.

Figure 5.12: Relevance of considered 15 ports (in TEU for the year 2011)



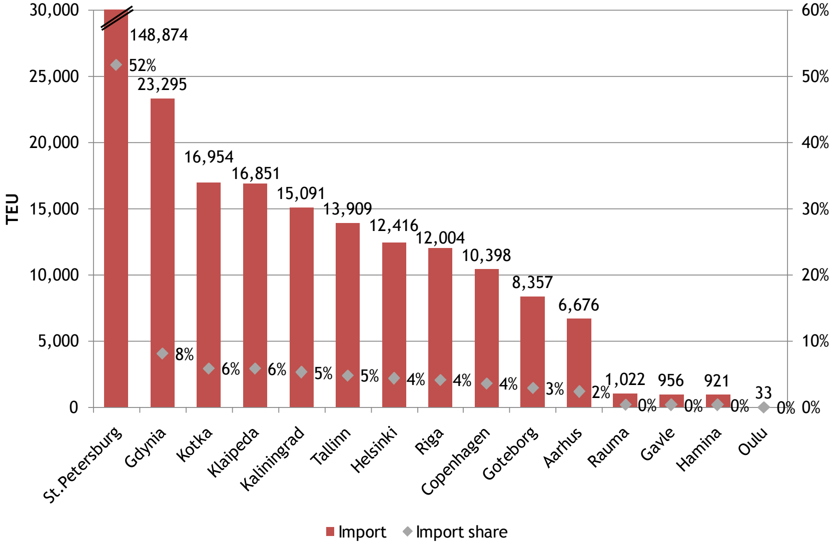
Source: Own design based on PLINS data set

On the port level, it becomes clear that empty imports and exports between Hamburg and the BSR not only differ in terms of total numbers but also structurally in terms of the ports of origin for empty imports and ports of destination for empty exports respectively.

Empty imports show the dominant role of the port of St. Petersburg (see Figure 5.13). Almost 150,000 TEU equalling more than 50% of the empty containers that reach Hamburg from the BSR originate from there. The remaining half is distributed among a larger number of ports in Poland, Scandinavia and the Baltic states with shares of between 4% and 8% or 10,000 and 23,000 TEU respectively.

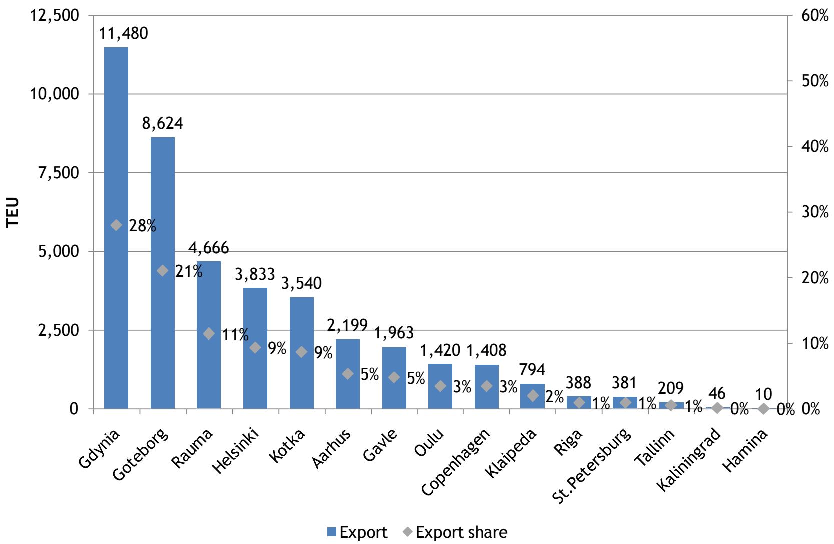
25 In the course of 2011, the ports of Kotka and Hamina merged into the Port of HaminaKotka. The underlying data set, however, still distinguishes between the two ports.

Figure 5.13: Import of empty containers by port (in TEU for the year 2011)



Source: Own design based on PLINS data set

Figure 5.14: Export of empty containers by port (in TEU for the year 2011)

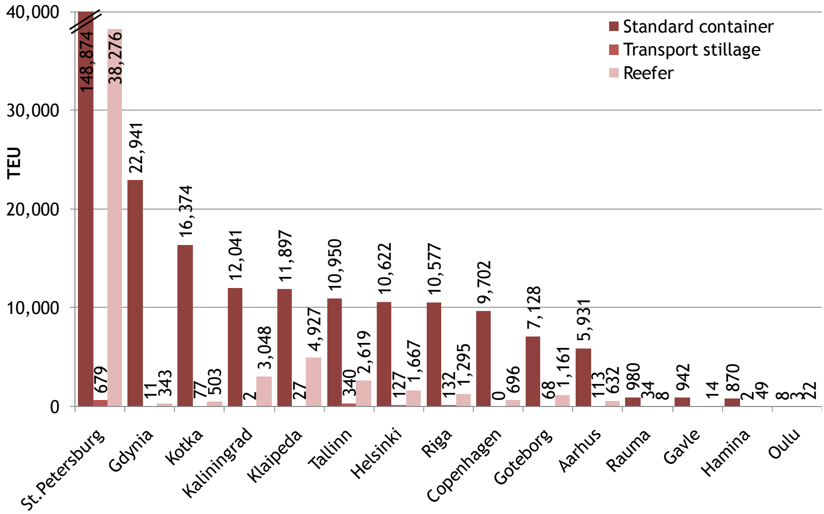


Source: Own design based on PLINS data set

Empties leaving Hamburg for the Baltic Sea region, in contrast, lack an equally dominant player (see Figure 5.14). Gdynia (c. 11,500 TEU or 28%) and Goteborg (8,500 TEU or 21%) together account for almost 50% of containers leaving Hamburg for the BSR, but on a much lower scale than St. Petersburg on the import side. The Finnish ports of Rauma (11%), Helsinki (9%) and Kotka (9%) account for a further 30% of all empties leaving Hamburg for the BSR (c. 12,000 TEU in total).

Another important factor for empty repositioning is the type of container equipment. Import and export flows to and from Hamburg can vary significantly depending on the container type. In the following, a distinction is drawn between standard containers, reefers and transport stillages.

Figure 5.15: Import of empty containers by type and port (in TEU for the year 2011)

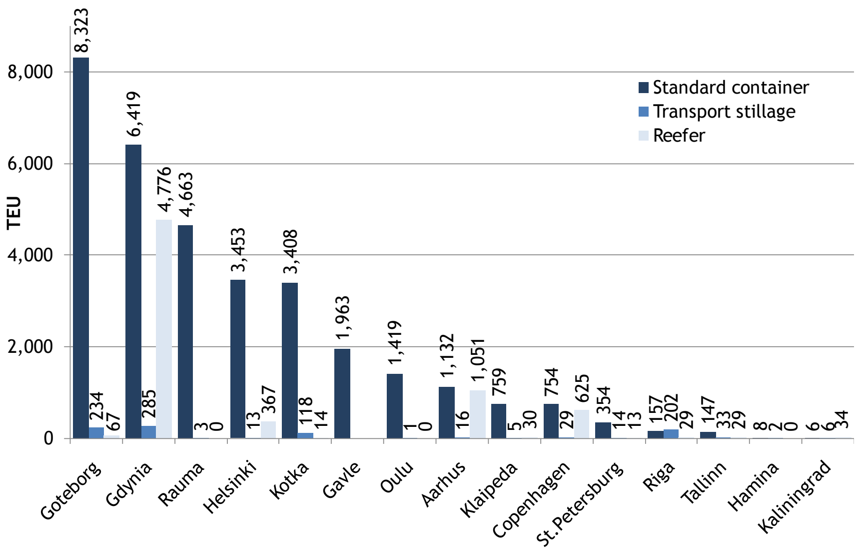


Source: Own design based on PLINS data set

Figure 5.15 shows the number of empty containers returning to Hamburg (import) from BSR ports (the 15 ports in question). Here again, the dominant role of St. Petersburg (c. 110,000 TEU empty standard containers and c. 38,000 TEU reefers) becomes apparent. For standard containers, Gdynia and Kotka come second and third, total numbers however, only add up to one fifth or one sixth of the volumes of St. Petersburg respectively. Some smaller ports such as Kaliningrad, Klaipeda, Tallinn, Helsinki, Riga and Copenhagen then follow with around 10,000 to 12,000 TEU p.a. For reefers, Klaipeda with around 5,000 TEU comes second, followed by Kaliningrad (c. 3,000 TEU) and Helsinki (c. 1,700 TEU). Transport stillages, which are used for example for tank containers, only play a minor role in empty flows between Hamburg and the BSR.

Export flows of containers are, as explained before, much smaller than imports. St. Petersburg plays only a minor role. Goteborg (c. 8,300 TEU), Gdynia (c. 6,400 TEU) and Rauma (c. 4,700 TEU) are the top 3 in standard empty container export. For reefers, they are Gdynia (c. 4,800 TEU), followed by Aarhus (c. 1,000 TEU) and Copenhagen (c. 600 TEU). As for imports, transport stillages only play a minor role here. Figure 5.16 shows the number of empty containers leaving from Hamburg (export) to the BSR ports (for the 15 ports in question).

Figure 5.16: Export of empty containers by type and port (in TEU for the year 2011)



Source: Own design based on PLINS data set

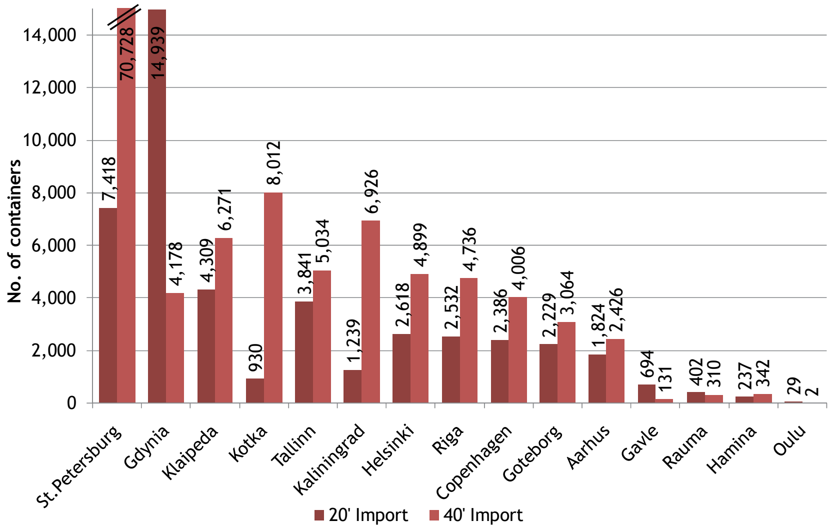
Containers can further be distinguished by container size into 20‘ and 40‘ containers[26]. For ease of comparison, units in Figure 5.17 and Figure 5.18 are, in contrast to the previous graphs, not TEU but actual numbers of containers.

Figure 5.17 shows the numbers of empty containers imported from the BSR to Hamburg in 20’ and 40’ units (from the 15 ports in question). It becomes clear that

26 The PoH data set did not allow further differentiation in for instance 45’, pallet wide, or high cube containers.

the dominant role of St. Petersburg is especially due to 40’ containers returning to Hamburg (c. 71,000). By comparison the number of 20’ containers returning to Hamburg from St. Petersburg is much smaller, accounting for only around 10% of all St. Petersburg containers destined for Hamburg. Other important ports from where 40’ standard containers are returned to Hamburg are Kotka (c. 8,000 containers), Kaliningrad (c. 6,900 containers) and Klaipeda (c. 6,300 containers) followed by a group of five ports across the region with around 4,000 to 5,000 empty containers. The largest port for 20’ standard containers destined for Hamburg is Gdynia with c. 15,000 empty boxes, followed by St. Petersburg (c. 7,500 containers), Klaipeda (c. 4,300 containers) and Tallinn (3,850 containers).

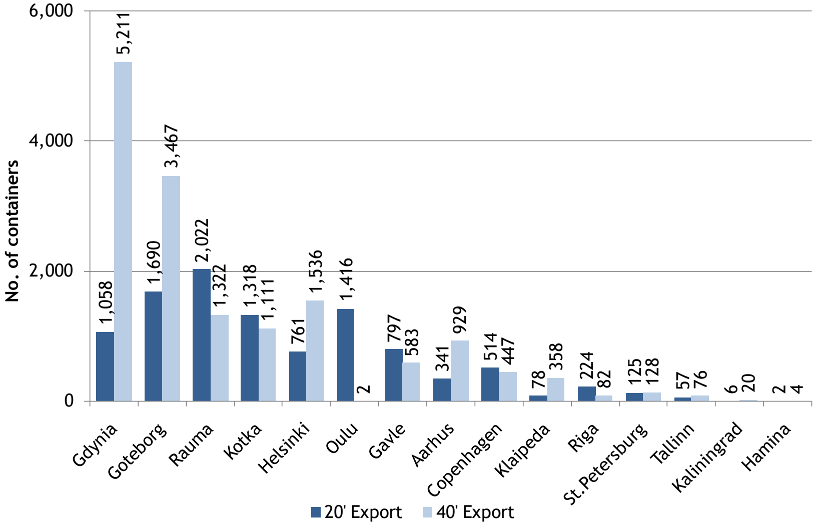
Figure 5.17: Import of empty containers by size and port (in total numbers for the year 2011)



Source: Own design based on PLINS data set

Figure 5.18 shows the numbers of empty containers exported from Hamburg to the BSR in 20‘ and 40‘ units (from the 15 ports in question). Compared with the total numbers, the scale of empty export containers leaving Hamburg for the BSR is much smaller than that of import containers. Important ports receiving 40‘ empties from Hamburg are Gdynia (c. 5,200), Goteborg (c. 3,450) and Helsinki (c. 1,500). Rauma (c. 2,000), Goteborg (c. 1,700) and Oulu (c. 1,400) are the largest receiving ports of 20‘ export containers leaving Hamburg.

Figure 5.18: Export of empty containers by size and port (in total numbers for the year 2011)



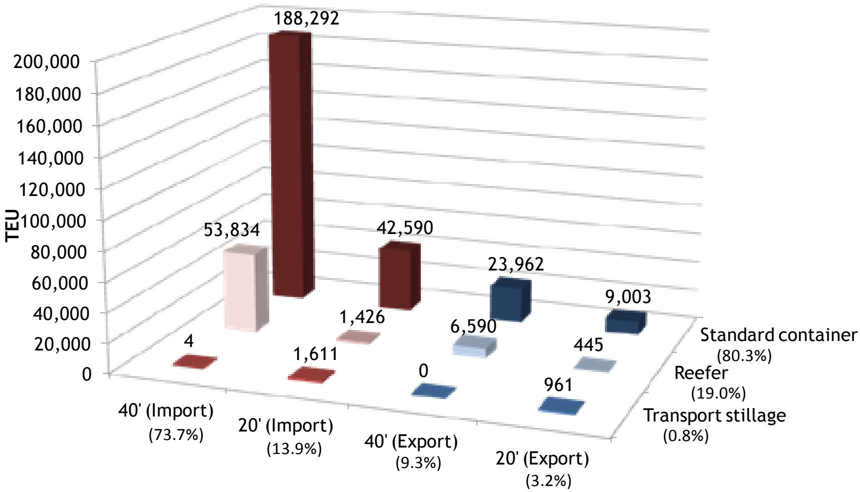
Source: Own design based on PLINS data set

Empty containers of different direction, sizes and types hold different shares in the overall empty turnover of the ports considered. By Figure 5.19 it becomes evident that the main share in terms of container type is held by standard containers, which account for around 80% of all empty containers. The majority of them are 40‘ import containers that amount to almost 190,000 TEU equalling almost 58% of all transported empties. The 20‘ import containers (c. 43,000 TEU or 13%) as well as the 40‘ import containers (c. 24,000 TEU or 7%) play a less but still important role in comparison to others. The 20‘ export containers (c. 9,000 TEU or 3%) are only a small share. Reefers account for 19% of all transported empty containers between the PoH and the ports in question. The main share is held by 40‘ import reefers which represent the second main group after 40‘ standard import containers with almost 54,000 TEU equalling c. 16%. Other reefers play only a subordinate role with 20‘ export reefers (c. 6,600 TEU or 2%), 40‘ import reefers (c. 1,500 TEU or 0,4%) and 20‘ export reefers (c. 500 TEU or 0,1%). These figures further show that reefers are usually 40‘ containers.

The ratio of 40‘ to 20‘ standard containers is around 4.4:1, while the ratio of 40‘ to 20‘ reefer containers is 37.8:1. Last, there are the transport stillages that account for only around 1% of all empty containers. Still, a clear dominance of

20‘ feet containers can be noted here, as only four 40‘ transport stillages where transported at all. Due to their apparent minor importance they are excluded from the following analysis.

Figure 5.19: Overview of empty containers on the relation PoH – BSR by direction, size and type for the 15 ports considered (in TEU for the year 2011)



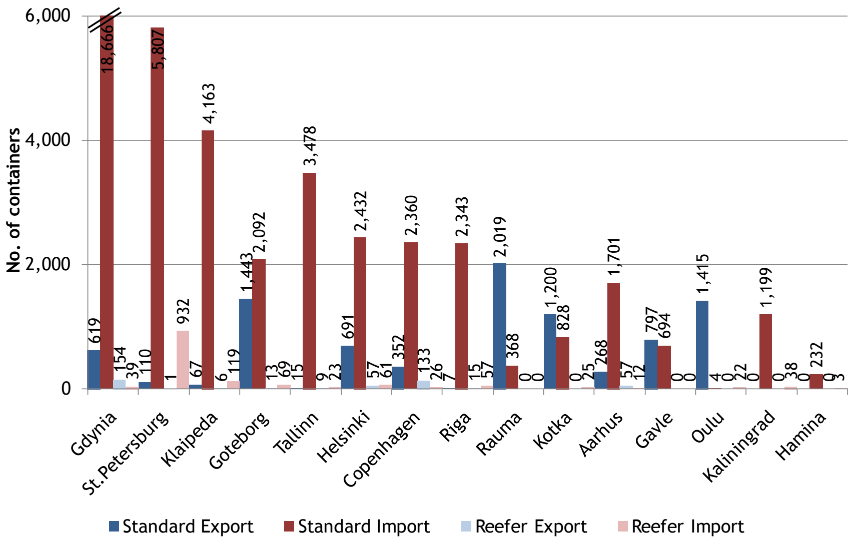
Source: Own design based on PLINS data set

The analysis has so far enabled a comparison of considered ports by container type, direction and size separately. In the following, results are further refined for a combined comparison.

In Figure 5.20 imports and exports of 20‘ containers are illustrated for empty standard and reefer containers. As mentioned above, the dominant role of the standard import containers is evident. In particular Gdynia (c. 18,500 containers) is salient in this respect. Second comes St. Petersburg (c. 5,800 containers) followed by Klaipeda (c. 4,200 containers) and Tallinn (c. 3,500 containers). Then a group of several ports account for between 1,700 and 2,500 containers (Helsinki, Copenhagen, Riga, Goteborg and Aarhus). Standard export containers play a subordinate role. They are headed by Rauma (c. 2,000 containers) followed by Goteborg and Oulu (both c. 1,400 containers), Kotka (c. 1,200 containers), Gavle (c. 800 containers), Helsinki (c. 700 containers) and Gdynia (c. 600 containers). In terms of reefers their minor role among 20‘ containers is again apparent. Around 1,000 import reefers return to the PoH from St. Petersburg and another

120 from Klaipeda. For other ports the figures are negligible (<100 containers). 20‘ export reefers are even rarer in exchange with the BSR. A few are destined for Gdynia (154 containers) and Copenhagen (133 containers); with regard to other ports the figures are again negligible (<100 containers).

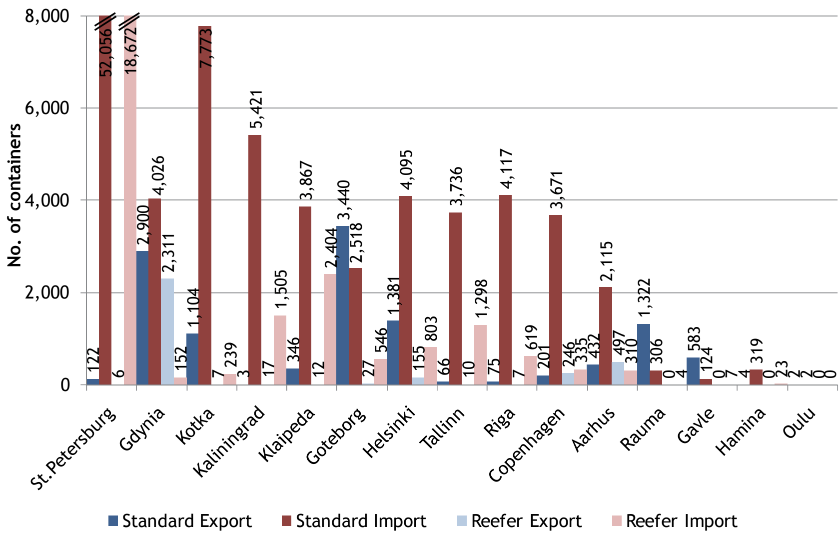
Figure 5.20: Import and export of empty 20‘ containers per container type (in total numbers for the year 2011)



Source: Own design based on PLINS data set

Figure 5.21 shows imports and exports of 40‘ containers for empty standard and reefer containers. As for 20‘ containers, the dominant role of standard import containers becomes evident for 40‘ containers as well. Here it is St. Petersburg that heads the ranking by far (c. 52,000 containers). At a remarkable distance St. Petersburg is followed by Kotka (c. 8,000 containers) and Kaliningrad (c. 5,500 containers) and several ports with around 4,000 standard import containers (Riga, Helsinki, Gdynia, Klaipeda, Tallinn, Copenhagen). The above-mentioned subordinated role of exports also applies to standard 40‘ containers. Goteborg receives around 3,500 40‘ standard containers, followed by Gdynia (c. 2,900 containers), Helsinki (c. 1,400 containers), Rauma (c. 1,300 containers), Kotka (c. 1,400 containers), and Gavle (c. 600 containers). By virtue of the fact that refers are predominantly 40‘ containers, greater flows than of 20‘ reefers are recorded. In terms of import reefers, St. Petersburg again stands out with around 18,500 containers. Second comes Klaipeda, at a remarkable distance, with around 3,900 containers, followed by Kaliningrad (c. 1,500 containers), Tallinn (c. 1,300 containers), and Helsinki (c. 800 containers). Reefers leaving Hamburg for the BSR are mainly destined for Gdynia (c. 2,300 containers). A few hundred go to Aarhus (c. 500 containers), Copenhagen (c. 250 containers) and Helsinki (c. 150 containers). Other 40‘ feet export reefers are negligible.

Figure 5.21: Import and export of empty 40′ containers by container type (in total numbers for the year 2011)



Source: Own design based on PLINS data set

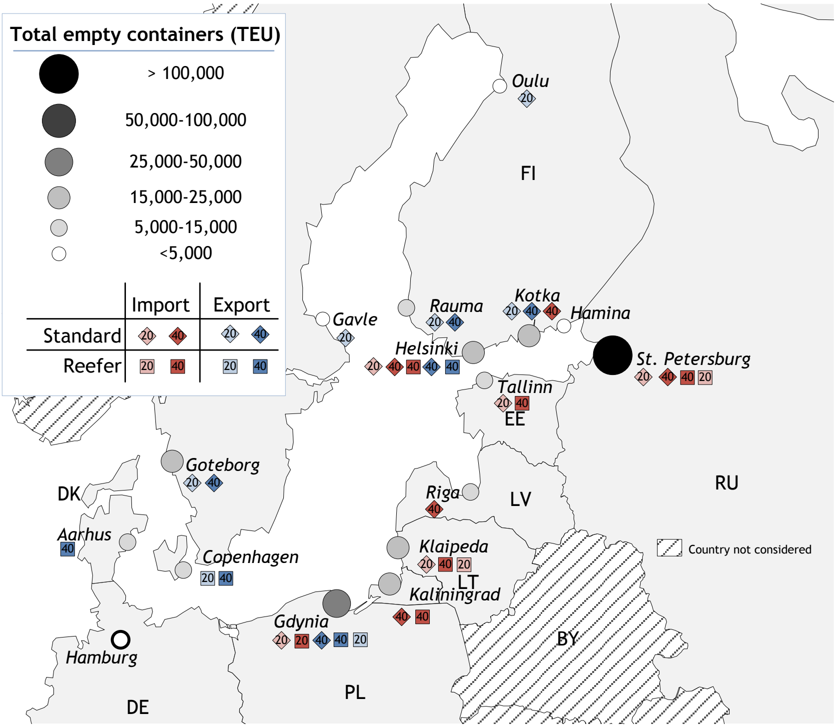
5.3 Summary

Empty container logistics can be said to be a key challenge of container transportation. It represents a remarkable cost component for the global industry, accounting for around one fifth of global industry income in recent years. Equally, empty container logistics leads to negative environmental and social impacts. Moreover, conflicting interests of involved stakeholders can become a critical burden when implementing improvement measures. Consequently, the application of the SMC in this field of application appears to be a suitable approach to exploring empty container logistics and its improvement.

Furthermore, the relevance of the study area Hamburg - BSR was portrayed by the data analysis in the preliminary chapter as Hamburg recording a comparatively high empty container incidence and the share of empty containers originating from the BSR being remarkable, especially incoming empty containers. Thus the focus on this particular study area appears to be reasonable.

Results of the data analysis are summarised in Figure 5.22. It shows the diversity of empty equipment handled in the region in terms of the type of empty equipment, its size as well as the direction of flows for the BSR ports considered. For standard and reefer containers, further divided by direction (import/export) and size (20‘/40‘), the top 5 ports of each were included in the illustration[27].

Figure 5.22: Hotspots of empty container flows on the relation PoH – BSR: ports by type, size and direction



Source: Own design based on PLINS data set

27 The top five only included figures greater than 100 so as not to overemphasise the role of a port. This applied to 20‘ reefers import and export (2 ports included for each), as well as to 40‘ reefer export (4 ports included).

St. Petersburg is by far the largest port in terms of empty import movements for standard containers as well as for reefers. So the vast majority of empty containers from there are imported, i.e. shipped back to Hamburg. Gdynia, the region's second largest port with regard to the exchange of empty containers with Hamburg especially receives empty reefers and 40‘ standard containers and ships back 20‘ standard and reefers. Southern Scandinavian ports such as Aarhus (40‘ reefers), Goteborg (20‘ and 40‘ standards) and Copenhagen (20‘ and 40‘ reefers) are predominantly receivers of empty equipment. The Baltic ports of Tallinn, Riga and Klaipeda, being predominantly exporters of empties, ship empties (standard as well as reefers) back to Hamburg. Ports in the Gulf of Finland show a heterogeneous picture. Whereas the Port of Helsinki imports and exports standard and reefer containers to and from Hamburg, the Port of Kotka, predominantly a transhipment hub, ships standard containers back to Hamburg and receives empty 20‘ standard boxes. Hamina plays only a minor role in terms of aspects analysed. The northern Scandinavian ports of Gavle, Oulu and Rauma predominantly receive empty standard containers from Hamburg.

Identified hotspots of empty container flows served as input for identifying stakeholders in the context of the case study.

6 Case study: Managing stakeholders in empty container logistics in the Hamburg - Baltic Sea Region area

In this chapter the consistency and feasibility of the framework developed for managing stakeholders in empty container logistics in the Hamburg – Baltic Sea Region (BSR) area are tested.

In accordance with the research design outlined in chapter 1.3, the *case study* research approach was chosen to test the consistency and feasibility of the framework developed. So the case study can be classified as explorative. Given that the first application of the framework enables the investigator to observe and analyse a phenomenon hitherto inaccessible to scientific investigation, the case study can be called a revelatory case, and thus the case investigated is a critical one.

The suitability of a stakeholder-oriented approach to improve empty container logistics was already shown in the preparatory study (see chapter 5.1). Furthermore, the reasonability for improving empty container logistics in the Hamburg – BSR area was portrayed (see chapter 5.2). Finally, the application of the stakeholder management framework to explore change processes of empty container logistics in the Hamburg – BSR study area is a justified approach. The SMC thus serves as analysis and management tool to create transparency and develop recommendations for stakeholder involvement.

The objective of this case study is thus twofold: it aims at testing the consistency and feasibility of the stakeholder management framework developed in this thesis but also aims at generating transparency and developing recommendations for change processes in empty container logistics for the PoH in relation to the BSR.

The case study comprises an application of the framework to two phases of the change process. The case study design in terms of the data collection and evaluation methods used is first described in chapter 6.1. The application during the definition phase is portrayed in chapter 6.2. In chapter 6.3, the evaluation phase is concretised for a measure to improve empty container logistics. Finally, a summary is given and conclusions are drawn with regard to the objectives set (chapter 6.4).

6.1 Case study design: data collection and evaluation methods

The configuration of SMC steps as portrayed in chapter 4 provides guidance on how to perform stakeholder management for change processes along maritime container transport chains. Thereby different methods such as interviews, surveys, literature review are proposed to perform the SMC. Nonetheless specific application requires a more detailed methodological knowledge that was not included in the SMC for avoiding a too tight framework. For example in context of chapter 4.4 different techniques for conducting enquiries were outlined including related advantages and disadvantages. However, the reasoning for a concrete interview structure or the choice of a specific evaluation method should be left to the user and the specific application.

The choice and application of methods as applied in the case study is portrayed in the following.

During the definition phase a set of different methods was used. Based on knowledge generated by the preparatory work outlined in chapter 5, a workshop was held to clarify the objective of the stakeholder management cycle and identify relevant stakeholders as part of the ensuing analysis. This ensuing analysis consists of two parts: an interview series with selected stakeholders to scope processes, identify issues and influence factors as well as a survey to evaluate identified issues and influence factors by comparison. Finally, all collected data is analysed and conclusions are drawn. The study design of the definition phase is summarised in Table 6.1.

Table 6.1: Study design of the definition phase

Study part	Related SMC steps	Applied data collection methods
Initial setting	- **Clarifying objectives** - **Identifying stakeholders**	Workshop
Interview series	- **Scoping processes** - **Profiling stakeholders** (for identifying issues and influence factors)	Qualitative interviews
Survey	- **Profiling stakeholders** (for evaluating identified issues and influence factors in comparison)	Questionnaire
Conclusion	- **Profiling stakeholders** (for evaluating and interpreting the data collected in previous steps) - **Deriving involvement strategies**	Analysis and compilation of previous results Literature Review

Source: Own design

The application of the SMC in the evaluation phase was based on insights gained during the definition phase amended with a literature review. Initial first strategies and measures to face challenges in empty container logistics were compiled from relevant sources in literature, mainly from journal papers and industry studies. For evaluation of the virtual container yard (VCY) as selected measures gained insights from the definition phase were further refined and specified for a diversified evaluation also based on relevant sources in literature. Here in particular the studies of Boile and Theofanis who explored the feasibility of virtual container yards for the Port of New York and New Jersey were taken as a basis (Boile, 2006; Theofanis & Boile, 2007). Of further relevance were studies by the Tioga Group (2002) and Le Dam Hanh (2003) who generally analysed empty container logistics in the Southern California Region for the Ports of Los Angeles and Long Beach and considered the VCY as one among several measures to improve empty container logistics (The Tioga Group, 2002, LeDam Hanh, 2003).

In particular the interview series and the survey conducted within the case study required a profound methodological basis for collecting and evaluating data and information. Therefore they are portrayed in detail hereinafter.

Interview series

The aim of the interview series was to explore the perspective of the various stakeholders in empty container logistics. It was intended to investigate aspects that should be considered in preparation for and during change processes. According to the framework developed, these are mainly the processes of empty container logistics, current issues and influence factors.

Due to the fact that this is an explorative case study and that in particular this part of the case study was to explore intentions, issues and influence with regard to empty container logistics, it was decided to make use of semi-structured interviews. As several people were to be interviewed, an interview guide was developed. The entire interviews – both parts (discussion of process charts and questions) – were recorded and transcribed for further analysis.

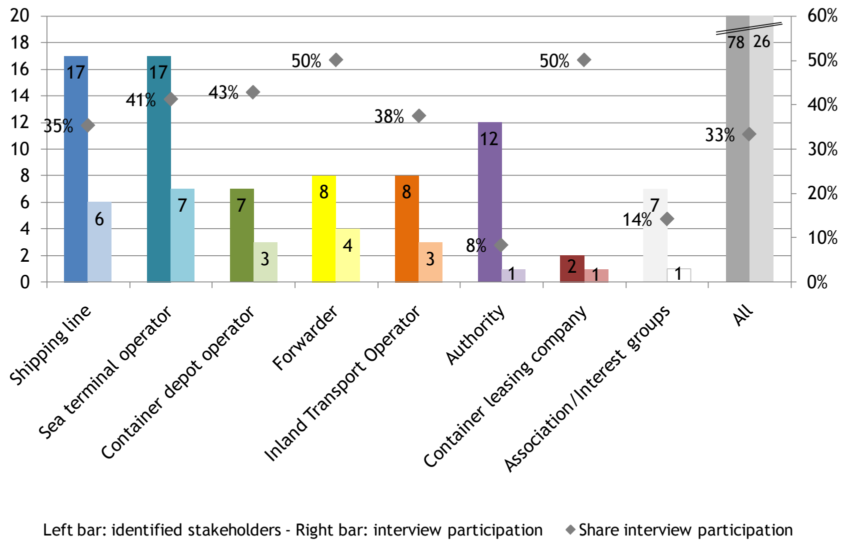
Focus group

During the workshop (see above), 78 relevant stakeholders were identified and assigned to different groups. They were classified as members of generic stakeholder groups such as shipping lines, terminal operators etc., but also assigned to different port areas. Interviewees were chosen out of the group by complying with the aim that both classifications were eventually sufficiently represented in the case study. The aim was thus to build a representative group for all port areas. Nevertheless, the willingness of potential interviewees is crucial for an interview, so some port areas were under-represented or not represented at all. As the case study's focus was on the Hamburg port area, more interviews were conducted there. An anonymised list of interviewees can be found in Table C.1.

An overview of the interview participation by different stakeholder groups is given in Figure 6.1. Overall, 26 interviews were conducted, thus one third of the stakeholders identified were interviewed for the case study. Interview participation is shown for each stakeholder group in absolute and relative figures. The low share of port authorities and associations/interest groups was due their low interest in being interviewed.

As for the allocation of stakeholder groups to port areas, low response rates were apparent for northern and southern Scandinavian port areas (see Figure C.1). This was partly due to a low interest in being available as interview partner. One aspect to mention is that no personal interviews could be offered to these stakeholders. These stakeholders were asked for a telephone interview but unfortunately without success.

Figure 6.1: Interview participation of different stakeholder groups



Source: Own design

Structure

All interviews were built up twofold. The first part included the discussion and verification of the process charts. The second part was based on the interview questions. In the following the questions are quoted, the original interview guide can be found in Annex C.1.

- Part A: Benefits and challenges of empty container logistics
  1. What are the benefits of empty container logistics for your company?
  2. Are there any benefits for other stakeholders you are aware of?
  3. What are the challenges of empty container logistics for your company?
  4. Are there any challenges for other stakeholders you are aware of?
- Part B: Current issues in empty container logistics
  5. What are current issues in empty container logistics for your company?
  6. Are there any other current issues you notice from other stakeholders?
- Part C: Potential for optimisation
  7. Do you see any potential for optimisation from the perspective of your company?
  8. Do you see any potential for optimisation with regard to other stakeholders?
- Part D: Interrelations with other stakeholders
  9. To which other stakeholders in empty container logistics do you have relevant interrelations and of what kind are they?
- Part E: Influence to design empty container logistics
  10. Which stakeholders have influence to design empty container logistics?
  11. Which aspects constitute influence and power in empty container logistics?
  12. What is your influence like to design empty container logistics?
- Part F Other
  13. Do you have any further comments?

Questioning and evaluation methods

The structure of interviews and choice of questions were designed for the following reasons. Starting with the process charts was chosen in order to begin with a topic that all respondents are expected to be familiar with and probably have no qualms about discussing. The questioning part and almost every topic dealt with always asked about the perspective of the respondent as well as about the perspective of other stakeholders to sensitise them for the focus of the whole study. Beyond the processes, the main interest of the interviews was in parts B (issues) and E (influence) to explore essential parts needed for the stakeholder management framework. Part A on challenges and benefits was intended to start the flow of the interview (as recommended by Lee & Lings, 2008, p.219) and to introduce the interviewee to part B, just as part D was intended to open the mind about interrelations of stakeholders as an introduction to part D. By Part C potential solution options were explored. The final part F was the last and completely open question in case interviewees wanted to add anything relevant.

The process charts were adapted and amended after almost every interview. So they were discussed and improved in 26 interviews. Due to the fact that suggestions for improvement declined over the time, their quality is assumed to have been sufficient to outline the processes desired.

The questioning part after the process discussion was analysed using elements of content analysis. Content analysis is a methodology applied in social sciences for reviewing and analysing the content of communication. Usually, content analysis (according to Mayring, 1983) is a comprehensive analysis comprising a three-stage coding procedure: summarising, expatiating and structuring (Bortz & Döring, 2006, p.332). In this case study only the latter step was conducted in order to identify relevant categories structuring the subjects under investigation[28].

Survey

The questionnaire was based on the series of interviews that were conducted to identify fields of action and power factors in empty container logistics design. Different stakeholders along the maritime container transport chain were addressed to build a substantiated basis for this survey. The questionnaire takes up the interview findings to cross-check them with the different stakeholder groups, presenting the comprehensive stakeholder-specific findings to them for a final comparative evaluation. This questionnaire is therefore aimed at creating a multi-stakeholder analysis on fields of action and exertion of influence to design empty container logistics in the Hamburg - BSR study area.

It was decided to make use of survey research as it permits enquiry about subjects that are internal to the participants as attitude and opinions. The survey was

28 This coding procedure was realised using the software NVivo.

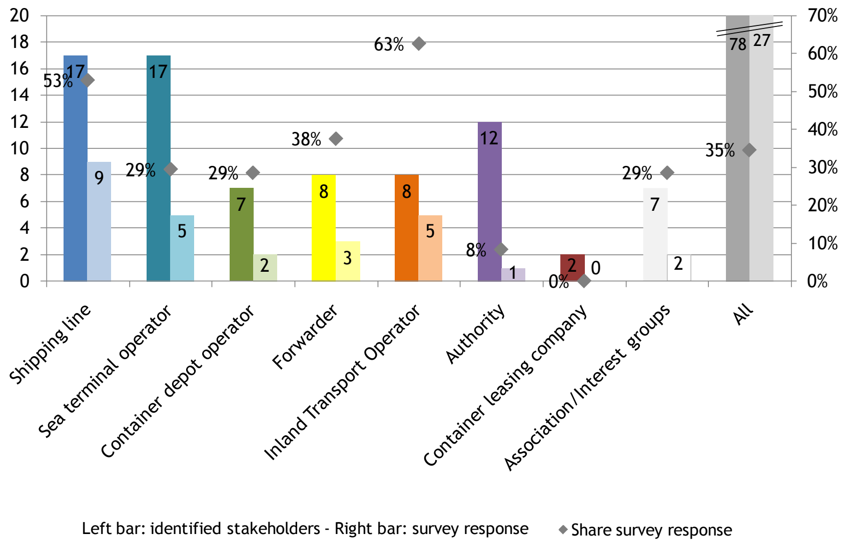
designed as an e-mail questionnaire and could be completed electronically (on a PDF form) or manually.

Focus group

The focus group comprised all the stakeholders identified during the initial workshop with the case study partner, so the questionnaire was sent to 78 potential respondents.

An overview of survey participation by different stakeholder groups is given in Figure 6.2. Around 27, or one third of identified stakeholders, took part in the survey. Survey participation is shown for every stakeholder group in absolute and relative figures. Again, the low share of port authorities is striking. Also, the container leasing companies did not show an interest in participating in the survey.

Figure 6.2: Survey participation of different stakeholder groups



Source: Own design

The low response rates of northern and southern Scandinavian port areas that were already apparent during the interview series occurred again in the survey (see Figure C.2).

Due to the fact that some stakeholder groups were under-represented (associations and authorities), they were subsumed in the group *others* in the ensuing analysis.

Structure

The questionnaire was divided in four parts. The first part A aimed to establish respondents' sectoral classification as well as their relation to empty container logistics in terms of their evaluation of the importance of empty container logistics with regard to their business. The second part B dealt with change process design, asking the respondents about their evaluation of stakeholder involvement in change processes of empty container logistics as well as about the kind of involvement they would prefer. The third part C sought to evaluate different fields of action to improve empty container logistics. Respondents were asked to describe their attitude towards the change of several fields of action to improve empty container logistics. Furthermore they were asked to rank their top 5 with regard to the different fields of action. The last part D dealt with power factors in change processes of empty container logistics by investigating the self-evaluation of respondents with regard to several power factors as well as a paired comparison of them. The questions are quoted as follows, the original questionnaire can be found at Annex C.3.

- Part A: Your company and the importance of empty container logistics
  - A.1 What is the name of your organisation/company?
  - A.2 What kind of organisation/company do you work for?
  - A.3 How would you rate the importance of empty container logistics with regard to your business?
- Part B: Design of change processes
  - B.1 How would you evaluate the importance of involving all related stakeholders in change processes of empty container logistics?
  - B.2 How would you like to be involved in change processes of empty container logistics?
- Part C: Fields of action to improve empty container logistics
  - C.1 How would you describe your attitude towards the change of the following fields of action to improve empty container logistics?
  - C.2 How would you rank the importance of the different fields of action to improve empty container logistics?
- Part D Power factors in change processes of empty container logistics

- D.1 How would you evaluate your influence in designing empty container logistics with regard to different factors of power?
- D.2 How would you evaluate the importance of the above power factors for change processes in empty container logistics?

Questioning and evaluation methods

As outlined above, the questionnaire was structured in four parts A, B, C and D. Parts A and B asked more general questions in order to classify respondents with regard to different stakeholder groups, their general attitude towards empty container logistics and the importance for respondents of being involved in change processes and how they might like to be involved. Parts C and D aimed at classifying respondents according to their attitude to identified issues (part C) as well as their influence by identified power factors (part D) in order to place them in a power-attitude matrix. They were thus also asked to rank issues (part C) and power factors (part D) according to their importance.

In order to comply with the objectives of parts A, B, C and D, different questioning and resulting evaluation methods were applied. In the following the methodological background is presented and the application in this case study is discussed and outlined.

Table 6.2: Description of ordinal scaling questions intending to classify respondents

No.	Intention of demanded evaluation	Dimension of the ordinal scale	Attributes
A3	Classification of respondents regarding the *importance of empty container logistics with regard to their business*.	Importance	Very important, important, or unimportant
B1	Classification of respondents regarding their perceived *importance of being involved in change processes*.	Importance	Very important, important, or unimportant
C1	Classification of respondents according to their *attitude towards different fields of action to improve empty container logistics*.	Attitude	Active resistance, reluctance, neutral, approval, or active support
D1	Classification of respondents regarding their *influence on change processes of empty container logistics* with respect to given power factors.	Influence	No influence, slight influence, relevant influence, or strong influence

Source: Own design

Question A1 asked respondents to name their company. Question A2 aimed at a sectoral classification of respondents and was formulated as a semi-closed question by giving a range of answers but providing the option to add a sector in a free field. Multiple entries were possible so that answers did not exclude each other.

Question B2 sought to investigate how respondents wanted to be involved in empty container logistics change processes (different ways of involvement were identified in chapter 4.5). The question was formulated as a closed question with multiple entries.

For the rest of the questionnaire only questions based on ordinal and interval scales were used, but with different intentions such as ranking elements or classifying respondents. Measurement on ordinal scales seeks to enable the researcher to order elements on a one-dimensional scale that permits ranking and also grouping or classifying. Ordinal scales are called interval scales if the intervals between elements are equal (Porst, 2009, p.69 ff.).

In several questions respondents were asked to give their evaluation on ordinal scales in order to classify them with respect to a certain dimension by the help of ordered attributes. In Table 6.2 the questions are described with regard to their intention of evaluation, the dimension of the ordinal scale and the attributes.

Whereas above questions aimed at classifying respondents, questions C2 and D2 aimed at ranking given elements by ordinal or interval scaling.

Question C2 sought to rank given fields of action to improve empty container logistics. Respondents were asked to choose the five most important fields of action by choosing from 11 listed fields of action. This way of asking was chosen, as it was supposed that ranking all 11 elements would be too challenging for respondents and would lead to random answers. Saaty (2001) points out that the number of manageable items in this respect usually ranges between five and nine (Saaty, 2001, p.17). Thereby a ranking from 1 to 5 induces an interval scaling.

However, this resulted in an incomplete ranking. Ranks (1, 2, 3, 4, and 5) given by the respondents (columns) for the given n elements (lines) are represented in a matrix. According to Zangemeister (1971) and the '*Rangordnungsummenregel*' (rule for building sums out of rankings), overall ranks can be established by building the sum of all ranks for each element and all responses and ordering the elements by the sums (starting with the smallest). In order to take into account the fact that the ranking is incomplete, the ranks are *inverted,* meaning 1 to 5, 2 to 4, 3 stays 3, 4 to 2 and 5 to 1. This method also leads to a true ranking, the sums per element then have to be ordered starting with the greatest at rank 1 (Zangemeister, 1971, p.269 ff.).

Question D2 sought to identify a weighted ranking of given power factors, so the ranking method of paired comparison was used, i.e. all factors were compared within a preference matrix. The comparison was related to one attribute: the importance of one factor for change processes in empty container logistics.

In literature the method of paired comparison is applied in manifold areas e.g. in the context of utility analysis (see Zangemeister, 1971), the analytical hierarchy process (see Saaty, 2001 or Saaty, 2000) but also described in the context of ranking methods in general (see Kendall & Gibbons, 1990) or quality management literature (Ott & Scheib, 2002; Kamiske, 2012).

Paired comparison is applied to rank different alternatives by comparing each two alternatives (a pair) on an ordinal scale with respect to a selected attribute (Zangemeister, 1971, p.160). The judgements applied combine logical thinking with informed experience (Saaty, 2001, p.71)

The following notation can be used (Kendall & Gibbons, 1990, p.184): if alternative A is preferred to alternative B with respect to one specific attribute write:

$$A \rightarrow B \text{ or } B \leftarrow A$$

Zangemeister (1971) uses mathematical operands to express the same judgement such as A > B or B < A (Zangemeister, 1971, p.161).

In practice the comparisons are done with the help of a matrix like Table 6.3, comparing four alternatives A_1, A_2, A_3 and A_4. The number of elements is n and takes 4 in this example. Depending on the method used, the comparative value c_{ij} (with $i \neq j$ and i, j= 1, 2, 3, 4) can take different values.

Table 6.3: Paired comparison using a preference matrix

j \ i	A_1	A_2	A_3	A_4
A_1	-	c_{12}	c_{13}	c_{14}
A_2	c_{21}	-	c_{23}	c_{24}
A_3	c_{31}	c_{32}	-	c_{34}
A_4	c_{41}	c_{42}	c_{43}	-

Source: Own design based on Zangemeister, 1971, p.161

The methods presented by Zangemeister (1971) or Kendall (1990) are applied to prioritising elements according to one attribute with true preferences, i.e. that when comparing two factors A_i and A_j, A_i or A_j is preferred to the other and they cannot be evaluated as equal. Thereby c_{ij} takes 1 if factor A_i is preferred to A_j and takes 0 if A_j is preferred to A_i. The reciprocal value for c_{ji} can be derived from c_{ij}: if c_{ij} equals 1 then c_{ji} should equal 0 and vice versa (Kendall & Gibbons, 1990, p.185 ff.; Zangemeister, 1971, p.161).

Other methods additionally allow the judgement of two alternatives being equal with respect to one attribute.

As part of the analytical hierarchy process the paired comparison is on a fundamental scale from 1, 3, 5, 7 to 9 to express different degrees of importance between *equal importance* (1) and *extreme importance* (9), thus c_{ij} takes values from 1 to 9 and c_{ji} takes the reciprocal value $^1/_1$ to $^1/_9$. An evaluation by 3 thus means that the preferred alternative is three times more important than the other one (Saaty, 2001, p.73).

The approach chosen here follows the application in reviewed quality management literature such as Kamiske (2012) and Ott (2002). The choice was determined by the objective of having the possibility of equality of two alternatives with respect to one attribute. Additionally it was decided not to make use of the analytical hierarchy process. Even though this method allows equality it requires very precise evaluations. The approach here differentiates between three judgements to compare alternatives A_i and A_j as well as the resulting values for c_{ji} (Kamiske, 2012, p.66; Ott & Scheib, 2002, p.144):

$$A_i > A_j,\ c_{ji} = 2, \text{ or}$$
$$A_i = A_j,\ c_{ji} = 1, \text{ or}$$
$$A_i < A_j,\ c_{ji} = 0$$

In order to derive a weighted ranking the sum of c_{ij} is built in each line for A_i (with i = 1, 2, 3, 4). These sums are summed up to $\sum c_{ij}$. To determine the weighted importance each line sum has to be divided by the sum $\sum c_{ij}$. Table 6.4 illustrates this context.

Table 6.4: Preference matrix and weighted importance

i \ j	A_1	A_2	A_3	A_4	Σ	%
A_1	-	c_{12}	c_{13}	c_{14}	$\sum c_{1j}$	$\sum c_{1j}/\sum c_{ij}$
A_2	c_{21}	-	c_{23}	c_{24}	$\sum c_{2j}$	$\sum c_{2j}/\sum c_{ij}$
A_3	c_{31}	c_{32}	-	c_{34}	$\sum c_{3j}$	$\sum c_{3j}/\sum c_{ij}$
A_4	c_{41}	c_{42}	c_{43}	-	$\sum c_{4j}$	$\sum c_{4j}/\sum c_{ij}$
					$\sum c_{ij}$	100%

Source: Own design

In paired comparison, judgement of at least three elements can become inconsistent. To express inconsistency Zangemeister (1971) and Kendall (1990) make use of so-called circular triads. Comparing three alternatives A, B and C on an ordinate scale and resulting in

$$A \rightarrow B \rightarrow C \rightarrow A$$

must be inconsistent because if A is preferred to B and B to C, then C cannot be preferred to A (Kendall & Gibbons, 1990, p.185 ff., Zangemeister, 1971, p.230). This logical conclusion is also called transitivity.

For the chosen approach the logical conclusions denoted in Table 6.5 must be fulfilled to obviate inconsistency:

Table 6.5: Transitivity applied for the paired comparison

Prerequisite	Conclusion
if A > B and B > C, or if A > B and B = C, or if A = B and B > C	⇨ A > C
if A < B and B < C, or if A < B and B = C, or if A = B and B < C	⇨ A < C
if A = B and B = C	⇨ A = C
if A >B and B < C if A < B and B > C	no conclusion

Source: Own design

According to Saaty (2001) inconsistency may be accepted to a certain extent as '*in real life specific circumstances often influence preferences, and circumstances change'* (Saaty, 2001, p.81). Furthermore, Kendall (1990) and Zangemeister (1971) generally accept inconsistency and propose a certain method to deal with it. As both authors work only with true preferences and not with equality, their methods in dealing with inconsistency (Kendall & Gibbons, 1990, p.186 ff.; Zangemeister, 1971, p.230 ff.) cannot be applied here. Saaty (2001) proposes maximum consistency ratios depending on the number of elements compared. According to him the analytical hierarchy process is determined by 7 elements due to its complexity. He suggests a consistency ratio of 5% for n = 3 (i.e. that at least 95% or more of the judgements should be free of inconsistency), 9% for n = 4 and 10% for 4 < n ≤ 7 (Saaty, 2001, p.81).

As in the approach chosen here n can take values greater than 7 and n equals 10 in the case study, a consistency ratio of 15% will be accepted for completed preference matrices. This assumption was necessary as no proposals could be found that fit to the applied case.

In Table 6.6 the questions intending to rank elements by means of interval and ordinal scaling are summarized.

Table 6.6: Description of questions intending to rank given elements

No.	Intention of demanded evaluation	Scale dimension	Method
C2	Ranking of given **issues** according to their **importance to improve empty container logistics**.	Importance	Denote and rank the five most important out of 11 elements (interval scaling).
D2	Ranking of given **power factors** according to their **importance for change processes in empty container logistics**.	Importance	Paired comparison of 10 elements (ordinal scaling).

Source: Own design

6.2 Definition phase: exploring the change situation

The definition phase of the change process aims to explore the change situation and to define objectives. The embedding of the SMC ensures adequate stakeholder involvement by determining the range of stakeholders to be considered. By scoping the processes, integrating them in the development of issues and recording their evaluation of the importance of issues, diversified knowledge and competences along the transport chain are exploited in a structured way. The derivation of involvement strategies serves for a focused stakeholder involvement in the definition of objectives and constraints as well as for ensuing steps. In the following the application of the SMC steps is outlined.

6.2.1 Clarifying objectives

Determination of the objective

The starting point of the stakeholder management cycle is to clarify the objective of the ensuing work. This step was performed as a moderated group interview (workshop).

Therefore a group of six people was chosen including three researchers from the university, two representatives from the HPA and one expert from a marketing organisation related to the PoH.

As an introduction results from the literature review and the data analysis were presented. Based on this a discussion was initiated to clarify the objective of the SMC.

The HPA's motivation for getting involved in this case study was twofold. Closure of what had been the biggest empty depot required the development of new areas for empty container logistics that consequently became part of the port development plan (see chapter 5.2.1). It is further predicted that empty container flows will increase within the port and thus an efficient empty container logistics is required. Beyond this local problem context, empty container logistics is perceived as a competitive advantage in comparison with other north range ports from the HPA's perspective. The HPA expressed an interest in exploring this topic and ways to improve empty container logistics in the port and thereby its competitive position.

The main results of the workshop are summarised as follows. First, the issue under consideration was established as empty container logistics within the PoH with a special focus on empty container flows from/to the BSR. From the perspective of the participants it was stated that despite awareness of the large number of empty container flows within the port and in particular from the BSR, transparency on steering mechanisms in the transport chain could be improved and in particular knowledge on stakeholders' interests and behaviour in terms of empty container logistics was to be generated. Second, the objective of the change process undertaken by the HPA with regard to empty container logistics was to increase efficiency in empty container logistics with a special focus on empty containers from/to the BSR. Furthermore, it was decided to explore the potential of empty container logistics as a competitive advantage for the PoH. The definition phase thus aims at exploring the change situation from a broad perspective. The objective of the SMC as a framework for the case study was noted as creating transparency on relevant stakeholders, their interests and influence with regard to empty container logistics. Results were to serve as a basis to derive adequate involvement strategies for potential undertakings in the PoH. With regard to the system boundaries in terms of the transport chain it was decided to include at least ports and terminals for special relations for the hinterland leg as well as depots and terminals in the hinterland for consideration. The results are summarised in Table 6.7.

Table 6.7: Determination of the objective in the definition phase

Question	Answers
What is the **issue under consideration**?	The issue under consideration is empty container logistics within the PoH with special focus on empty container flows from/to the BSR.
What is the **objective of the change process** dealing with that issue?	The objective is to increase efficiency in empty container logistics within the PoH and in particular for empty container flows from/to the BSR and to explore the potential of empty container logistics as competitive advantage for the PoH.
What is the **objective of the particular phase** of the change process?	During the definition phase it is aimed to explore empty container logistics in the PoH from a broad perspective.
What is the **objective of the SMC**?	During the definition phase the objective is to create transparency on relevant stakeholders, their interests and influence with regard to empty container logistics in order to derive adequate involvement strategies for potential later undertakings in the PoH.
What are the **system boundaries** of the SMC with regard to the **transport chain**?	The transport chain considered by the SMC definitely covers the maritime leg and terminals. For special relations the hinterland leg and hinterland terminals/depots can be regarded.

Source: Own design

Classification of the change situation

According to the SMC, the change situation ought to be classified during the first SMC step, what is described as follows.

The change situation considered can first be classified by the typologies of changes stated by Nadler and Tushman (1995) (see chapter 2.1). It has already been noted that changes are usually more incremental than transformational with respect to the maritime transport chain. The same applies to the change situation under consideration, that of improving empty container logistics for the PoH in the study area Hamburg - BSR, as here efficiency is the driving factor for change rather than a radical change of the underlying paradigm.

There must thus be a discussion of whether the anticipated incremental change is more reactive adaption or proactive tuning. Reflecting the HPA's above-mentioned motivation of dealing with empty container logistics it appears that both types of change are relevant here. On the one hand, the anticipated provision of more space for empty container handling can be called reactive as this is a reaction to an expected increase in empty container volumes and the recent closure of a large big empty container depot. On the other hand, the improvement of the position in comparison to competing ports can be termed proactive. In addition the first motivation is driven more by external factors, which is inherent in adaption, whereas the latter motivation is not directly due to external pressure but more of an internally driven attempt to improve the port's competitive position.

In terms of the change process as per Paton and McCalman (2008) outlined in chapter 2.1, the state of the underlying change situation of improving empty container logistics in the study area can be allocated to the definition phase. So far, neither the change situation was explored in depth, nor were clear objectives defined. Thus the SMC can be integrated at an early stage in the change situation, which is strongly recommended in related literature in order to ensure adequate and successful stakeholder involvement. Consequently the first part of the case study comprises the application of the SMC in the definition phase in order to develop the in-depth specification of the change situation as well as resulting change objectives together with stakeholders. It is thereby intended to create a common basis for understanding and identification with the issue under consideration as well as the commonly chosen course of change by stakeholder involvement. Following the principle of the change process as structured by Paton and McCalman (2008), the ensuing phase is the evaluation phase in which potential solution options are generated and evaluated from different stakeholder perspectives. Thus the second part of the case study describes the application of the SMC on the choice and evaluation of a concrete measure. Given that no real undertaking resulted from the case study, the implementation phase could not be undertaken and no concrete application of the SMC could be realised for this phase.

6.2.2 Identifying stakeholders

Based on the data analysis presented above, the identification of stakeholders was conducted during the initial workshop. This step was performed in two parts.

Listing stakeholders

At first, stakeholders in the PoH area were listed with the help of a brainstorming session. For each generic stakeholder group as introduced in chapter 2.5, workshop participants were asked to name stakeholders. In the Hamburg area 47 stakeholders were identified (see Table 6.8).

Table 6.8: Classification of empty container logistics stakeholders in the PoH area

Generic stakeholder group	Abbr.	Role	Resources	Connections	Class
		Shaping of attributes			
Authority	A1	Low	Low	Low	Secondary
Authority	A2	Low	Low	Low	Secondary
Authority	A3	Medium	Strong	Strong	Primary
Associations/Interest groups	AI1	Low	Low	Low	Secondary
Associations/Interest groups	AI2	Low	Medium	Strong	Primary
Associations/Interest groups	AI3	Low	Medium	Strong	Primary
Associations/Interest groups	AI4	Low	Medium	Strong	Primary
Associations/Interest groups	AI5	Low	Medium	Strong	Primary
Associations/Interest groups	AI6	Low	Medium	Strong	Primary
Associations/Interest groups	AI7	Medium	Strong	Strong	Primary
Container depot operator	CDO1	Low	Low	Low	Secondary
Container depot operator	CDO2	Low	Low	Medium	Secondary
Container depot operator	CDO3	Low	Low	Medium	Secondary
Container depot operator	CDO4	Low	Low	Low	Secondary
Container depot operator	CDO5	Low	Low	Medium	Secondary
Container depot operator	CDO6	Low	Low	Low	Secondary
Container leasing company	CLC1	Low	Medium	Low	Secondary
Container leasing company	CLC2	Low	Medium	Low	Secondary
Sea freight forwarder	F1	Low	Medium	Strong	Primary
Sea freight forwarder	F2	Strong	Strong	Strong	Key
Sea freight forwarder	F3	Strong	Strong	Strong	Key
Local/hinterland forwarder	F4	Low	Medium	Medium	Secondary
Local/hinterland forwarder	F5	Low	Medium	Medium	Secondary
Local/hinterland forwarder	F6	Low	Low	Low	Secondary
Inland Transport Operator	ITO1	Low	Low	Low	Secondary
Inland Transport Operator	ITO2	Low	Low	Low	Secondary
Inland Transport Operator	ITO3	Low	Low	Low	Secondary
Inland Transport Operator	ITO4	Low	Medium	Medium	Secondary
Inland Transport Operator	ITO6	Low	Medium	Medium	Secondary
Inland Transport Operator	ITO7	Low	Medium	Low	Secondary
Inland Transport Operator	ITO8	Low	Low	Low	Secondary
Ocean carrier	SL1	Strong	Strong	Strong	Key
Ocean carrier	SL10	Strong	Strong	Strong	Key
Ocean carrier	SL11	Strong	Strong	Strong	Key
Ocean carrier	SL12	Strong	Strong	Strong	Key
Ocean carrier	SL13	Strong	Strong	Strong	Key
Ocean carrier	SL14	Strong	Strong	Strong	Key
Feeder shipping line	SL15	Medium	Medium	Strong	Primary
Ocean carrier	SL16	Strong	Strong	Strong	Key

Generic stakeholder group	Abbr.	Role	Resources	Connections	Class
		Shaping of attributes			
Feeder shipping line	SL17	Medium	Medium	Strong	Primary
Ocean carrier	SL2	Strong	Strong	Strong	Key
Ocean carrier	SL3	Strong	Strong	Strong	Key
Ocean carrier	SL4	Strong	Strong	Strong	Key
Ocean carrier	SL5	Strong	Strong	Strong	Key
Feeder shipping line	SL9	Medium	Medium	Strong	Primary
Sea terminal operator	STO1	Medium	Strong	Strong	Primary
Sea terminal operator	STO6	Medium	Strong	Strong	Primary

Source: Own design based on workshop results

The second part aims to amend this stakeholder list by adding stakeholders in the BSR. It was therefore decided that stakeholders in the BSR should be included only exemplarily, as the number of stakeholders should be kept to a rational and manageable amount. It was further presumed by the workshop group that stakeholders in other port areas are very useful in terms of gaining knowledge on relevant aspects of empty container logistics but will not participate comprehensively in later undertakings. And even if later undertakings require the participation of stakeholders from other port areas, the SMC would consider this aspect by its cyclical character.

For the choice of stakeholders in the BSR the mapped hotspots of empty flows (see Figure 5.22) were clustered in six port areas by their specifics in terms of empties with regard to size, type and direction. Hamina was not considered any further due to its minor importance. The resulting port areas are as follows and are portrayed in Figure 6.3:

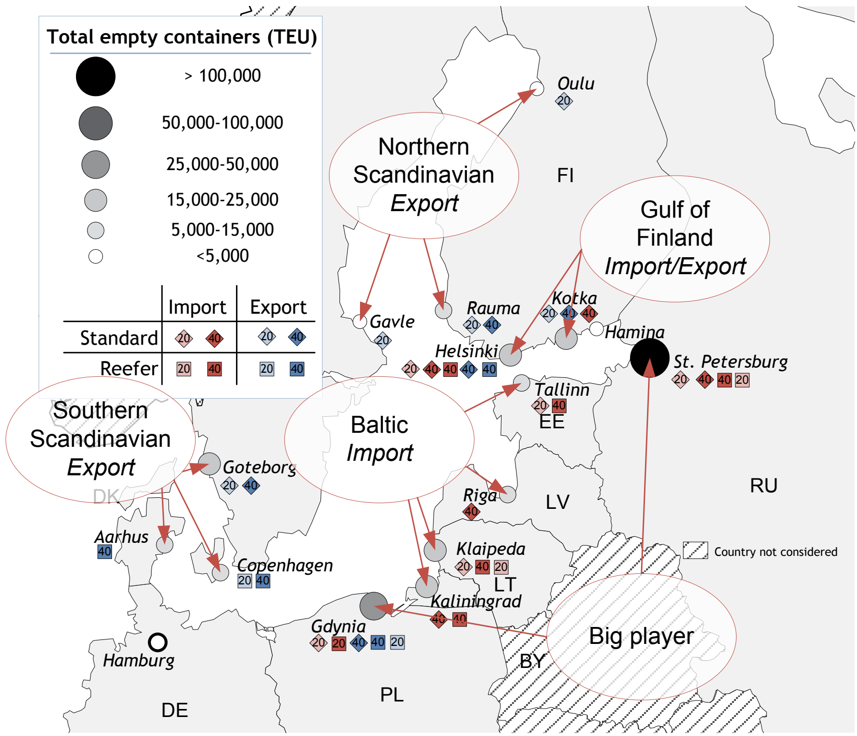
- Northern Scandinavian export: Gavle (SE), Oulu (FI) and Rauma (FI)
- Southern Scandinavian export: Aarhus (DK), Copenhagen (DK), Goteborg (SE)
- Gulf of Finland import/export: Helsinki (FI), Kotka (FI)
- Big player: St Petersburg (RU) import
- Baltic import: Tallinn (EE), Riga (LT), Klaipeda (LV), Kaliningrad (RU)
- Big player: Gdynia (PL) import/export

It was decided that approximately five stakeholders per port region should be included in the ensuing analysis. Thus, in a next step the list was amended by the inclusion of a further 31 stakeholders.

The resulting stakeholder list comprised 78 stakeholders including 17 shipping lines (SL) (14 ocean carriers and 3 feeder shipping lines), 17 sea terminal operators (STO), 7 container depot operators (CDO), 8 forwarding companies (3 sea freight forwarders and 5 hinterland forwarders (F), 8 inland transport operators (ITO), 12 authorities (A), 2 container leasing companies (CLC) and 7 associations or interest groups (AI). Clustering only took into consideration the company's core competence. Nevertheless many stakeholders offer a wider range of services due to vertical integration. Many inland transport operators for instance offer forwarding services while shipping lines and sea terminal operators operate container depots or hinterland terminals.

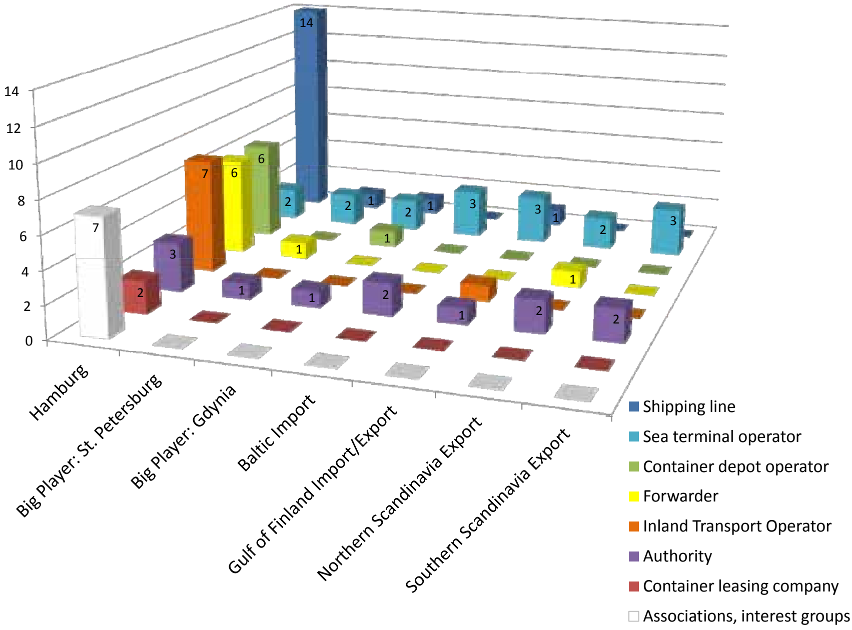
The allocation of generic stakeholder groups to port areas is portrayed in Figure 6.4. In the ensuing steps stakeholders are anonymised by being assigned numbers and being assigned to generic stakeholder groups.

Figure 6.3: Hotspots of empty container flows Hamburg – BSR: ports clustered by port areas



Source: Own design based on PLINS data set and workshop results

Figure 6.4: Allocation of identified stakeholders to generic stakeholder groups and port areas



Source: Own design based on workshop results

Classifying stakeholders

Following the procedure developed for mapping stakeholders (see chapter 4.2) the list of stakeholders was evaluated according to the attributes role, resources and connectivity in order to classify them as key, primary and secondary stakeholders. *Role* is understood here as steering influence on relevant processes as well as on the physical flow (containers) and information. *Resources* are understood as assets, financial resources, human resources (including the corresponding know-how). *Connections* stand for the variety, quantity, and quality of being integrated to other actors in the chain.

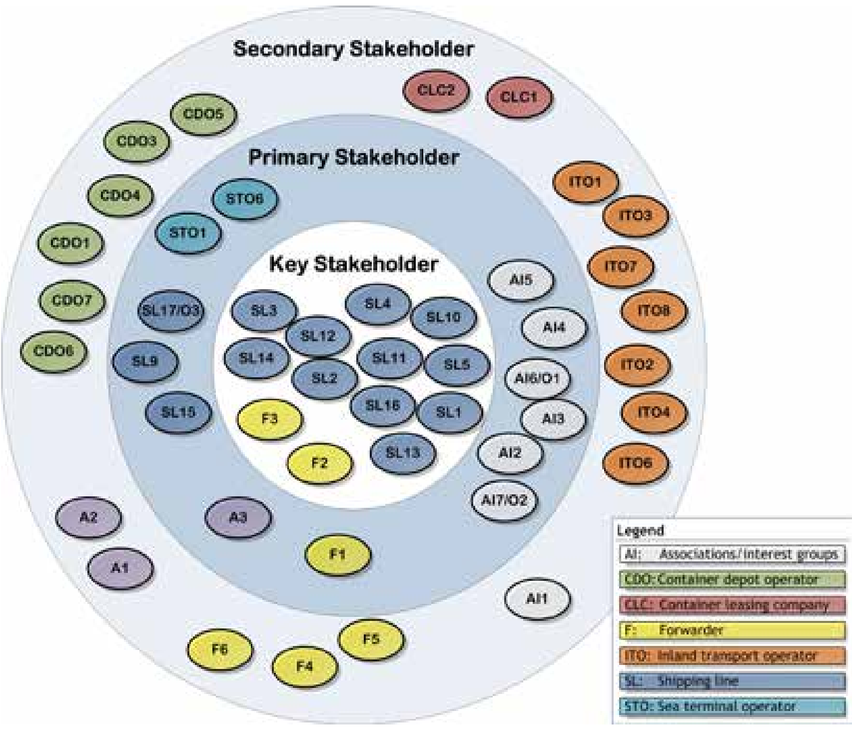
The resulting stakeholder classes are *key*, *primary* or *secondary* and were allocated according to the following rules. Stakeholders evaluated three times with the characteristic strong are *key stakeholders*. *Primary stakeholders* are those evaluated with either two times strong, once strong and at least once medium, or two or more times medium. Others are accordingly *secondary stakeholders*.

Due to the fact that stakeholders of other port areas than Hamburg were only chosen exemplarily they were excluded from this evaluation.

Mapping stakeholders

Based on this evaluation, stakeholders were placed on the stakeholder map as proposed in chapter 4.2. This visualisation originally tends to include stakeholder relations, however during the workshop the participants stated that this could not be evaluated in detail at this stage of the SMC and must be refined later. So the map displayed in Figure 6.5 was created showing stakeholders in the PoH area allocated to stakeholder classes in terms of change processes in empty container logistics. In the ensuing analysis some stakeholders whose group is underrepresented are summarised to the group *other* (O). Accordingly they have two abbreviations.

Figure 6.5: Stakeholder map clustering stakeholders as key, primary and secondary stakeholders



Source: Own design based on workshop results

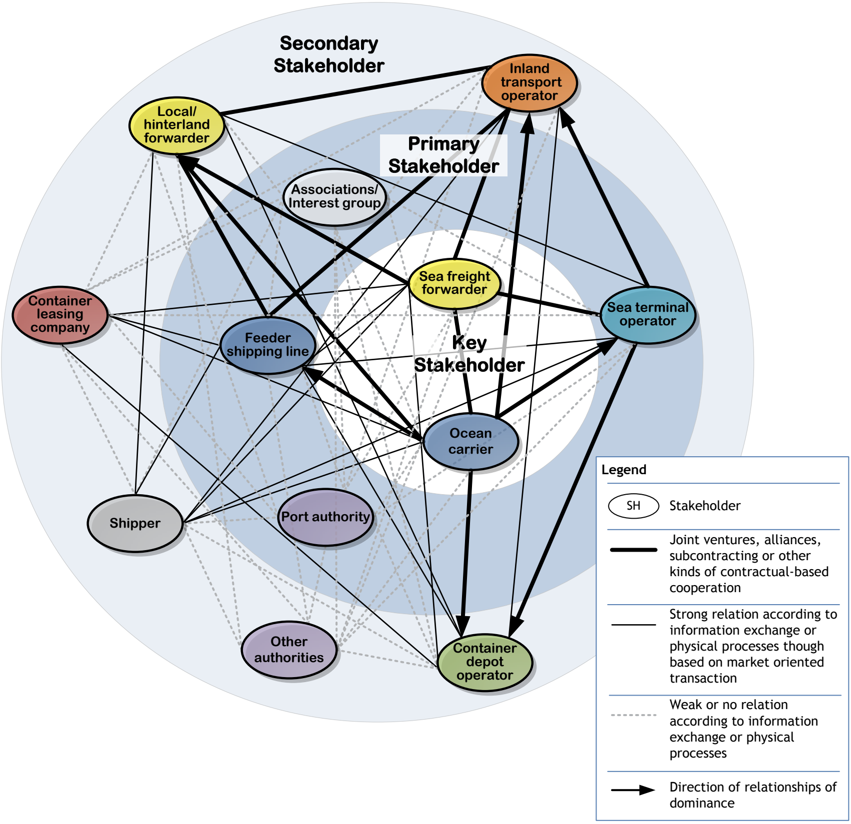
The results show the important role of shipping lines, which are almost exclusively evaluated as key stakeholders (these are ocean carriers) or else as primary stakeholders (these are feeder shipping lines). Forwarders are also evaluated as having a strong position. Among them the key and primary stakeholders are globally operating sea freight forwarders, those allocated to secondary stakeholders tend to be local/regional operators. Sea terminal operators are considered as primary stakeholders. Associations or interest groups are also almost exclusively considered to be primary stakeholders. This might lead to the conclusion that other stakeholder groups which are in more fragmented markets such as container leasing companies, container depot operators and inland transport operators – all considered as secondary stakeholders – are represented by specific associations. As for authorities the port authority is deemed to be a primary stakeholder and others as secondary stakeholders.

During the interview series one question explored relationships with other stakeholders. These insights sought to refine the stakeholder map shown above. Due to the large number of stakeholders and the insight that a two-dimensional figure with 48x47 possible relations does not lead to transparency or further insight, relations between stakeholders were summarised at the level of generic stakeholder groups. Three groups were thus not allocated clearly: sea freight forwarders, authorities and associations/interest groups. In the latter case, only one out of seven associations was allocated to secondary and not to primary stakeholders, thus they are subsumed under primary stakeholders. With regard to authorities, the one allocated to primary stakeholders is the port authority, whereas other authorities are allocated to secondary stakeholders. This differentiation will also be considered in the stakeholder map. As for sea freight forwarders, one out of three is allocated to primary rather than of key stakeholders. This evaluation might be valid in the individual case. Nevertheless, sea freight forwarders were shown to be quite important in terms of planning and organising the maritime container transport chain during literature analysis in chapter 2.5 and also during process analysis, so they are subsumed under key stakeholders.

Referring to stakeholder interrelations which were portrayed in chapter 2.5 for maritime container transport chains three levels of relation were derived. First, there are alliances, joint ventures, subcontracting or other kinds of contract-based cooperation that is intended for mid- or long-term collaboration and leads to economic interdependencies among collaborating parties. During the interviews these kinds of relations were named in particular in respect of large ocean carriers. Their desire for vertical integration leads to quite intensive collaboration with sea terminal operators (e.g. in dedicated terminals) or forwarders and subcontracting of feeder shipping lines, depot operators, local/hinterland forwarders with a dominant position of the ocean carrier. The tendency towards vertical integration also applies to sea terminal operators who collaborate with depot operators and inland transport operators. In both cases it is even common for ocean carriers or terminal operators to found new companies (also as one of several shareholders) or take control by merger and acquisition. Contractually based collaboration is also usual between sea freight and local/hinterland forwarders, feeder shipping lines or forwarders and inland transport operators e.g. by subcontracting as well as between container leasing companies and shipping lines. Relationships are not exclusively valid as portrayed in Figure 6.6, the map rather tends to catch usual relationships, in other words, looser forms of collaboration are also possible between these parties. Second, there are relations that are still strong but rely more on normal market activities without contractual arrangements in framing mid- to long-term collaboration. This kind of relationship applies to many operational partners in the transport chain whose relationship is characterised by a physical interface due to operational processes. Here too, process modelling provided input. Again, it should be mentioned that between these parties stronger or weaker relationships are also possible. In particular with regard to shippers it can be stated that it is quite common to have contractually based collaboration with forwarders and shipping lines or if they are acting as MTOs with other parties in the transport chain. Usually shippers use all potential options to ship cargo, via long term contracting or spot market shipments, depending on the specifics of the shipment. Here free market purchase relationships are portrayed. Third, there are weak relations between parties who rarely are in touch with each other with regard to operational processes or information exchange e.g. with associations/ interest groups or authorities. The results are summarised in Figure 6.6.

The stakeholder list and map served as a basis for the choice of participants for the interview series and the ensuing survey.

Figure 6.6: Stakeholder map clustering and relating generic stakeholder groups



Source: Own design based on workshop and interview results

6.2.3 Scoping processes

During the interview series a process analysis was undertaken to elaborate the operational processes relating to empty container logistics with a special focus on the different areas of responsibility of each stakeholder, their interfaces and the exchange of information. Furthermore, strategic decisions exerting influence on operational processes were concluded from the interviews and are portrayed in the following.

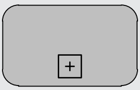
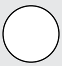
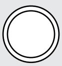
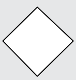
Collecting data and information

Draft process charts were derived from several sources in literature: Theofanis & Boile, 2009, p.60 f.; Will, 2011, p.93 ff.; Konings, 2005b, p.228 ff. These process charts were discussed during the interview series and adapted accordingly. Thus results portrayed in the following are taken from these interviews if no other source is named.

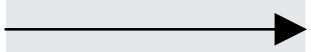
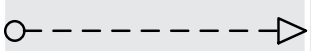
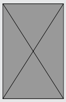
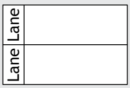
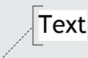
Modelling processes[29]

First of all, the notation of process charts according to the Business Process Model Notation is displayed in Table 6.9.

Table 6.9: Notation of process charts according to the BPM notation

Symbol	Name	Meaning
	Activity/Task	An activity is a generic term for work that is performed in process. The types of activities that are a part of a process model are: tasks and sub-processes. A task is an atomic activity within a process flow and is used when the work in the process cannot be broken down to a finer level of detail.
	Collapsed Sub-Process	The details of the sub-process are not visible. A 'plus' sign in the lower centre of the shape indicates that the activity is a sub-process and has a lower level of detail including sub-processes and /or tasks.
	Start Event,	A start event indicates where a particular process will start.
	Intermediate Events	An intermediate event occurs between a start event and an end event. They will affect the flow of the process, but will not start or (directly) terminate the process.
	End Event	An end event indicates where a process will end.
	Gateway	A gateway is used to control the divergence and convergence of sequence flow in a process. Thus, it will determine diverging and merging paths. Internal markers will indicate the type of behaviour control (see below).
	Exclusive Gateway	A diverging exclusive gateway (decision) is used to create alternative paths within a process flow. A converging exclusive gateway is used to merge alternative paths. Thereby only one alternative is taken by the sequential flow at a diverging exclusive gateway. Thus, converging exclusive gateways only 'wait' for one incoming flow: the previously taken alternative.

29 This section partially was published as part of the project TransBaltic deliverables: Wolff et al. (2012).

Symbol	Name	Meaning
	Inclusive Gateway	A diverging inclusive gateway (inclusive decision) can be used to create alternative but also parallel paths within a process flow. Since each path is considered to be independent, all combinations of the paths may be taken. A converging inclusive gateway is used to merge a combination of alternative and parallel paths. It is used if one or several paths are only relevant and will be taken under certain conditions.
	Parallel Gateway	A parallel gateway is used to create parallel flows and to synchronize (combine) parallel flows. At diverging parallel gateways all paths are taken by the sequential flow. Thus, converging parallel gateways 'wait' for all incoming flows before proceeding.
	Sequence Flow	A sequence flow is used to show the order that activities will be performed in a process.
	Message flow	A message flow is used to show the flow of messages between two participants that are prepared to send and receive them.
	Data Object	The data object shows the required input of information/data resp. the activity output.
	Swimlane	The swimlane here serves as a graphical container for allocating activities to different stakeholders.
	Text annotation	Text Annotations are a mechanism to provide additional text information for the reader.

Source: Own design based on Object Management Group 2009, pp.22-33, p.263 ff.; Gadatsch 2010, p.98; Weske, 2007, p.209

An overview of the empty container processes is given in Figure 6.7. This process chart shows the empty container process chain at an aggregated level and comprises five sub-processes that are further detailed thereafter.

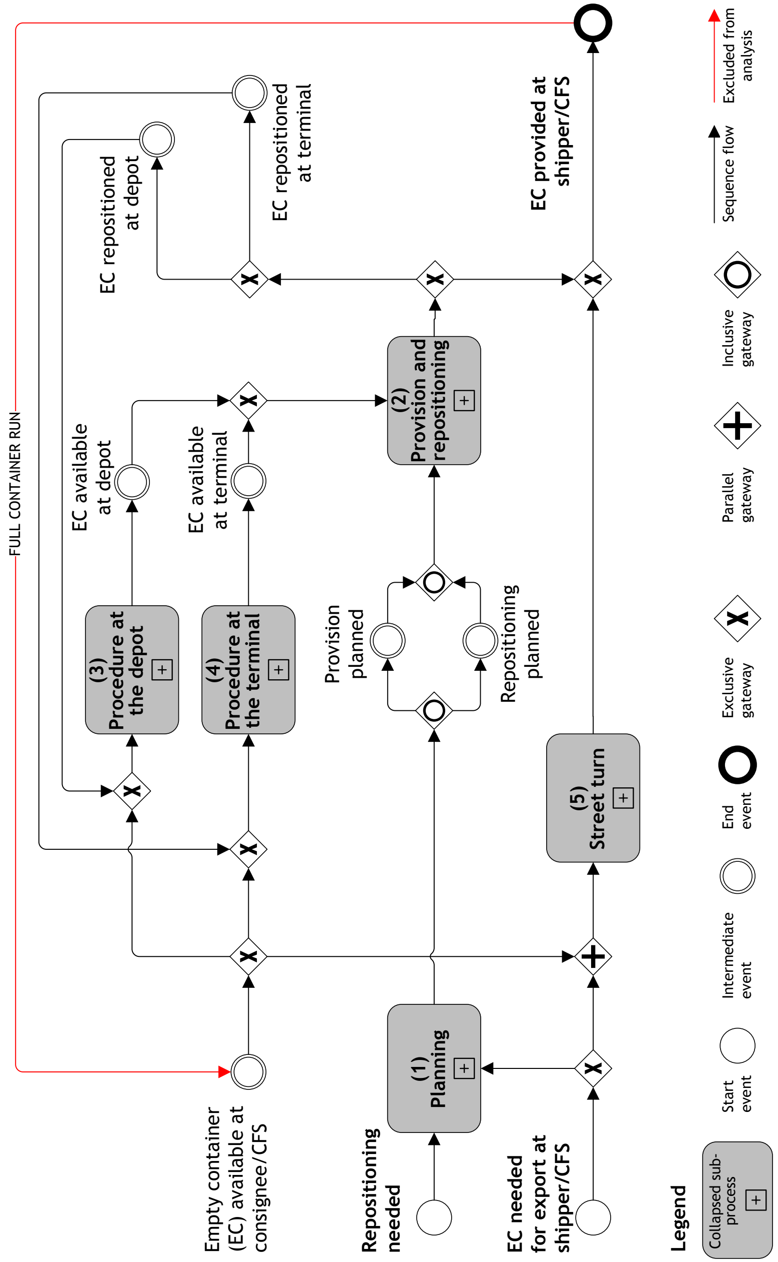
The process flow begins with the start event[30] that an empty container is needed for an export shipment by a shipper or container freight station (CFS). This event

30 Due to the fact that the container process chain is actually circular, there is no clear starting point, though most interviewees pursued a customer-oriented perspective and start by the event that an empty container is needed for an export shipment. This is usually also the first event chronologically in relation to one concrete empty movement. However, coevally containers are emptied at their point of destination and likewise trigger empty movements. The same applies to usual repositioning, detached from concrete export shipments. Here, the event that an empty container is needed for export and regular repositioning are set to be the starting points and the other processes follow the resulting chronology.

triggers the planning process (1) where repositioning and provision of empty containers are planned and scheduled. Repositioning due to usual container imbalances and detached from a specific export shipment is likewise a start event that triggers the planning process. The planning process (1) finalises with planned provision and repositioning. Both intermediate events are followed by the actual repositioning and provision process (2). Empty containers are repositioned either at a depot or at a sea terminal (intermediate events) or they are provided by a consignee or CFS and that marks the end event of the empty container process chain. From there the full container run takes place, which is, however, not subject to this process analysis. After the full container run, the container is stripped and the container is emptied and available again. In door-to-door and pier-to-door container services, containers are stripped at the consignee's site whereas in door-to-pier and pier-to-pier container services, stripping happens at CFS. Upstream from this event there are three alternatives to distinguish. The container can be transported back to a depot (3) or terminal (4) to undergo procedures there. Here also the repositioned empty containers rejoin the process flow. The empty container available at a consignee's site/CFS can also be directly reused and therefore is provided in reasonable proximity to a shipper/CFS needing an empty container for export. This alternative is called street turn (5).

In the following all processes are portrayed ordered by numbers as in Figure 6.7. First, strategic reflections are portrayed for each sub-process to introduce underlying decisions relating to operational processes followed by a description of respective processes. After the detailed description of the five sub-processes, information on lease and customs processes is provided. In order to focus on operational processes and to reduce complexity, these two perspectives have been excluded from the process charts and related descriptions. Nevertheless both perspectives are part of the overall process and are thus described in brief.

Figure 6.7: Processes of empty container logistics: overview on processes



Source: Own design

Planning the provision and repositioning of empty containers (1)

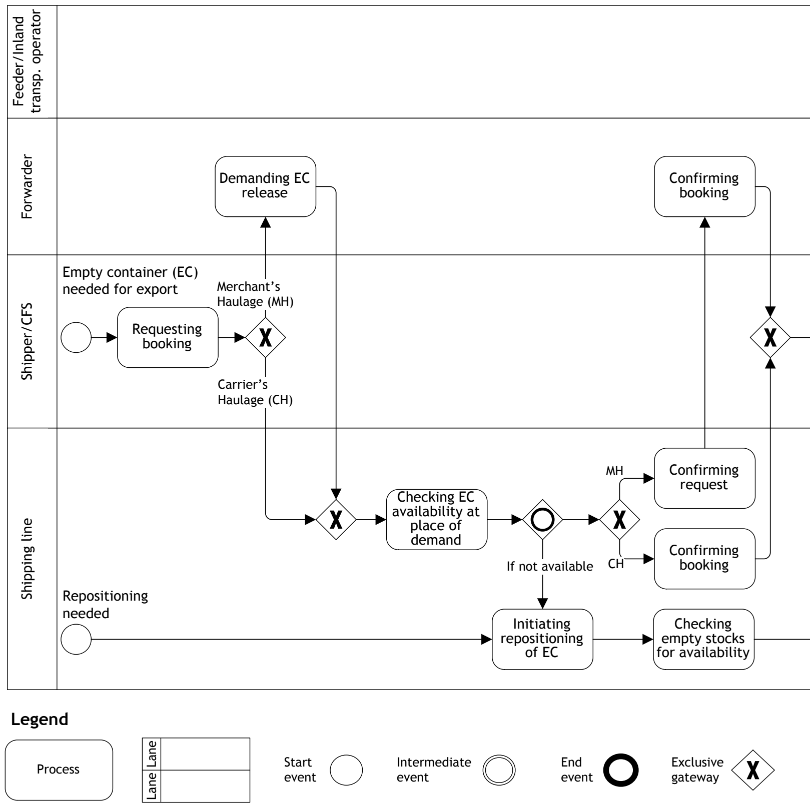
Usually empty container (EC) movements and processes are not detached from loaded container processes. Both are planned for one export shipment and thus agreements on the schedule of provision, drop-off location etc. are already fixed in the consignment note. Nevertheless, trade and equipment imbalances lead to empty movements that are not necessarily related to a specific export container although repositioned containers will eventually be used for export again. According to the experience of the shipping line the repositioning or evacuation of ECs on specific relations can be a standard process. Sometimes depot and terminal operators support shipping lines in monitoring their stocks as they also have knowledge about and experience of the demand for ECs. Due to the fact that shipping lines earn higher revenues from loaded containers being transported on their ships, the evacuation of empties is sometimes initiated in the short-term to make use of free capacities. Sometimes the reason can also be that weight limits have been reached and free slots could not be filled with loaded containers anyway. This also applies to rail operators and trains. These short-term demands might lead to peaks in capacity usage of depots, terminals and transport infrastructure as they sometimes have to be prepared and transported to the seaport terminal in a very short time.

With regard to the availability of empties the strategy of shipping lines is crucial: how they build up their stocks of empties and, in particular, whether they release specific containers identified by container number from depots and terminals or just containers of a specific type, size and quality. The first case leads to complex requirements for depot or terminal operators as they must provide a specific container and potentially have additional handling requirements as a result, in contrast to the second case in which ECs have to fulfil certain requirements but are exchangeable.

Forwarders sometimes also have their own stocks of leased containers in the hinterland, so-called grey depots. Leased containers are not dropped off but stay in lease until they can be used for another export booking. Normally these grey depots are temporary storage slots at an inland terminal or the yard of a trucking company that is not intended for huge numbers of ECs.

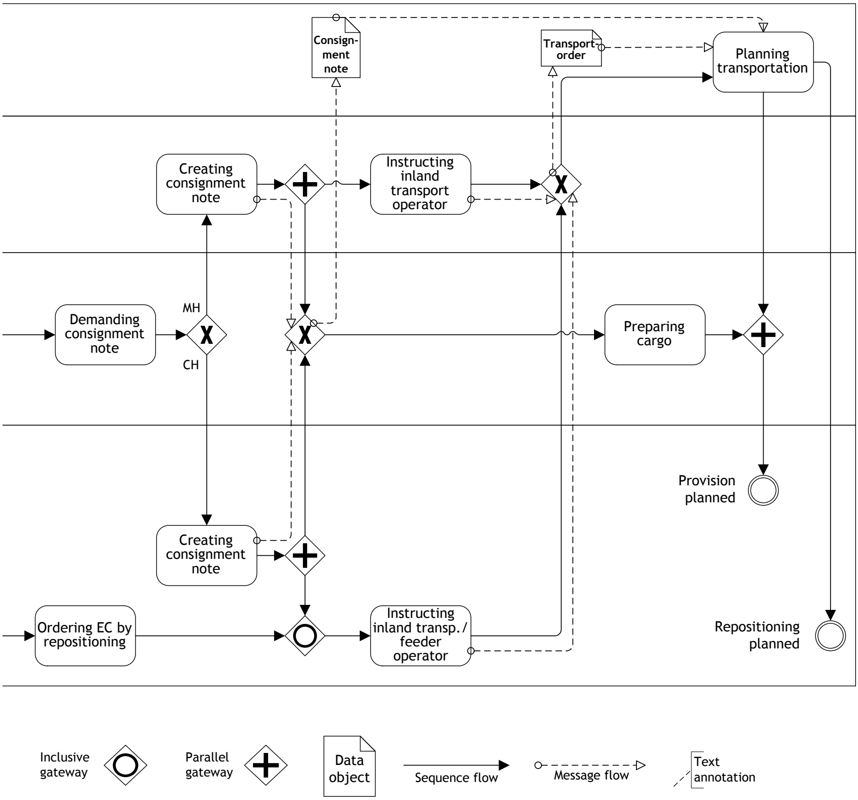
Processes of planning provision and repositioning (1) are shown in Figure 6.8. Planning processes start with the booking request of a shipper or CFS needing an EC for an export shipment. If the export is organised by a forwarder (merchant haulage) confirmation for the equipment has first to be requested from the shipping line. The shipping line then checks the availability of the required

Figure 6.8: Processes of empty container logistics: planning



Source: Own design

EC (regarding type, size and quality). If the right EC is available the booking or equipment request is confirmed. In a second step the consignment note is created and sent to the shipper and transport operator. The shipper is then able to schedule the export and prepare the cargo. If the EC is not available in proximity of the place of demand the shipping line needs to initiate the repositioning of an EC. This process is closely related to standard repositioning – also called evacuation - processes. Potential empty stocks have to be checked with regard to the specific requirements the EC must fulfil. Then the EC has to be ordered and transport operators and feeder shipping lines instructed. Planning is finalised with the scheduled transport.

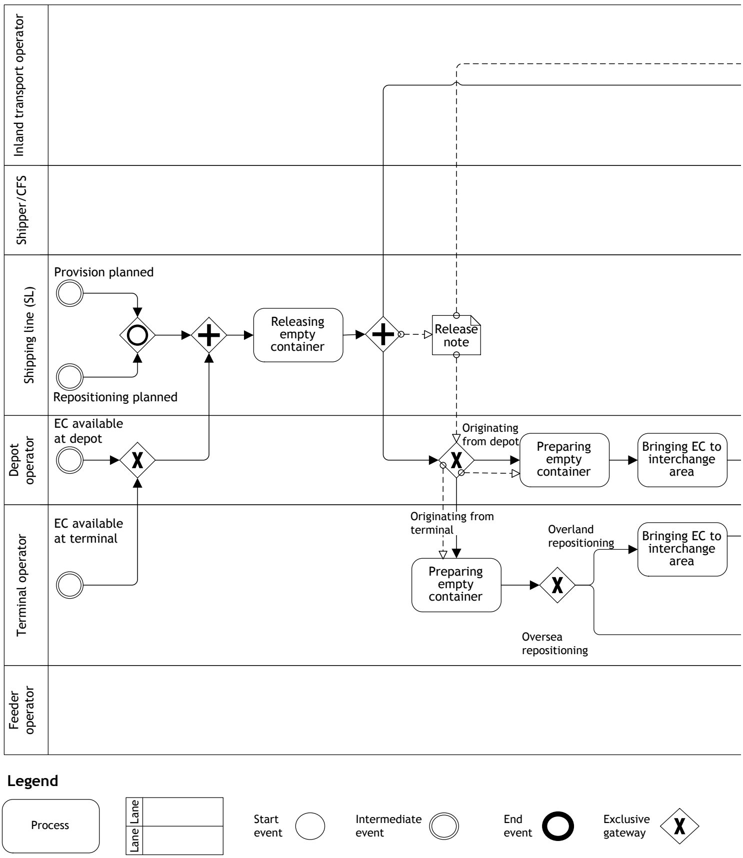


Provision and repositioning of empty containers (2)

The specific schedule for container transportation requires the EC release note provided by the shipping line (see below). The earlier this is sent to related parties (transport, feeder, depot and terminal operators), the better they can plan the utilisation of capacities. From the perspective of the shipping line it is rather the contrary, the later the release note is sent, the more flexibly they can plan their capacities (container equipment as well as ships). Consequences of these short-term demands are described above.

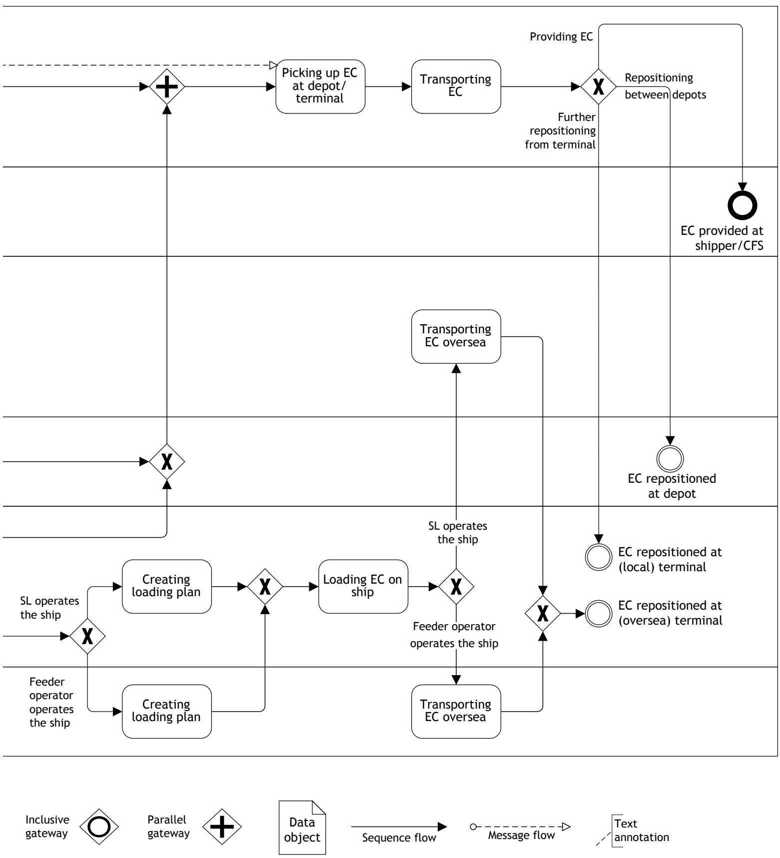
Processes related to the provision and repositioning (2) of ECs are shown in Figure 6.9. The initial process is the sending of the release note by the shipping line to related parties, usually by EDI (electronic data interchange). This applies to all ECs: direct provision for export as well as repositioning. The depot operator then prepares the EC and brings it to an interchange area according to the transport mode involved. The same applies to the terminal operator who brings the EC to an interchange area in the case of overland provision or repositioning. For repositioning by sea it makes a difference which stakeholder operates the ship. If an explicit feeder operator is involved they are the ones creating the loading plan and executing the transport. If the shipping line is operating the ship, the terminal

Figure 6.9: Processes of empty container logistics: provision and repositioning



Source: Own design

operator creates the loading plan and the shipping line executes the transport. In both cases the terminal operator loads the EC onto the ship. Repositioning by sea in this description ends with the available container in another sea terminal. It should be stated that here the procedures at the terminal (see below) start again. In the case of overland transportation (both, provision and repositioning of ECs) the truck, train or barge operator picks up the EC from the interchange areas at the depot and terminal for further transportation. Then the container is either provided at the shipper's site or CFS for export or available at the depot to be provided from there or at the seaport terminal for further repositioning.



Procedures at the depot (3) and terminal (4)

Given that both procedures are closely related, strategic reflections are summarised for both of them for a better understanding of the underlying decisions.

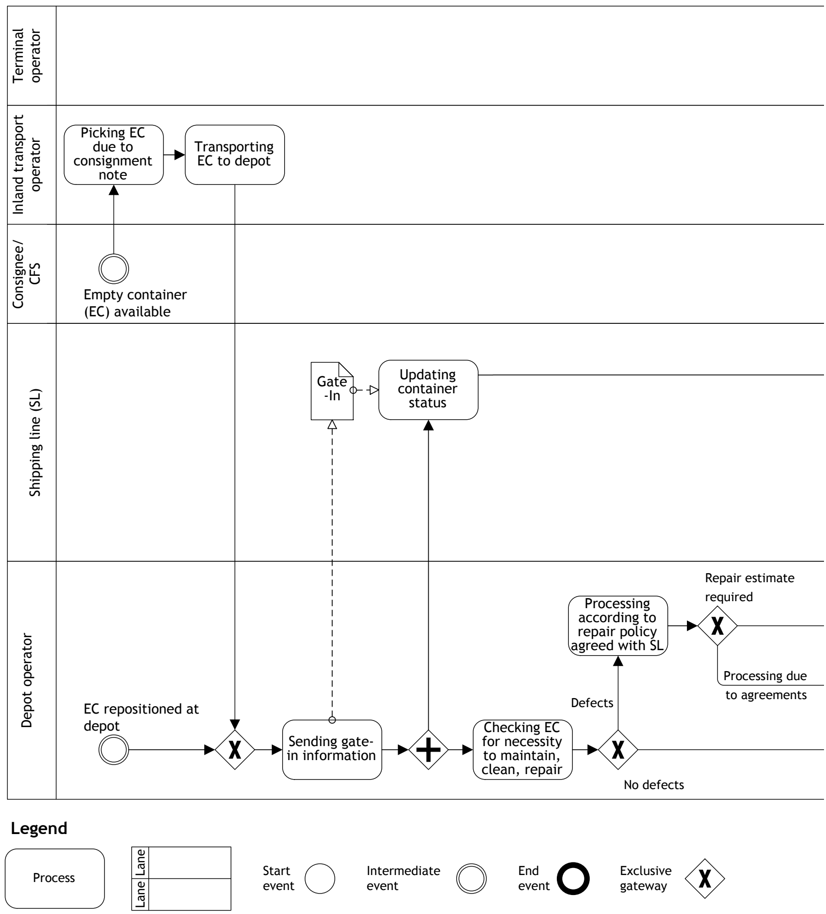
The case described here is that of the depot and the seaport terminals being at different locations, which may, however, not always be the case. Empty depots can also be situated on-dock i.e. on the sea terminal area. A detached operation may be argued as follows. The seaport terminal operator handles containers from ship to land and vice-versa. Buffering zones for full and empty containers are therefore situated on the terminal area, enabling the decoupling of connected transport systems which are at least sea and road transportation, very often rail and sometimes barge. Due to the fact that depot processes are less profitable than terminal processes in relation to required space, terminal operators – especially in ports where space is at a premium – prefer not to offer depot processes on the terminal. Thus empty depots are situated somewhere else in the port area either operated by independent parties or by parties affiliated to terminal operators or shipping lines. Nevertheless, shipping lines prefer to have empty stocks and even depot services directly on the terminal as from there they can move their container fleets very flexibly and at short notice. Furthermore, throughput time decreases and becomes more predictable. Accordingly, space availability and influence of shipping lines or major shippers determine the location of empty depots in the port. In the hinterland, depots and terminals are often but not exclusively at the same location.

The location of dropping-off the EC is closely related to the EC strategy that the shipping line adopts for that port or region. A determining factor is the balance of imports and exports leading to surplus or deficit areas with respect to ECs. Thus it can be a usual policy in surplus areas to bring almost all ECs back to the sea port terminal for further repositioning, e.g. from Europe back to Asia. If the container most likely can be used for export in the region it is worth bringing it to the depot to undergo regular maintenance, or if necessary repair and cleaning services. Another determining factor is the balance of quality standards required for export containers and the quality of repair services supplied in the region. If quality requirements cannot be served within the region the EC is shipped to another location to undergo repair or cleaning services there. Last but not least, labour costs exert an influence on regional empty container strategies. Regions with high labour costs are not in favour for repair works, some shipping lines bring all damaged containers back to Asia (if they are still transportable) where labour costs are lower. But already around the Baltic Sea the difference in labour costs can lead to empty movements.

At the depot, ECs are mostly stored by shipping line, type, size and quality grade. The storing principles applied can also become a part of agreements between shipping lines and depot operators. Some shipping lines require first-in first-out, other leave it to the depot operator. Moreover, as mentioned above, the container release relates either to a specific container identified by an individual number or to a container of a specific type, size and quality.

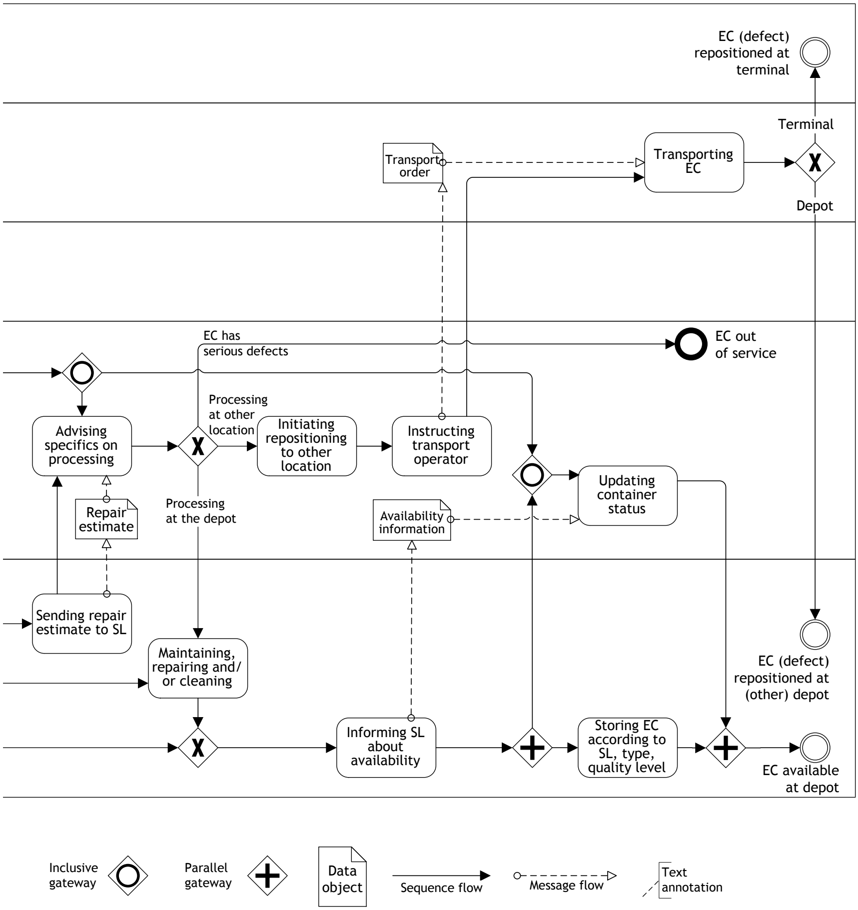
The procedure at the depot (3) is shown in Figure 6.10. Empty containers entering a depot can either originate from a consignee or CFS after an import shipment or from repositioning. In the first case the EC is picked up by a transport operator and shipped to the depot, instructions already having been provided by consignment note. The drop-off location can be a region, a port, a specific depot or seaport terminal. If an EC is entering an empty depot a gate-in note is first sent to the container owning shipping line. Then the depot operator carries out the standard EC checking processes as agreed with the shipping line. If there are no defects, the shipping line is informed accordingly about the availability of the EC at the depot location. If there are defects, the depot operator proceeds according to the repair policy agreed with the shipping line. Sometimes there are agreements on an average fee paid for every container passing through the depot (damaged or not), or a threshold value below which the depot operator proceeds without query. Above that threshold value or as its usual process the depot operator sends a repair estimate, sometimes accompanied by digital photos, to the shipping line, usually by e-mail. Sometimes further negotiations or even personal inspections by the shipping line follow this repair estimate. Then the shipping line decides on the specifics of the repair and cleaning processes and whether these processes are to take place at the depot or at a different location. If the EC has serious defects it can be taken out of service to be scrapped. If it is decided to repair at another location a transport operator is assigned and picks up the damaged EC at the depot and brings it to the seaport terminal for further repositioning. Sometimes ECs are exchanged between depots if one depot cannot offer all of the services required. If the repair takes place at the original depot, the shipping line is informed as soon as the empty container is available. ECs are stored until they are released.

Figure 6.10: Processes of empty container logistics: procedure at the depot



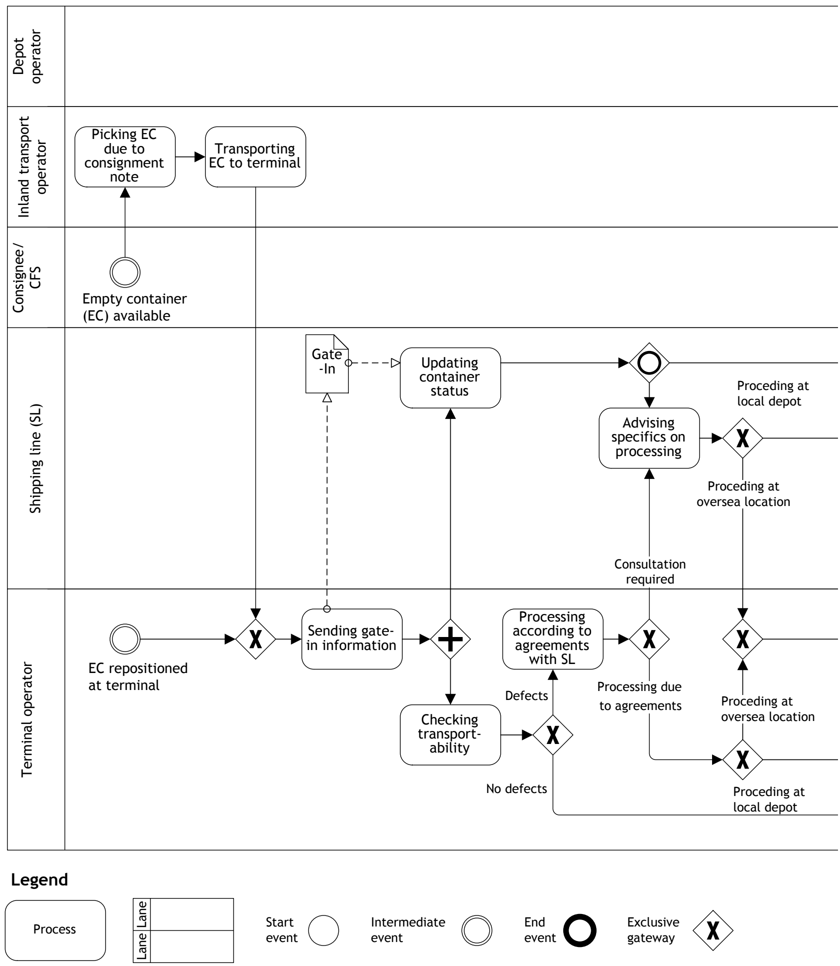
Source: Own design

The procedure at the terminal (4) is portrayed in Figure 6.11. Empty containers entering a terminal can either originate from a consignee or CFS after an import shipment or from repositioning (from overland and oversea). Here too a gate-in note is first sent to the shipping line that owns the container. The same process applies to ECs that enter the terminal from the sea. If there is no on-dock depot the container usually does not undergo standardised checking processes, only transportability or obvious defects are checked by the seaport terminal operator. In some ports there are subcontracted companies or the shipping line itself



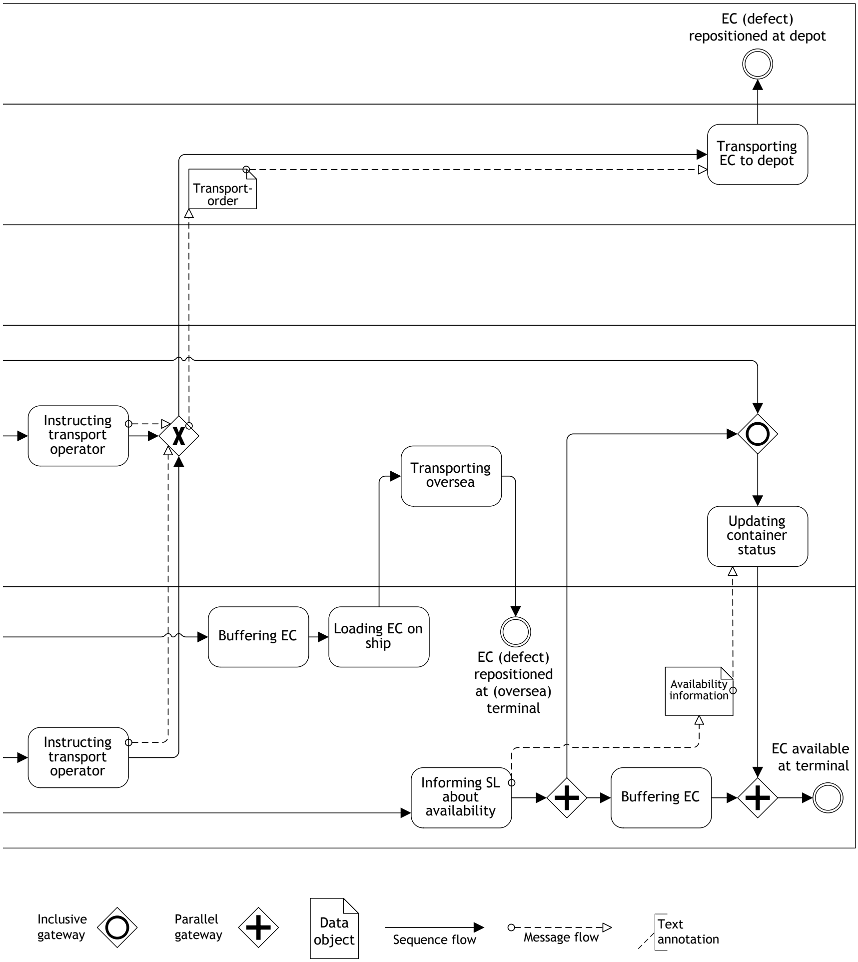
checking the container in the terminal area. If there are any defects the seaport terminal operator proceeds according to the agreements with the shipping line. Sometimes the terminal operator needs to consult the shipping line before further processing. Then the shipping line itself decides about the ensuing steps. In case they prefer to let the container be checked and repaired etc. at a local depot they instruct an inland transport operator to bring the EC from the terminal to the depot. In case the container ought to be repaired etc. at an oversea location they initiate the repositioning. Therefore the ECs are buffered at the terminal and

Figure 6.11: Processes of empty container logistics: procedure at the terminal



Source: Own design

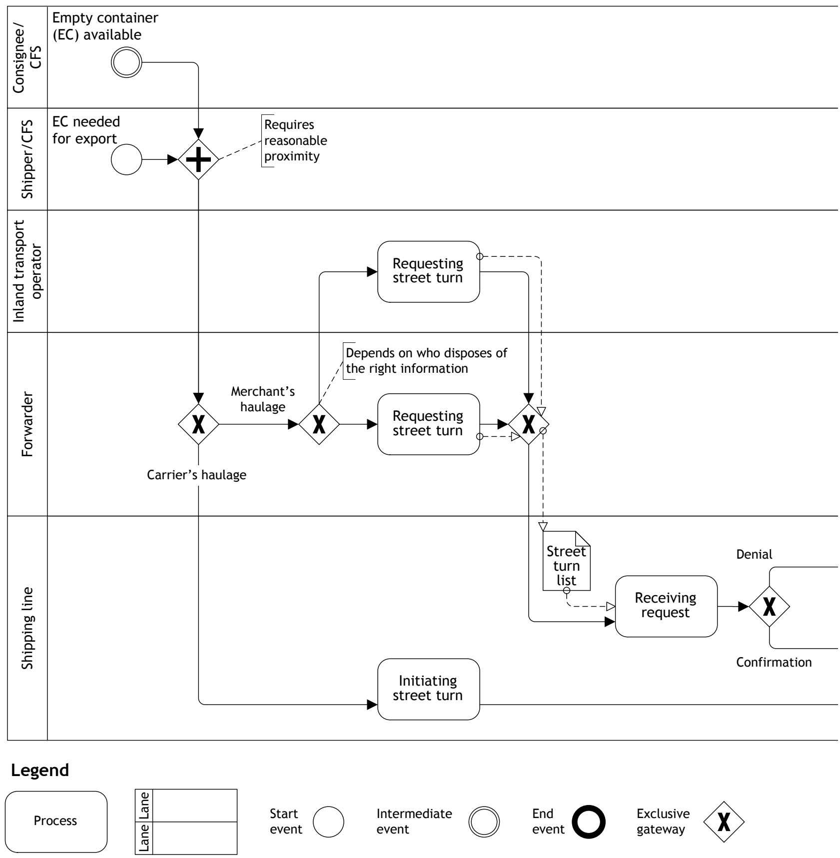
loaded on the ship by the terminal operator. The shipping line then transports the EC oversea. If there are no defects the shipping line is informed about the availability of the EC at the seaport terminal and the EC is buffered either in a dedicated area or in the normal stock. In case the seaport terminal operator has already received the release note for this specific EC, it is possible to bring the EC already to the export area for a specific ship, or a train.



Street turn (5)

The street turn is a two-edged affair. It avoids empty transportation by shipping the EC directly to the next export location without backhaul transportation to depots or terminals and provision from these locations. This means a better capacity utilisation of transporting and forwarding companies which are the ones initiating street turn processes. Nevertheless this alternative does not include any checking processes in the depot, which might lead to quality complaints by the new shipper. For this reason it is handled with care by shipping lines responsible for the equipment not only in areas where the quality of container equipment is crucial. In recent years the share of street turns increased due to the fact that better capacity utilisation was desired by the shipping lines too and information exchange on that issue has improved as well. But street turns still do not have a high share: a range from 5% to 10% was mentioned by different interviewees in Hamburg. At other regions around the BSR this alternative is even more in-frequent or almost non-existent, e.g. in Finland as paper products require high

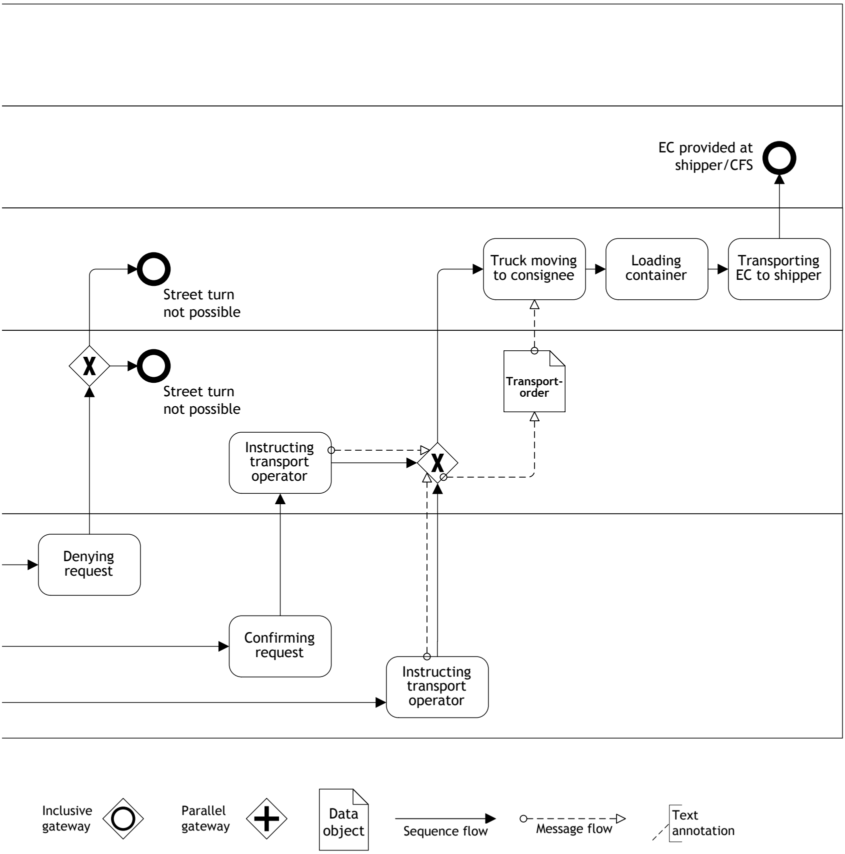
Figure 6.12: Processes of empty container logistics: street turn



Source: Own design

quality standards of the container equipment and due to this, checking processes at the depot are preferred. The same two-edged perspective applies to the alternative of direct reutilisation of the EC by the same consignee/shipper. In this context it must be mentioned that import and export cargo of one shipper often require different container types, sizes and quality grades, making this an even more infrequent alternative.

Processes related to the street turn (5) are shown in Figure 6.12. For the street turn alternative there have to be two initial requirements: a container is emptied at a consignee's site/CFS and in a reasonable proximity cargo is available that



requires an EC of that size, type and quality grade. Reasonable proximity very much depends on container availability in the region or the distance to the next seaport or hinterland depot/terminal. If forwarding companies or transporting companies on behalf of forwarders are the initiators of the street turns (merchant haulage) they first have to request the confirmation of the shipping line to use the equipment in this way. Information exchange is mostly realised by so-called street turn lists sent by email or transferred by phone. In case permission is provided the transport operator gets instructions to pick up the EC either by the forwarder (merchant haulage) or the shipping line (carrier's haulage). In case, the request is denied, the street turn is not possible. Sometimes the trucking company is advised to check the container roughly before transporting it. The street turn process ends with the EC provided at the shipper's site/CFS.

The stakeholder classification as portrayed in the stakeholder map (see Figure 6.6) was also reflected during process modelling. The key role of ocean carriers and sea freight forwarders could thereby be approved. Due to their steering role either in merchant's or carrier's haulage their salience in comparison to others became evident. The key role of the ocean carriers was further approved by them controlling the container equipment. The primary role of sea terminal operators was also confirmed due to their control of the main transshipment point in the container transport chain and their insights on outgoing and incoming empty movements. Also, they are partly involved in deciding about the location of empty depots (on-dock or off-dock). The secondary role of inland transport operators and container depot operators was also approved. They tend to be in charge of other stakeholders or have to consult other stakeholders before the process sequence continues.

Lease processes

Operational lease processes differing from the ones described above mainly occur after drop-off of master lease containers, during dry leases or after drop-off of spot lease containers. Drop-off of the container is then usually at a depot to ensure a professional statement on the quality of the container. The depot operator undertakes the checking procedures agreed for the container and then sends a repair estimate to the shipping line, which has to compare that to the terms agreed in the lease contract. Then negotiations between shipping lines and container leasing companies start. Finally, the depot operator receives instructions on how to proceed.

Customs processes

Normally empty containers are regarded as load units with respect to customs procedures. They may be imported or exported for temporary use (also called temporary admission) if they are once licensed. By registration at the Bureau International des Containers they get a so-called prefix - a seven-character number – that enables customs to handle them more easily. If they are not registered in this way, which often is the case with so-called shippers' own containers, they have to apply in a specific procedure for temporary use every time they are imported or exported. If the container itself is the traded good, customs procedures are similar to other goods that are imported or exported. Depending on the customs processes there are sometimes checks on whether the container is really empty, e.g. at the gates to get out of the free port zone in Hamburg[31]. Then customs officials have to open every empty container leaving the port to make sure that it is really empty.

6.2.4 Profiling stakeholders

This step in the SMC includes the development of attitude and power profiles[32].

Developing attitude profiles

During the interview series interviewees were asked to report on current issues with regard to empty container logistics. This step aimed to identify the stakeholders' main challenges as a basis for determining measures to improve empty container logistics.

Issues applying to logistics optimisation in general and independently of this context, such as cost reduction, the qualification of human resources and the standardisation of information flows, were identified during the interview series. Here, the cost aspect eventually means reduction of repositioning costs, which mainly affects the shipping line responsible for the repositioning processes. As the exchange of information affects all actors, **standardisation of information flow** was mentioned during almost every interview as a crucial factor. In relation to steering mechanisms of container transport chains and thereby addressing the shipping lines as key players in this respect, the following issues were mentioned by almost all terminal, transport and depot operators interviewed. They were that

31 The free port zone in Hamburg was dissolved on January 1, 2013.

32 This section partially was published as part of the project TransBaltic deliverables: Wolff et al. (2012).

the scheduling respectively **the early notification of empty flows** must permit planning in time and thereby increase capacity planning and utilisation. Furthermore, the traceability of containers and the **transparency on processes and volumes** for all actors were again referred to by almost all terminal, transport and depot operators interviewed. Several issues were named that mainly affect stakeholders involved in port-related operational processes (shipping lines as well as terminal, depot and transport operators). They are **integrated capacity utilisation** – improving a balanced utilisation of port infrastructure and suprastructure -, **increased space efficiency at the terminal** and **decreased throughput time in the depot or terminal**. With regard to the port but mainly valid for the PoH are the following issues. The **image of empty containers** in terms of imparting the necessity of empty container logistics as an essential factor to enable good full container logistics was mentioned during almost all interviews with stakeholders in Hamburg. As full container handling (but also some other port activities) leads to higher revenues with respect to the required space and operating empty container depots is a space-intensive business, this leads to the issue of **space availability for depots** in the port being brought up by almost all port actors. Some of them additionally mentioned trimodal accessibility of depots as an important issue to ensure flexibility and the potential for modal shift. In relation to the bad image of empties another issue was brought up by a few actors involved in associations linking the port business with societal interests. This is the negative environmental and socio-economic impact of empty flows. This issue also applies more to Hamburg, where port and residential areas are growing close to each other and negative impacts such as atmospheric pollution, noise and unsightly stacks of containers affect local residents directly. Finally, some issues referred to the hinterland area, mainly brought up by transport operators, shipping lines and container leasing companies. One is the increase in the network density of hinterland container depots, which in Hamburg is closely related to dry port development in the hinterland. Both converge to the issue of **container availability in the hinterland**. Another issue in this context is **container availability in the hinterland**, in particular that of special equipment. Last not least the **quality of container equipment** was mentioned as an important issue, especially by shipping lines and forwarders.

The issues identified were summarised for the survey. Respondents were asked to rank these issues according to their importance for improving empty container logistics. The results of all respondents (n=27) are summarised in Table 6.10, in detail they are presented in Table C. 2.

Table 6.10: Ranking of given fields of action to improve empty container logistics

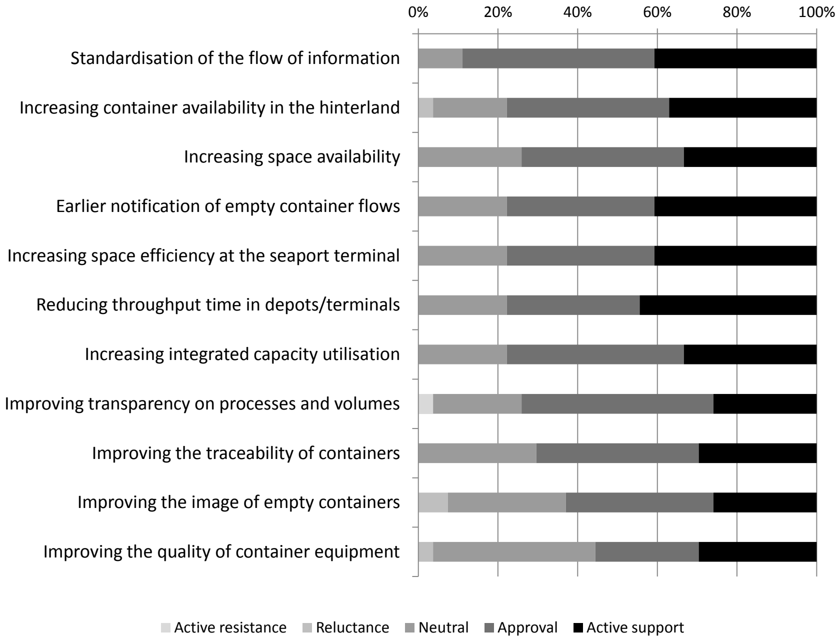
Rank	Issues/Fields of action
1	Standardisation of the flow of information
2	Increasing container availability in the hinterland
3	Increasing space availability in the port
4	Earlier notification of empty container flows
5	Reducing throughput time in depots/terminals
6	Increasing integrated capacity utilisation
7	Increasing space efficiency at the seaport terminal
8	Improving transparency on processes and volumes
9	Improving the traceability of containers
10	Improving the image of empty containers
11	Improving the quality of container equipment

Source: Own design based on survey results, n=27

With regard to generic stakeholder groups, detailed results are also shown in Annex C.5. The **standardisation of the flow of information** as an overall prioritised issue is also in the first rank as evaluated by shipping lines (n=8) and terminal operators (n=5). The scattered stakeholders subsumed in the group *others* (n=4) shared this evaluation. Inland transport operators (n=5) gave their most emphasis to **integrated capacity utilisation**. Forwarders (n=3) focus more on **container availability in the hinterland**. The **earlier notification of empty container flows** is mostly wanted by container depot operators (n=2).

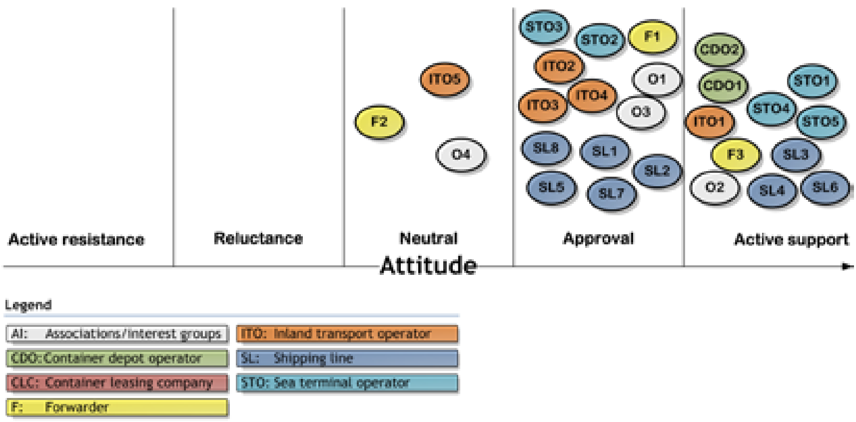
Further respondents were asked to evaluate their attitude on given issues. The results are summarised in Figure 6.13 (ordered by above ranking); they are presented in detail in Annex C.6 for each responding stakeholder and summarised by generic stakeholder group. Results show that almost exclusively all issues were evaluated as positive in terms of stakeholders' attitude regarding a change. Only three issues (container availability in the hinterland, quality of container equipment, and the image of empty containers) got a reluctant evaluation from one or two stakeholders. Transparency on processes and volumes was the only issue that triggered active resistance despite the fact that a change of selected issues would create approval from about 40-50% of stakeholders. Slightly fewer (30-45% of stakeholders) would even receive support from the stakeholders. Some stakeholders chose a neutral position (10-40%). The fact that this covers a broader range than other attitudes is noticeable, especially that the share of neutral responses increases the greater the rank. This can be interpreted as verification of the ranking just as a neutral position reflects a level of indifference on the part of stakeholders.

Figure 6.13: Respondents' attitudes towards identified issues



Source: Own design based on survey results, n=27

Figure 6.14: Standardisation of the flow of information: respondents' attitudes



Source: Own design based on survey results, n=27

For the top issue – standardisation of the flow of information – respondents' attitudes are portrayed in Figure 6.14. As already mentioned, this issue was almost exclusively evaluated as positive in terms of stakeholders' attitudes toward change. Only three stakeholders showed a more neutral perspective, 13 stakeholders declared their approval and the remaining eleven stakeholders even their active support for a potential change. At the level of generic stakeholder groups only the container depot operators (n=2) showed a clear vote for active support. Forwarders (n=3) and also those subsumed under *others* (n=4) are almost balanced between neutrality, approval and active support. The responding inland transport operators (n=5) have a slight focus on an approving position. Shipping lines (n=8) and sea terminal operators (n=5) are between approval and active support, though shipping lines show a slight preference for approval.

Developing power profiles

Another focus of the interview series was to determine influencing factors with respect to the design of empty container logistics.

At first, interviewed parties were asked to name key players in this respect and factors that constituted their power. They mentioned the shipping lines first due to the fact that they **control container assets**. This applies both to the half of the worldwide container fleet they own directly and to the other half that they lease from container leasing companies. Resulting from this control of container assets and their functioning as carrier's haulage, shipping lines also **control strategic steering processes** with regard to the global flow of (empty) containers. So the main drivers are repositioning due to the imbalance of trade and the imbalance of container equipment (due to different requirements regarding sizes and types) and labour costs (for e.g. maintenance and repair), quality of service in certain ports and container production costs. Interview partners were further asked to name other factors constituting influence as well as their scope of action and underlying influencing factors to design empty container logistics. The factor **control of operational processes**, which is closely related to **pricing**, was named very often, especially in relation to terminal and depot operators who handle the containers and have a major influence on throughput time in the port. They also serve short-term demand by shipping lines when they optimise the utilisation of ship capacities by filling ships with empties for repositioning if there is no loaded cargo available or the ship's weight limits have been reached. This also applies to rail operations in the hinterland where due to capacity optimisation ad hoc demand can emerge. The **market situation** also plays a major role, as in a somewhat fragmented market like the road transport market operational processes can more easily be substituted in the short term by competitors even though road transport operators with a high share of loadings may also exert influence. Some factors relating to interrelations between different stakeholders were mentioned, such as the pressure that one party exerts due to contractual relations. In this context **vertical and horizontal integration** were named as important influencing factors. As for horizontal integration, some shipping lines are organised in alliances or other kinds of collaboration to create synergies with respect to empty container repositioning, e.g. they have agreements on cabotage, which in this context is a one-way spot lease of the container owning shipping line to a shipping line which has a loaded container on that specific basis. Also, other stakeholders integrate horizontally e.g. terminal operators to develop their common hinterland as well as almost all actor groups joining associations. With regard to vertical integration this applies very often among certain stakeholders, especially the triangle of shipping lines, terminal operators (seaborne and hinterland) and depot operators. With regard to cargo owners the **shipper's specific demand** was named as an influencing factor in particular but not exclusively if shippers are transporting large volumes. Their specifics exert influence on quality requirements for the empty container. That leads to requirements along the entire transport chain. The shipping line has to monitor not only container size and type when repositioning but also different quality levels for a cargo range (from e.g. scrap metal to units of stored blood). This further leads to the necessity of sorting the container in the depot (sometimes also at the terminal) not only by shipping line, size and type but also by up to sometimes five quality criteria. That is one reason for the space intensity of this business. Another factor mentioned is the degree of integration in the port community. Many agreements and orders rely on trust and **informal relations** or on personal contacts that are sometimes built up over years. **Knowledge and competence** of empty container patterns was also frequently mentioned as an influencing factor. Also, the **political framework setting** was named by a few interview partners. Especially in ports, urban and transport planning authorities can exert influence by decisions they take with regard to e.g. transport infrastructure or general port development. In particular, the control of space resources, which is the case in landlord ports, was named as a very important influencing factor for designing empty container logistics.

In the survey respondents were asked to rank these identified power factors according to their importance by designing empty container logistics. The results are summarised in Table 6.11, in detail they are presented in Annex C.7 for each responding stakeholder.

Table 6.11: Ranking of given power factors to improve empty container logistics

Rank	Power factor	Weight [%]
1	Container ownership	15
2	Market share	14
3	Strategic process power	13
4	Operational process power and pricing	12
5	Demand-side power	11
6	Knowledge and competences	10
7	Vertical Integration	8
8	Political power	7
9	Informal connectivity	5
10	Horizontal integration	5

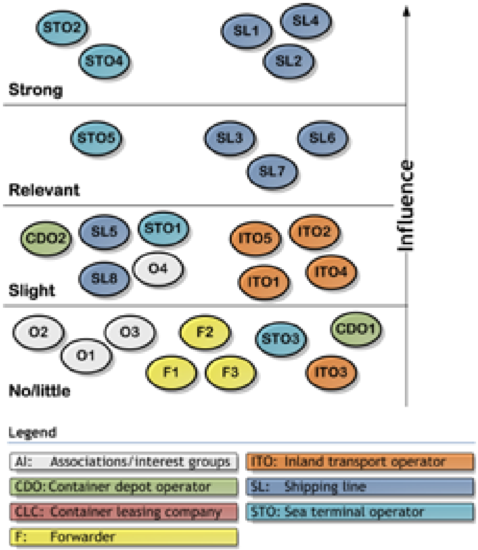
Source: Own design based on survey results, n=27

Further respondents of the survey were asked to evaluate their own influence with respect to the above power factors.

In order to create an overall evaluation of respondents' power the evaluation was aggregated in the following steps. For evaluation only the six most important factors were considered, each amounting to up to 10-16% and together constituting the significant share of almost 80%. Among these six most important factors the maximum entry of one attribute (strong, relevant, slight, or no influence) was counted among all respondents. This logic takes as a basis the fact that respondents are not evaluated by absolute figures but relative to each other. That the full range of influence is considered was ensured by the choice of stakeholders. In conclusion, all respondents who hit the maximum entry per attribute were classified to this attribute group.

The results are shown in Figure 6.15, in detail they are presented in Annex C.8. It becomes obvious that the self-conception of the majority of shipping lines and sea terminal operators is that they play a strong or at least a relevant role. Inland transport operators and container depot operators see themselves more as having a slight or even no influence. Answers from the three participating forwarders mirror their self-conception as playing only a weak role.

Figure 6.15: Classification of respondents according to the self-evaluation of their influence to design empty container logistics



Source: Own design based on survey results, n=27

6.2.5 Deriving involvement strategies

In compliance with the SMC procedure developed, the results of the stakeholder attitude and power profiles are compiled in power-attitude matrices. Finally, this serves as a basis for developing adequate involvement strategies for each stakeholder.

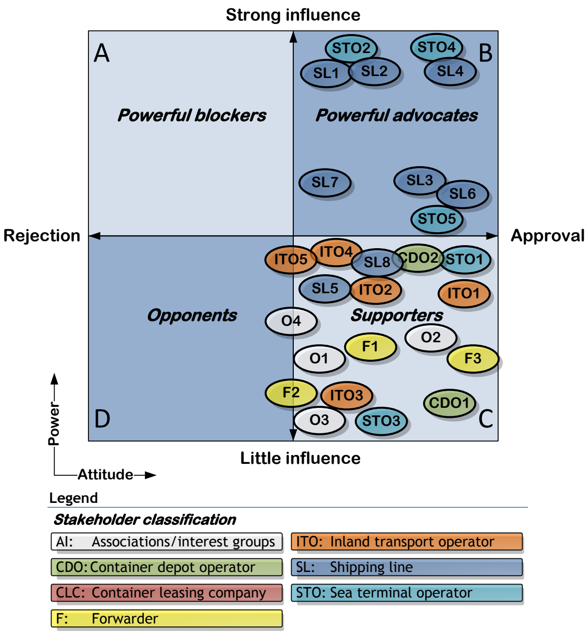
Creating the power-attitude matrix

The results of the previous step in the SMC – profiling stakeholders – are merged and illustrated by power-attitude matrices such as a matrix being created for each issue. Here only the matrix for the top issue - standardisation of the flow of information - is illustrated exemplarily in Figure 6.16, others can be found in C.9. Also, the further analysis is only exemplified for this issue.

Combining results of the attitude and power profiles leads to an allocation of stakeholders to the quadrants A, B, C, and D. Given that this issue was evaluated almost entirely positively in terms of stakeholder attitudes, the allocation is less diversified in that stakeholders are only allocated to quadrants B and C.

Following the terms of the SMC (as described in chapter 4.5) this issue only has *powerful advocates* (quadrant B) and *supporters* (quadrant C). It becomes evident that the majority of shipping lines and terminal operators are classified as powerful advocates in quadrant B. The other groups, such as inland transport operators, forwarders, container depot operators and the sum total of other respondents, are all classified as supporters in quadrant C.

Figure 6.16: Standardisation of the flow of information: power-attitude matrix



Source: Own design based on survey results, n=27

In the following, the results of the survey are refined and aligned and stakeholders who did not answer the survey are evaluated for power and attitude. Furthermore, individual evaluation of respondents is aggregated back on the generic level of stakeholder groups to amend the overall picture by providing for missing stakeholder groups such as container leasing companies, authorities, shippers and associations. This step will be finalised by taking survey results and refining them with the help of insights gained from previous steps and related literature.

As for shipping lines, the evaluation of their influence meets expectations from the second step in the SMC: identifying stakeholders. There they were evaluated as key stakeholders in empty container logistics (see Figure 6.6) and their strong influence is adopted here. The differentiation between ocean carriers and feeder shipping lines (feeder operators) has to be re-integrated as the range of survey respondents did not offer this detailed view. Bearing in mind identified power factors, the influence of regionally operating feeder shipping lines will be less than that of globally operating ocean carriers. As for container ownership, small or medium sized shipping lines prefer to lease rather than own containers in contrast to large, globally operating shipping lines (Theofanis & Boile, 2007, p.22 f.). However, the feeder operators hold a significant share in the Baltic container market (Breitzmann, 2009, pp.25-26). In terms of the power on strategic processes their control of the overall chain is less significant than that of ocean carriers as they are usually in charge of them (Styhre, 2010, pp.69-71). As the executive party in feeder operations their operational process power is estimated to be relatively strong. To summarise, the influence of regionally operating feeder shipping lines is estimated as being less strong than that of the ocean carriers but still relevant. Due to no other source their attitude is assumed to be like that of over sea carriers.

The allocation of terminal, inland transport and container depot operators seems to be relatively consistent with previous steps in the SMC. The terminal operators were evaluated as primary stakeholders, which corresponds to the evaluation in the power profiles, where their influence is relevant but less than that of the over sea shipping lines. Likewise the designation of inland transport and container depot operators as secondary stakeholders corresponds to the evaluation of having a slight influence.

As for forwarders, the survey results differ from the evaluation during stakeholder mapping. Sea freight forwarders were evaluated as primary stakeholders and local/hinterland forwarders were designated to secondary stakeholders. All forwarders who responded were globally operating sea freight forwarders. Their self-evaluation seems to be underestimated as they regard their influence as rather slight or little. Thus an adaptation seems to be required. In contrast to shipping lines, forwarders usually do not own container resources. However, merchant haulage has a significant average share of 70% in Europe (Notteboom, 2009, p.56). Their strategic process power is shaped strong because in merchant haulage, if not executed by the shippers themselves, the forwarder arranges all services in the transport chain (cf. Veenstra, 2005, p.70). Here it seems to be reasonable to differentiate between sea freight and hinterland forwarders. The latter's control of the container logistics chain is determined as they are usually subcontracted by globally operating forwarders or ocean carriers. To summarise, the influence of sea freight forwarders is found to be less strong than the influence of ocean carriers but still relevant. Hinterland forwarders' influence is again less significant than that of sea freight forwarders and evaluated as being slight. Due to no other source, their attitude is assumed to be like that of the sea freight forwarders.

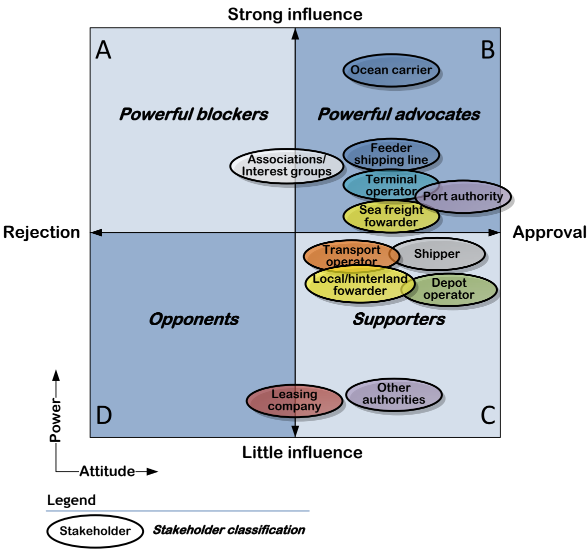
Finally it remains to allocate the generic stakeholder groups that were underrepresented or not represented at all during the survey.

First, there are container leasing companies, which were allocated to the secondary stakeholders during the stakeholder mapping. Like the shipping lines, they are the owner of container assets although the equipment is leased to the shipping lines. Thus their strategic process power is much less significant than that of the shipping lines. They do not do business directly with other stakeholders or others involved in the container transport chain (The Tioga Group, 2002, p.33). One container leasing company was interviewed during the interview series. They stated that their influence on empty container logistics design is fairly weak, especially in comparison with that of ocean carriers and sea freight forwarders. To summarise, their influence is evaluated as being little. Their attitude could not be recorded in the survey. However, in the interview it was stated that their general interest in logistics process design is rather low or neutral as their main business is serving equipment demand according to the needs of the transport market. Furthermore, their business is going very well and they did not suffer extensively from the economic crisis in 2008 and following years, which can also be concluded from related literature (UNCTAD, 2011, p.39 ff.). So, their need for optimisation is not as strong as that of other stakeholders in the maritime container market. Consequently their interest is evaluated as being neutral, also with regard to the issue '*standardisation of the flow of information*'.

Second, there are the shippers. They were evaluated as secondary stakeholders during the stakeholder mapping. As for the power factors identified, it can be stated that they usually do not own containers and account for only a very small share of the container fleet (Theofanis & Boile, 2009, p.54). Their strategic process power can become relevant if they are responsible for the transport chain in merchant haulage. However, their operational process power is estimated as being very weak as they are not usually involved in operational transport processes and even in merchant haulage they charge terminal and transport operators. Nevertheless, they represent the demand-side power by using marine containers for export and import loads. To summarise, their influence is estimated as being slight. As for their attitude, no results could be gained by empiricism. In related literature their interests and needs are said to be closely related to those of the shipping lines and transport operators representing their customers' needs (Theofanis & Boile, 2007, pp.41-42). In addition, it is assumed that they support attempts to standardise the flow of information. Thus their attitude is set to between approval and strong support.

Authorities, in particular port authorities, were somewhat reserved in answering the survey and the one responding port authority thus was subsumed under the group *others*. Their self-evaluation regarding their power was that of holding slight influence. Nevertheless they were designated as primary stakeholders during stakeholder mapping. Bearing in mind that this case study was initially supported by the Hamburg Port Authority and the whole process was planned to be under their mediation, the port authority's influence is regarded as being at least relevant. Furthermore, their attitude towards the standardisation of the flow of information is estimated as being of strong support due to the same reason. As for other authorities, it is assumed that their influence is determined or better executed by the port authority and thus rather weak. Nonetheless, other authorities might become crucial during specific planning. Their attitude is estimated as being between approval and support.

Figure 6.17: Standardisation of the flow of information: power-attitude matrix refined



Source: Own design

Finally there are associations and other interest groups. During stakeholder mapping almost all stakeholders of this kind were designated to primary stakeholders as they bundle interests of other stakeholders, they exert their influence by lobbying and they are strongly networked. Nevertheless it is assumed that only a specific association and interest group rates a sharp evaluation and thus this group is rather difficult to allocate on a generic level. However, not to underestimate their influence, this group is evaluated by a '*wild card*' with relevant influence, bearing in mind that specific conditions have to be considered for concrete planning. Given that it is difficult to evaluate their attitude too, it is set as neutral at this stage.

The results are summarised in Figure 6.17.

Developing involvement strategies

During this step in the SMC, strategies on how to involve identified stakeholders are to be developed. The involvement itself is referred to the next change process phase, i.e. here strategies are to derive how to involve identified stakeholders in the evaluation phase of the change process. In the context of this case study, issues identified during the evaluation phase are to be weighed up and measures to deal with them are to be established and concretised.

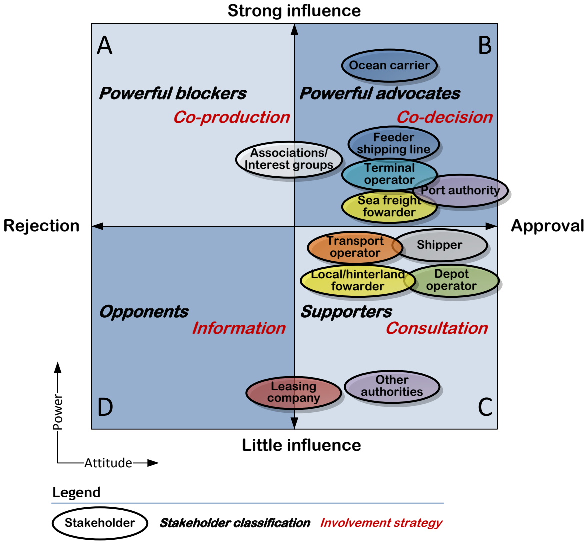
Involvement strategies will most likely differ for each issue. Thus involvement strategies have to be developed for every issue, and that will be picked up in the next phase of the change process.

The development is again exemplified for the top issue - standardisation of the flow of information (see Figure 6.18). In line with the SMC framework developed, stakeholder classifications are already linked to different kinds of involvement.

As the issue considered exclusively induces a positive attitude, stakeholders are classified only as powerful advocates and supporters. Powerful advocates are to be involved by co-decision, supporters at least by consultation.

Co-decision means that change processes are designed by joint analysis and joint action planning, so co-production is included here as well. Stakeholders involved by co-decision contribute their knowledge and expertise to generate a knowledge base in preparation for decision-making. Furthermore, they ensure legitimacy of the chosen direction of change processes by their involvement in decision-making. Depending on the number of stakeholders involved, different methods can be applied to ensure adequacy. As this involvement is highly dependent on the participation of stakeholders, participatory methods such as workshops and working groups are proposed here as they are based on the aim of achieving

Figure 6.18: Standardisation of the flow of information: involvement strategies



Source: Own design

consensus and are used to elaborate structured results. According to the results arrived at, at least shipping lines (both ocean carriers and feeder shipping lines), sea freight forwarders, terminal operators, associations and interest groups and of course the port authority as the initiator in this case study are to be involved. Due to the fact that these are generic stakeholder groups and in practice several individual stakeholders are included in each group (bearing in mind the 78 stakeholders from the SMC step stakeholder identification and mapping) the proposal is to start with a bigger workshop inviting all stakeholders belonging to the generic groups of powerful advocates to attend. Stakeholders who have an interest in further active involvement should be singled out during this workshop. If a large number of stakeholders still show an interest in being actively involved, the planning process should be split into several tasks to be elaborated in different working groups to enable more stakeholders to contribute.

Consultation in the context of the SMC means the selective involvement of stakeholders in change processes by the decision maker. Stakeholders are asked for their opinions on proposals at various stages of the process with the decision maker being free to take the stakeholder's advice into account or not. According to elaborated results the following groups are to be involved: inland transport and depot operators, shippers, local forwarders, container leasing companies and other authorities. Selective involvement leads to a selection of stakeholders. Breaking these groups down into individual stakeholders may end up with a huge amount of stakeholders. If one generic group is already adequately represented by its association, bundling forces could be considered to reduce the number of interfaces. In order to reduce the number of individual stakeholders but still take into account the generic group, representatives can be chosen who are known for their willingness to be involved in planning processes and who are acknowledged by other stakeholders of the group. Another important factor is if individual stakeholders in general have an interest in being involved. Normally, there should be experienced with these circumstances from former attempts. Or the stakeholders who responded to the survey have declared the kind of involvement they would like. Referring to the above proposal to initiate the next stage of the process with a large workshop event, initial consultation can be integrated in this context too. It is proposed to select representatives of intermodal transport and depot operators, of local forwarders and shippers and invite them to the first workshop. As for leasing companies, their neutral attitude is interpreted as meaning that it is not necessary to involve them from the beginning, but for follow-up actions such as the planning of specific measures, consulting them should be considered if it is appropriate. The same applies to other authorities, especially as it is assumed that their general interests are represented by the port authority at least in a first stage.

The question may then arise as to what finally makes the difference between suggested involvement strategies that end up in the same workshop. The aim should be to reach consensus in decision-making with powerful advocates to ensure that the process is designed and supported by those who exert a significant power along the maritime container transport chain. Furthermore, it is necessary to design change processes with their help to consider their views and challenges on existing processes. In contrast to this, supporters are not mandatory in designing and supporting change processes. They should be involved if the specific issue requires their knowledge and expertise. However, they do not need to be actively involved in decision-making.

Insights gained from this step in the SMC will provide valuable input for the change process in terms of the definition of objectives as well as for the ensuing phase that includes the choice of measure(s).

6.3 Evaluation phase: the virtual container yard as a measure to improve regional empty container logistics

The evaluation phase portrays the choice and planning of the virtual container yard as a measure to improve regional empty container logistics. It is described separately from concrete planning within the PoH and it should be kept in mind that this application has not been approved by the HPA or by other port stakeholders. Thus implications are mainly derived from related literature and from the interview series in the definition phase. The main aim of this chapter is to show how to continue the definition phase and apply the SMC on concrete planning during the evaluation phase.

6.3.1 Clarifying objectives

The evaluation phase aims at generating and evaluating potential solution options. Therefore different strategies and measures to mitigate negative impacts of empty container logistics will be presented first.

Strategies and measures in empty container logistics

In the literature several strategies and measures are described that have potential to improve empty container logistics. Empty container logistics strategies are said to aspire to avoid empty trips, to reduce empty vehicle miles travelled, to reduce empty container storage costs and to minimize dwell time (The Tioga Group, 2002, p.9; Lun et al., 2010, p.161).

Boile (2006) structures measures that aim at keeping the container a part of the intermodal transport system in managerial, policy, ICT and technology solutions (Boile, 2006, pp.64-72). She also presents options for a secondary use of containers such as for habitation, warehousing (Boile, 2006, pp.73-79). However, the focus here will be on empty containers remaining part of the intermodal transport chain.

Management

A very simple strategy is to reduce imbalances by searching actively for return cargo and thereby improving the utilisation rate of containers. The measure is mainly applied by shipping lines or other transport operators, in rare cases also directly by the shipper. However, it is limited by the balance potential of the destination, some are simply imbalanced (Konings & Thijs, 2001, p.337).

Moreover, there are different approaches for shipping lines to use price policy to balance or steer empty movements. It is, for example, possible to compensate the high costs on the low demand leg by imposing a surcharge on the freight rate of the high demand leg. Another option for container owners (i.e. leasing companies and shipping lines) is to introduce price incentives for the flow of equipment, e.g. to give incentives for a desired drop area or for the return of a specific container type to avoid shortages. There is also the possibility for the shipping companies to sell containers in the surplus area and to buy them in the deficit area. This depends very much on the ratio of current purchase prices and the cost of repositioning. In this context container cabotage should be mentioned, i.e. shipping lines offering repositioning containers to other transport operators who in exchange for transporting the container to a desired location may use the container free of charge (Konings & Thijs, 2001, p.336).

Other shipping lines pursue horizontal cooperation to reduce the costs of empty transport. As a very common and obvious option, the use of spare ship capacities was named, either of one's own fleet or that of other shipping lines (Konings & Thijs, 2001, p.336).

Cooperation can also focus on the container itself by making use of container pooling (Boile, 2006, p.65). Container pooling implies the consolidation of containers in one pool that manages container-related tasks to an agreed extent (Vojdani et al., 2010, p.150), such as maintenance and repair, provision etc. One special form of this measure is the so-called grey box pool or grey boxing. This adds neutrality in terms of the usually individually branded containers to the pool concept using only one colour for containers (Boile, 2006, p.65; Vojdani et al. 2010, p.150).

Another solution is the repacking of cargo from marine to domestic containers. This measure avoids inland transportation, which might be difficult to predict in terms of the time horizon, and enables a quick repositioning to a surplus area, e.g. from the US to Asia (Boile, 2006, p.69).

ICT

Several ICT solutions exist to face challenges in empty container logistics. An important factor for managing repositioning is the visibility of equipment (Boile et al., 2004, p.11). One solution is an electronic market to find free slot capacities for empty containers, the focus being on the exchange of large blocks of empties. Another solution includes Internet-based platforms to enable container unit exchange at a regional level, so-called street turns or triangulation. Shipping lines usually maintain these systems in their own network. If the platform is provided for the entire port community, it is called a virtual container yard (Theofanis & Boile, 2009, p.63). Recent advances in ICT such as radio frequency identification (RFID) have also been tested in empty container logistics to promote tracking and tracing, although this is still in its infancy (Brito & Konings, 2007, p.8).

Technology

One technology measure described in literature is the foldable container (Boile, 2006, p.71-72; Vojdani et al., 2010, p.151). Most of the strategies applied try to reduce the number of empty containers transported. In contrast to that, the development of foldable containers reduces the volume of empty containers transported (Konings, 2005b, p.224). Several attempts - the first in the 1980s - to introduce the foldable container have failed in the past. However, at the moment there are several attempts to reinvent foldable containers and some types of foldable flatracks already use a comparable concept (Konings & Thijs, 2001, p.340). The idea of a foldable container still has to cope with scepticism as to its economic success, technical performance and reliability, the complexity of the folding and unfolding processes, as well as logistical and organizational problems (Konings & Thijs, 2001, p.347).

In addition to foldable containers Vojdani et al. (2010) refer to the usage of special empty container forklifts and barges (Vojdani et al., 2010, p.150, referring to Crainic et al., 1993).

Policy

One strategy to improve empty container logistics that is broadly discussed is the design of a network of depots for empty containers (Theofanis & Boile, 2009, p.58). The network design comprises the allocation of depots in the port and hinterland depending on the spatial and stochastic allocation of transport volumes, the given transport infrastructure, costs, etc. (Vojdani et al., 2010, p.150). Here the measure is allocated to policy measures due to the fact that it is usually implemented or encompassed by port authorities and/or planning authorities optimising empty container logistics at a regional level (cf. Mittal, 2008, p.120; Vojdani et al., 2010, p.151). However, this strategy can also be applied at the level of an individual shipping line that optimises locations for container depot services in its own network as a managerial measure.

Another measure for public authorities to limit the number of empty containers in the port or port region is to issue specific regulations for the length of time that empty containers can stay in the port. Argentina for example has passed a punitive law for containers stored longer than a certain number of days (Boile et al., 2004, p.10). Other measures regulate the stack height or the number of boxes in a facility (Boile, 2005, p.16).

Derivation of measure

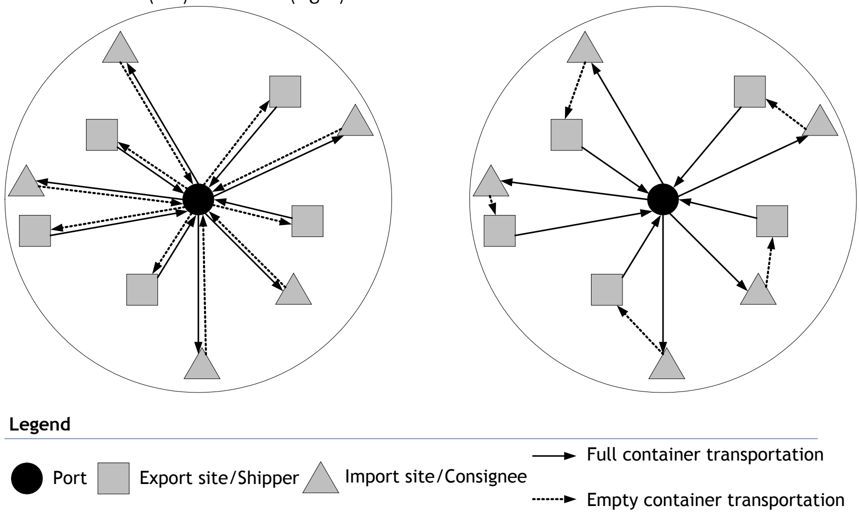
During the definition phase several issues were identified and evaluated by the stakeholders consulted. The top issue identified was *standardisation of the flow of information*. Thus it appears reasonable to focus first on measures dealing with this issue. Various ICT measures are known to aim at facilitating the repositioning of empty containers (see above). In the context of a preliminary study (Wolff et al., 2011) a survey was conducted to evaluate measures mitigating negative impacts of empty movements by their success. Stakeholders were asked to state their experience or estimations with regard to different measures. Among the ICT measures respondents identified the virtual container yard (VCY) as the most promising measure (Wolff et al., 2011, p.29 f.). With reference to standardising the flow of information, this measure is appropriate as it is based on a platform where information on empty container demand and availability is matched and direct interchange of empty containers (street turn) is enabled. The exchange of information between different actors of the container transport chain for this purpose is normally done by e-mail or phone (see chapter 6.2.3).

Usually such an evaluation would not be taken as the only basis for choosing a measure but requires a participatory process that is described in the derived involvement strategies of the SMC applied in the definition phase of the change process. However, as this step could not be realised within a participatory process and the application aims to show the application of the SMC framework on a specific measure, the VCY is selected as the measure to concretise planning.

Consequently, the SMC is applied to the evaluation phase of installing a VCY in the Port of Hamburg. The idea behind and motivation for a VCY are portrayed in brief (in more detail the VCY is presented in the section on scoping processes).

The VCY is an Internet-based platform to post information and enhance direct empty container interchanges between an importer (consignee) and a next exporter (shipper). Empty trips to/from the marine terminal or container depot are thereby avoided (Theofanis & Boile, 2007, p.6) as shown in Figure 6.19. Empty container exchange is called street turn or triangulation (LeDam Hanh, 2003, p.16).

Figure 6.19: Full and empty container transportation without (left) and with (right) a VCY



Source: Own design based on Theofanis & Boile, 2007, p.7

Its major functions are to enable posting of critical information and serve as a conduit for communication (The Tioga Group, 2002, p.3). According to Rodrigue (2012) the VCY is a '*clearinghouse*' to help connecting demands and availabilities of containers and is mentioned as a strategy to keep the container equipment constantly be in circulation. It helps to improve information exchange between actors involved in supply chain management such as trucking companies, shipping companies, distribution centres and container leasing companies and to assist these actors in their decision making process on the use of container assets, namely returns and exchanges (Rodrigue, 2012g). The main motivation for a VCY is to achieve a significant reduction in empty, unproductive vehicle miles travelled. Thus the VCY helps to mitigate freight transportation related congestion around ports and associated adverse environmental impacts (Theofanis & Boile, 2007, p.17). The motivation is driven mainly by local or regional entities (LeDam Hanh, 2003, p.10 ff.). Though this measure rather has a regional focus and does not specifically consider the relation of the PoH to the BSR a successful implementation could become a good practice example for other ports in the area.

Determination of the objective

In terms of the issue under consideration and the objective of the change process in general, no adaptation appears to be required and thus both remain the same during the definition phase.

By virtue of above derived measure, the objective of the evaluation phase is to concretise planning for installing a VCY in the PoH.

With regard to the objective of the SMC, it is to create transparency of relevant stakeholders with regard to the VCY, their interests in and influence on the realisation of a VCY in Hamburg in order to arrive at adequate involvement strategies for realising the measure.

Referring to the system boundaries in terms of the transport chain, Theofanis et al. (2007) limit the application of the VCY to a radius of around 70 miles (≈112 km) for 90% of potential sources and destinations (Theofanis & Boile, 2007, p.103). Other sources do not concretise geographical boundaries. It is assumed that there is potential for applying a VCY in the further hinterland of the port. However, at this stage of planning the boundaries will be based on underlying literature bearing in mind the locally inspired objectives of a VCY. Furthermore, it is assumed that street turns are realised largely by road transport, as otherwise either the shipper/consignee has to have direct access to rail or inland waterway or combined transport is required, which would lead to additional handling. So geographical boundaries of the VCY are determined by the local hinterland of the PoH that is reached by road transport.

Following the proposed SMC framework the following questions were to be reposed and answers are summarised in Table 6.12.

Table 6.12: Determination of the objective in the evaluation phase

Question	Answers
What is the **issue under consideration**?	The issue under consideration is empty container logistics within the PoH with special focus on empty container flows from/to the BSR.
What is the **objective of the change process** dealing with that issue?	The objective is to increase efficiency in empty container logistics within the PoH and in particular for empty container flows from/to the BSR and to explore the potential of empty container logistics as competitive advantage for the PoH.
What is the **objective of the particular phase** of the change process?	The objective of the evaluation phase is to concretise planning for installing a VCY in the PoH.

Question	Answers
What is the **objective of the SMC**?	The objective is to create transparency on relevant stakeholders with regard to the VCY, their interests in and influence on the realisation of a VCY in Hamburg in order to derive adequate involvement strategies for realising the measure.
What are the **system boundaries** of the SMC with regard to the **transport chain**?	The transport chain considered by the SMC is determined to the local hinterland of the PoH that is reached by road transport.

Source: Own design

6.3.2 Identifying stakeholders

Identification of stakeholders at this stage was mainly based on a review of VCY-related literature and literature on empty container logistics in general aligned with insights during the definition phase.

Listing stakeholders

According to Theofanis and Boile (2007) the main stakeholders in a VCY are shipping lines, shippers, road transport operators, sea terminal operators, container depot operators, container leasing companies and the port authority (Theofanis & Boile, 2007, pp.16-20). The Tioga Group (2002) further names freight forwarders (The Tioga Group, 2002, pp.27-29). In the proposed framework all stakeholders are described by to their role, resources and connectivity on the level of generic stakeholder groups.

Classifying stakeholders

According to the SMC framework developed the role is to be seen as that of a strong steering influence on the change objective. Transferred to this application, the role is thus understood as being the influence of stakeholders during the anticipated implementation of the VCY. In terms of resources the core ingredients of a VCY are considered. They are the container assets and relevant information on demand and availability of containers, as well as relevant know-how on exchange processes and other related resources. Here also the required resources for launching and operating a platform should be considered. With regard to the connectivity of each stakeholder, insights already gained during the definition phase are taken and refined for the VCY.

Shipping lines are mainly involved by owning or leasing container assets. They control much of the container logistics chain (The Tioga Group, 2002, p.27).

Their role in the VCY is indispensable as they give the permission to use an empty box (Theofanis & Boile, 2007, p.17, 20). Thus their role is estimated to be strong and they are defined as veto stakeholders. Large ocean carriers and regionally operating feeder shipping lines have to be classified differently with regard to their resources. In contrast to large ocean carriers, small shipping lines would rather lease than own containers (Theofanis & Boile, 2007, p.22). In particular, small and regional lines often rely entirely on rented boxes (Lun et al., 2010, p.159). Referring to insights gained during the definition phase, connectivity to other players is estimated to be strong for both ocean carriers and feeder shipping lines.

With regard to *inland transport operators* the VCY-related literature refers to road operators or *motor carriers* without further considering intermodal transportation by rail or barge in detail. Following the above argumentation and limiting the application of the VCY to the local hinterland of the PoH, only road operators will be included here too. According to Theofanis and Boile (2007) road transport operators are considered to be crucial for the success of a VCY as they, together with shipping lines, build the simplest form of a VCY in terms of information exchange (Theofanis & Boile, 2007, p.16). In terms of resources road operators have access to relevant knowledge and information in the VCY system. They are an important interface in posting empty box demand and availability (Theofanis & Boile, 2007, p.19; The Tioga Group, 2002, pp.31-33). Finally, their connectivity is estimated as being fairly strong, which tallies with insights gained in the definition phase.

Container depot operators are not specifically considered as having an important role with regard to a VCY in the corresponding literature. According to Veenstra (2005) off-dock depot operators fulfil a somewhat passive role in routing empty containers, although they have access to superior information on surpluses and shortages of empty containers (Veenstra, 2005, p.70). Both their role in implementing a VCY and their resources are consequently estimated as being low. Furthermore, insights from the definition phase determine their connectivity as being low or medium. Referring to the local implementation context of the VCY and the fact that their local integration is more pronounced, the latter will be adopted here.

Similarly to depot operators, *sea terminal operators* have access to relevant information (The Tioga Group, 2002, p.34) though in general they play a rather minor role with regard to information exchange in the context of the VCY (Theofanis & Boile, 2007, p.19). Their connectivity is said to be strong as they have many stakeholders as customers (Theofanis & Boile, 2007, p.44).

Container leasing companies play a role in the VCY if their equipment has to be off- or on-hired. These issues are particularly important for liability and responsibility patterns (The Tioga Group, 2002, pp.33-34). Furthermore, they are the owners of container assets even though the equipment is leased to and controlled by shipping lines. They do not directly do business with other stakeholders and thus are not strongly connected (The Tioga Group, 2002, p.33).

With regard to *forwarders* the literature does not provide comprehensive information on their involvement. This might be due to the fact that merchant haulage is much more common in Europe than in the USA. In Europe the average for merchant haulage is 70%, with some shipping lines only controlling 10% on some European inland routes (Notteboom, 2008, p.79). So they will be evaluated in relation to the shipping lines here. As for their role in information exchange their position in the VCY is comparable to that of the shipping lines as they control the rerouting of empty containers (Veenstra, 2005, p.70). Here again it seems reasonable to differentiate between sea freight and hinterland forwarders. The latter's control of the container logistics chain is determined as they usually do not serve over sea destinations. They are subcontracted by sea freight forwarders and shipping lines, but also directly by the shipper. In contrast to the shipping lines, forwarders do not own container resources but they also provide essential know-how when it comes to the container transport chain as well as demand and availability of empty containers at their customers' sites. Regarding their connectivity it is estimated that sea freight forwarders are more strongly related to other stakeholders than hinterland forwarders due to their scope of action.

The literature tends to expand on the reasons and benefits of *port authorities* to initiate a VCY rather than on their involvement on the process. The port authority – here a landlord – holds overall responsibility for the management of the port (Theofanis & Boile, 2007, p.21). Referring to the underlying objective of this case study and the fact that the VCY requires the strong support of the port authority, its role is deemed to be strong. It is understood as more that of a mediator or instigator rather than an active party using the VCY. Nevertheless with this intermediate function they provide relevant human resources and potentially financial resources for the development process of the VCY. They are related to all stakeholders in the port community. However, their relation is not linked to transport chain patterns thus their connectivity is estimated to be medium.

Another relevant VCY stakeholder is the *port community system (PCS) provider* for the PoH: DAKOSY (Datenkommunikationssystem). The PCS assists connected companies and authorities to optimise their import, export and transit processes by providing a wide range of EDI, ICT and data centre services for their customers. These companies include trading and industrial companies, freight forwarders, shipping companies, liner agents, carriers and various authorities (e.g. customs, water police). The company is a stock corporation that is owned by three consortia of interest groups (each holds one third): Hamburg freight forwarders, Hamburg port handling companies and Hamburg liner agents (DAKOSY, 2013). Their system provides the opportunity to embed the VCY in the existing infrastructure. So, they are a potential provider of such a platform. Thus their provision of relevant resources is estimated to be strong as they provide the relevant knowledge and expertise for planning and execution of the VCY. As for their role, it has be stated that they are the service provider according to the needs of their customers, in particular the shareholders namely the shipping lines, terminal operators and forwarders. As a consequence their role cannot be said to be all that strong as it will depend on the role of their main customers. Nevertheless it is estimated as still being relevant. Their connectivity is rated as strong because they are connected to all port stakeholders (Rodrigue, 2012f).

According to Theofanis and Boile (2007) it is important to involve *shippers* in early discussion of the VCY although their interests and needs are closely related to those of the shipping lines and transport operators representing their customers' needs (Theofanis & Boile, 2007, pp.41-42). As the shippers do not dispose of relevant resources this attribute is evaluated by medium shaping. Their connections are mostly limited to shipping lines, transport operators or forwarders (Theofanis & Boile, 2007, pp.41-42) and evaluated as low.

The classification of VCY stakeholders is summarised in Table 6.13.

Table 6.13: Classification of VCY stakeholders

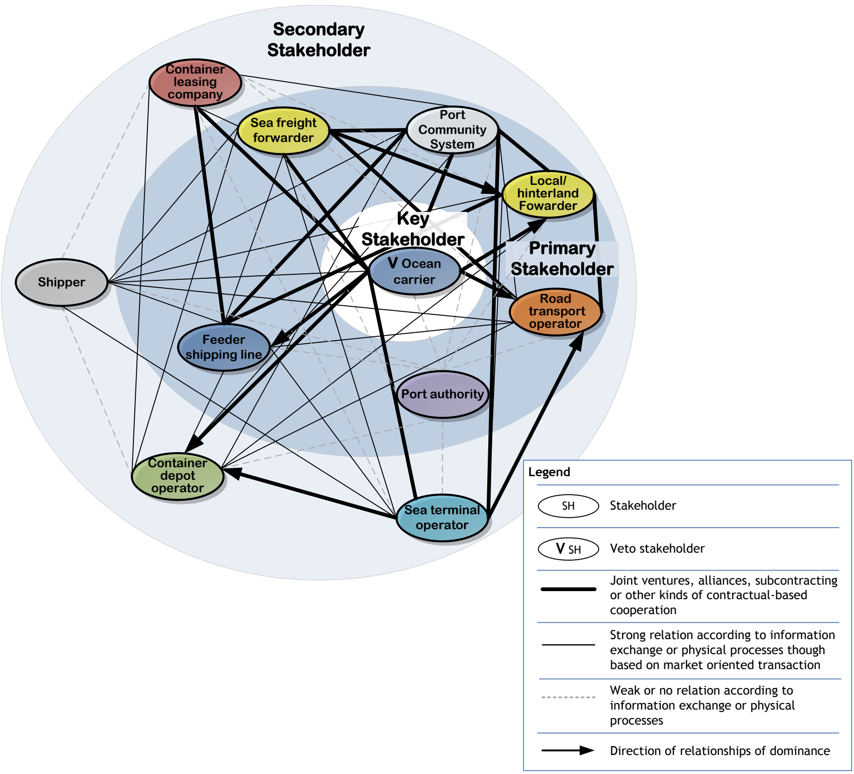
Generic stakeholder group	Role	Resources	Connections	Class
	Shaping of attributes			
Global ocean carrier	Strong	Strong	Strong	Key (Veto)
Feeder shipping line	Strong	Medium	Strong	Primary
Road transport operator	Strong	Medium	Strong	Primary
Container depot operator	Low	Low	Medium	Secondary
Sea terminal operator	Low	Low	Strong	Secondary
Container leasing company	Medium	Medium	Low	Secondary
Port community system provider	Medium	Strong	Strong	Primary
Sea freight forwarder	Strong	Medium	Strong	Primary
Local/hinterland forwarder	Medium	Medium	Medium	Primary
Port authority	Strong	Low	Medium	Primary
Shipper	Medium	Low	Low	Secondary

Source: Own design

Mapping stakeholders

The results of stakeholder identification and classifying are depicted in Figure 6.20. All generic stakeholder groups are allocated to the classification key, primary or secondary stakeholders. The ocean carriers as veto stakeholders are marked accordingly. Connectivity among depicted stakeholders is mainly adopted from the definition phase with only the port community system provider integrated and concretised. Their connectivity is strong to almost all port stakeholders as they provide the platform for the interchange of all port-related information. By virtue of their legal form as a stock corporation and their main shareholders being associations of forwarders, shipping lines and terminal operators, these relationships are accordingly marked as collaborative.

Figure 6.20: Street turn with VCY: stakeholder map clustering and related generic stakeholder groups



Source: Own design

6.3.3 Scoping processes

The VCY facilitates street turns or triangulation by matching empty container availabilities and requests in compliance to defined rules regarding users, container type, location and time. These rules have to be defined according to the needs of the container owning shipping lines for installing the VCY.

Collecting data and information

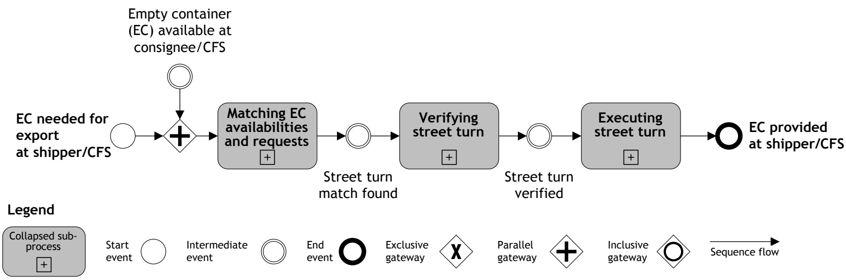
The status quo of the street turn process already was portrayed in chapter 6.2.3 during the definition phase. Its embedment in the empty container process chain still is valid as in Figure 6.7.

The process described hereinafter portrays the informational and physical flow of a street turn process with VCY. Thereby descriptions and modelling mainly were based on Theofanis & Boile, 2007, pp.15-19, amended with processes/actors that were not considered in this source of literature but that are required for this application context.

Modelling processes

The street turn process with VCY is portrayed on an aggregated level in Figure 6.21. Three sub-processes make up this process alternative: *(1) matching empty container availabilities and requests*, *(2) verifying the street turn* and *(3) executing the street turn*. If a street turn match is found, the street turn is verified by all involved parties and the street turn can be executed properly, the EC is provided at the shipper/CFS. In case e.g. no match was found, the street turn is denied by the shipping line or the EC has any defects, the street turn is not possible and the loop goes back to the starting position, that an EC is needed for export. Sub-processes are described below.

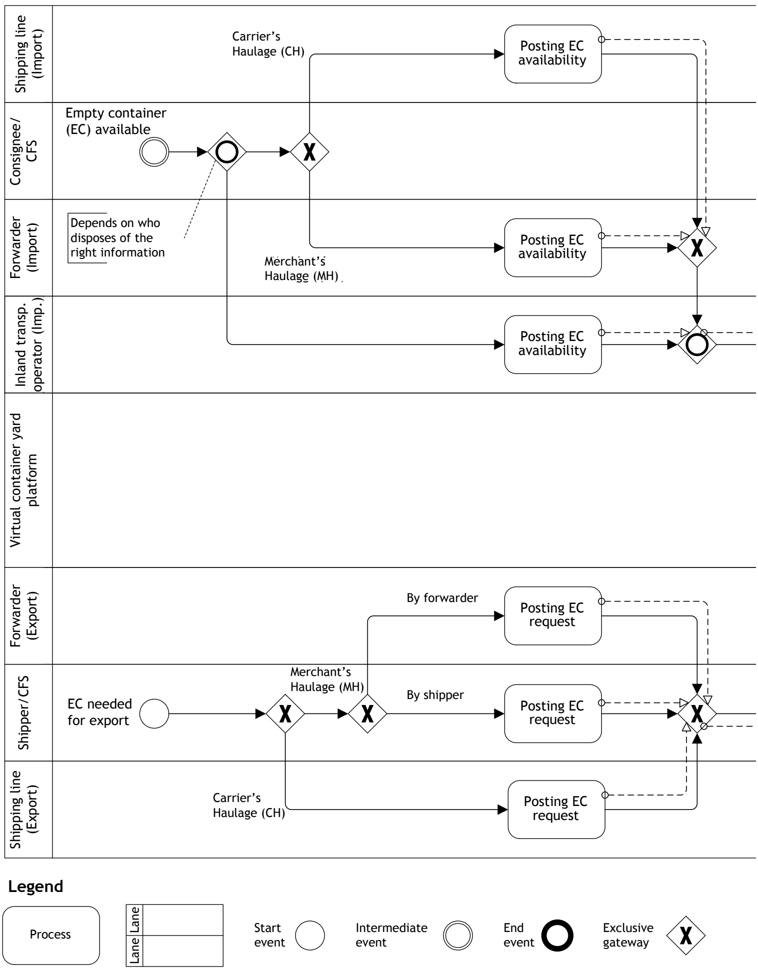
Figure 6.21: Street turn process with VCY: overview



Source: Own design

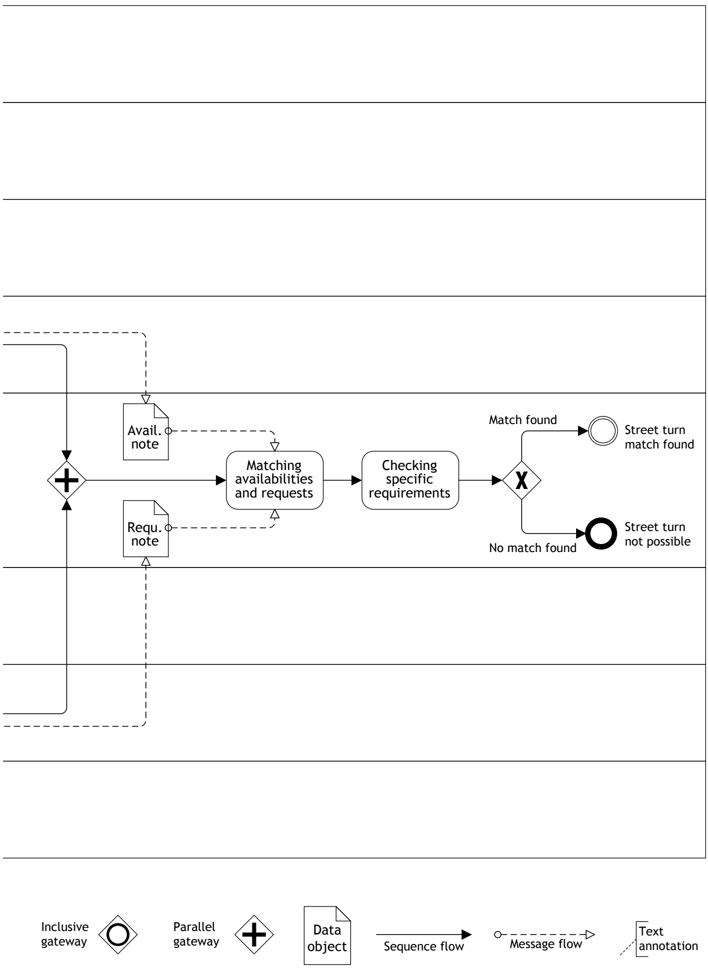
(1) Matching empty container availabilities and requests (see Figure 6.22): The starting event for a street turn is still that an empty container is needed for an export shipment at a shipper's site/CFS. In addition, an EC available at a consignee's site/CFS is needed to trigger the street turn process. In a next step the information on the availability and the request has to be posted on the VCY platform by the involved parties. In case of carrier's haulage it is the shipping line that has access to that information, or in case of merchant's haulage the sea

Figure 6.22: Street turn process with VCY: Matching empty container availabilities and requests



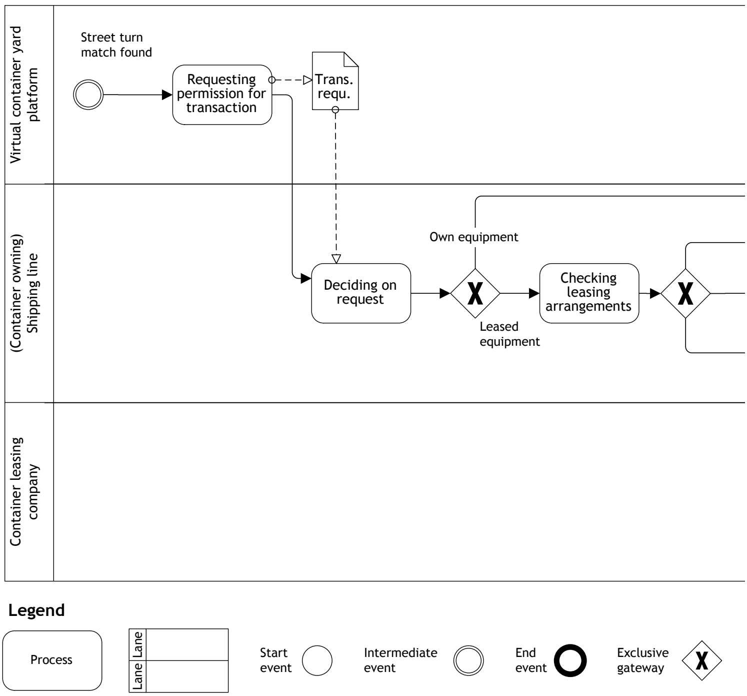
Source: Own design

freight forwarder. In both cases it is also possible that the road operator is involved for posting this information depending on contractual arrangements and depending on who disposes of the relevant information. The VCY platform is then used to match availabilities and requests according to their specifics in terms of location, time and container type. Furthermore, matches are only valid if they are in compliance with predefined rules regarding the potential user. If a valid match is found, the next sub-process can start. Otherwise the street turn is not possible.



(2) Verifying the street turn (see Figure 6.23)***:*** If a valid match is found the VCY platform sends a request to the container owning shipping line asking for the permission for transaction. The shipping line then has to check if the container is owned or leased. In the latter case, the leasing arrangements have to be checked to make sure if the container is suitable for a transaction. If the leasing arrangements are suitable for transaction, e.g. the container is in a dry or master lease, the shipping line can decide on permitting or denying the transaction. If the leasing arrangements are not suitable and have to be adapted, e.g. as the container is in a master lease and actually has to be off-hired short-term, the shipping line can decide if an adaption of leasing arrangements are useful or not. If not, the transaction will be denied. Otherwise the shipping line has to request an adaption of the leasing arrangements. The container leasing company then decides on confirming or denying the request. This results in an approval or denial of the whole transaction by the shipping line. In the latter case the street turn is not possible. In case the permission for transaction is provided, the user parties

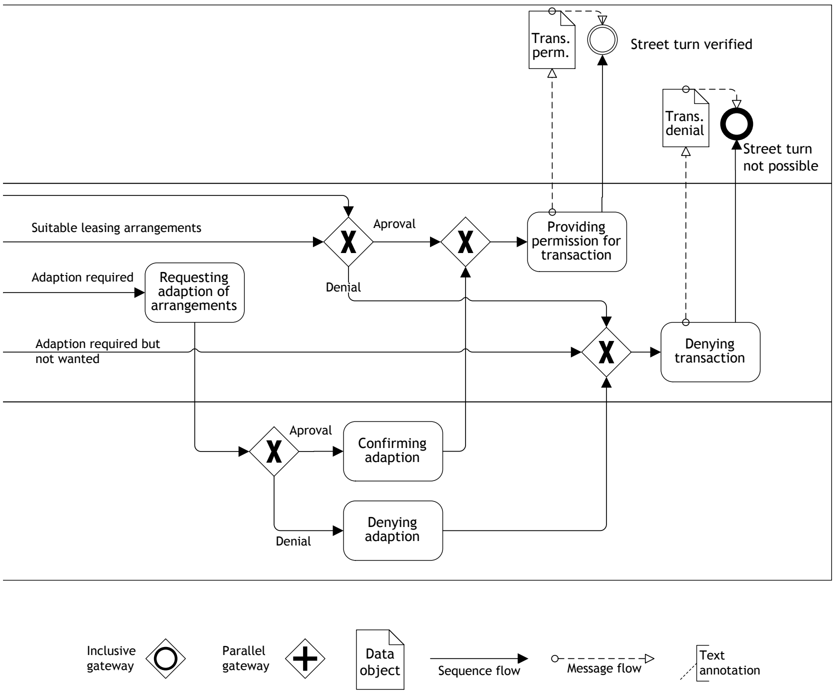
Figure 6.23: Street turn process with VCY: Verifying the street turn



Source: Own design

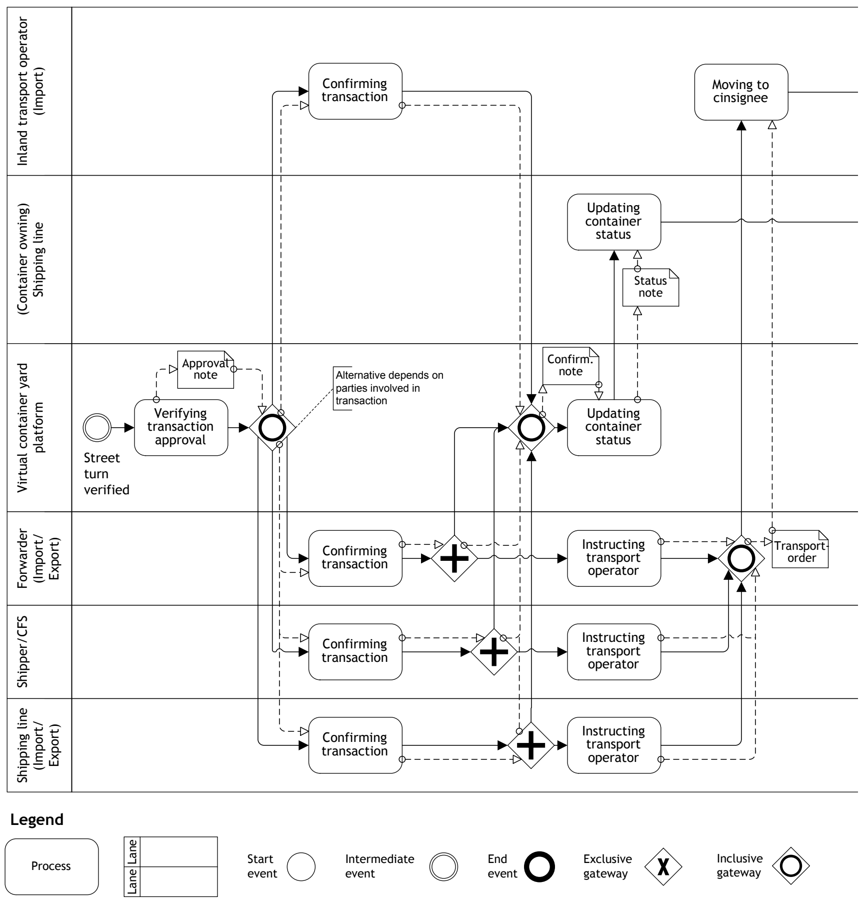
building the match of availability and request are informed about the verification of transaction by the VCY. Then a confirmation by these parties is sent back to the VCY platform and the container status update is sent to the container owning shipping line.

(3) Executing the street turn (see Figure 6.24)***:*** Once, the street turn is verified, parties involved in the street turn then are instructing the road transport operator about the transaction details in terms of location and time in case the operator is not involved anyway. The transport operator moves to the consignee's site due to the given time. Then the container has to be checked according to predefined rules. If there are any defects (cleanliness, damage) this is reported to the VCY platform which then forwards an update on the container status to the shipping line and sends a cancelation note to other parties involved. The container owning shipping line initiates the repair or cleaning process. If the container is in a proper condition it is picked up and moved to the shipper's site/CFS and provided for stuffing.



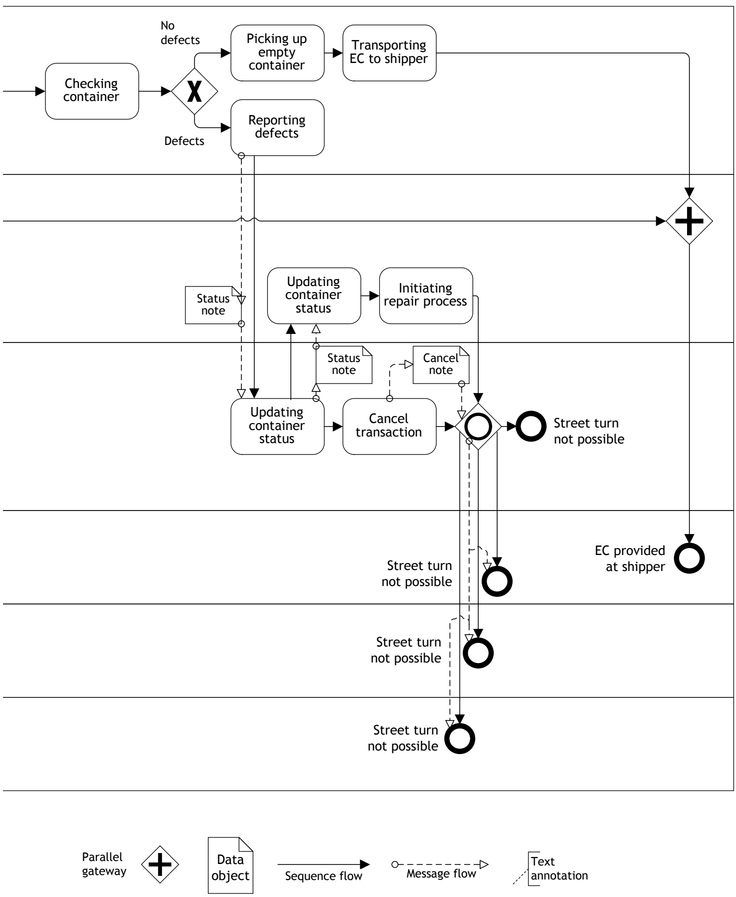
It can be stated that in comparison to the street turn process as applied now, it appears that the VCY adds more processes to stakeholders. However, the required processes and exchange of information by each stakeholder are almost the same. The main difference is that the exchange of information is no longer bilateral by e-mail or phone but always via the VCY platform by standardised data exchange. The establishment of a VCY requires a conscious definition of rules to enable a reasonable matching of container availabilities and requests. The benefit remains that it bears the potential to increase the number of street turns and by this increase the usage of container equipment and reduces empty movements. Moreover, due to the direct exchange of container equipment also space capacities are relieved in utilization.

Figure 6.24: Street turn process with VCY: Executing the street turn



Source: Own design

From process modelling it is emphasised that the container owning shipping line plays a key role in the whole process by permitting or denying the transaction of empty containers. Furthermore, it becomes clear that the forwarders, shipping lines and road operators also play an important role as they are the parties with access to relevant information on container availabilities and requests. Leasing companies are only involved if the container is leased and the leasing arrangements are not suitable for the transaction. Container depot operators and terminal operators are not involved at all. Thus the process modelling verifies the reasoning during the previous step in the SMC of identifying stakeholders.



6.3.4 Profiling stakeholders

Profiling stakeholders comprises the development of attitude and power profiles.

Developing attitude profiles

The attitudes of identified stakeholders will be derived from related literature and interviews undertaken during the definition phase.

Shipping lines' attitudes are not unanimous as the VCY offers certain opportunities for them though it likewise bears risks. Starting with the latter, shipping lines, especially large ocean carriers, are afraid of losing the control over their container assets in terms of meeting customer demand for a container of one specific type and certain quality. Usually they negotiate or define a free day allowance for a container being picked up in the port before the container has to be returned to a terminal or depot. If the free day allowance expires a detention fee becomes due. In addition, matching a specific export load with suitable equipment in proximity requires sensitive, proprietary information regarding the customer base and shipment commitments of the shipping line. Thus they are rather reluctant to share this information with competitors. Furthermore, cargo and container security are another factor leading to a reluctant position in terms of information sharing. Another important aspect is liability and responsibility for the equipment. Without a formalised and standardised check of the container, which is usually done at the depot, there is a risk of not being able to maintain unbroken liability, inspection and responsibility records. The benefit for the shipping line is to increase the use of its equipment as the container is directly used for an export load. Furthermore, it gains more transparency on the container's location in the local hinterland if the transportation is organised by merchant haulage (Theofanis & Boile, 2007, pp.22-31; LeDam Hanh, 2003, pp.20-21; 27-28; The Tioga Group, 2002, pp.37-44). Again, it is necessary to differentiate between large and medium or small sized shipping lines, i.e. ocean carriers and feeder shipping lines. Large shipping lines already have internal ICT systems enabling street turns in their own network (Theofanis & Boile, 2007, p.26). In alliances these systems are also used by different shipping lines to manage cargo flow imbalances (Ewert, 2006, p.146). Small and medium sized shipping lines are more open for sharing information as they do not have the opportunity to match import and export loads in their own network (Konings & Thijs, 2001, p.337; Song & Carter, 2009, p.304). Large ocean carriers are afraid of losing their competitive advantage to smaller ones who rely on leasing containers rather than on owning them. Furthermore, their competitive edge to serve large and/

or sudden demands may hamper them from sharing their equipment (Theofanis & Boile, 2007, p.22-23). To summarise, it can be concluded that ocean carriers tend to have a reluctant or even resistant attitude towards the implementation of a VCY, whereas smaller regionally operating feeder shipping lines tend to be supportive with a view to improving their competitive position.

With regard to *road transport operators* it can be stated that their attitude is depicted as being supportive to the idea of installing a VCY. They may have some reservations in terms of liability and responsibility patterns and of sharing information (Theofanis & Boile, 2007, pp.31-39). However, for economic reasons they will be supportive as they look for opportunities for a street turn rather than taking boxes back to the port (The Tioga Group, 2002, p.33). The same supportive attitude was found during the interview series in Hamburg though not directly related to the VCY, with road operators stressing their willingness to increase the number of street turns.

Container depot operators are not specifically considered or evaluated with regard to their attitude in related literature. It is assumed that they will tend to have a reluctant position. Due to the fact that the street turn dispenses with regular checking processes at the depot, the depot operator will lose orders.

As for *sea terminal operators* it is said that they favour an opportunity to reduce port congestion and improve efficiency of the import-export process. Furthermore, the space inside the terminal reserved for empties might be reduced and more full containers can be handled at the terminal (Theofanis & Boile, 2007, p.43 f.). Thus they will approve such a development or even be supportive.

The *container leasing companies* comes into play if they are the owner of the container that is object of the street turn process. They likewise will have reservations in terms of liability and responsibility records. In addition, there are no direct advantages of the VCY for leasing companies (Theofanis & Boile, 2007, p.41 f.). So their attitude is rather neutral, tending toward resistant.

As far as the *forwarders* are concerned almost no conclusions could be drawn from related literature, probably due to the fact that they play a rather minor role in the USA. During the interview series in Hamburg the sea freight forwarders interviewed stressed the importance of container interchange, though referring to the further hinterland of the PoH. Thus in general it is concluded that they show approval for installing a VCY. Usually global sea freight forwarders maintain their own ICT system to match empty containers with suitable export loads. Thus the attitude of local/hinterland forwarders is evaluated as being more supportive.

The HPA was not involved in this step. However, the basic assumption for installing a VCY in a port is that it is initiated by public authorities or by the port authority itself in order to improve the utilisation of transport infrastructure and reduce container movements to and from the port and due to this road congestion (Theofanis & Boile, 2007, p.42 f.). So their attitude is set at supportive.

Due to the fact that the *port community system provider* acts according to the needs of its customers, its attitude is set as being neutral.

As for the *shippers* their attitude is said to be difficult to summarise or generalise (Theofanis & Boile, 2007, p.41 f.). However, they are not physically involved in the interchange (The Tioga Group, 2002, p.34), so that their attitude is set as neutral.

Developing power profiles

No empirical verification of the stakeholders' influence could be undertaken, thus the argumentation from stakeholder mapping is repeated and summarised briefly for developing power profiles. It is thus based on related literature and interviews undertaken during the definition phase.

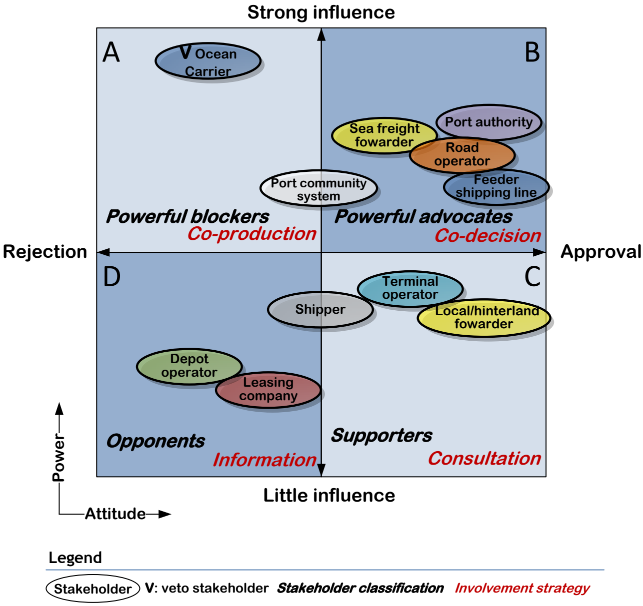
Shipping lines doubtless exert a strong influence during the planning and operation of the VCY by owning container assets and controlling much of the container logistics chain (The Tioga Group, 2002, p.27). Their role in the VCY is called '*indispensable*' as they provide the permission to use an empty box (Theofanis & Boile, 2007; p.17, 20). Their indispensable role as veto stakeholders also was verified in process modelling, showing that they control the crucial process to permit the transaction (see Figure 6.22 and Figure 6.23). In contrast to large, globally operating ocean carriers, feeder shipping lines are evaluated as having a less strong but still relevant influence because they would rather lease than own containers (Theofanis & Boile, 2007, p.22). *Road transport operators* are likewise considered indispensable for the success of a VCY (Theofanis & Boile, 2007, p.16). However, their influence is evaluated as less strong but still relevant than that of the ocean carriers as they control neither the logistics chain nor the container assets. *Container depot operators* are not specifically mentioned as having an important role with regard to a VCY in the literature. In general, they have access to superior information on surpluses and shortages of empty containers but their role is a somewhat passive one in routing empty containers (Veenstra, 2005, p.70). So their role is set to be slight to weak. The *sea terminal operator* plays a minor or slight role in the context of a VCY (Theofanis & Boile, 2007, p.19). *Container leasing companies* play a role in the VCY if the interchange container is leased equipment (The Tioga Group, 2002, pp.33-34). As around 40% of the worldwide container fleet is leased, this is most likely and their role is evaluated as being slight to relevant. *Forwarders* are still differentiated as sea freight and local/hinterland forwarders. The sea freight forwarders are evaluated as having a relevant influence in comparison to the ocean carriers. Though they control very much of the container logistics chain, they do not own container assets. As far as local/hinterland forwarders are concerned their influence is evaluated as being slight as their control of the container logistics chain is rather limited and they are usually subcontracted. As for the *port authority* its role is deemed to be strong keeping in mind its function as the instigator. Regarding the *port community system provider* DAKOSY its role cannot be said to be all that strong as its influence will depend on the role of its main customers. Nevertheless it is estimated as still being relevant. The *shippers'* interests and needs are closely related to those of the shipping lines and transport operators representing their customers' needs (Theofanis & Boile, 2007, pp.41-42) thus it is assumed that they play rather a slight role.

6.3.5 Deriving involvement strategies

Creating the power-attitude matrix

Results from profiling stakeholders are summarised in a power-attitude matrix for the VCY (see Figure 6.25). It becomes evident that the allocation of stakeholders is not exclusively promising for installing a VCY, as the ocean carriers as veto stakeholders are allocated to *powerful blockers*. However, there are several stakeholders allocated to *powerful advocates*: the sea freight forwarders, the feeder shipping lines, the port authority and the road transport operators. The port community system provider DAKOSY – with a neutral attitude – is somewhere in between. In addition, there are some *opponents* such as the container leasing companies and depot operators. Terminal operators and local/hinterland forwarders are *supporters.* The shippers are rather neutral and in between.

Figure 6.25: Street turn with VCY: power-attitude matrix and stakeholder involvement



Source: Own design

Developing involvement strategies

The fact that ocean carriers are veto stakeholders in the VCY and are designated as *powerful blockers* requires a conscious development of involvement strategies. In a first step it should be anticipated to move stakeholders toward a supportive position. Hayes (2010) provides a set of strategies for such a stakeholder allocation (see Table 4.2). Among the six strategies the first and fifth seem to be promising in this context: *winning the support of those who oppose the change and have the power to influence the outcome* (strategy 1) and *fragmenting existing coalitions who are antagonistic towards the change* (strategy 5). Other strategies proposed by Hayes (2010) do not seem to be applicable to this situation as the regulation of influence seems not to be feasible in this context (strategy 2, 3), any coalition of powerful advocates (strategy 4) will not be able to balance out the influence of shipping lines and bringing new champions into play seems not to be realistic in terms of a VCY (strategy 6).

Ocean carriers' reluctance to participate in the VCY is here mainly related to their reservations in terms of liability and responsibility as well as of sharing sensitive information. In order to gain their support (according to the first strategy as by Hayes (2010) it is thus crucial to design the VCY in such a way that their reservations can be minimised. So it is important to involve them by *co-production* and develop and define clear rules for container interchange. In terms of sharing information it is crucial that they are able to pose certain conditions on the reuse of empty containers. These restrictions may be in terms of cargo, geographic position or simply include or exclude certain shippers, road operators or other shipping lines and forwarders. Ocean carrier must be able to post restrictions with respect to who is allowed to use their containers (Theofanis & Boile, 2007, p.26, 78). Furthermore, it is important that the ocean carrier always has the right to permit or deny the interchange (Theofanis & Boile, 2007, p.27). With regard to liability and responsibility patterns it is important to develop clear, unambiguous and objective inspection criteria that are to be observed by participants in the interchange (Theofanis & Boile, 2007, p.81). In this context it is also important to simplify mechanisms to transfer liability and responsibility between users. So an electronic interchange within the VCY might be a solution (Theofanis & Boile, 2007, p.29). Here the experience of the shipping lines who already perform street turns in their own network might be helpful as they will already deal with these patterns.

As the allocation to stakeholder classifications and related involvement has been realised at a generic stakeholder group level, this group has to be disaggregated back to an individual level. In a next step the individual attitude of different ocean carriers has to be recorded by e.g. interviews or a survey. For involving them by co-production it is proposed to launch a working group with interested ocean carriers to develop and define clear rules for above issues in the VCY. Starting this working group with interested ocean carriers might help to persuade other ocean carriers to likewise become interested in and possibly supportive for the topic. In this way the fifth strategy according to Hayes (2010) is applied which aims at fragmenting the coalition of reluctant stakeholders.

With regard to other stakeholders several stakeholder groups are allocated to powerful advocates such as the feeder shipping lines, the port authority, the road operators and the sea freight forwarders. Their approval or even support for launching a VCY provides a strong base for planning. Their involvement is deemed to be by co-decision, thus they should take part in joint analysis and decision-making. Again, it is necessary to disaggregate the generic stakeholder groups to the level of individual stakeholders. Due to the fact that at least the group of road operators will include a large number individual stakeholders, a few representatives should be selected for closer involvement. So an initiating event that the entire group is able to attend might be used to identify these representatives. Concrete planning can then be realised in working groups consisting of identified representatives of each stakeholder group. DAKOSY as the provider of the port community system should also be involved by co-decision. Even though their attitude is estimated being neutral, it is crucial for realising the VCY in terms of physical resources for the platform as well as of their know-how for designing such a new feature.

As for the opponents, the container depot operators and container leasing companies, it is not indispensable to gain their support for the change as their influence on the change is determined. Their reasons for reservation have been described above and can be taken into account if appropriate. However, they should be informed about the planning process.

With regard to the supporters, including the terminal operators and the local/hinterland forwarders, they should be consulted if they can contribute to the planning process. Concrete involvement can be realised by their participation in the initial event in order to identify representatives for the work in ensuing working groups. The same involvement strategy should be applied to the group of shippers. Given that this group also consists of a large number of individual stakeholders, interested representatives should be identified. It might be helpful to include supportive shipping lines or sea freight forwarders to select interested representatives among the shippers being their customers.

However, it has to be stated that the reluctance of ocean carriers towards the VCY as portrayed during the development of attitude profiles appears to be plausible and comprehensible. If it is not possible to move their attitude toward support, the VCY cannot be realised as they – being veto stakeholders - are indispensable for launching such a platform.

The virtual container yard was evaluated from different stakeholder perspectives in the evaluation phase. Recommendations for stakeholder involvement during implementation were provided. By virtue of the fact, that no real planning of the HPA or another stakeholder was realised during the timeframe of the case study, the last phase implementation could not be encompassed with the SMC. General remarks and recommendations on the application of the SMC during implementation were already given in chapter 4.7.3.

6.4 Case study essence

The objective of this case study was twofold: it aimed at testing the consistency and feasibility of the stakeholder management framework developed during this thesis and coevally aimed at generating transparency and developing recommendations for change processes in empty container logistics for the Hamburg – BSR area. Hereinafter, the main insights with respect to both objectives will be outlined. First, the main enhancements that were achieved for change processes in empty container logistics in the study area are summarised. Second, a critical reflection of the framework is conducted discussing positive and negative aspects in terms of its consistency and feasibility.

6.4.1 Enhancements for change processes in empty container logistics in the Hamburg – Baltic Sea Region area

The objective of the overall change process in the Port of Hamburg (PoH) was to increase efficiency in empty container logistics within the PoH and in particular for empty container flows from/to the BSR and to explore the potential of empty container logistics as competitive advantage for the PoH.

The case study covered two phases of the change process: the definition phase to explore the change situation as well as the evaluation phase to evaluate one concrete measure to improve empty container logistics. The last phase of implementation could not be covered due to the above-mentioned reasons. Thus, in the following, the steps performed and their main results are summarised for the first two phases. Afterwards, main insights are summarised.

Definition phase

In the first step, the objective of the SMC was determined to create transparency on relevant stakeholders in empty container logistics in the study area, their interests and influence with regard to empty container logistics in order to derive adequate involvement strategies for potential later undertakings by the PoH. This step was performed during a group interview/workshop with PoH experts.

The second SMC step includes the identification and mapping of stakeholders. First, stakeholders were identified again during a group interview/workshop with experts from the PoH. Their identification was conducted along the generic stakeholders groups derived in chapter 2.5, at first for stakeholders in empty container logistics in Hamburg. This list was amended with stakeholders from the BSR along the hotspots of empty container flows derived in chapter 5.2 Thus

BSR stakeholders were included by way of examples due to the fact that their contribution was intended only to relate to their knowledge and experience with regard to empty container logistics and also in order to keep the amount of stakeholders to a manageable quantity. Overall 78 stakeholders were identified, including 48 in Hamburg. The latter group was further classified as key, primary and secondary stakeholders by means of the attributes role, resources and connectivity during the workshop. The classification was then summarised on the level of generic stakeholder groups. The results reflect the importance of stakeholder groups with regard to empty container logistics. They show the dominant role of ocean carriers and sea freight forwarders, both groups were classified as key stakeholders. Primary stakeholders included sea terminal operators, feeder shipping lines, association and interest groups as well as the port authority. The remaining generic stakeholder groups were classified as secondary stakeholders. The mapping of stakeholders further considered relations between stakeholders that were classified to three degrees of strength in collaboration. First are alliances, joint ventures, subcontracting or other kinds of contractual-based cooperation that is intended for mid- or long-term collaboration. This strong kind of collaboration in particular applies to large ocean carriers, longing for vertical integration, with sea terminal operators, forwarders, feeder shipping lines, depot operators, local/hinterland forwarders or sea terminal operators collaborating with depot operators and inland transport operators. Second are relations that are still strong but rely rather on normal market activities without contractual arrangements framing a mid- to long-term collaboration. This kind of relationship applies to many operational partners in the maritime container transport chain whose relationship is characterised by a physical interface due to operational processes. Third, there are weak relations between parties who rarely are in touch with each other with regard to operational processes or information exchange e.g. with associations/interest groups or authorities. The main result of the second SMC step is the stakeholder map in Figure 6.6 including stakeholders' classification in terms of importance for empty container logistics as key, primary and secondary stakeholders in addition to their relations classified according to strength of collaboration.

The third SMC step aims at scoping processes and thus a process analysis was undertaken to elaborate the processes relating to empty container logistics. Draft process charts were derived from several sources in literature and further discussed and refined during the interview series. The resulting process charts were separated into five parts: planning, provision and repositioning of empty containers, procedures at the depot as well as at the terminal and the street turn. Further, lease and customs processes were described without however being modelled in process charts. The results show the different areas of responsibility of each stakeholder, their interfaces and the exchange of information. Furthermore, strategic decisions of different stakeholders exerting influence on operational processes in empty container logistics were concluded from the interviews and portrayed.

Profiling stakeholders constitutes the fourth step in the SMC. It was aimed at evaluating stakeholders according to their attitude towards and their influence on the empty container logistics change process. Profiling for both aspects considered was conducted in two steps during the definition phase. With regard to their attitude, first a list of issues was drawn up to differentiate the field of empty container logistics into fields of action that are perceived as relevant by considered stakeholders. Stakeholders were asked to report on current issues with regard to empty container logistics during the interview series. In a second step, these issues were summarised for the survey, in which respondents were asked to rank given issues and to state their attitude towards a potential change. The results lead overall to eleven issues considered as relevant for empty container logistics. The most important was seen as standardisation of the flow of information, followed by increasing container availability in the hinterland and increasing space availability in the port. In terms of stakeholders' attitudes, issues almost exclusively were evaluated as positive. With regard to stakeholders' influence on empty container logistic a similar principle was applied as for the attitude profiles. First, factors constituting influence were discussed and derived during the interview series. Overall, ten power factors were identified. Likewise, they were summarised for the survey to demand a (weighted) ranking by respondents. The power factor ranked as most important to influence empty container logistics was container ownership, closely followed by market share, strategic process power, operational process power and pricing, demand-side power, and knowledge and competence. Weights of named factors ranged from 10% to 15%, thus no factor achieved a salient role. Furthermore, survey respondents were asked to give a self-evaluation with respect to derived power factors. Their self-evaluation reflected with weighted power factors show for each responding stakeholder an allocation between no/little influence, via slight and relevant up to strong influence on empty container logistics.

The final step in the SMC serves to derive strategies for stakeholder involvement in ensuing phases of the empty container logistics change process. Results from the preceding step in the SMC – profiling stakeholders – are therefore merged and illustrated by power-attitude matrices with one matrix created for each issue. The top issue in empty container logistics - standardisation of the flow of information – was picked out to serve as an example to conduct the last SMC step. First, then, the allocation of survey respondents to the power-attitude matrix was portrayed. Based on this, results were further refined by taking survey results and aligning them with the help of insights gained from previous steps and related literature. Furthermore individual evaluations of respondents were aggregated back on the generic level of stakeholder groups to amend the overall picture by missing stakeholder groups and enable general conclusions. This resulted in a refined power-attitude matrix on the level of generic stakeholder groups with stakeholders allocated to four quadrants representing the four different classes of stakeholders: powerful blockers, powerful advocates, opponents and supporters. As the issue considered exclusively induces a positive attitude, stakeholders were classified only as powerful advocates and supporters. Following the SMC framework, stakeholder classifications are already linked to different kinds of involvement. Powerful advocates are to be involved by co-decision, supporters at least by consultation.

According to the derived results at least shipping lines (both ocean carriers and feeder shipping lines), sea freight forwarders, terminal operators, associations and interest groups and of course the port authority as the initiator in this case study are to be involved by co-decision in change processes on empty container logistics. The following groups are to be involved by consultation: inland transport and depot operators, shippers and local forwarders. For both involvement strategies, practical guidance on how to realise the desired kind of involvement were given. Finally, the aim is to reach consensus in decision-making with powerful advocates to ensure that the process is designed and supported by those who exert a significant power along the maritime container transport chain. Further it is necessary to design change processes with their help to consider their views and challenges on existing processes. In contrast to this, supporters are not mandatory in designing and supporting change processes. However, they should be involved if the concrete issue demands their knowledge and expertise. The results are depicted in Figure 6.18. Insights gained from this step in the SMC will provide valuable input for the change process in terms of the definition of objectives as well as for the ensuing phase that includes the choice of measure(s) to improve empty container logistics.

Evaluation phase

During the definition phase different fields of action were identified and evaluated. Standardisation of the flow of information was identified as most important field of action by stakeholders responding to the survey. Generally, the evaluation phase aims to generate and evaluate potential measures to improve the issue under consideration. Therefore, at first, different strategies and measures to mitigate negative impacts of empty container logistics were presented and the VCY was selected as reasonable measure among ICT measures intending to improve and standardise the flow of information. Accordingly, the objective of the SMC during this phase of the change process was to create transparency on relevant stakeholders with regard to the VCY, their interests in and influence on the realisation of a VCY in Hamburg in order to derive adequate involvement strategies for realising the measure.

In the second step, stakeholders in the VCY were identified and classified according to their importance. Ocean carriers approved their salient role as key stakeholders and further as veto stakeholders, i.e. they were evaluated as being indispensable for implementing the VCY. As primary stakeholders the following stakeholders were identified: forwarders, feeder shipping lines, road transport operators, the port authority and the port community system provider. Remaining stakeholders play a more minor role and were classified as secondary stakeholders. Relations among depicted stakeholders were mainly adopted from the definition phase with only the port community system provider newly integrated as its connectivity is strong for almost all port stakeholders as it provides the platform for the interchange of port-related information. The results are summarised in the stakeholder map depicted in Figure 6.20 and provide an overview on the stakeholder structure for the VCY in terms of their importance and interrelations.

During the third SMC step, processes were modelled for the VCY, mainly based on relevant literature and refined by logical reflections. The status quo of the street turn process was already portrayed in chapter 6.2.3 during the definition phase. For the evaluation phase informational and physical flow of a VCY were portrayed. Results show the different areas of responsibility of each stakeholder, their interfaces and the exchange of information. In terms of information exchange the main progress achievable by a VCY is that the exchange of information is no longer bilateral by email or phone but always via the VCY platform by means of standardised data exchange. So the establishment of a VCY requires a conscious definition of rules to enable a reasonable matching of container availabilities and requests.

For profiling stakeholders as the fourth SMC step the attitude and influence of generic stakeholder groups with regard to the VCY were derived from related literature as well as from interviews undertaken during the definition phase. It was concluded that ocean carriers tend to have a rather reluctant or even resistant attitude towards the implementation of a VCY, whereas smaller regional operating feeder shipping lines tend to be supportive to improve their competitive position. Regarding forwarders, it was concluded that they show approval for installing a VCY. So global sea freight forwarders usually maintain their own ICT system to match empty containers with suitable export loads. Thus the attitude of local and hinterland forwarders is evaluated as being comparatively more supportive. Likewise road transport operators, sea terminal operators and the port authority were said to be supportive to the idea of installing a VCY. In contrast to this, it was assumed that container depot operators would have a somewhat reluctant position as they probably will lose orders after the implementation of a VCY. Also, container leasing companies will have reservations in terms of liability and responsibility records without having direct benefits from a VCY. The attitudes of the port community system provider as well as of shippers were set as neutral. For generating power profiles, all generic stakeholder groups were evaluated according to their influence on the implementation of the VCY. Shipping lines were evaluated as exerting a very strong influence. So feeder shipping lines are evaluated as having a less strong but still relevant influence in contrast to ocean carriers. Sea freight forwarders are evaluated as having a relevant influence in comparison to the ocean carriers, whereas local and hinterland forwarders are evaluated as having a slight influence. Other stakeholder groups considered to exert a relevant to strong influence with regard to the VCY are the port authority, the port community system provider and the road transport operators. The role of container depot operators, container leasing companies, shippers and terminal operators was allocated somewhere between weak and slight relevance.

Finally, the insights gained were summarised in a power-attitude matrix for the VCY in Figure 6.25. Results show that the allocation of stakeholders is not exclusively promising for installing a VCY, as the ocean carriers as veto stakeholders are classified as powerful blockers. However, several stakeholders are classified as powerful advocates: the sea freight forwarders, the feeder shipping lines, the port authority and the road transport operators. The port community system provider DAKOSY – with a neutral attitude – is somewhere in between. In addition, there are some opponents such as the container leasing companies and the depot operators. Terminal operators and local and hinterland forwarders are supporters. The shippers are somewhat neutral in between. Due to the fact that ocean carriers as veto stakeholders were classified as powerful blockers, recommendations were made on how to move them in a supportive position and involve them in co-production. Ocean carriers' reluctance to participate in the VCY is here mainly related to their reservations on liability and responsibility as well as on sharing sensitive information. In order to gain their support it is thus crucial to define clear rules for container interchange in terms of the cargo, the geographic position or the participating parties. Furthermore it is important to simplify mechanisms to transfer liability and responsibility between the users. However, if it is not possible to move their attitude to support, the VCY cannot be realised as they – being veto stakeholders - are indispensable for launching such a platform. Beyond that, stakeholder groups classified as powerful advocates, such as the feeder shipping lines, the port authority, the road operators and the sea freight forwarders, build a strong base for planning. Their involvement is deemed to be by co-decision, thus they should take part in joint analysis and decision-making. Supporters including the terminal operators and the local and hinterland forwarders should be consulted in case they can contribute to the planning process. As for the opponents, who are the container depot operators and the container leasing companies, they should be informed about the planning process. For all involvement strategies, practical guidance on how to realise the desired kind of involvement was given.

The involvement strategies outlined consider stakeholders' benefits and prospects as well as their disadvantages and reservations with regard to the VCY. Knowing these circumstances makes it possible to specify the change situation and eventually adjust the change process to avoid reluctant behaviour that hampers subsequent implementation.

Design of change processes

The reasonability of empty container logistics as the field of application and the Hamburg - BSR area as the chosen study area was discussed and derived in chapter 5. During the interviews and by means of two survey questions the reasonability as perceived by involved stakeholders was reflected.

During interviews conducted in the Hamburg port area, the ambition of the HPA to face challenges in empty container logistics with the aid of stakeholder involvement was highly appreciated by all interviewees. Likewise interviews in the BSR mirrored a positive attitude by stakeholders toward the chosen approach to explore the diversity of empty container logistics.

Furthermore, in the context of the survey, one question explored the design of change processes and desired stakeholder involvement. The results are portrayed shortly as follows.

Stakeholders were asked to evaluate the importance of involving stakeholders in change processes of empty container logistics (see Figure C.20). In general all stakeholders chose either *important* or even *very important,* implying that stakeholder involvement is considered as being of importance and not *unimportant* by all generic stakeholder groups. Answers of forwarders and container depot operators show that their interest in being involved in improving empty container logistics is quite high. Also, sea terminal operator respondents seem to have a strong interest in that matter. For shipping lines and container depot operators the share voting for *very important* is lower but still the overall picture mirrors a deep interest.

Beyond a general evaluation of integrated stakeholder involvement, survey respondents were asked to choose their desired kinds of involvement such as co-decision, co-production, consultation, information, or no involvement at all. In general it can be stated that, apart from no involvement, all kinds of involvement seem to be desired by a remarkable share of stakeholders. In absolute figures co-decision, co-production, consultation were chosen each by an almost equal share of respondents. Thus there is no overriding preference. Regarding different stakeholder groups, the vote of responding shipping lines implies their preference for being informed. Consultation got the lowest vote by shipping lines. Inland transport operators rather mirror an interest for co-production and being informed than for co-decision or consultation. The least interest in the different kinds of involvement was shown by the sea terminal operators whose response was relatively low for all kinds of involvement other than co-production. Forwarders show an interest in all channels of involvement. Desired kinds of involvement chosen by every stakeholder are shown in Figure C.21.

Finally, it can be stated, that both - interviews and the survey – were able to approve of the deduced reasonability.

Summary

In reference to the second case study objective, to create transparency and develop recommendations for change processes in empty container logistics for the PoH in relation to the BSR, the following conclusions can be drawn. The case study created transparency in empty container logistics for the PoH in relation to the BSR in particular by results elaborated in the definition phase. The application of the SMC and respective steps drew a transparent picture of relevant stakeholders, processes and derived strategies for adequate stakeholder involvement in change processes in empty container logistics. In the evaluation phase further recommendations were developed on how to improve empty container logistics. The VCY as a concrete measure was analysed by means of the SMC, hence an integrated picture of stakeholders and processes was created and likewise involvement strategies were derived. So this objective was fulfilled.

The overall objective of the change process is to increase efficiency in empty container logistics within the PoH and in particular for empty container flows from/to the BSR and to explore the potential of empty container logistics as a competitive advantage for the PoH. Keeping this in mind, it can be stated that the VCY bears the potential to increase the number of street turns and by this increase the usage of container equipment and reduces empty movements. Moreover, due to the direct exchange of container equipment space capacities are also relieved in utilisation. So it most likely improves empty container logistics within a port. Though this measure has a rather regional focus and does not specifically consider the relation of the PoH to the BSR, a successful implementation could become a good practice example for other ports in the area. By virtue of the fact that no concrete measures were implemented within the PoH during the timeframe of this thesis the overall objective of the change process could not be met (so far).

6.4.2 Critical reflection of the framework developed

In respect of the first case study objective, testing the consistency and feasibility of the developed framework, implications from application are drawn with regard to specific SMC steps and in general as follows.

Concerning the first step – clarifying objectives - it can be stated that it was approved as an important reference point of the whole SMC. By determining the system boundaries the analysis environment of the SMC is outlined. Objectives are set and the focus of analysis is defined. Though it must be stated as well that different objective levels considered by this step might become confusing during application. There is the SMC objective, the objective of a particular change process phase and the objective of the overall change process that require harmonisation. However, different objective levels are not unusual and here it reflects the embedding of the SMC in the change process and thereby stresses that the SMC is not a standalone tool. An appropriate designation of differences might dissolve any confusion. Furthermore, the fact that the SMC does not provide any sub-steps for clarifying objectives might turn this step more challenging than the ensuing ones. In contrast to the other steps there is no clear advice given how to reach the goal of this step. The goal is determined by giving a set of questions to answer and some guidance on how this can be done. However, no guidance is provided on how to get in the position to be able to answer the questions. The case study application showed that there are different ways to get in this position exemplified for the definition and evaluation phase. Finally, the decision to design this step more openly proved to be consistent, although it makes this step more difficult with respect to its feasibility for potential users.

With respect to identifying stakeholders the application showed that this step is crucial for the ensuing analysis. Here the stakeholder perspective of the SMC is determined. The choice of relevant stakeholders within set system boundaries and their classification is the first confrontation with the complexity of the ensuing analysis. This also results in great efforts required during this SMC step and should not be underestimated. In particular if essential parts of this step are performed by a workshop, participants should be prepared. If a large number of individual stakeholders are considered, the stakeholder maps used here are not an appropriate tool to map relationships as well. This was solved here by showing relationships on the level of generic stakeholder groups supposing that relationships are the same on that level which may, however, not always be the case. Otherwise relationships can be recorded, such as by a matrix. Also, appropriate software could be used that is, for example, applied for social network analysis, although specialised software might generate barriers for potential users in terms of costs or required skills. By the SMC it is implied that an organisation or at least departments/ subsidiaries represent a tangible and clearly evaluable stakeholder. However, it is possible that, for example, the attitude towards an issue might differ within a tangible unit. Theoretically this would require a differentiated consideration. Nonetheless, this complexity is beyond the limitation of this thesis. Insights from social science or other relevant disciplines might provide help for dealing with it.

In the third step the process perspective of the SMC is determined. This step reflects the integration of the process perspective and due to this the flow character of the chain in the stakeholder management framework. This constitutes the main specification of existing frameworks for an application along maritime container transport chains. Moreover, as mentioned before, it was intended to build the communicative basis of all interaction with stakeholders in order to create a common basis of understanding. This could be confirmed during application, at least in the definition phase of the change process. All interviews were started by discussions on the process charts. Feedback from interviewees – independently of country, stakeholder group and position - was almost exclusively positive in terms of understanding the process model and mutual insights gained by related discussions. In particular the sensitisation for a holistic view on the chain revealing preceding and ensuing processes as well as related stakeholders was perceived as beneficial. Process models created here refer only to stakeholders involved in planning and operation of the empty container chain as well as in the ownership of equipment. This is by its very nature, as most of the stakeholders in the environment of the maritime container transport chain are not involved in considered processes. Hence, other stakeholders become more transparent for the SMC user and it should be considered to amend this SMC step adequately to create a more balanced situation here. Though, it remains that the process models can be used to develop a common basis of understanding with stakeholders in the environment. Further, strategic reflections exerting influence on portrayed processes allow also including stakeholders in the environment.

Profiling stakeholders was likewise based on strong interaction (interviews and questionnaire) with stakeholders during the definition phase. The close exchange with stakeholders is evaluated as very helpful for a broad exploration of the change situation. By virtue of the fact that interviews were used to identify issues in empty container logistics as well as sources of power to take influence, this step was quite time-consuming. Although this way of exploring the change situation was deemed to be necessary as no suitable information was available on that subject, the definition of issues and sources of power can also be done by decision-makers in the change process, e.g. based on a literature review or expert know-how.

In the last step in the SMC - developing involvement strategies - an appropriate mechanism was integrated to conflate analysis results from ensuing steps and enable a conscious choice of strategies to involve the stakeholders considered. Only by this step does the framework become more than an analysis tool as it enables the user to transfer analysis results into concrete recommendations for action: the involvement of stakeholders in future undertakings. During framework development it was already stated that stakeholder involvement should always be reflected in context and not follow methodological advice aimed at being simple and understandable. Hence, the sharp allocation of stakeholder involvement to stakeholder classes should rather be taken as basis for a focused discussion. This last step suffered from the fact that the case study partner HPA decreased its effort in the case study. In particular this context was supposed to be performed by means of a workshop enabling a focused discussion. The derivation of involvement strategies also includes strategies to deal with powerful stakeholders intending to block the change. Several means are proposed how to move them toward a more supportive position. However, there is no assurance that these strategies succeed. Hence this step could be amended with insight from motivation research or psychological disciplines that provide guidance in this respect.

With regard to the interconnectivity between framework steps and resulting iteration the application showed how particular steps can provide helpful input or serve as verification for preceding and ensuing steps. Though the iteration seems to contradict the cyclical character of the framework the usefulness of following the proposed order of framework steps still was prevailing.

In addition, the cyclical character also reflects embedding in the change process and by this the fact that the SMC is repeated for accompanying changes through different phases. This context was tested by applying the SMC in two phases: the definition and the evaluation phase. For both phases, set objectives could be achieved and the transition from one phase to another also was perceived as seamless. Results from the definition phase serves as input for several steps in the ensuing phase and so the connection between the different phases by the SMC as proposed during framework development could be verified. Unfortunately, no implementation was realised within the timeframe of this case study, so that this phase could not be tested. Overall, the embedding of the SMC in the change process can be subsumed as consistent. In terms of its feasibility, it must be stated that the chosen change process model appears rather abstract and not widely spread. However, as mentioned before, change process models usually follow the same logic and are similar in their structure. Thus, it is presumed that embedding the SMC in other change process structures should be manageable.

Different methodological approaches were used to apply the framework. Whereas the definition phase was based on a strong interaction with stakeholders, the evaluation phase was mainly based on desktop work relying on respective literature, although insights gained during the definition phase also provided valuable input. It thereby became evident that a broad exploration of the change situation by the definition phase also forms a solid base for the evaluation phase. Though both ways are consistent and lead to valid results it is expected that results developed and verified by strong stakeholder interaction are more valuable. In addition, strong interaction with stakeholders is a crucial constituent part of the SMC not only for generating valuable results but also for maintaining direct and pure interchange with the stakeholders as focus of the framework. A conscious and structured stakeholder involvement is the main target of the SMC but likewise a means to improve the change process. However, a strong interaction with stakeholders requires huge efforts in terms of time and human resources. Hence, the latter way to apply the SMC might be better feasible.

Another important aspect is the support of the stakeholders addressed. It cannot be assumed that stakeholders are always interested in strong interaction and are available for personal interviews and surveys. Moreover, it is important that SMC users designing a particular change process - i.e. the decision-making parties - support the application of the SMC. As already indicated in the case study description, the case study could not be performed as it was supposed to be as the case study partner HPA decreased its efforts in supporting the work. In this context also, the specific change situation should be discussed. It was supposed that both types of incremental changes are relevant here. Concerning the provision of more space capacities for empty container handling in the port area, it was assumed that this is rather a reactive change i.e. an adaptation to external factors such as the expected increase of empty container volumes and the recent closing of one large empty container depot. The attempt to improve the competitive position by advancements in empty container logistics was supposed to be rather proactive.

Experience gained during the change process and recent developments show that the supposed external pressure is perceived differently by stakeholders. The HPA considered the provision of new areas as part of an overarching empty container logistics concept in the port development plan as a concrete task. As a landlord port authority the HPA is the decision-making party in terms of providing space capacities in the port. However, no concrete actions resulted from that. Although one bigger empty container depot was moved to a more accessible area in terms of inner port traffic in summer 2013 (HPA, 2013b), no new areas have yet been assigned for empty container logistics. In contrast to this, other port actors have already developed solutions for the capacity constraints. A working group of two container depot operators, a big local forwarder and a consultant elaborated a solution that is of high actuality and discussed in port magazines, at port-related events etc. The solution includes the combination of the designation of a new area within the port and the designation of a huge empty depot in the close hinterland of Hamburg to outsource land-intensive empty container logistics of the port. The huge empty depot is planned to be in Wittenberge, which is around 170km south-east of Hamburg and connected to the port by the River Elbe. Due to this, consolidation ought to be achieved by using IWW for transporting empty containers and by this reduce empty movements by road (Hafenreport, 2012, pp.6-7; SUT, 2013, pp.100-102).

To summarise, it can be stated that in the context of the observed change process, operational actors propose a solution option and stress the urgency of finding a solution, thus they tend to show an offensive and action-oriented behaviour whereas the decision-making party – here the port authority - is more temporising in its behaviour. Even less or no activities were observed regarding the second change motivation – the attempt to improve the competitive position of the port by empty container logistics. Finally, it is recommended that the stakeholder management cycle be applied by a decision-making party that internalizes the objective of the SMC, accepts related efforts and is disposed to face a reflective and iterative dialogue with stakeholders.

Experiences from the case study also provide an insight unto the usefulness of the framework developed. The approach to involve stakeholders to advance change processes was appreciated by almost all stakeholders and could be observed during interviews and also in the survey. Direct interchange with stakeholders enabled mutual benefits. They contributed to the change process by providing diversified knowledge and competences. Coevally, they gained a holistic view of the chain including processes, their causal relations as well as responsibilities. Also, relevant issues and reflection on power along the chain were exchanged during the interviews.

Finally, it can be stated that the SMC is consistent and can be applied in accordance with the developed framework. Some weaknesses with respect to its feasibility were outlined above. However, they are not deemed seriously hampering the application of the framework as developed during this thesis. Moreover, the case study showed that the framework developed as a specific stakeholder management approach bears the potential to improve change processes along the maritime container transport chain.

7 Summary, conclusion and outlook

The results elaborated during this thesis are summarised by answering the research leading questions in chapter 7.1. The main conclusions of this thesis are drawn in this connection. An outlook for further research is provided in chapter 7.2.

7.1 Summary and conclusion

The overall objective of this thesis was to develop a stakeholder management framework in order to improve change processes along the maritime container transport chain.

In order to accomplish the overall objective several research leading questions were posed to guide the research work. In the following these questions are answered including the main conclusions that were drawn from elaboration.

What are the main characteristics of change and of the maritime container transport chain? What are the resulting implications for framework development? (RQ1)

Change as process of alteration passes through different phases aimed at preparing, specifying, implementing and maintaining the change. Change process models thereby enable a structured and defined consideration of the phases and their characteristics. In the context of this thesis the Intervention Strategy Model by Paton and McCalman (2008) was introduced and used as a change process model. This model structures the change process in three phases: the definition phase to explore the change situation, the evaluation phase to chose and specify solution options and the implementation phase to realise the chosen option. Throughout these phases the stakeholder setting might change such as stakeholders' importance or attitude shift, new stakeholder come into play etc. Finally, the developed framework was designed to be repeated and applied in all phases of the change process to ensure following and recording developments in the stakeholder environment that are inherent in change. Moreover, the change situation is exposed to different determining conditions. Change differs by its immediate effect being either incremental (a stepwise change within existing frames) or transformational (fundamental break with existing paradigm performed in one step). Also, change differs by timing as the capability to anticipate and to respond to change being either proactive or reactive. Depending on these attributes each change type includes specific characteristics leading to typical reactions in the stakeholder environment of the change. Due to this, the framework considers the type of change at the beginning of the change process in order to evaluate the intensity of change and potential barriers due to expected reactions of stakeholders.

Characteristics of the maritime (container) transport chain also imposed requirements on framework development. According to Wolf (1999) and Swinarski (2005) the maritime transport chain can be classified from a systems theory context, i.e. by defining elements standing in interrelations. This classification differentiates a functional and an institutional perspective. The functional perspective includes elements such as logistics nodes, the means of transport as well as all transport related processes along the flow of goods. The institutional perspective focuses on involved organisations such as logistics or transport service companies as institutional elements as well as on their inter-organisational relations. The object of research was further determined to the maritime *container* transport chain due to its high level of integration in terms of functional and institutional elements, its importance for international trade and its need for smart management. The maritime container transport chain was thus defined as a logistical meta-system that focuses on the integrated design and realisation of logistical processes as well as on links between involved institutions to enable seamless container transportation by utilising the maritime mode in the pre-, main or on-carriage. Furthermore, the functional and institutional perspective was specified for the maritime container transport chain as the depiction of a basic transport chain, the compilation and description of main actors, the explanation of key terms, etc. Interrelations between the institutional elements were explored in the context of transaction cost theory as an explanatory approach and possible interrelations were structured according to the degree of cooperation on the range between market and hierarchy. Outlined characteristics of both perspectives then served as point of reference for framework development.

What are the theoretical considerations on stakeholder and process oriented thinking, as well as the fields of application and methodological approaches to both perspectives? What are the resulting implications for framework development? (RQ2)

Stakeholder management was derived as an answer to face outlined challenges along the maritime transport chain. Moreover, the integrated view in a functional and institutional perspective that is inherent in the underlying understanding of maritime container transport chains emphasised the stakeholder perspective as relevant to focus on and additionally led to process orientation as second research perspective.

Reviewing the development of stakeholder oriented thinking showed how the stakeholder concept took shape from the pure recognition that there are demand groups of an organisation - later defined as stakeholders - up to the insight that involving stakeholders can be crucial for its survival. Initially developed in the realm of corporate management the stakeholder concept also became relevant in other disciplines such as project management, public planning, and development cooperation. It was also further refined in fields related to corporate management such as change management, CSR, strategic management, supply chain management, etc. Similar conditions justifying the conscious exploration of stakeholders were thus recognised in different fields of application. These are changing or volatile environments, conflicting interests of involved stakeholders and the reliance of the organisations or undertakings success on the support of various stakeholders. By virtue of the fact that these conditions meet challenges along the maritime transport chain the appropriateness of the stakeholder perspective as research approach was justified.

The underlying understanding of the stakeholder term covers a broad range in reviewed literature. According to Mitchell et al. (1997) the understanding firstly differs in terms of the broadness of relations (broad vs. narrow). Thus the narrow perspective only considers the most pressing stakeholder relation whereas broad definitions comprehensively consider the stakeholder environment including several relations. Furthermore, the concrete relation (claimants vs. influencers), the actuality of relation (potential vs. actual) and the direction of relation (power vs. dependence) make a difference in understanding. By virtue of the fact that the developed framework is applied in a rather vague field - being change processes along maritime container transport chains - it was decided to underlie a comprehensive stakeholder understanding to this thesis. A narrow and focused definition could leave out relevant stakeholders already in the beginning whereas using a broad and comprehensive definition enables to consider all kinds of potentially relevant stakeholders. Moreover, the developed framework includes means to prioritise and profile stakeholders, thus a potentially broad starting point can be channelled by conscious decisions on adequate stakeholder involvement. As a consequence stakeholders were defined as '*actors who have an interest in the issue under consideration, who are or will be affected by the change process dealing with that issue or could have an active or passive influence on decision-making and implementation encompassing the change process'*.

Reflecting the derived definition with respect to actors identified along the maritime container transport chain it became evident that these actors comply with the underlying understanding of stakeholders. In reference to the systems theory view on transport chains these stakeholders represent the institutional elements with different kinds of cooperation representing the interrelations.

Application of the stakeholder concept relates to approaches such as stakeholder management, stakeholder analysis, stakeholder mapping or stakeholder participation. Stakeholder analysis or even mapping alone are, by contrast, analysis tools. Stakeholder participation tends to focus on different ways of involvement and their reasoning without a broad analytical basis. Stakeholder management was identified as the most comprehensive approach that aims to accomplish classical management functions such as planning, directing, and controlling with respect to stakeholders. Hence stakeholder management is most appropriate to accompany change processes along the maritime container transport chain by analysing *and* involving stakeholders. It incorporates stakeholder analysis and mapping and puts emphasis on stakeholder participation so that different forms of involvement are proposed and discussed. For defining the underlying understanding of stakeholder management the term steering as classical management function was replaced by '*organising, motivating and directing*' for a meaningful accentuation of the subject of management addressed here: stakeholders and the aim of involving them in the change process. As a consequence stakeholder management was defined as aiming at '*planning, organising, motivating, directing, and controlling stakeholders by understanding and evaluating them to determine their relevance to as well as to derive adequate involvement strategies for the change process.*'

Several approaches to stakeholder management, analysis, mapping and participation were reviewed from different fields of application such as corporate management, policy development and implementation, development cooperation and project management. There are a few approaches dealing with transport issues but those tend to focus on large infrastructure transport projects rather than on the transport chain or even the maritime container transport chain. By reviewing different approaches a knowledge pool on different possible tools was generated.

Process-oriented thinking is the second research perspective that was explored. The dualistic view of organisations incorporating structures and processes paved the way for process-oriented thinking. Process oriented thinking implies a horizontal view of organisation following processes in contrast to a vertical and hierarchic view following structures. By Porter's value chain and approaches to process optimisation such as business reengineering, continuous improvement and business process improvement it became widespread and widely accepted in particular in production companies. Likewise it was adopted in logistics research and practice. Progress from *functions to processes* was imposed as a required paradigm shift in logistics because it emphasised the flow-oriented perspective inherent in logistics. Process management was thus established as strategy-oriented analysis, evaluation, design, steering and control of value-added process within and between organizations.

Process analysis as part of process management is a common tool in organisations and logistics systems to create a transparent base for improvement, usually focusing on costs, quality and time. Even though the importance of actors is mentioned the stakeholder perspective is not specifically elaborated. In process-oriented literature institutional aspects are inherent in the structural view incorporated in the dualistic view of organisations. However, the structural view does not comply with the stakeholder definition as only actors involved in the processes or the organisation are considered and thus stakeholders that taking influence or being influenced outside the organisation are not included.

The focus of process analysis as applied here was determined by its anticipated use, that is to ensure considering the functional perspective of the maritime container transport chain and thereby integrating the flow character of the chain into the stakeholder management framework. It was thus applied to the identified functional elements of the chain. Finally, the term process analysis in context of this thesis was defined as follows: *'Process analysis aims to create process transparency by identifying and documenting relevant process elements and their interrelations. Along the maritime container transport chain process elements include the logistics nodes, the means of transport as well as all transport related processes covering the physical and informational flow under responsibilities to be determined. Interrelations are represented by the sequence flow and causal relationship of processes.'*

In conclusion to the literature review, the framework steps were also derived. Steps that formed part of reviewed stakeholder management approaches were discussed and prioritised by an evaluative comparison. In addition, process analysis was integrated as a step in order to specify the framework for application along maritime container transport chains. As a result the framework developed comprises five steps:

(1) Clarifying objectives, to determine the system boundaries of stakeholder management in the change process.

(2) Identifying stakeholders, to cover the institutional perspective on the change process.
(3) Scoping processes, to cover the functional perspective on the change process.
(4) Profiling stakeholders, to analyse stakeholders in terms of their attitude towards and influence on the change process.
(5) Developing involvement strategies, to derive strategies for adequate stakeholder involvement in reference to the previous analysis.

Also, the iterative character of stakeholder management was stated in that individual steps can provide insights for preceding and subsequent steps and it was therefore included in the framework.

With reference to the functional and institutional perspective that is inherent in the underlying understanding of maritime container transport chains the framework integrates both perspectives as different views of the same subject that can be understood as '*system of stakeholders*' as well as '*system of flows*'.

What are the fundamental constituent parts of a stakeholder management framework and their configuration for change processes along the maritime container transport chain? (RQ3)

The core of this thesis is the stakeholder management framework developed. In order to comply with the imposed iterative and repetitive character it is named stakeholder management cycle (SMC).

The stakeholder management cycle represents a tool that enables potential users to manage stakeholders in change processes along the maritime container transport chain. Included analysis and management methods ensure planning, organising, directing and controlling the stakeholders in question. Therefore, it was referred to the knowledge pool of different reviewed approaches to stakeholder management, analysis, mapping and participation as well as to process analysis. Furthermore, the interaction with stakeholders and the creation of a common understanding of the issue under consideration is also emphasised by the tool for motivating stakeholders. The integration of the process perspective and the generation of process models is thus an important aspect for creating a common basis of understanding. The resulting models represent a communicative basis and serve as reference point for interacting with stakeholders. Also, with respect to other steps, the usefulness of a strong interaction with stakeholders is stressed and participatory approaches such as workshops, interviews and surveys are included.

The SMC includes for each derived step the specification for an application along maritime container transport chains (if applicable) and a description on how each step should be performed. In the following each step is shortly summarised.

(1) The first step in the SMC intends to determine its system boundaries by clarifying objectives. Therefore a set of questions was developed whose answers outline relevant aspects crucial to define when starting the SMC.

(2) The ensuing step in the SMC aims at identifying stakeholders as subjects of investigation. Therefore three sub-steps are included: listing, classifying and mapping stakeholders. Stakeholders are listed by identified generic stakeholder groups in the maritime container transport chain and the underlying stakeholder definition. It must thus be specified on the one hand which generic stakeholder groups are relevant with regard to the change process and on the other hand which concrete companies or organisations belong to the different groups. Afterwards, stakeholders are classified according to their role, resources and connections with regard to the maritime container transport chain into key, primary and secondary stakeholders. The results are summarised in a stakeholder map showing their importance and further including relationships between stakeholders according to the collaborative relationships introduced.

(3) The third step in the SMC – scoping processes - aims at creating process transparency on the physical and informational flow, as well as on stakeholder's scope of action by revealing process responsibilities. This SMC step comprises two sub-steps: collecting data and information and modelling processes. Collecting data and information covers relevant process elements within considered system boundaries and should be based on personal enquiries with process owners (if possible). Results are conflated in process models. For process modelling it is suggested to make use of the BPMN methodology if no other methodologies are used that are more familiar to the SMC team or (a) focal organisation(s).

(4) The fourth step serves for profiling stakeholders regarding their attitude towards and their influence on the change process and hence includes two sub-steps: developing attitude profiles and developing power profiles. For developing attitude profiles stakeholders are evaluated according to issues identified as relevant for the change situation. With regard to power profiles stakeholders are evaluated according to identified sources of power. Both profiles are the main input for the power-attitude matrix created in the ensuing step.

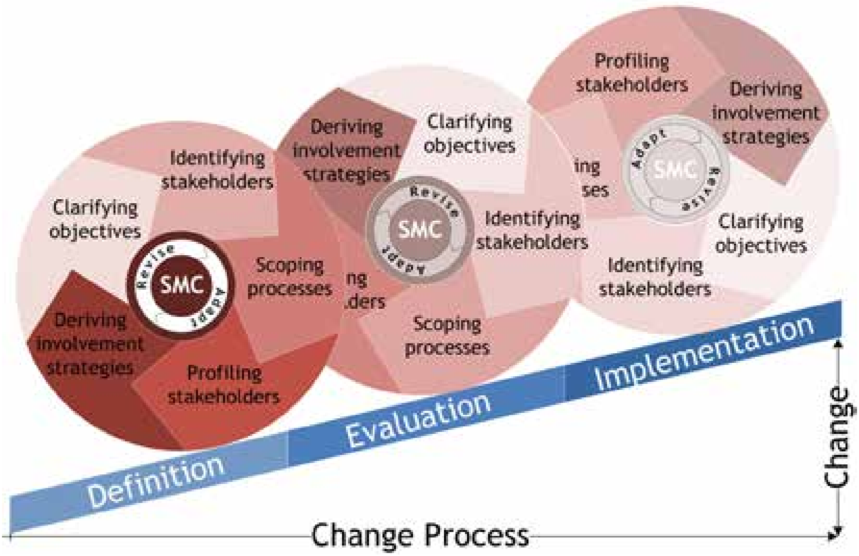
(5) The fifth and last step in the SMC aims at deriving involvement strategies for the change process and includes two sub-steps: creating the power-attitude matrix and developing involvement strategies. Following a matrix approach, sta-

keholders are classified in four groups (equalling four quadrants) based on the attitude and power profiles developed in the preceding steps. Finally the four quadrants lead to four different involvement strategies: co-decision, co-production, consultation and information. These strategies differ in terms of involvement in decision-making, analysis and knowledge production.

Insights gained in individual steps thereby can contribute to preceding and subsequent steps. Hence, the SMC is iterative and includes a mechanism of revise and adapt to enable potential users reflecting possible iteration relations.

The SMC is not a standalone tool but is embedded in the change process as part of the wider context. The embedding is realised for the change process model used by Paton and McCalman (2008) in that the SMC is repeated in each change phase: the definition phase, the evaluation phase and the implementation phase. The SMC thereby provides different inputs for the phases to ensure following and recording developments in the stakeholder environment that are inherent in change. The imposed interaction with stakeholders is used to benefit from their diversified knowledge and competences along the transport chain when generating solution options. Also, their attitude vis-à-vis several solution options represents an interesting attribute when comparing the solutions. It is strongly recommended to integrate the SMC right from the beginning of the change process

Figure 7.1: Stakeholder management cycle embedded in the change process



Source: Own design

in order to enable comprehensive stakeholder awareness and allow a conscious dealing with them. Embedding the SMC in the change process is depicted in Figure 7.1.

What are the resulting implications from an application of the developed stakeholder management framework in the field of transport and logistics? (RQ4)

The stakeholder management framework was applied in a case study on empty container logistics in the Hamburg – Baltic Sea Region (BSR) study area.

During preparatory studies the application of the SMC was identified as a suitable approach for exploring empty container logistics and its improvement. Empty container logistics is a major problem in container transportation. It represents a significant cost component for global shipping and further leads to negative environmental and social impacts. Hence, improvement of empty container logistics is a key challenge. However, conflicting interests of involved stakeholders were identified as a critical burden while implementing improvement measures. Also, the relevance of the study area Hamburg - BSR in terms of empty container logistics was shown. The Port of Hamburg (PoH) records a comparatively high empty container incidence and measures to improve empty container logistics are required in particular with respect to space capacity constraints. Furthermore, the share of empty containers in the PoH originating from the BSR is remarkable, in particular incoming empty containers. The reasonability of exploring empty container logistics in the study area by a stakeholder approach was also confirmed by own empirical evidence such as from interviews and the survey during the case study. Due to the fact that conducted preparatory studies require great efforts and relevant data is not always available and/or accessible, the applied approach was not included in the SMC but is considered as reasonable amendment to it by providing valuable outcomes such as the identification of hot spots of empty flows in the study area. Moreover, it is not unusual that studies like these are part of the overall change process to explore the change situation.

The case study objective was twofold: it aimed at testing the consistency and feasibility of the stakeholder management framework developed during this thesis and coevally aimed at generating transparency and developing recommendations for change processes in empty container logistics for the PoH in relation to the BSR. Therefore the SMC accompanied two phases of the change process: the definition as well as the evaluation phase. For both phases the SMC was applied completely. The last phase of implementation could not be accompanied due to the missing opportunity during the timeframe of the case study.

It can be stated that the case study created transparency on empty container logistics for the PoH in relation to the BSR in particular by results elaborated in the definition phase. The application of the SMC and respective steps drew a transparent picture of relevant stakeholders, processes and derived strategies for adequate stakeholder involvement in change processes in empty container logistics. By the evaluation phase further recommendations were developed on how to improve empty container logistics. The VCY as a concrete measure was analysed by means of the SMC, hence a holistic picture of stakeholders and processes was created and involvement strategies were likewise derived. So the second case study objective was met.

During interviews conducted in the Hamburg port area, the ambition of the HPA to face challenges in empty container logistics with the aid of stakeholder involvement was highly appreciated by all interviewees. Likewise stakeholders interviewed in the BSR mirrored an affirmative attitude towards an interaction-based approach to exploring the diversity of empty container logistics. Feedback from interviewees – independently of country, stakeholder group and position - was almost exclusively positive in terms of understanding the process model and mutual insights gained by related discussions on relevant issues, sources of power etc. In particular, sensitisation for a holistic view on the chain revealing causal relations of processes as well as responsible stakeholders was perceived as beneficial. Hence, it is concluded that the SMC contributed to improving the change process.

The overall objective of the change process is to increase efficiency in empty container logistics within the PoH and in particular for empty container flows from/to the BSR and to explore the potential of empty container logistics as competitive advantage for the PoH. Keeping this in mind, it can be stated that the VCY bears the potential to increase the number of street turns and by this increase the usage of container equipment and reduces empty movements. Moreover, due to the direct exchange of container equipment also space capacities are relieved in utilisation. So, it most likely improves empty container logistics within a port. Though this measure rather has a regional focus and does not specifically consider the relation of the PoH to the BSR a successful implementation could become a good practice example for other ports in the area. Either way, as there were no concrete measures implemented in the PoH within the timeframe of this case study the overall objective of the change process is not achieved (so far). However, the consideration of empty container logistics and its anticipated improvement in the port development plan as well as efforts by other port stakeholders show positive ambitions in advancing the change process.

Critical reflection of the framework developed

Consistency of the SMC was confirmed by application such as that all steps could be performed as they were supposed to be and led to anticipated targets. Clarifying objectives determined the system boundaries of stakeholder management in the change process as well as of the SMC application in a particular change process phase. By this it represents a crucial point of reference for the whole SMC. Relevant stakeholders as subject of investigation were identified in the second step. Scoping processes created process transparency and ensured generating and maintaining a communicative basis with stakeholders. By profiling stakeholders, they were analysed in terms of their attitude towards and influence on the change process in order to determine their relevance for the change process. The last step represents an appropriate mechanism to conflate analysis results from ensuing steps and enable a conscious choice of strategies to involve considered stakeholders. Only by this step, the framework becomes more than an analysis tool as it enables the user to transfer analysis results into concrete recommendations for action: the involvement of stakeholders in future undertakings.

Also, the interconnectivity between or iteration of SMC steps was evaluated as consistent being a helpful mechanism to reflect and harmonise previous and subsequent results. The 'outer-connectivity' such as the embedding of the SMC in the change process also was proved consistent. For both phases, set objectives were achieved and transition from one phase to another was perceived as seamless in that results from the definition phase contributed to several steps in the ensuing phase and so the proposed connection of the different phases by the SMC was verified.

With respect to the feasibility of the SMC some weaknesses were identified with regard to the different steps, however most of them were already resolved during application.

As for the first step – clarifying objectives – it was stated that different objective levels included in this step might become confusing during application. Thus an appropriate designation of differences is needed. Further, the open character of this step was identified as a possibly complicating factor insofar as potential users get a set of guiding questions but finding answers is left to them. However, the application showed that this step requires a certain openness as there are different ways to find answers to posed questions.

Identifying stakeholders might require great efforts and should not be underestimated. For applications that cover a huge amount of individual stakeholders, the stakeholder maps used are not an appropriate tool for mapping relationships. Supposing that relationships on the level of generic stakeholder groups are the same as on the individual level they can be considered on an aggregated level. Otherwise relationships can be recorded e.g. by a matrix. Also, appropriate software (e.g. for social network analysis) could be used, though specialised software might generate barriers for potential users in terms of related costs or required skills. Here the individual level implies that an organisation or at least departments or subsidiaries represent a tangible stakeholder. However, it is not unusual for, say, the attitude toward an issue to differ within a tangible unit and theoretically require a differentiated consideration. Nonetheless, this complexity is beyond the limitation of this thesis. Insights from social science or other relevant disciplines might provide help for dealing with it.

With regard to the third step, it was found that process models refer to all stakeholders but those in the environment of the maritime container transport chain. It remains the case that the process models can be used to develop a common basis of understanding also with stakeholders in the environment and strategic reflections exerting influence on portrayed processes also permit including them. However, other stakeholders become more transparent for the SMC user and consideration should be given to amending this SMC step adequately to create a more balanced situation here.

Profiling stakeholders by means of interviews and a survey as applied in the case study required huge efforts in time. Although this way of exploring the change situation was deemed to be necessary as no suitable information was available on that subject, the definition of issues and sources of power can also be performed on the basis of, say, literature review or on expert know-how.

During framework development it was already stated that stakeholder involvement should always be reflected in context and not only follow methodological advice aimed at being simple and understandable. The sharp allocation of stakeholder involvement to a stakeholder class was designed as basis for a focused discussion. Hence, a focused discussion on this last step should be emphasised by potential SMC users. The derivation of involvement strategies also includes strategies to deal with powerful stakeholders intending to block the change though it cannot be assumed that these strategies will always succeed. Insights from motivation research or psychological disciplines could provide guidance and amend the SMC in this respect.

With reference to the feasibility of the chosen change process model, it was stated that it appears somewhat abstract for use in practice. Though being consistent as applied here, consideration should be given to using another change process model that is more appropriate and more widespread. Due to the fact that change process models usually follow the same logic in terms of phases undertaken it is presumed that embedding the SMC in other change process structures should be manageable.

Two approaches were used to apply the framework. Whereas the definition phase was based on a strong interaction with stakeholders, the evaluation phase was mainly based on the literature, although insights gained during the definition phase also provided valuable input. Though both ways are consistent and lead to valid results it is expected that results developed and verified by a strong stakeholder interaction will be more valuable. In addition, a strong interaction with stakeholders is a crucial constituent part of the SMC. A conscious and structured stakeholder involvement is the main target of the SMC but likewise a means to advance the change process. However, the latter way to apply the SMC might be better feasible as it requires fewer efforts by potential users.

In this context, the support of addressed stakeholders is also of interest. It cannot be assumed that relevant stakeholders are always interested in a strong interaction and are available for personal interviews and surveys. Moreover, it is important that SMC users designing a particular change process - i.e. the decision-making parties - support the application of the SMC. Experience gained during the case study and recent developments in Hamburg show that the supposed external pressure of improving empty container logistics is perceived differently by stakeholders. In the recent port development plan the port authority together with involved actors is assigned to develop an overarching concept for improving empty container logistics that includes organisation of logistics and storage as well as transport of empty containers in the port associated with external locations. Several operational actors proposed a solution option facing space capacity constraints and stress the urgency of finding a solution, thus they rather show an offensive and action-oriented behaviour. In contrast to this the port authority as decision-making party when it comes to the provision of areas inside the port is rather temporising in their behaviour. It is concluded that the perception of external pressure and thus of urgency with regard to the change process must be internalised also by the decision-making party. Moreover, they have to accept related efforts and are disposed to face a reflective and iterative dialogue with stakeholders to achieve advancements in a change process.

To summarise, it can be stated that the SMC is consistent and applicable in accordance with the framework developed. Some weaknesses with respect to its feasibility were outlined but are not deemed seriously hampering the application of the framework as developed during this thesis. Ideas for improvement were briefly outlined, some are considered in the outlook for further research in the next sub-chapter. Moreover, it was shown that the framework provides valuable input for change processes by adding in the stakeholder perspective in a structured and conscious way. As exemplified for empty container logistics in the Hamburg – BSR study area, knowledge valuable for the change process can be gained by integrating stakeholders in the definition of the change situation and the generation of solution options. Also, the establishment and maintenance of stakeholder relations reveals potential barriers and includes means to mitigate resulting problems. Direct interchange is highly appreciated by involved stakeholders and leads to mutual insights in terms of e.g. relevant issues, causal relations of processes or process responsibilities. Hence, it is concluded that the SMC bears the potential to improve change processes along maritime container transport chains.

7.2 Outlook for further research

Challenges along the maritime transport chain reflect awareness of stakeholder-oriented thinking and indicate the need for conscious and structured dealing with stakeholders. The SMC as a stakeholder management framework specified for maritime container transport chains contributes to overcoming these challenges and provides a tool that enables the user not only to analyse but also to manage stakeholders in change processes along the maritime container transport chain. By means of the case study approach, an exemplified application of the SMC was conducted for empty container logistics in the Hamburg – BSR study area. Application proved consistency and feasibility of the SMC. Furthermore, enhancements for the field of application were achieved such as transparency on the change situation was created and recommendations were developed on how to improve empty container logistics in the study area by a concrete measure. Results show the potential of the SMC to improve change processes along maritime container transport chains by applying the stakeholder approach.

The potential SMC user group comprises any actor of the maritime container transport chain that is involved in change processes. Likewise researchers or consultants in this area can benefit from the framework developed and use the SMC to deal with complex stakeholder environments. The SMC enables establishing and maintaining stakeholder relations in a structured and conscious way during the whole change process. Potential barriers resulting from reluctant stakeholders are revealed, as is the identification of supportive stakeholders, thereby ensuring a successful change process. For different kinds of stakeholders the SMC provides guidance on their involvement. Furthermore, benefits include the usage of valuable and diversified knowledge by involving stakeholders to explore the change situation and to identify and evaluate potential solution options.

The potential user group also has potential for further research. This thesis leaves open the question which actor is appropriate as the driving force in change processes along the maritime container transport chain. Several authors refer to ports or port authorities and their important role in supply/transport chains in this respect (see chapter 3.1.3, e.g. Langen, 2008; Bichou & Gray, 2004; Bichou & Gray, 2005; Song & Panayides, 2008b; Martino & Morvillo, 2008; Martino et al., 2012). They get involved in improving the transport chain and thereby the competitiveness of the port (Langen, 2008, p.7). In this context the integration of port community actors as a source of competitive advantage for ports is one important aspect mentioned (Martino & Morvillo, 2008, p.571), and port authorities are requested to manage coordination in port clusters (Langen, 2008, p.16). Having them take over the role as port cluster manager coordinating community actors shows the need for a conscious stakeholder management. Also, experience gained in the case study stresses the important role of (landlord) port authorities in change processes that concern their scope of action. The development of transport infrastructure, the provision and management of areas in the port, traffic management etc. is under the responsibility of a landlord port authority. Thus they can exert immense influence on container logistics in a port. Despite the observed temporising behaviour of the port authority that was perceived as somewhat hampering the change process, ambitions to develop a overarching empty container logistics concepts together with stakeholders (as stated in the port development plan) indicate a positive progress in this respect. Finally, further research may elaborate the importance of stakeholder management for port authorities as driving force in change processes along the maritime container transport chain.

The SMC is designed for an application along the *maritime container* transport chain. So, the question appears to what extent it can be transferred to other (maritime) transport chains. Integration of the process perspective or process analysis respectively represents the main specification of the SMC in comparison with existing frameworks. This emphasise the flow character of the chain. Also, by developing classifications and analysis schemes designed for the maritime container transport chain the framework is specified for a focused application by potential users. Regarding the integration of process analysis, the main principle can easily be transferred to other transport chains as the flow character is inherent in transport chains in general. However, process elements have to be specified accordingly and also key terms and basic processes have to be redefined. Also, accommodated classifications and analysis schemes in particular valid for the identification and profiling of stakeholders cannot directly be transferred. However, the approach how to achieve accommodation can be used for a specification on other chains such the approach for creating a generic stakeholder list, for classification of stakeholders' relevance according to their role, resources and connectivity, for classification of inter-organisational relations or deriving power sources. Finally, dissolving the approach to achieve specification and apply it on other transport chains could be an interesting field of further research and enable a transfer of the SMC to other transport chains.

The SMC is not a standalone tool and is intended to be integrated in frameworks that comprehensively accompany change processes. Here the change process model by Paton and McCalman (2008) was chosen, although the integration in other models is also deemed feasible. As mentioned above, the chosen model is somewhat abstract and not focused on an application along transport chains. An appropriate model could be the planning analysis by Flämig. In Flämig (2004) the planning analysis is introduced as an ex-post tool designed to evaluate past planning in transportation. It therefore comprises different analysis levels including the initial situation of planning, its objectives, measures applied to pursue a specific planning goal, the impact of applied measures in terms of their implementation process and in terms of their concrete results and finally determining factors comprising success factors and barriers. The latter analysis level includes the so-called actor arena as one aspect of analysis. Two kinds of exerting influence (by power or knowledge) are differentiated. However, stakeholders (in a broad understanding) are not explicitly considered and no profound stakeholder analysis or resulting management advice is integrated. Hence, an integration of the SMC in the planning analysis would create synergies for both tools. The planning analysis would gain a more profound stakeholder perspective and means for conscious analysis. The SMC could be embedded in a more appropriate change process model designed for application to transportation and logistics. For an integration of both tools the planning analysis must further be adapted for an application encompassing change processes as it is designed as an ex-post tool. Finally, further research may consider an integration of the SMC in the planning analysis to also specify the greater context of change for transport chains.

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9 Annex

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A Methodological approaches to stakeholder management, analysis, mapping and participation

Table A.1: Approaches for stakeholder analysis and management: authors, year, purpose and performed steps

Author	Year	Purpose	Performed steps/answered questions
McConnell, J. Douglas	1971	Corporate management: Determination of corporate objectives.	- What does this group want from the company? - What expectations do they have of the company? - To what extent are these expectations being met? - To what extent can the company meet them? (McConnell, 1971, p.3)
Slatter, Stuart	1980	Corporate management: Influencing corporation stakeholders through public relations.	- Identifying existing and potential stakeholder groups likely to have an influence on the firm's objective - Identifying the objectives and strategies - both implicit and explicit - of each stakeholder group - Identifying the values of each group and the factors that influence the attitude of its members - Identifying and assessing each groups' resources and the constraints within which it operates - Measuring the current attitudes of the members in each group along relevant dimensions - Identifying the micro-political environment within each stakeholder group, e.g. how decisions are made, the basis and location of power etc. (Slatter, 1980, p.58)

Lindenberg, Marc;
Crosby, Benjamin
	1981	Development cooperation: Improving managerial performance in development cooperation.	- What do I want?
			  - Problem specification
			  - Setting objectives and outcomes
			- Who has it?
			  - Inventorying actors and resources
			- When and how can I get it?
			  - Strategy Design
			  - Strategy Selection
			  - Implementation
			  - Evaluation
			(Lindenberg et al., 1981, p.26)

Mason, Richard O.;
Mitroff, Ian I.
	1981	Policy development and implementation: Surfacing assumptions about the current and future behaviour of an organization's stakeholders in context of policy development.	- Group formation:
			  - Minimize interpersonal conflicts and maximise differences in knowledge and problem perspective
			  - Form small groups
			  - Choose a focal point of the group/perspective
			- Assumption surfacing:
			  - Identify all stakeholders
			  - List optimal assumptions about each stakeholder to make the plan/strategy/policy optimal (inverse optimal question)
			- Debate/within group dialectic:
			  - Reduce the list by its irrelevant assumptions

Author	Year	Purpose	Performed steps/answered questions
			- Rate assumptions according to their certainty and importance - Choose pivotal assumptions (group wise) - Information requirement analysis/between group dialectic debates: - Evaluate, debate and discuss the assumptions of each group - Synthesis and decision (Mason & Mitroff, 1981, p.38 ff.)
Freeman, R. Edward	1984	Corporate management: Building a stake-holder framework and constructing strategic programs for stakeholders.	- Stakeholder framework - *Stakeholder maps (rational level)*: Who are the stakeholders in the organisation and what are their perceived stakes? incl. steps like the following: - Identification of stakeholders and their ‚stakes' - Examination of the interconnection of stakeholder groups - Developing a stakeholder grid by their interest (equity, economic, influencers) and power (formal/voting, economic, political) - *Environmental scanning (process level)*: What standard operating procedures are used to manage multiple stakeholder relationships? - Interacting with stakeholder (transactional level): How do the organisation and its managers interact with stakeholders? What resources are allocated to interact with which group? - Formulating strategies for specific stakeholders - *Stakeholder Behaviour analysis* - Actual or observed behaviour - Cooperative potential - Competitive threat - *Stakeholder behaviour explanation* - State the objectives of a stakeholder - Conduct a stakeholder analysis of the stakeholder - Examine the stakeholder beliefs about the firm - *Coalition analysis* - Commonalities in behaviour - Commonalities of interest (objectives, stakeholder, beliefs) - *Deriving strategies for stakeholders* - Distinguish between swing, defensive, offensive and hold stakeholders depending on their cooperation potential and competitive threat (Freeman, 1984, p.54 ff., p.139 ff.)

Author	Year	Purpose	Performed steps/answered questions
Honadle, George; Cooper, Lauren	1989	Development cooperation: Facilitating sustained institutional development by strengthening local interorganizational networks.	- List problems which are faced in achieving a project objective - List all stakeholders who can help to solve the problems - Match problems with stakeholders who can resolve them - Distinguish problems in situations which are under control, influence or appreciation - Derive an adequate coordination type (information sharing, resource sharing, joint action) for the different situations (Honadle & Cooper, 1989, p.1532 ff.)
Brinkerhoff, Derick W.	1991	Development cooperation: Identifying what development programs need from its stakeholders to be successfully implemented.	- Identify stakeholders relevant to the program's goal - Describe them according to the resources (tangible and intangible) they control and potential interests in program benefits - Built a matrix in which stakeholders are related to transactions (e.g. financing, physical input, approvals) necessary for the program's success - Derive the focus of attention and develop strategies and tactics to facilitate achieving sustainable results (Brinkerhoff, 1991, p.32 ff.)
Crosby, Benjamin L.	1991	Development cooperation/ Policy management: Implementing Policy Change Projects in development cooperation.	- List groups that seem most relevant for the issue - the policy under consideration - Identify the groups' interest in the issue - Identify relevant resources the group bears - Identify the capacity to mobilize these resources - Examination of the group's position regarding the issue (Crosby, 1991, p.2 ff)
Grimble, Robert; Chan, Man-Kwun	1995	Development cooperation: Facilitating practical natural resource management issues and land-use management.	- Identify the main purpose of the analysis - Develop an understanding of the system and its decision-makers - Identify principal stakeholders - Investigate stakeholder interests, characteristics and circumstances - Determine views of stakeholders on relevant questions - Identify patterns and contexts of interaction between stakeholders - Assess options for management at all levels, from round-table negotiation to expert group analysis and resolution (Grimble & Chan, 1995, p.118 ff.)

Author	Year	Purpose	Performed steps/answered questions

Overseas Deve-lopment Administrati-on (ODA)	1995	Development cooperation: Buil-ding consensus and developing a workable project by working out jointly solutions for the underlying problem.	- Introduction
			  - Time perspective
			  - Team
			  - Effort
			- Drawing up stakeholder tables
			  - Identifying the stakeholder and creating a list
			  - Drawing out stakeholder's interests in relation to the project
			- Assessing the influence and importance of stakeholders
			  - Assessing influence
			  - Assessing importance
			  - Combining influence and importance in a matrix diagram
			- Drawing out assumptions and risks affecting project design and participation
			  - Identifying assumptions and risks about stakeholders
			  - Identifying appropriate stakeholder participation
			- Using the findings of a stakeholder analysis
			(ODA, 1995a, p.2 ff.)

Mitchell, Ronald K.; Agle, Brad-ley R.; Wood, Donna J.	1997	Corporate management: Classify corporate stakeholder along defined attribute: power, legitimacy and urgency.	- Identify stakeholders - Classify stakeholders according to attributes (Mitchell et al., 1997, p.853 ff.)
Eden, Colin; Ackermann, Fran	1998	Corporate ma-nagement: Pursu-ing strategic ends in corporations.	- Developing the power/interest grid - Developing the power/interest star diagram - Developing the actor influence network map - Developing the stakeholder-role think (Eden & Ackermann, 1998, p.344 ff.)
Grundy, Tony	1998	Corporate management: Guiding strategy implementati-on projects in corporations.	- Stakeholder identification (Stakeholder brainstorm) - Evaluating their influence - Evaluating their attitude - Reshaping strategies to overcome obstacles caused by stakeholders (8 questions) (Grundy, 1998, p.47 ff.)

Author	Year	Purpose	Performed steps/answered questions

Varvasovszky, Zsuzsa; Brugha, Ruairi	2000	Policy development and implementation: Managing stakeholders in health policy projects.	- Preliminary Questions
			  - Aim and time dimension
			  - Context
			  - Level (geographic)
			- Preparation
			  - Analyst/Analysis team
			  - Conducting the analysis
			- Identifying and approaching stakeholders
			  - Data collection methods and data
			  - Organising and analysing data
			  - Presenting findings (output)
			  - Using the findings
			- Limitations, validity and reliability of the analysis
			(Varvasovszky & Brugha, 2000, p.338 ff.)

Karlsen, Jan Terje	2002	Project management: Enabling systematic stakeholder management in projects primarily realised in corporations.	- Plan: Initiation of the stakeholder management process - Identify: identification of stakeholders - Analyze: analyzing the stakeholders - Communicate: communication of stakeholder assessment to the project management and project members - Act: developing implementation strategies - Follow up: following-up the strategies and actions implemented (Karlsen, 2002, p.22 ff.)
Oxley-Green, Abigail; Hunton-Clarke, Lynsey	2003	Policy development and implementation: Derive different strategies for stakeholder participation for companies from approaches in public planning.	- Selection from different kinds of stakeholder participations levels (Oxley-Green & Hunton-Clarke, 2003, p.292 ff.)
Zimmermann, Arthur; Maennling, Claudia	2006	Development co-operation: Managing stakeholders towards changes objective of a system intervention in the realm of development cooperation.	- Identifying key stakeholders - Stakeholder mapping - Stakeholder profiles and strategic options - Power and power resources - Stakeholders' interests and scope for action - Influence and involvement - Force field analysis - Building trust - Exclusion and empowerment - Gender (cross-cutting building block on gender equality in development) (Zimmermann & Maennling, 2006, p.9 ff.)

Author	Year	Purpose	Performed steps/answered questions
Winch, Graham	2007	Project management: Managing stakeholders in projects to mitigate complexity of projects.	- Identify those stakeholders with a claim in the project - Specify the nature of each stakeholder's claim - Assess each stakeholder's ability to press that claim - Manage the response to that claim so that the overall impact on the definition and execution of the project are minimised (Winch, 2007, p.275)
Hage, Maria; Leroy, Pieter	2008	Policy development and implementation: Providing guidance for stakeholder participation in public planning processes for environmental knowledge production.	- Selection of stakeholders - Choosing participation method - Organising interactive workshops (Hage & Leroy, 2008, p.5 ff.)

Görgen, Maraile; Klien, Soete	2009	Corporate management: Considering stakeholders as part of change management.	- Building block1: Stakeholder Map
			  - Defining scope and objective of the change process
			  - Identification and clustering of stakeholders
			  - Visualisation of the stakeholder map
			- Building block2: Key players and their attitude towards the change objective
			  - Discussion of the attitude
			  - Discussion and development of interventions
			(Görgen & Klien, 2009, p.88 ff.)

Bourne, Linda	2009	Corporate management: Managing stakeholders in an organisational context	- Identify: identify all stakeholders - Prioritise: Build profile and prioritise - Visualise: Reveal right stakeholders for time now - Engage: Define attitude: develop engagement profile - Monitor: Measure and monitor effectiveness (Bourne, 2009, p.49 ff.)
Johnson, Gerry; Scholes, Kevan; Whittington, Richard	2008	Corporate management: Mapping stakeholders to derive their expectations and power with regard to corporation strategy	- Stakeholder mapping: creating power/interest matrix (not further specified) (Johnson et al., 2008, p.156)
Cleland, David I.; Ireland, Lewis R.	2010	Project management: Dealing with stakeholders focuses around the allocation of the management functions to potential stakeholder issues.	- Identify stakeholders - Gather information on stakeholders - Identify stakeholder mission - Determine stakeholder strengths and weaknesses - Identify stakeholders strategy - predict stakeholder behaviour - Implement stakeholder management strategy (Cleland & Ireland, 2010, p.135 ff.)

Author	Year	Purpose	Performed steps/answered questions
Hayes, John	2010	Corporate management: Managing stakeholders in change processes in corporations.	- Stakeholder identification - Stakeholder mapping by a influence-attitude-matrix - Developing a strategy for managing stakeholders (Hayes, 2010, p.149 ff.)
Wadenpohl, Frank	2010	Project management: Coping with stakeholder issues during the development and implementation of large transport infrastructure projects	- Identification of stakeholders - Identification of issues - Development of the stakeholder-issue-map - Development of the interest-impact-matrix - Derivation of involvement strategies (Wadenpohl, 2011, p.23 ff.)
World Bank	2006	Development cooperation: Addressing the social dimension of transport projects or programmes.	- Identify stakeholders - Analyze the interest and influence of the stakeholders (stakeholder analysis matrix) - Differentiate the stakeholders by the status-quo or, conversely, their desire of change (Interest versus influence) (World Bank, 2006, p.36)

Source: Own compilation

B Preparatory study: data set excerpt for considered ports

Table B.1: Import/export of empty containers to/from the PoH by 15 considered ports (in total numbers for the year 2011)

Port	Import						Export					
	Standard		Reefer		Transport Stillage		Standard		Reefer		Transport Stillage	
	20′	40′	20′	40′	20′	40′	20′	40′	20′	40′	20′	40′
Aarhus (DK)	1,701	2,115	12	310	111	1	268	3,440	57	27	16	0
Copenhagen (DK)	2,360	3,671	26	335	0	0	352	2,900	133	2,311	29	0
Gavle (SE)	694	124	0	7	0	0	797	1,381	0	155	0	0
Gdynia (PL)	14,889	4,026	39	152	11	0	619	1,322	154	0	285	0
Göteborg (SE)	2,092	2,518	69	546	68	0	1,443	1,104	13	7	234	0
Hamina (FI)	232	319	3	23	2	0	0	583	0	0	2	0
Helsinki (FI)	2,432	4,095	61	803	125	1	691	432	57	497	13	0
Kaliningrad (RU)	1,199	5,421	38	1,505	2	0	0	346	0	12	6	0
Klaipeda (LT)	4,163	3,867	119	2,404	27	0	67	201	6	246	5	0
Kotka (FI)	828	7,773	25	239	77	0	1,200	122	0	6	118	0
Oulu (FI)	4	2	22	0	3	0	1,415	75	0	7	1	0
Rauma (FI)	368	306	0	4	34	0	2,019	66	0	10	3	0
Riga (LV)	2,343	4,117	57	619	132	0	7	4	15	0	202	0
St. Petersburg (RU)	5,807	52,056	932	18,672	679	0	110	3	1	17	14	0
Tallinn (EE)	3,478	3,736	23	1,298	340	0	15	2	9	0	33	0

Source: Own design based on PLINS data set

Table B.2: Import/export of loaded containers to/from the PoH by 15 considered ports (in total numbers for the year 2011)

Port	Import						Export					
	Standard		Reefer		Transport Stillage		Standard		Reefer		Transport Stillage	
	20′	40′	20′	40′	20′	40′	20′	40′	20′	40′	20′	40′
Aarhus (DK)	4,368	7,048	165	2,072	275	0	9,781	113,941	190	25,307	389	0
Copenhagen (DK)	4,235	4,043	221	838	108	0	8,083	33,708	101	178	69	0
Gavle (SE)	4,671	9,238	1	17	0	0	3,991	31,723	0	1,124	0	0
Gdynia (PL)	11,844	27,014	265	3,956	210	0	27,233	17,946	88	442	61	0
Göteborg (SE)	10,657	27,716	78	137	1,070	0	12,724	16,244	113	217	80	0
Hamina (FI)	74	145	1	0	0	0	965	15,057	5	2,382	22	0
Helsinki (FI)	6,974	15,782	125	666	64	0	12,122	14,705	79	905	161	1
Kaliningrad (RU)	789	310	0	9	2	0	2,043	13,887	49	562	3	0
Klaipeda (LT)	4,734	12,435	23	186	7	0	8,354	10,757	140	444	58	0
Kotka (FI)	6,481	22,537	2	51	105	0	6,580	9,787	24	1,262	157	0
Oulu (FI)	989	119	0	0	11	0	138	5,975	26	1,058	58	0
Rauma (FI)	6,318	8,957	0	2	55	0	2,355	2,549	0	55	30	0
Riga (LV)	4,110	8,295	20	40	301	0	6,047	1,622	52	1	238	0
St. Petersburg (RU)	17,685	37,571	18	675	251	0	37,693	1,119	967	0	1,030	0
Tallinn (EE)	2,438	8,643	19	85	132	0	8,624	790	21	0	410	0

Source: Own design based on PLINS data set

C Case study: detailed documents and results

C1 Interview guide

Interview guide

'Stakeholder Perspectives in Empty Container Logistics'

Background

This interview is embedded in the project TransBaltic (Towards an integrated transport system in the Baltic Sea Region) wherein amongst other tasks empty container management in the Baltic Sea Region (BSR) is investigated. So far a study on empty container management in the BSR has been performed providing first insights on empty container flows in the BSR, involved players, general reasons for and impact of empty container logistics as well as on potential measures. Implications from theory and empiricism have shown that a crucial point in optimising empty container logistics are different and partially conflicting perspectives of relevant stakeholders. This can be a barrier for implementing measures aiming to improve empty container logistics. Therefore we are conducting a series of stakeholder interviews in context of a case study together with the Hamburg Port Authority.

Interview objective

The objective of the interview is to figure out the perspective of the various stakeholders of empty container logistics. It is intended to investigate aspects which should be considered in preparation of and during change processes.

Interview structure

Within the first part of the interview we will talk about processes in empty container logistics based on process charts we will prepare. In the second part we will pose the questions you will find below.

Exploitation of results

Based on the aspects you are going to specify during this interview a short questionnaire (1-2 pages) will be developed and distributed to you after the interview series. This questionnaire will comprise aspects of all interviewed stakeholders hence all stakeholders get an idea of issues concerning the others and can take the opportunity to evaluate all relevant issues.

Naturally, all your answers will be treated confidentially and it will not be possible to identify individual persons or institutions in the subsequent questionnaire or any other kind of document. The results of this analysis will be part of a doctorial thesis dealing with stakeholder management along the maritime transport chain.

Interview Questions

A Benefits and challenges of empty container logistics

1. What are the benefits of empty container logistics for *your company*?
2. Are there any benefits for *other stakeholders* you are aware of?
3. What are the challenges of empty container logistics for *your company*?
4. Are there any challenges for *other stakeholders* you are aware of?

B Current issues in empty container logistics

5. What are current issues in empty container logistics for *your company*?
6. Are there any other current issues you notice from *other stakeholders*?

C Potential for optimization

7. Do you see any potential for optimization from the perspective of *your company*?
8. Do you see any potential for optimization with regard to *other stakeholders*?

D Interrelations with other stakeholders

9. To which other stakeholders in empty container logistics do you have relevant interrelations and of what kind are they?

E Influence to design empty container logistics

10. Which stakeholders have influence to design empty container logistics?
11. Which aspects are constituting influence and power in empty container logistics?
12. What is your influence like to design empty container logistics?

F Other

13. Do you have any further comments?

C2 List of interviewees

Table C.1: List of interviewed stakeholders

Stakeholder group	Position of interviewee	Date	Location
Sea terminal operator	Managing Director	03.05.2012	Hamburg, Germany
Inland transport operator	Managing Director	03.05.2012	Hamburg, Germany
Container depot operator	Managing Director	09.05.2012	Hamburg, Germany
Shipping line	Head of Intermodal and Logistics, Germany	10.05.2012	Hamburg, Germany
Customs	Head of Department	15.05.2012	Hamburg, Germany
Inland transport operator, Forwarder	Marketing and Sales Director	15.05.2012	Hamburg, Germany
Container leasing company	Marketing Manager, Germany	01.06.2012	Hamburg, Germany
Sea terminal operator, Container depot operator	Managing Director	11.06.2012	Helsinki and Kotka, Finland
Inland transport operator, Forwarder	Marketing and Sales Director	12.06.2012	Helsinki, Finland
Shipping line	Operations and Logistics Manager, Northern Europe/ Russia/ Black Sea	13.06.2012	Helsinki, Finland
Port authority	Director	13.06.2012	Kotka, Finland
Sea terminal operator, Container depot operator	Vice President, Marketing and Sales Container Operations	14.06.2012	Helsinki and Kotka, Finland
Sea terminal operator	Terminal Manager	15.06.2012	Riga, Latvia
Container depot operator	Managing Director	21.06.2012	Hamburg, Germany
Port community system	Sales manager	25.06.2012	Hamburg, Germany
Shipping line	Marketing & Sales Director, Germany	05.07.2012	Hamburg, Germany
Inland transport operator, Forwarder	Managing Director	09.07.2012	Hamburg, Germany
Sea terminal operator	Marketing Director	12.07.2012	Gdynia, Poland
Container depot operator	Trade Department, Sales Manager	12.07.2012	Gdynia, Poland
Shipping line	Equipment Manager	13.07.2012	Gdynia, Poland
Shipping line	Manager Logistics, Germany	17.07.2012	Hamburg, Germany
Forwarder	Regional Manager Sea Freight, Strategy, Processes and Systems	01.08.2012	Hamburg, Germany
Forwarder	Equipment and disposition Manager	01.08.2012	Hamburg, Germany
Sea terminal operator	Director - Customer Relations	06.08.2012	St. Petersburg, Russia
Forwarder	Head of sea freight department	06.08.2012	St. Petersburg, Russia
Shipping line	General director/Area manager for Russia	07.08.2012	St. Petersburg, Russia

C3 Questionnaire

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Institute for Transport Planning and Logistics

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Fax +49 (40) 42878 2726
transbaltic@tu-harburg.de

Survey on Empty Container Logistics: Hamburg–Baltic Sea Region

Hamburg, August 2012

Dear Sir or Madam,

Please find enclosed a questionnaire about empty container logistics in the Hamburg-Baltic Sea Region (BSR) study area that we would kindly ask you to complete. It will take approximately 10–15 minutes.

The questionnaire is based on a series of interviews that were conducted to identify fields of action, potential for optimisation and power factors to design empty container logistics. Different stakeholders along the maritime transport chain were addressed to build a substantiated base for this survey. The questionnaire takes up the interview findings to cross-check them with the different stakeholder groups, presenting the comprehensive stakeholder-specific findings to them for a final comparative evaluation. This questionnaire is therefore aimed at creating a multi-stakeholder-analysis on fields of action and exertion of influence to design empty container logistics in the Hamburg–BSR study area.

The survey is part of a case study by the Institute for Transport Planning and Logistics and the Hamburg Port Authority. The initiative is part of the EU-project **TransBaltic – Towards an integrated transport system in the Baltic Sea Region**, which is funded by the Baltic Sea Region Programme.

Your benefit will be a report on the results that we will send you after interpretation of responses received. Further results will be part of a doctoral thesis on "Stakeholder management along the maritime transport chain".

We very much hope that you will find the time to respond to our questions or as many of them as you can. We also appreciate partially completed questionnaires.

Naturally, all your answers will be treated as confidential and it will not be possible to identify individual persons or institutions in the report.

Please return the completed questionnaire by 5 September, 2012.

With many thanks and kind regards,

Prof. Dr.-Ing. Heike Flämig, Jutta Wolff
Institute for Transport Planning and Logistics, Hamburg University of Technology

Structure of the questionnaire:

- Part A: Your company and the importance of empty container logistics
- Part B: Design of change processes
- Part C: Fields of action to improve empty container logistics
- Part D: Power factors in change processes of empty container logistics

Instructions to complete the survey:

- Please fill in your answer as text or numbers.
- ■ Please tick/check the relevant box.

You can fill in your answers directly in the PDF file on your computer or in a printout (the file is also available from www.vsl.tu-harburg.de/transbaltic).

SURVEY ON EMPTY CONTAINER LOGISTICS
HAMBURG–BALTIC SEA REGION

Part A Your company and the importance of empty container logistics

A.1 What is the name of your organisation/company?

A.2 What kind of organisation/company do you work for?

Please choose from the following (multiple entries possible).

☐ Port authority
☐ Shipping line
☐ Container leasing company
☐ Terminal operator *(please specify)*
  ☐ Seaport ☐ Hinterland
☐ Container depot operator
☐ Forwarder
☐ Transport operator *(please specify)*
  ☐ Feeder ☐ Rail
  ☐ Road ☐ Barge
☐ Other *(please specify)*

A.3 How would you rate the importance of empty container logistics with regard to your business?

Please rate the importance of empty container logistics as either "very important", "important" or "unimportant".

☐ Very important ☐ Important ☐ Unimportant

Part B Design of change processes

B.1 How would you evaluate the importance of involving all related stakeholders in change processes of empty container logistics?

Please rate the importance of involving related stakeholders as either "very important", "important" or "unimportant".

☐ Very important ☐ Important ☐ Unimportant

B.2 How would you like to be involved in change processes of empty container logistics?

Please choose from the following (multiple entries possible).

☐ **Co-decision:** Common design of and decision on change processes.

☐ **Co-production:** Involvement in creating knowledge bases in preparation of decision-making.

☐ **Consultation:** Selective involvement in change processes by the decision maker.

☐ **Information:** Regular reports on the development of change processes by the decision maker.

☐ **No involvement** in change processes.

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Part C Fields of action to improve empty container logistics

C.1 How would you describe your attitude towards the change of the following fields of action to improve empty container logistics?

Please describe your attitude as either "active resistance", "reluctance", "neutral", "approval," or "active support".

Fields of action to improve empty container logistics	Attitude towards the fields of action				
	Active resistance	Reluctance	Neutral	Approval	Active support
Increasing **space availability** in the port (e.g. for empty depots)	☐	☐	☐	☐	☐
Standardisation of the flow of information between actors of empty container logistics	☐	☐	☐	☐	☐
Increasing **integrated capacity utilisation** (Port 24/7)	☐	☐	☐	☐	☐
Earlier notification of empty container flows	☐	☐	☐	☐	☐
Increasing **container availability in the hinterland**	☐	☐	☐	☐	☐
Increasing **space efficiency at the seaport terminal**	☐	☐	☐	☐	☐
Improving **transparency on processes and volumes** for all actors	☐	☐	☐	☐	☐
Improving the **traceability of containers**	☐	☐	☐	☐	☐
Improving the **image of empty containers** as a substantial part of loaded container logistics	☐	☐	☐	☐	☐
Reducing **throughput time in depots/terminals**	☐	☐	☐	☐	☐
Improving the **quality of container equipment**	☐	☐	☐	☐	☐

C.2 How would you rank the importance of the different fields of action to improve empty container logistics?

Please name the five most important fields of action by choosing from the drop-down lists.

Ranking	Fields of action
1	
2	
3	
4	
5	

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Survey on Empty Container Logistics: Hamburg – Baltic Sea Region

Part D Power factors in change processes of empty container logistics

D.1 How would you evaluate your influence in designing empty container logistics with regard to different factors of power?

Please evaluate your influence as either "no influence", "slight influence", "relevant influence" or "strong influence".

Factors of power	Evaluation of your influence			
	No influence	Slight influence	Relevant influence	Strong influence
Container ownership: Exerting influence by owning container assets	☐	☐	☐	☐
Horizontal integration: Exerting influence by collaboration with competitors	☐	☐	☐	☐
Informal connectivity: Exerting influence by integration in port community (informal relationships)	☐	☐	☐	☐
Market share: Exerting influence by market positioning towards competitors	☐	☐	☐	☐
Demand-side power: Exerting influence by specific require-ments on container equipment	☐	☐	☐	☐
Operational process power and pricing: Exerting influence by controlling operational processes and their pricing	☐	☐	☐	☐
Political power: Exerting influence on political frame work set-ting	☐	☐	☐	☐
Strategic process power: Exerting influence by controlling steer-ing processes e.g. steering of repositioning, quality requirements	☐	☐	☐	☐
Vertical integration: Exerting influence by collaboration with actors along the transport chain	☐	☐	☐	☐
Knowledge and competences: exerting influence by providing relevant experiences and information	☐	☐	☐	☐

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D.2 How would you evaluate the importance of the above power factors for change processes in empty container logistics?

Please evaluate the importance by comparison in pairs of two respective power factors, i.e.:

- *If factor A is more important than factor B → please insert* **A**.
- *If both factors are of the same importance → please insert* **0**.
- *If factor B is more important than factor A → please insert* **B**.

Please only complete the right-side part of the table. The Tab key takes the cursor to the next input field.

Factor A \ Factor B	Container ownership	Horizontal integration	Informal connectivity	Market share	Demand-side power	Operational process power and pricing	Political power	Strategic process power	Vertical integration	Knowledge and Competences
Container ownership										
Horizontal integration										
Informal connectivity										
Market share										
Demand-side power										
Operational process power and pricing										
Political power										
Strategic process power										
Vertical integration										
Knowledge and Competences										

THANK YOU FOR COMPLETING THE SURVEY!

Please return the completed questionnaire by 5 September, 2012:

By e-mail: transbaltic@tu-harburg.de

By fax: +49 (0)40 42 878 2728

By mail: Hamburg University of Technology, Institute for Transport Planning and Logistics
21071 Hamburg Germany

Queries? Please call Jutta Wolff +49 (0)40 42 878 – 2110.

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C4 Response statistics

Figure C.1: Interview participation of stakeholder groups in different port areas

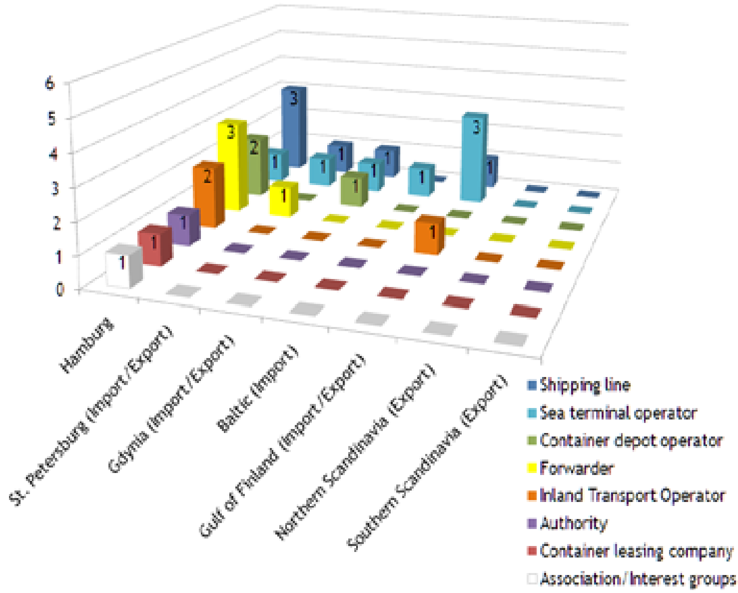
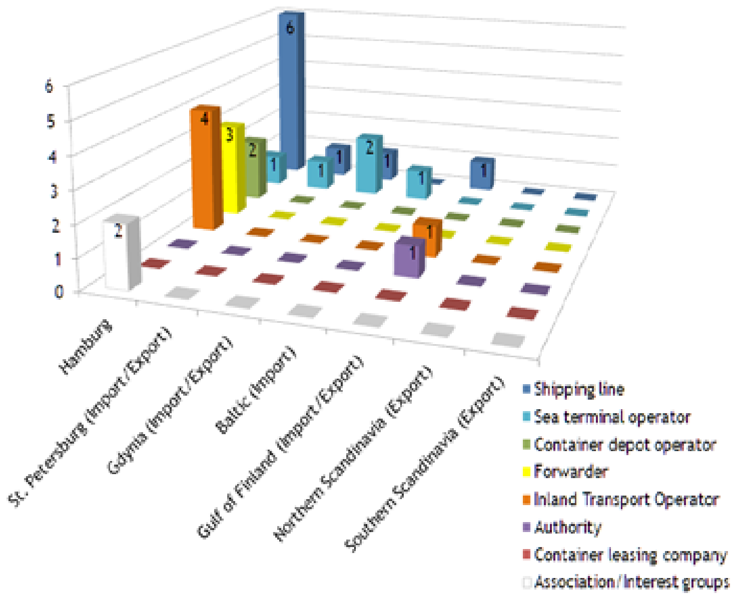


Figure C.2: Survey participation of stakeholder groups in different port areas



C5 Ranking of given fields of action

Table C.2: Evaluation of fields of action

Abbrev.	CDO1	CDO2	F1	F2	F3	ITO1	ITO2	ITO3	ITO4	ITO5	O1	O2	O3	O4	SL1	SL2	SL3	SL4
Improving the quality of container equipment				3	4			5									5	
Reducing throughput time in depots/ terminals	4		5	2	2		2	2				4	5	2			4	1
Improving the image of empty containers		4		5		5	5						3		5	1		
Improving the traceability of containers					5						4	3			3	5		
Improving transparency on processes and volumes			4			4					3		4	4	2			
Increasing space efficiency at the seaport terminal									4					1			3	4
Increasing container availability in the hinterland		3	1	1	1				1	1	1				1	4		
Earlier notification of empty container flows	2	1	3						5	2		2	1			2		
Increasing integrated capacity utilisation	5	5		4	3	3	1	4	3	3		5					2	3
Standardisation of the flow of information	1		2			2	4	3	2		2	1	2	3	4	3		2
Increasing space availability in the port	3	2				1	3	1			5			5			1	5

Abbrev.	Increasing space availability in the port	Standardisation of the flow of information	Increasing integrated capacity utilisation	Earlier notification of empty container flows	Increasing container availability in the hinterland	Increasing space efficiency at the seaport terminal	Improving transparency on processes and volumes	Improving the traceability of containers	Improving the image of empty containers	Reducing throughput time in depots/ terminals	Improving the quality of container equipment
SL5	2	3			1	5		4			
SL6		2		5				3		4	1
SL7	3	4			1	2				5	
SL8	5	2	3	4		1					
STO1		2	4	3		1					
STO2		3				1	2	4	5		
STO3		1		2		3	4				5
STO4	1	5					2		3	4	
STO5		3	4				1	2		5	

Source: Own design based on survey results, n=27

Table C.3: Shipping lines: ranking of given fields of action to improve empty container logistics

Rank	Issues/Fields of action
1	Standardisation of the flow of information
2	Increasing container availability in the hinterland
3	Increasing space efficiency at the seaport terminal
4	Increasing space availability in the port
5	Reducing throughput time in depots/terminals
6	Increasing integrated capacity utilisation
7	Improving the traceability of containers
8	Earlier notification of empty container flows
9	Improving the image of empty containers
10	Improving the quality of container equipment
11	Improving transparency on processes and volumes

Source: Own design based on survey results, n=8

Table C.4: Sea terminal operator: ranking of given fields of action to improve empty container logistics

Rank	Issues/Fields of action
1	Standardisation of the flow of information
2	Improving transparency on processes and volumes
3	Increasing space efficiency at the seaport terminal
4	Earlier notification of empty container flows
5	Improving the traceability of containers
6	Increasing space availability in the port
7	Increasing integrated capacity utilisation
8	Improving the image of empty containers
9	Reducing throughput time in depots/terminals
10	Improving the quality of container equipment
11	Increasing container availability in the hinterland

Source: Own design based on survey results, n=5

Table C.5: Forwarders: ranking of given fields of action to improve empty container logistics

Rank	Issues/Fields of action
1	Increasing container availability in the hinterland
2	Reducing throughput time in depots/terminals
3	Increasing integrated capacity utilisation
4	Improving the quality of container equipment
5	Standardisation of the flow of information
6	Earlier notification of empty container flows
7	Improving transparency on processes and volumes
8	Improving the traceability of containers
9	Improving the image of empty containers
10	Increasing space availability in the port
11	Increasing space efficiency at the seaport terminal

Source: Own design based on survey results, n=3

Table C.6: Inland transport operator: ranking of given fields of action to improve empty container logistics

Rank	Issues/Fields of action
1	Increasing integrated capacity utilisation
2	Standardisation of the flow of information
3	Increasing space availability in the port
4	Increasing container availability in the hinterland
5	Reducing throughput time in depots/terminals
6	Earlier notification of empty container flows
7	Increasing space efficiency at the seaport terminal
8	Improving transparency on processes and volumes
9	Improving the image of empty containers
10	Improving the quality of container equipment
11	Improving the traceability of containers

Source: Own design based on survey results, n=5

Table C.7: Container depot operators: ranking of given fields of action to improve empty container logistics

Rank	Issues/Fields of action
1	Earlier notification of empty container flows
2	Increasing space availability in the port
3	Standardisation of the flow of information
4	Increasing container availability in the hinterland
5	Reducing throughput time in depots/terminals
6	Increasing integrated capacity utilisation
7	Improving the image of empty containers
8	Increasing space efficiency at the seaport terminal
9	Improving transparency on processes and volumes
10	Improving the traceability of containers
11	Improving the quality of container equipment

Source: Own design based on survey results, n=2

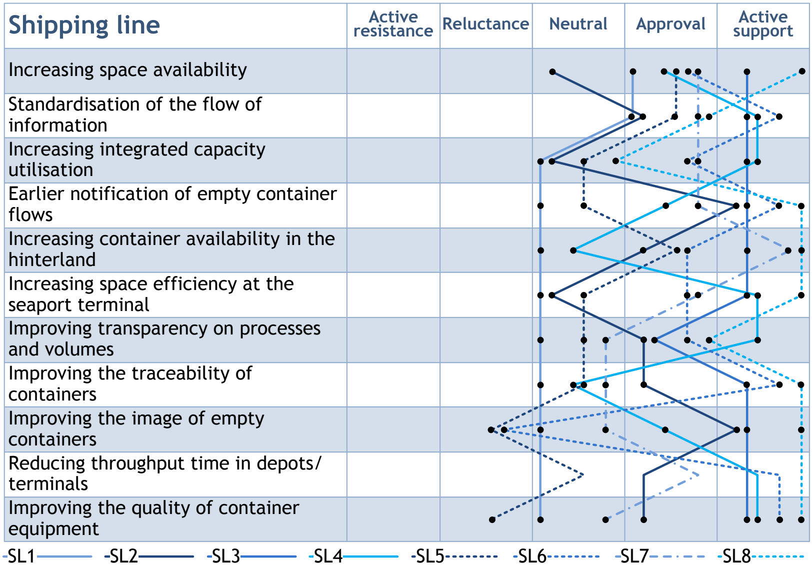
Table C.8: Others: ranking of given fields of action to improve empty container logistics

Rank	Issues/Fields of action
1	Standardisation of the flow of information
2	Earlier notification of empty container flows
3	Reducing throughput time in depots/terminals
4	Improving transparency on processes and volumes
5	Increasing container availability in the hinterland
6	Increasing space efficiency at the seaport terminal
7	Improving the traceability of containers
8	Improving the image of empty containers
9	Increasing space availability in the port
10	Increasing integrated capacity utilisation
11	Improving the quality of container equipment

Source: Own design based on survey results, n=4

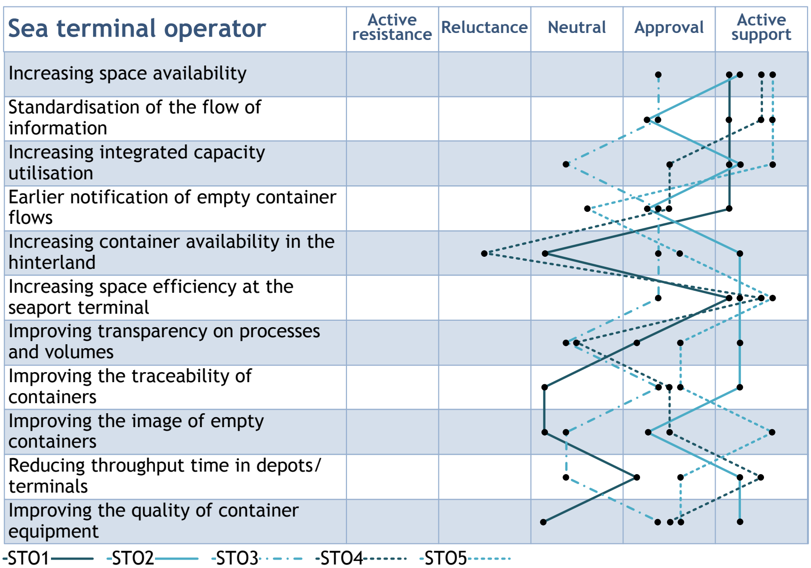
C6 Evaluation of given fields of action

Figure C.3: Shipping lines: evaluation of given fields of action



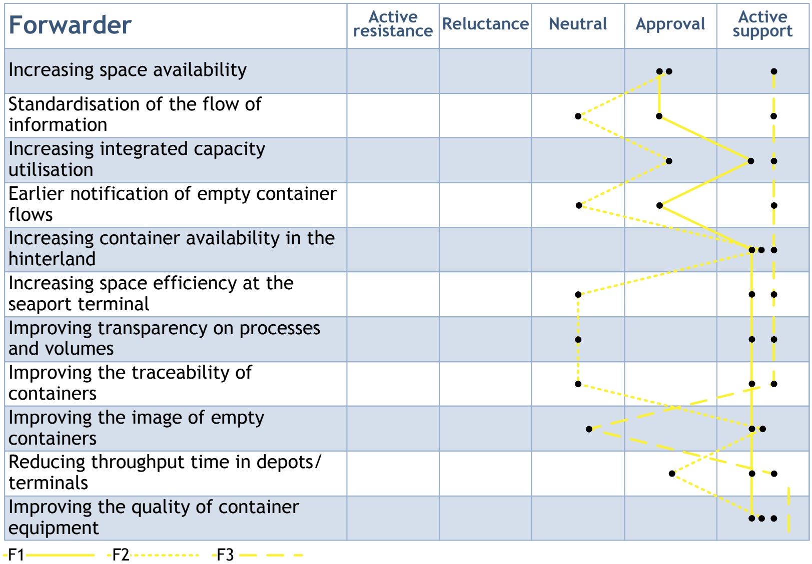
Source: Own design based on survey results, n=8

Figure C.4: Sea terminal operators: evaluation of given fields of action



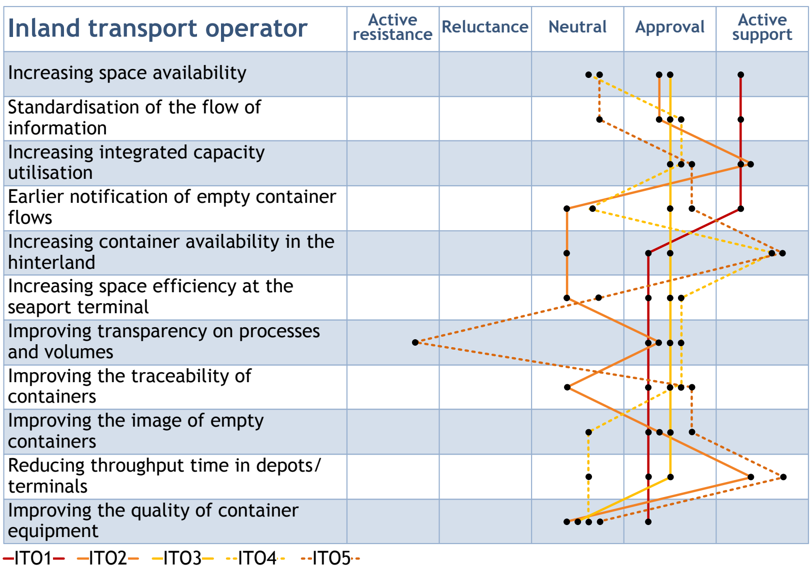
Source: Own design based on survey results, n=5

Figure C.5: Forwarders: evaluation of given fields of action



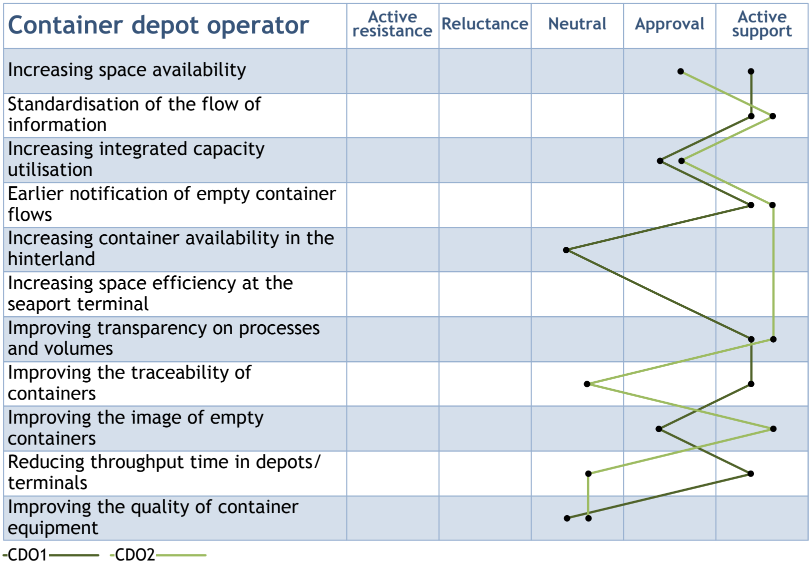
Source: Own design based on survey results, n=3

Figure C.6: Inland transport operators: evaluation of given fields of action



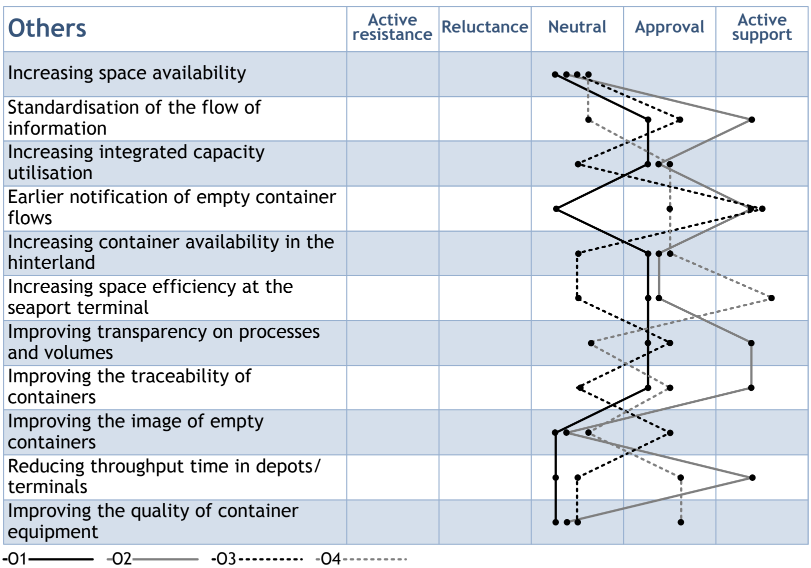
Source: Own design based on survey results, n=5

Figure C.7: Container depot operators: evaluation of given fields of action



Source: Own design based on survey results, n=2

Figure C.8: Others: evaluation of given fields of action



Source: Own design based on survey results, n=4

C7 Ranking of given power factors

Table C.9: Evaluation of power factors: weighted ranking and ratio of error

Power factor / SH abbrev.	Ratio of error [%]	Knowledge and competences [%]	Vertical Integration [%]	Strategic process power [%]	Political power [%]	Operational process power and pricing [%]	Demand-side power [%]	Market share [%]	Informal connectivity [%]	Horizontal integration [%]	Container ownership [%]
CDO1	*31	5.56	4.44	4.44	15.56	13.33	16.67	7.78	6.67	5.56	20.00
CDO2	15	2.27	0.00	9.09	13.64	6.82	11.36	15.91	9.09	11.36	20.45
F1	11	8.89	4.44	20.00	17.78	11.11	2.22	13.33	6.67	2.22	13.33
F2	*20	12.22	2.22	10.00	2.22	8.89	14.44	12.22	14.44	3.33	20.00
ITO1	*44	6.67	6.67	10.00	12.22	3.33	1.11	14.44	7.78	17.78	20.00
ITO2	*38	10.00	6.67	10.00	1.11	15.56	7.78	10.00	13.33	6.67	18.89
ITO3	*27	8.89	6.67	4.44	8.89	8.89	6.67	17.78	6.67	11.11	20.00
ITO4	0	17.78	12.22	12.22	3.33	17.78	3.33	17.78	3.33	3.33	8.89
O1	7	1.11	6.67	17.78	3.33	14.44	16.67	11.11	2.22	8.89	17.78
O2	*38	7.78	6.67	6.67	4.44	12.22	18.89	18.89	8.89	4.44	11.11
O3	0	15.56	5.56	5.56	5.56	5.56	15.56	20.00	15.56	5.56	5.56
O4	*20	8.89	15.56	17.78	0.00	6.67	2.22	8.89	13.33	15.56	11.11
SL1	*49	6.67	4.44	8.89	2.22	11.11	13.33	7.78	16.67	8.89	20.00
SL2	4	17.78	11.11	11.11	4.44	13.33	6.67	13.33	2.22	0.00	20.00
SL3	*24	8.89	12.22	17.78	5.56	20.00	8.89	8.89	2.22	6.67	8.89
SL4	*40	10.00	10.00	11.11	13.33	8.89	7.78	12.22	1.11	6.67	18.89
SL5	*27	10.00	7.78	8.89	2.22	11.11	16.67	17.78	3.33	4.44	17.78
SL6	*49	15.56	4.44	14.44	8.89	12.22	13.33	13.33	2.22	4.44	11.11
SL7	9	8.89	1.11	14.44	11.11	17.78	4.44	13.33	6.67	2.22	20.00
STO1	0	11.11	8.89	13.33	2.22	6.67	15.56	17.78	0.00	4.44	20.00
STO3	*49	7.78	8.89	8.89	2.22	10.00	16.67	8.89	12.22	7.78	16.67
STO4	7	6.67	13.33	6.67	4.44	15.56	17.78	20.00	2.22	2.22	11.11
STO5	13	11.11	13.33	15.56	0.00	15.56	17.78	2.22	4.44	6.67	13.33
Average Weight		10.12	7.67	12.58	6.59	12.46	11.14	14.48	5.24	4.69	15.05

Source: Own design based on survey results, n=23

* Evaluation was excluded from the ranking (and thus from the average means per power factor), as the ratio of error is greater than 15%.

** The following stakeholders did not respond to question D2: F3, STO2, SL8, ITO5.

C8 Evaluation of power factors

Table C.10: Self-evaluation of stakeholders according to given power factors

SH abbrev.	Container ownership	Horizontal integration	Informal connectivity	Market share	Demand-side power	Operational process power and pricing	Political power	Strategic process power	Vertical Integration	Knowledge and competences
CDO1	no	slight	relevant	relevant	no	slight	slight	no	slight	relevant
CDO2	no	relevant	strong	relevant	slight	relevant	relevant	no	strong	relevant
F1	strong	relevant	relevant	relevant	slight	slight	slight	slight	relevant	relevant
F2	no	no	no	slight	slight	no	no	no	relevant	relevant
F3	slight	slight	slight	relevant	relevant	slight	slight	slight	relevant	slight
ITO1	slight	slight	relevant	slight	slight	slight	relevant	slight	slight	relevant
ITO2	no	no	relevant	slight	no	slight	no	no	no	slight
ITO3	no	relevant	relevant	relevant	slight	no	slight	no	slight	relevant
ITO4	no	no	no	relevant	no	relevant	no	slight	slight	relevant
ITO5	no	no	strong	strong	slight	relevant	no	no	relevant	strong
O1	no	no	relevant	no	no	no	relevant	no	slight	slight
O2	no	slight	slight	no	no	no	no	no	slight	slight
O3	no	no	slight	relevant	slight	no	no	no	no	slight
O4	slight	slight	relevant	slight	no	slight	slight	no	slight	slight
SL1	strong	no	relevant	slight	strong	strong	no	strong	strong	strong
SL2	strong	slight	relevant	strong	relevant	strong	slight	relevant	relevant	relevant
SL3	strong	relevant	slight	slight	relevant	strong	no	strong	strong	strong
SL4	strong	relevant	relevant	strong	relevant	strong	relevant	strong	relevant	relevant
SL5	strong	no	no	slight	slight	slight	no	strong	relevant	slight
SL6	strong	relevant	slight	strong	strong	relevant	slight	strong	slight	slight
SL7	relevant	slight	slight	relevant	relevant	relevant	relevant	slight	slight	relevant
SL8	relevant	slight	relevant	relevant	relevant	slight	no	strong	strong	strong
STO1	no	slight	relevant	slight	no	strong	slight	no	relevant	strong
STO2	no	relevant	relevant	strong	slight	strong	no	strong	strong	strong
STO3	no	no	slight	no	no	relevant	no	no	no	slight
STO4	strong	relevant	relevant	strong	strong	strong	slight	relevant	strong	relevant
STO5	strong	relevant	slight	strong	relevant	strong	no	relevant	relevant	relevant

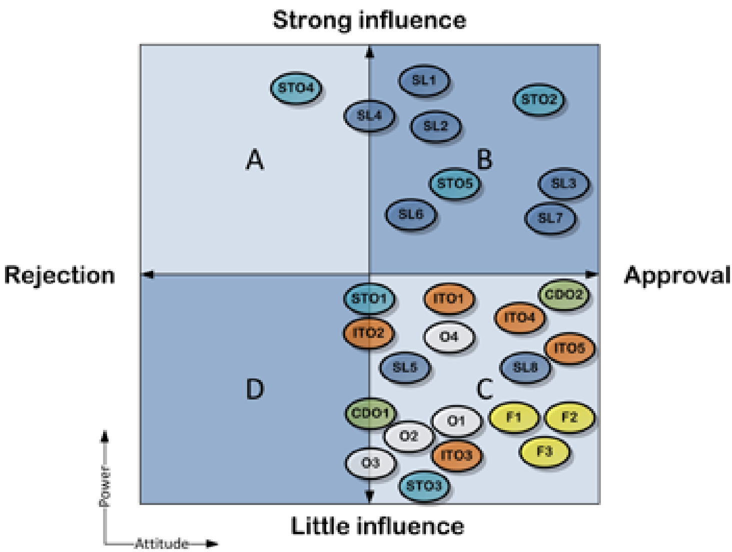
Source: Own design based on survey results, n=27

C9 Power-attitude-matrices

Figure C.9: Legend for ensuing figures

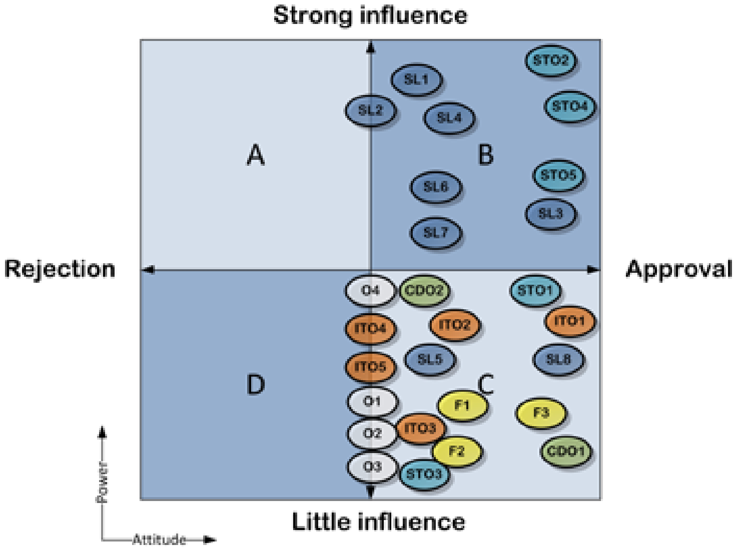
Source: Own design

Figure C.10: Container availability in the hinterland: power-attitude matrix



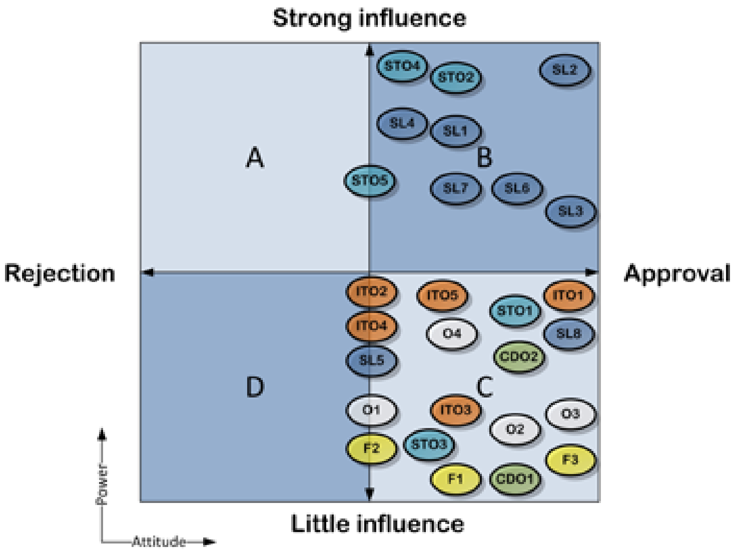
Source: Own design based on survey results, n=27

Figure C.11: Increasing space availability in the port: power-attitude matrix



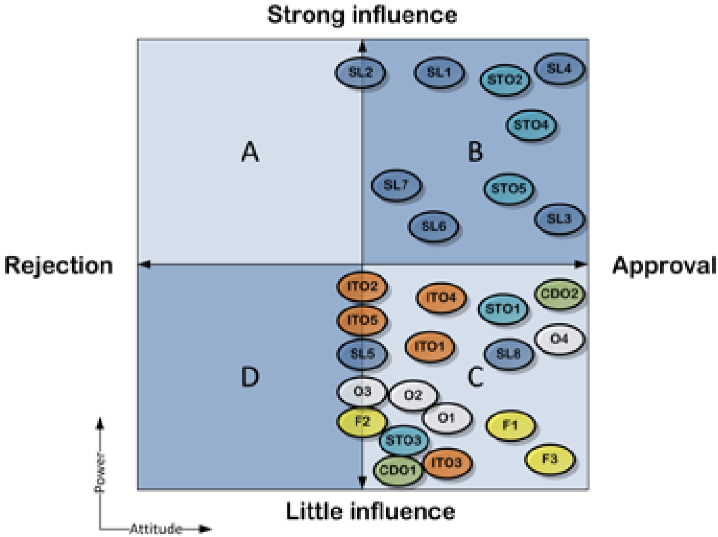
Source: Own design based on survey results, n=27

Figure C.12: Earlier notification of empty container flows: power-attitude matrix



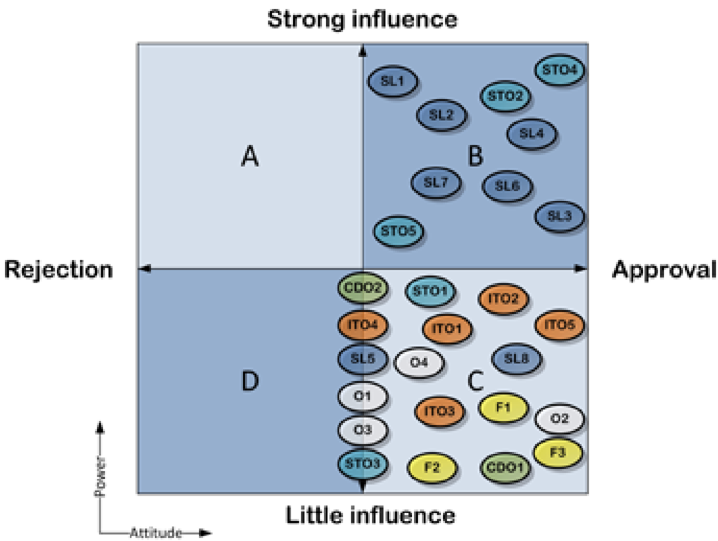
Source: Own design based on survey results, n=27

Figure C.13: Increasing space efficiency at the seaport terminal: power-attitude matrix



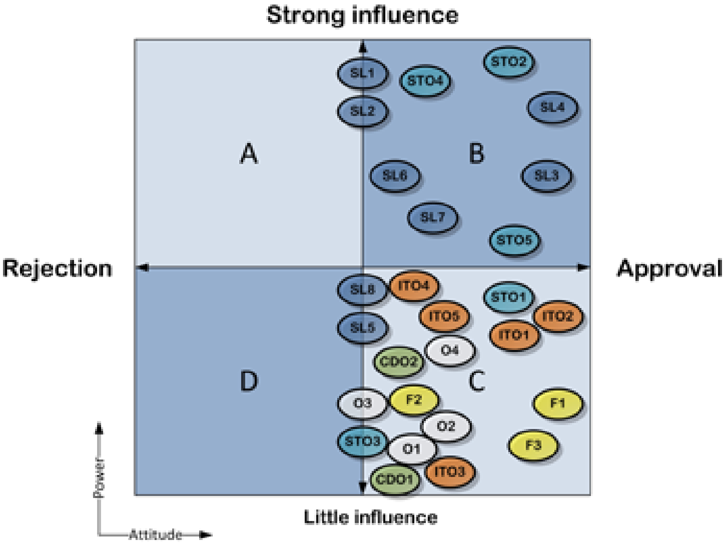
Source: Own design based on survey results, n=27

Figure C.14: Reducing throughput time in depots/terminals: power-attitude matrix



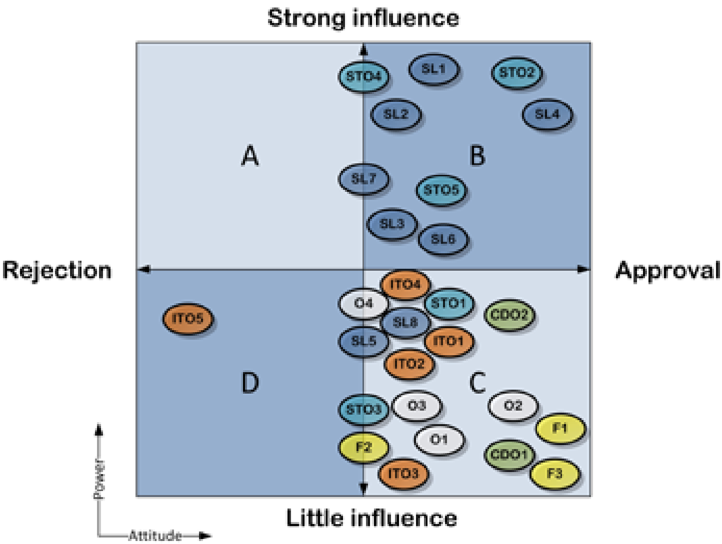
Source: Own design based on survey results, n=27

Figure C.15: Increasing integrated capacity utilisation: power-attitude matrix



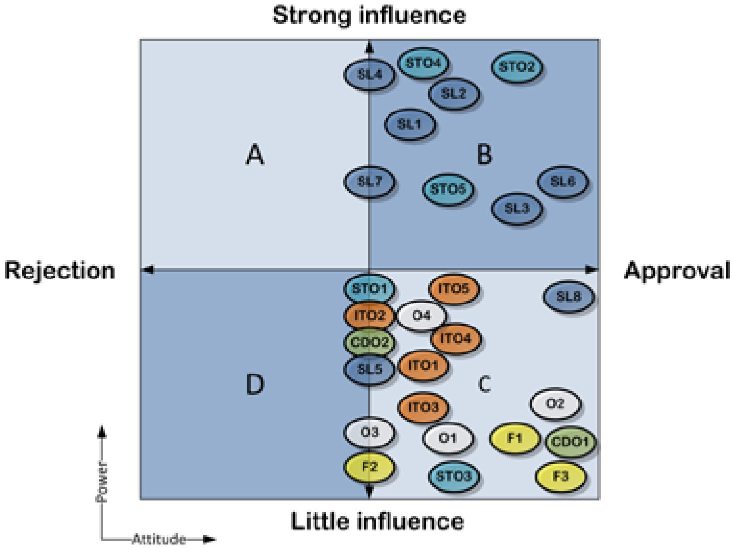
Source: Own design based on survey results, n=27

Figure C.16: Improving transparency on processes and volumes: power-attitude matrix



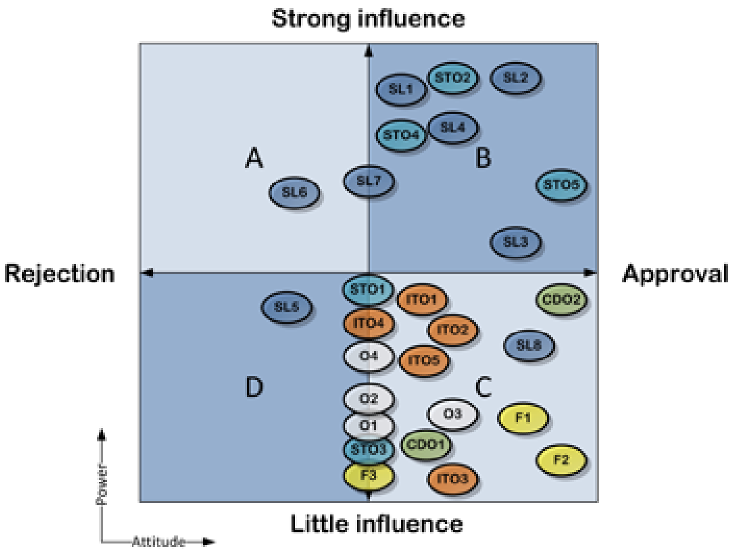
Source: Own design based on survey results, n=27

Figure C.17: Improving the traceability of containers: power-attitude matrix



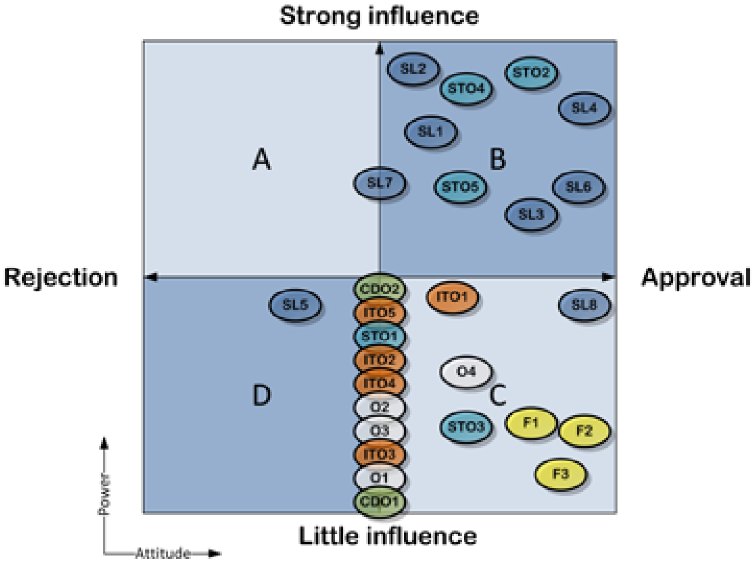
Source: Own design based on survey results, n=27

Figure C.18: Improving the image of empty containers: power-attitude matrix



Source: Own design based on survey results, n=27

Figure C.19: Improving the quality of container equipment: power-attitude matrix



Source: Own design based on survey results, n=27

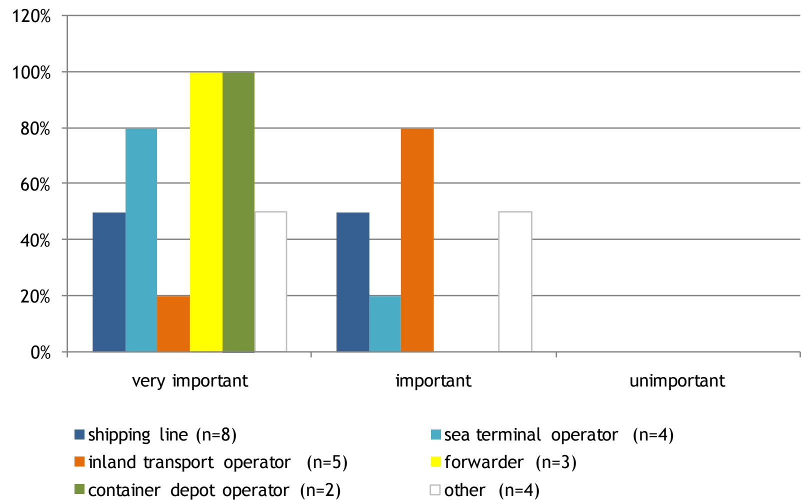
C10 Importance of stakeholder involvement in design of change processes

Table C.11: Evaluation of importance to involve stakeholders in change processes of empty container logistics

SH Abbrev.	Evaluation of importance	SH Abbrev.	Evaluation of importance
CDO1	very important	SL1	important
CDO2	very important	SL2	very important
F1	very important	SL3	very important
F2	very important	SL4	very important
F3	very important	SL5	important
ITO1	very important	SL6	important
ITO2	important	SL7	important
ITO3	important	SL8	very important
ITO4	important	STO1	very important
ITO5	important	STO2	very important
O1	very important	STO3	important
O2	important	STO4	very important
O3	very important	STO5	very important
O4	important		

Source: Own design based on survey results, n=27

Figure C.20: Evaluation of importance of stakeholder involvement in change processes



Source: Own design based on survey results, n=27

C11 Desired kind of stakeholder involvement

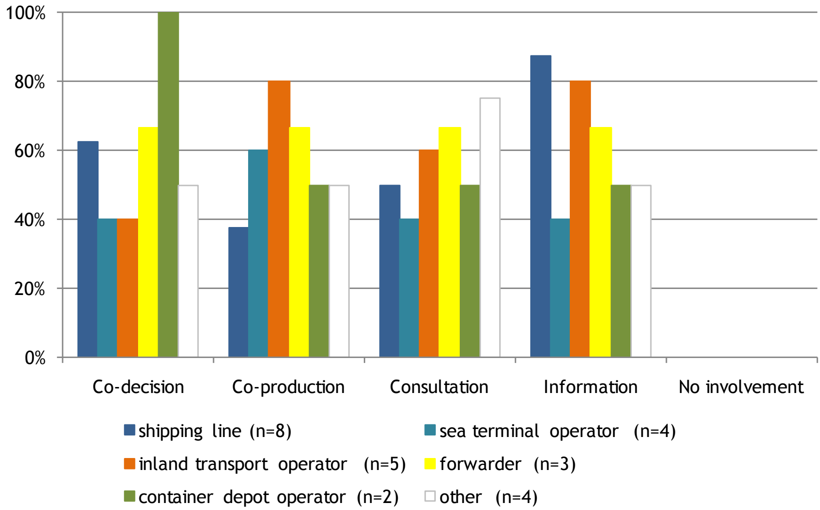
Table C.12: Desired kinds of involvement

SH Abbrev.	Co-decision	Co-production	Consultation	Information	No involvement
CDO1	X	X	X	X	-
CDO2	X	-	-	-	-
F1	X	X	-	X	-
F2	X	X	X	X	-
F3	-	-	X	-	-
ITO1	X	X	X	X	-
ITO2	-	X	-	X	-
ITO3	X	X	X	X	-
ITO4	-	X	X	-	-
ITO5	-	-	-	X	-
O1	X	X	X	X	-
O2	X	X	-	-	-
O3	-	-	X	-	-
O4	-	-	X	X	-
SL1	X	X	X	X	-
SL2	-	-	-	X	-
SL3	-	-	-	X	-
SL4	X	X	-	X	-
SL5	X	-	-	X	-
SL6	X	-	X	-	-
SL7	-	-	X	X	-
SL8	X	X	X	X	-
STO1	X	X	-	-	-
STO2	-	-	X	X	-
STO3	-	-	-	X	-
STO4	-	X	X	-	-
STO5	X	X	-	-	-

X: desired
-: Not desired

Source: Own design based on survey results, n=27

Figure C.21: Desired kind of involvement: share per stakeholder group



Source: Own design based on survey results, n=27