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# Stakeholder management theory as an opportunity for synchromodal market expansion

by

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## Abstract

Synchromodality is a new transportation strategy introduced in 2010 by the Strategisch Platform Logistiek and was part of the advice given to the government of the Netherlands regarding the development of the Dutch logistics industry. It offers an advantage over intermodal hinterland transportation in its use of dynamic planning and real-time switching. By doing so, it promises to deliver lower negative externalities, improved utilization of all hinterland modality assets, increased transportation reliability, and lower transportation cost. While pricing has been raised as a consideration in positioning this concept in the market and the difficult task of aligning stakeholders' interests is acknowledged, there is a gap in the research with respect to commercial aspects, specifically the challenge for synchromodal transport operators to identify *how* to generate the volumes necessary to create 'high corridor' lanes in which the concept will thrive. The process is complex and there are many stakeholders who all need to be aligned, or synchronized, for the process to work.

Stakeholder management theory highlights the existence of multiple stakeholders having an influence on or being affected by the outcome of another stakeholder's actions, having varying interests and who are motivated to protect their interests and improve the results of their objectives. They do this by aligning with other stakeholders to pool resources, capitalize on complementary capabilities, achieve economies of scale, innovate, mitigate problems, reduce costs, and improve the efficiency of executing formal and informal contractual arrangements.

This thesis seeks to answer the question, "*What is the opportunity for stakeholder management theory to be applied to further develop the market for synchromodal transportation?*" This is done by investigating the following sub-questions: What is stakeholder theory? What is synchromodality? Who are the stakeholders in synchromodal transportation? What evidence of stakeholder management theory principles is present thus far in the development of synchromodal transport? What opportunities remain to further integrate stakeholders in the process?

The hypothesis is that concepts from stakeholder management theory can be applied to the synchromodal transport concept to understand the stakeholders and identify ways in which stakeholder relationship strengths can be capitalized to unlock the market for synchromodal transportation. The objective of this study is to apply the knowledge related to successful collaborative stakeholder relationships with the extensive list of stakeholders in the business of international containerized transportation to the hinterland to identify where there are opportunities to generate the necessary volume to make a synchromodal strategy feasible.

After an extensive review of the literature on stakeholder management theory, hinterland transportation and synchromodal transportation, the Delphi technique was applied in two rounds to analyze stakeholders with respect to their role in synchromodal transportation.

The conclusion from this research confirms the hypothesis that concepts from stakeholder management theory *can* be applied to the synchromodal transport concept to understand stakeholders in the process and identify ways in which stakeholder relationship strengths can be capitalized to unlock the market for synchromodal transportation. From this, several recommendations are offered as to how synchromodal transportation stakeholders should engage in the process. Lastly, several recommendations for additional research are suggested.

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### *List of Abbreviations*

The following abbreviations used throughout the thesis.

APL *American President Lines*

APMT *APM Terminals*

ECT *Europe Container Terminals*

EGS *European Gateway Services*

# 1 Introduction

***Quote from personal interview #6 of Delphi Round One:***

*"…this is how complex or fragmented the… European freight market is organized. You can have an inbound freight forwarder sitting somewhere in Germany having contact with [a] Dutch haulier who says 'I can offer you this service. I deliver the 10 containers a week…2 on Monday, 2 on Tuesday…This is my rate.' He can use one-way trucking whenever that's suitable and he speaks to the respective container line to have the one way container dropped at an inland terminal because the carrier in their turn can use it for export. But the same haulier can come to EGS and say 'I have 2 containers a day that I want to have railed to Venlo.' So he buys part of the routing with EGS… all these variations… everybody's very hungry and everybody's very, I would say, ingenious to make it work, and to a certain extent, it makes sense…"*

Stakeholder management theory is a strategy in which a focal firm takes into consideration parties beyond the immediate input-output contributors such as suppliers, customers, employees and shareholders. It expands its scope to consider stakeholders related to the firm, which affect or are affected by the firm's actions.

Stakeholders often have various interests, which may or may not be in alignment with other stakeholders, but will nevertheless act to protect their interests. Stakeholders have the capacity to present both opportunities and threats to other stakeholders. One successful strategy identified for achieving a competitive advantage in the market is through collaborating with stakeholders to create "win-win" outcomes in which the parties achieve the project's goals without sacrificing one another's benefits. Loyalty, honesty, integrity, persistence, effort, balanced information, shared control, and trust are critical requirements to facilitating a successful collaborative endeavor.

Collaboration enables parties to pool resources, capitalize on complementary capabilities, achieve economies of scale, innovate, mitigate problems such as free-riding and opportunism, reduce negotiation, monitoring enforcement and operation costs, and improve the efficiency of executing formal and informal contractual arrangements. Through collaboration stakeholders develop a common definition to a common problem and are able to solve problems that could not be solved by any single firm acting alone.

Synchromodality is a new transportation strategy introduced in 2010 by the Strategisch Platform Logistiek and was part of the advice given to the government of the Netherlands regarding the development of the Dutch logistics industry. It is an inland transportation concept in which the modality of inland transportation is not defined in advance, there are multiple modes of transportation available on a given corridor, cargo flows of various customers on a given corridor are considered in

aggregate, and modal routing is taken such that both the shipper's delivery requirements are satisfied and the network of available transportation modalities is optimized.

Synchromodality has potential for significant benefit through reduction of pollution and congestion in the port areas as well as on container terminals via shifting hinterland transport away from road and toward rail and barge services, while at the same time, achieving customers' delivery time requirements through the flexible use of inland transportation modes. There are many stakeholders in the hinterland transport process and each plays a significant role.

While pricing has been raised as a consideration in positioning this concept in the market and the difficult task of aligning stakeholders' interests is acknowledged, there is a gap in the research with respect to commercial aspects, specifically the challenge for synchromodal transport operators to identify *how* to capture more of the merchant-controlled haulage and generate the volumes necessary to create 'high corridor' lanes in which the concept will thrive. The process is complex and there are many stakeholders who all need to be aligned, or synchronized, for the process to work. Identifying the appropriate roles to capitalize on each stakeholder's strengths to route more of the merchant-controlled freight through a synchromodal system has not yet been explored. It would be of value to understand the following:

*"What is the opportunity for stakeholder management theory to be applied to further develop the market for synchromodal transportation?"*

Sub-research questions are as follows:

- What is stakeholder theory?
- What is synchromodality?
- Who are the stakeholders in synchromodal transportation?
- What evidence of stakeholder management theory principles is present thus far in the development of synchromodal transport?
- What opportunities remain to further integrate stakeholders in the process?

Both intermodal transport providers and synchromodal transport providers offer the service of transporting international containerized cargo to and from the hinterland and are trying to earn the highest number of transport orders on a given lane while generating the best margin possible. Their available resources and stakeholders are different. The intermodal transport provider has one tool in their basket and is trying to maximize the reward on its own behalf. A synchromodal transport provider has multiple tools in their basket and is trying to combine them in such a way that the reward is maximized for all parties.

The hypothesis is that concepts from stakeholder management theory can be applied to the synchromodal transport concept to understand the stakeholders and identify ways in which stakeholder relationship strengths can be capitalized to unlock the market for synchromodal transportation. The objective of this study is to apply the knowledge related to successful collaborative stakeholder relationships with the extensive list of stakeholders in the business of international containerized transportation to the hinterland to identify where there are opportunities to generate the necessary volume to make a synchromodal strategy feasible.

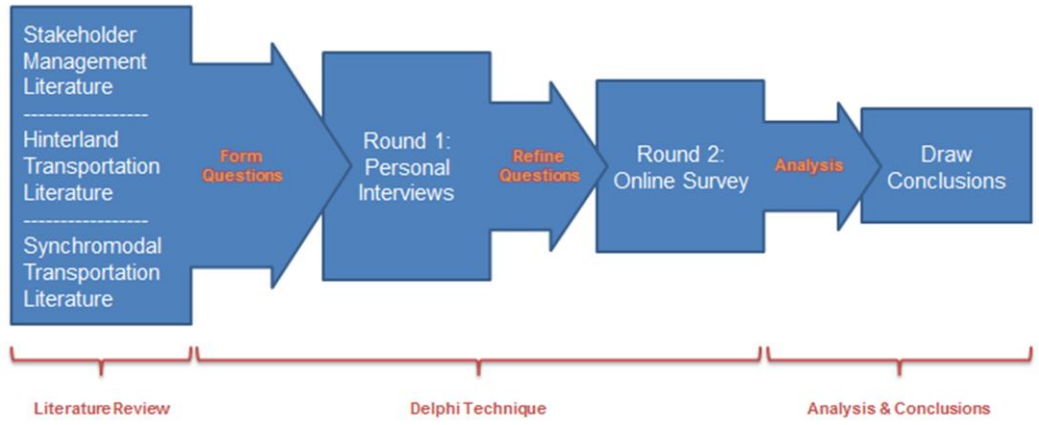


**Figure 1: Overview of research framework**
Information gathered from the literature review of stakeholder management theory, hinterland transportation and synchromodal transportation are used as the basis for formulating probing questions for the personal interviews of Delphi round one. Information collected during the interviews are consolidated and used to refine the questions for Delphi round two. Lastly, literature, interview content and survey results are analyzed together to draw conclusions about the stakeholders of synchromodal transportation and identify ways in which relationship strengths can be capitalized to unlock the market.

*(Source: Author's rendition)*

Considering the circumstances of this objective, application of the Delphi method would be relevant. The Delphi Method is a group facilitation technique that seeks to obtain consensus from a panel of experts through a series of structured questionnaires, or 'rounds'. The questionnaires are completed independently and anonymously, without the need for bringing the panelists together physically. Feedback from previous rounds are summarized and statistical analysis of the responses help to formulate questions for the next round. This process is repeated until consensus is obtained or the number of returns for each round decreases. By using successive questionnaires in an anonymous environment opinions are obtained in a non-adversarial manner. This Delphi experiment for this study was conducted in two rounds of questioning: 1) personal interviews conducted between June 25 and August 2, 2014 and 2) an online survey conducted in the weeks of August 4th and August 11th, 2014. Delphi round one involved a series of personal interviews with a subject matter expert panel including one port authority, two deep sea terminal operators, one ocean carrier, and three freight forwarders. Delphi round two consisted of a self-administered online survey.

Figure 1 summarizes the framework for this thesis research. The remainder of this paper is organized as follows.

Chapter 2 is dedicated to an analysis of the literature related to stakeholder management theory, hinterland transportation of international containerized cargo, and synchromodal transportation. Stakeholder management theory will focus on the definition of a stakeholder, their motivation to take action and strategies, in particular collaboration, to engage relevant stakeholders in an effort to reach a common goal.

From there, literature on international containerized cargo transportation, specifically transportation to and from a port's hinterland will reveal an extensive list of stakeholders involved in the process. Continuing on this theme, an overview of research on the topic of synchromodality will be presented. Research is limited given the development of the concept is only in its infancy stage.

The hypothesis will be described in chapter 3. In chapter 4 a description of the Delphi Method, when it is applicable, and how it is used are presented followed by a recap of how the technique was applied in this research. Research limitations are summarized in section 4.3. Findings from the interviews of Delphi round one will be summarized in Chapter 5 and bridged to the online survey question(s) of Delphi round two. Then, meaningful observations will be extracted as they pertain to an opportunity for synchromodal transportation in Rotterdam's hinterland. Lastly, chapter 6 presents a summary of conclusions and describes future research opportunities. Bibliographic information and appendices are provided in chapters 7 and 8 respectively.

# 2 Literature Review

## *2.1 Stakeholder Management Theory*

In the literature, credit for stakeholder theory is given to R. Edward Freeman (1984) for work on the topic in his book, *Strategic Management: A Stakeholder Approach*. In this book, Freeman challenges the traditional shareholder view of the firm, which focuses on the firm's financial obligation to the bottom line in order to maximize shareholder value. In this case, the shareholder is seen as the owner of the company. Freeman indicates that prior work focused on a much simpler input-output vision of the firm, the "production view" followed later by the "managerial view", whereby investors, suppliers and employees offer input to the firm. The firm then combines the inputs and outputs their final good to a customer. The customer compensates the firm for their product and the firm delivers to their shareholders an added value which is the difference between the revenue generated from the sale to the customer and the cost of the inputs required (Freeman 1984, pp.4–7). Donaldson and Preston (1995, p.68) reflect on earlier literature as well, summarizing Freeman's view, but adding, according to liberal economics, in the long-run equilibrium, input contributors operate at the margin, earning only "market competitive" benefits and it is the customers who reap the majority of the benefits. According to Svendsen (1998, p.15), companies that focus strictly on the bottom line tend to make poorer, more costly decisions likely on account of lacking the information to anticipate opportunities and problems and address them while they are still small.

Freeman (1984, pp.11–26) indicates that this traditional input-output model is incomplete in that it overlooks the changing business environment aspect, which affects "business-as-usual". Svendsen (1998, p.51) and Sloan (2009, p.31) also address the firm's need to respond to changes in the external environment. When the external environment changes a firm typically copes by taking one of four positions: inactive, reactive, proactive, or interactive. By taking no action, a firm ignores the changes to the environment and continues with business as usual. In a reactive position, the firm waits for something to change, then is stimulated to take action in response to that external force. Alternatively, the firm may take a proactive approach by attempting to predict what the change might be and taking action before it actually occurs. Lastly, the firm's interactive strategy would involve active engagement with the external forces causing the environmental change in an attempt to jointly create the future for those involved (Freeman 1984, p.23). It is precisely this last strategy which warrants a more thorough understanding of the stakeholder. Given this alternative perspective of the firm, numerous researchers have sought to classify various stakeholders in an attempt to understand how they impact the firm (Co & Barro 2009, p.594).

### 2.1.1 What is a stakeholder?

In a broad scope, researchers have defined a firm's stakeholders as those parties who either affect or are affected by the activities of the firm (Freeman 1984, p.vi; Donaldson & Preston 1995, p.86; Rowley & Moldoveanu 2003, p.205; Sloan 2009, p.26). More specifically, stakeholders have interests in the firm (Rowley & Moldoveanu 2003, p.206; Donaldson & Preston 1995, p.76; Jones 1995, p.408). They bear some form of risk in relation to the firm and thus have claims on how the firm should allocate the resources under its control (Freeman 1984, p.53; Rowley &

**Table 1: Stakeholder relationships identified in literature**

- Investors / Shareholders (6)
- Customers (6)
- Suppliers (5)
- Employees (5)
- Media (4)
- Special interest groups (4)
- Local/state/federal government (4)
- Competitors (3)
- Environmentalists (3)
- Financial Institutions (2)
- Activists (2)
- Local communities (2)
- Legislators (2)
- Authorized representatives and distributors / Retailers (2)
- Non-governmental organizations (1)
- Third party logistics providers (1)
- Environment (1)

This table is a summary of the various relationships to the focal firm which have been identified as stakeholders in the literature. Following each stakeholder group is the number of times it was referenced in the literature reviewed.
*(Source: Author's summary of literature cited in text)*

Moldoveanu 2003, p.206). Stakeholders have the power to affect or influence the focal firm's performance (Donaldson & Preston 1995, p.86; Jones 1995, p.407; Rowley & Moldoveanu 2003, p.206; Co & Barro 2009, p.594) and are identified according to the actual or potential harms and benefits that they experience or anticipate experiencing as a result of the firm's actions or inactions (Donaldson & Preston 1995, p.85).

Table 1 is a summary of the various relationships to the focal firm which have been identified as stakeholders in the literature. Following each stakeholder group is the number of times it was referenced in the literature reviewed. By far, investors / shareholders, customers, suppliers, and employees are most commonly recognized as stakeholders. Competitors, local/state/federal governments, media, special interest groups, and environmentalists are represented moderately. Additional stakeholders identified on an isolated basis included financial institutions, legislators, the environment, authorized representatives and distributors / retailers, activists, non-governmental organizations, local communities and third party logistics providers (Freeman 1984, p.25; Jones 1995, pp.407–408; Donaldson & Preston 1995, pp.68, 84, 86; Svendsen 1998, p.36; Co & Barro 2009, p.597; Sloan 2009, p.26; Savage et al. 2010, p.21; Fassin 2012, pp.84–85, 93).

Considering the extensive list of parties capable of being considered a stakeholder, researchers have made further classifications to better distinguish between those that have the capacity to affect or be affected versus those who should be taken into account, but are not directly influencing or influenced by the firm's day to day business. Fassin's work includes the most extensive attention to this topic, detailing three different classification schemes for stakeholder functions: primary vs secondary, normative vs derivative, and claimant vs influencer. Accordingly, primary stakeholders are those actors who enjoy a direct and contractually determined relationship with the company, whereas secondary actors operate at the boundaries of the firm, who may be affected on by its actions, but lack any contractual connection; Normative stakeholders are those to whom the organization has a moral obligation (of fairness) while derivative stakeholders are those groups or individuals who can either harm or benefit the organization, but to whom the organization has no direct moral obligation; A claimant is any individual or group that maintains a

stake (a claim, right or interest) in an organization and influencers are those who can affect or can be affected by the firm (Fassin 2012, pp.84–85).

Donaldson and Preston (1995, p.86) also identify the influencer role, however distinguish this from the role of a stakeholder indicating that a recognizable stakeholder may have no influence and an influencer may not have stakes in a firm. Fassin maintains that both claimants and influencers are still considered stakeholders, although recognizes that the two positions are not mutually exclusive (Fassin 2012, p.85). Sloan (2009, p.26) separates close from distant stakeholders claiming that the close stakeholders provide the company with essential resources.

Building upon this idea, Fassin develops four unique definitions of stakeholders: stakeowners, stakewatchers, stakekeepers, and stakeseekers. Stakewatchers are mainly pressure groups that influence the firm, stakekeepers include regulators who impose external control and regulations on the firm, while stakeseekers mererly seek to have a voice in a corporation's decision making. Of the four categories, he believes only the stakeowners to be 'real' genuine stakeholders as they are the parties who have a real stake in the company. They are the stakeholders who own and deserve a stake in the focal firm (Fassin 2012, p.83).

A common theme in most literature describing stakeholding parties is that they have a stake in the focal firm's performance (Freeman 1984, pp.22–23; Jones 1995, p.407; Donaldson & Preston 1995, pp.66–67; Rowley & Moldoveanu 2003, p.206). Complicating the task of catering to these parties is their tendency to have multiple, often conflicting interests (Freeman 1984, pp.54–64; Jones 1995, p.409; Svendsen 1998, pp.15, 20, 28; Savage et al. 2010, pp.22–23). Savage (2010, p.22) refers to social partnerships, whereas Freeman (1984, pp.37–38) describes the "stakeholders in the system". Rowley and Moldoveanu simply discuss the stakeholder groups without assigning a specific label (2003, p.205). Regardless of the description, all allude to the daunting task of the focal firm to address the various concerns of their stakeholder groups as they pertain to realizing the main objective. Individual stakeholders consciously united in groups (Rowley & Moldoveanu 2003, p.205) are collective in terms of having a shared perception of an issue they face and possible solutions and often the focal organization changes over time as their issues change (Freeman 1984, p.24; Svendsen 1998, p.51; Rowley & Moldoveanu 2003, p.205). For this reason, it is necessary for a focal firm to maintain an understanding of and address their needs so as to not lose their attention. Freeman (1984, pp.37–38) believes it is only through stakeholder participation that a system-wide problem can be solved.

Formal contracts may exist between the focal firm and the stakeholder(s), however this is not a requirement for the existence of a stakeholder relationship (Jones 1995, pp.405–409, 432; Svendsen 1998, p.14; Savage et al. 2010, p.22; Fassin 2012, pp.84, 86). While stakeholders have the capacity to present both opportunities and threats (Freeman 1984, p.34; Sloan 2009, p.30), firm-stakeholder engagements are typically developed on a foundation of trust, cooperation, loyalty, fairness, and long-term commitment (Jones 1995, pp.404, 416; Svendsen 1998, pp.14, 20, 87; Fassin 2012, pp.87, 89). Stakeholder collaboration is believed to be a source of competitive advantage for a firm when successfully executed (Jones 1995, pp.404–405, 411, 421; Svendsen 1998, pp.3, 28; Sloan 2009, p.36).

### 2.1.2 Motivation for action

Various factors will motivate stakeholders to take action either in alignment with a focal firm or against. As indicated earlier, individuals as well as groups of stakeholders have multiple interests in the focal firm and sometimes, particularly with stakeholder groups, these interests can vary. Regardless, stakeholders are likely to act to protect their interests. They will take action for both material reasons such as collectively taking advantage of shared money, hardware, software, labor, etc. as well as non-material reasons including consensus with the group or improved coordination, leadership or social engagement (Freeman 1984, p.90; Jones 1995, p.409; Rowley & Moldoveanu 2003, pp.206–207; Savage et al. 2010, p.22).

The likelihood of stakeholder action is dependent on how the focal firm acts with respect to the issues closest to the stakeholder. Action is driven according to the expected values and payoffs related to the outcome of the focal firm's (in)action. If a stakeholder perceives an expected end state will not be reached as a result, they are more likely to take action (Rowley & Moldoveanu 2003, p.207).

In stakeholder groups, action is motivated primarily by the collective interests of the groups, however it may be the case that an individual stakeholder is a member of multiple stakeholder groups and that these groups have differing interests. In such cases, to avoid competing interests, a stakeholder may be inclined to not take action independent of whether they have the ability to take action. Conversely, they may be more inclined to take action if there is similarity in the interests of overlapping stakeholder groups to which they belong (Rowley & Moldoveanu 2003, p.213).

Similarly, while a stakeholder's interests may not be fully aligned with the group, there may still be motivation to take action so as to maintain its identity as a member (Rowley & Moldoveanu 2003, p.209; Savage et al. 2010, p.22). Actors in a group become linked in such a way that creates a common identity and a shared commitment to achieving the objectives of the group (Rowley & Moldoveanu 2003, pp.208, 210). That said, in an effort to maintain its own distinct identity, a stakeholder may refrain from action which it believes strongly in if it perceives taking action similar to another stakeholder would diminish its own distinctness (Rowley & Moldoveanu 2003, p.214).

A firm's social responsibility entails managing risk, while at the same time doing no harm to its stakeholders. This includes the perspective of actually 'doing good' in the process (Sloan 2009, p.33). Be it formal or informal, through efficient contracting with its stakeholders, a firm focuses on those interest-aligning techniques which enable them to create incentive, reduce negotiating, monitoring and governing costs, and reduce opportunistic behavior avoidance costs (Jones 1995, pp.414, 428–429; Donaldson & Preston 1995, pp.70, 78; Svendsen 1998, p.28; Rowley & Moldoveanu 2003, pp.208–210; Sloan 2009, p.30). Engaging in collective action with other parties presents opportunities for free-riding, which would impede progress toward achieving the common goal. As a result, it is necessary to be selective in engaging stakeholders and to develop clear membership guidelines to reduce or eliminate opportunistic behavior such that costs for all individuals conducting business is reduced overall (Rowley & Moldoveanu 2003, p.71).

### 2.1.3 Stakeholder strategies

By far the literature related to stakeholder management theory primarily revolves around two themes: interest in the focal firm as discussed in the previous section and power. The balance of power between the focal firm and stakeholders profoundly affects the engagement strategy employed. Power is defined as the ability to use resources to make an event actually happen (Freeman 1984, p.64). Generally it is both the stakeholder which is dependent on the focal firm and vice versa. Power resources are unequally distributed among the stakeholders in a network and the overall network relationships are what determine the power position of each party (Donaldson & Preston 1995, p.78; Savage et al. 2010, p.23; Fassin 2012, p.88). Managers of a focal firm are in a position to direct and control the interactions between the corporation and the shareholders whereby the firm takes a position of defending itself against the demands of the stakeholders (Svendsen 1998, p.22). This argument implies that the stakeholder possesses a more powerful position. Alternatively, agency theory indicates that corporations are structured in such a way to minimized the cost of trying to get some parties, the agents, to do what another party, the principle, wants (Donaldson & Preston 1995, p.78). In this case it is the focal firm who has control. Sloan (2009, p.25) argues that while stakeholder engagement based on a system of monitoring and controlling will serve to mitigate risk of the focal firm, it is not sufficient for achieving excellence in sustainability of the relationship. Stakeholders lacking direct power have to rely on advocacy of others and can indirectly increase their power by acquiring resources via forming alliances and bargaining (Fassin 2012, p.88).

Throughout the literature, researchers have compiled a lengthy list of strategies by which a focal firm might engage its stakeholders (Freeman 1984, p.69; Co & Barro 2009, pp.591, 596; Sloan 2009, pp.26, 38; Savage et al. 2010, p.23; Fassin 2012, p.87). Strategies define a firm's expectations in terms of what it wants to achieve and the commitments it is willing to make to achieve the goals. Firms define their strategies by first identifying their customer requirements and then evaluating the requirements of key stakeholders (Svendsen 1998, p.15). Various strategies identified in the literature are summarized in Table 2.

**Table 2: Summary of stakeholder strategies identified in literature**

- Collaborating
- Defending
- Involving
- Monitoring
- Adaptation
- Aggression
- Cooperation
- Isolation
- Educate
- Leading
- Following
- Pressuring
- Proaction
- Accommodation
- Reaction
- Coercion
- Compromise
- Alignment
- Alliances
- Bullying tactics

*This table summarizes various stakeholder strategies identified in the literature. (Source: Author's summary of literature cited in text)*

Power and stake are frequently used to further segregate the above strategies. Freeman proposed a methodology of stakeholder analysis in which the range of perceived stakes – ranging from having equity in the firm, to having a stake in the market, to being an influencer – and power of various stakeholders – voting power, economic power, or political power – are plotted in a two-by-two matrix. The firm must then take an appropriate strategy depending on the stakeholder's position in the matrix and the given business environment (Freeman 1984, pp.60–80).

Savage (2010, p.24) classified various strategies as either integrative or distributive strategies. Integrative strategies are positive in nature and involve close collaboration with other stakeholders. They strive to achieve a "win-win" outcome in which the parties achieve the project's goals without sacrificing one another's benefits. With these strategies, firms are willing to change their behaviors or use persuasion to change their partners' views as opposed to forcing demands upon their stakeholders. Distributive strategies are negative and typically lead to a "win-lose" outcome. With distributive strategies, focal firms do not conform to stakeholder demands and set out to achieve their project goals at the expense of the other stakeholder's benefits.

Sloan (2009, pp.34–35) argues the difference between outward-looking and inward-looking strategies. An outward-looking strategy establishes dialogue and two-way communication with stakeholders and is aimed at raising visibility to potential problems and laying the foundation for developing future projects. Focal firms tend to use these strategies as a means to control and manage risk; however they run the risk of becoming distorted if reporting becomes a higher priority than acting. An inward-looking strategy, on the other hand, is characterized by collaboration and partnership activities with the stakeholder in an effort to generate organizational learning and transformation. Engagement is inclusive and through learning, both parties become better aligned and positioned for a sustainable relationship.

A last example of further strategy segregation is that of aggressive versus cooperative approaches. According to Co and Barro (2009, pp.591–594, 597–598, 605–607), in the focal firm's attempt to change another stakeholder's behavior via aggressive strategies, they display a form of forceful attitude or behavior toward stakeholders, which is often perceived by the stakeholder as a bullying tactic. Aggressive strategies are employed when there is a heightened sense of urgency related to the undertaking, a lack of trust, difficulty in conveying the legitimacy of a collaborative approach, or a lack of faith that all stakeholders will do their part to assure a collaborative approach will work. Cooperative strategies are used when all stakeholders perceive the same sense of urgency about the activity, there is a high level of trust amongst the partners, all members believe that collaboration is the appropriate approach to solving the problem, and all members have faith that their partners can and will be able to make the collaborative activity work.

In general, stakeholder relationships are managed using techniques such as issue analysis, consultation, strategic communication and formal or informal contracts or agreements. Different strategies are used for various stakeholders and are decided based on a combination of prior experiences with the stakeholder(s) involved and the perceived demands of the situation at hand (Svendsen 1998, pp.2–3; Co & Barro 2009, p.598; Sloan 2009, p.26).

### 2.1.4 Collaboration

Collaboration amongst all parties in the firm-stakeholder group relationships is a prevalent theme in the literature related to stakeholder management theory. Stakeholder collaboration requires long-term commitment and responsibility to the group's initiative, although actual interactions may be temporary. Consequently, it is typically limited to a small number of genuine, fair, loyal stakeholders with legitimate stakes in the cause (Svendsen 1998, p.43; Fassin 2012, pp.86–87, 193–194).

As a result of the varying interests and goals of different stakeholders, collaborative relationships are complex. Collaborative advantage is achieved when successful partnership activities deliver the desired outcome. This advantage can be offset by collaborative inertia which is encountered when obstacles interfere with partners achieving their collaborative goals. Lack of trust, power differences, and the inability to effectively deal with conflict are among obstacles which may interrupt progress of a collaborative endeavor (Donaldson & Preston 1995, pp.78–79; Savage et al. 2010, pp.22–23). Fassin (2012, p.90) echos this sentiment claiming that hidden agendas, conflicts of interest and abuses of power should be avoided since opportunistic behavior by stakeholders undermines ethical business practice. Jones (1995, pp.409–411) reflects on the moral hazard and adverse selection problems of agency theory, the holdup problem and issues with stakeholders opportunistically misrepresenting value with respect to transaction cost theory, and the free-rider problem of team production or team consumption theory. Referring to the formal contracts or informal relationships between the firm and its stakeholders, he argues that trusting and cooperative relationships help to address these problems related to opportunism (Jones 1995, p.432).

Loyalty, honesty, integrity, persistence, effort, information, shared control, and trust are critical requirements to facilitating a successful collaborative endeavor. Trading partners must share the same sense of urgency about the project and believe their partners have the ability to correctly see the project through to completion (Co & Barro 2009, p.591).

Through mutual demonstration of fairness, loyalty, honesty, and integrity, primary stakeholders tend to have a competitive advantage in the marketplace as it contributes to reducing the cost of opportunism and facilitates a more efficiently operating relationship (Fassin 2012, pp.83, 87; Jones 1995, pp.412–413). Successful collaboration initiatives thrive when there is high involvement and persistence from both the focal firm and stakeholders (Sloan 2009, p.38; Svendsen 1998, p.87).

It is imperative to have reliable and transparent transfer of information. All parties have an obligation to share correct information in a timely manner (Fassin 2012, p.86). "Information asymmetry" impairs the group's ability to realize full potential of the combined resources. Monitoring devices, such as public reporting requirements, aid in reducing asymmetrical information by making it transparent and available for all parties (Donaldson & Preston 1995, pp.79–80). Referring to the used car market, Jones (1995, pp.412–413) provides an example of the "market for lemons", in which the absence of reliable information about the car results in bad quality cars selling at average price, higher than their actual value, and good quality cars selling at average price for lower than their actual value. Slowly, as people become aware of this and discontinue taking good quality cars to auction, the overall quality of the

cars falls lower and lower until only the worst cars (the “lemons”) are offered for sale.

Information sharing through open dialogue and two-way communication enables all parties to develop a common definition of the problem or opportunity. Through this partnership, parties are able to suspend preconceived notions, coordinate actions to avoid duplicated efforts, generate new ideas, implement new solutions, or take advantage of mutually beneficial opportunities – activities which are less available without collaborative information sharing (Sloan 2009, p.34; Svendsen 1998, pp.63, 87, 90). While critical to the success of collaboration, information sharing can be costly, especially in the short term. Technology investment with shared access is often required to encourage conversation, improve coordination, and overall facilitate a means for effectively achieving the common goal (Svendsen 1998, pp.64, 90–93).

Trust can be considered as the glue which holds the cooperative initiative together. Without it, there is no foundation upon which to build. As identified earlier, lack of trust is one of the obstacles which lead to collaborative inertia preventing progress toward realizing the common goal (Savage et al. 2010, p.23). Operating in an environment of trust, however, enables the partnership to remain viable in the long-term (Fassin 2012, p.89). Collaborative relationships, especially in supply chains, involve high degrees of interdependency between stakeholders, which sometimes can include competitors. Commitment and trust lead to efficiency, productivity and effectiveness without having to mandate cooperation. Honesty and trustworthiness in the relationship help to address important commitment problems related to opportunism. Since the cost of preventing or reducing opportunism are high, relationships built on mutual trust and honesty generally enjoy a competitive advantage over others by being able to avoid these costs. Firms that are not honest and trustworthy are generally not enlisted as a partner when the project requires trust (Co & Barro 2009, p.592; Jones 1995, pp.416, 422, 432). Partners should perceive an equality between the resources input and the outcome received from the relationship. Fair treatment of all stakeholders helps to build trust in the organization, however it’s important to note that reciprocity is the key driver in developing *mutual* trust (Fassin 2012, pp.87–93).

There are significant benefits for a firm partaking in collaborative relationships with its stakeholders. Collaboration enables parties to pool resources, capitalize on complementary capabilities, achieve economies of scale, innovate, mitigate problems such as free-riding and opportunism, reduce negotiation, monitoring enforcement and operation costs, and improve the efficiency of executing formal and informal contractual arrangements (Jones 1995, pp.408–412, 415, 422; Donaldson & Preston 1995, p.78; Svendsen 1998, pp.20, 28; Rowley & Moldoveanu 2003, p.210; Co & Barro 2009, pp.605–607; Sloan 2009, pp.25, 31, 33, 37; Savage et al. 2010, p.21; Fassin 2012, p.87). Through collaboration stakeholders develop a common definition to a common problem, then structure their interaction and joint resources to achieve goals that could not be accomplished in any other way (Donaldson & Preston 1995, p.71; Svendsen 1998, p.23; Rowley & Moldoveanu 2003, pp.208, 211; Savage et al. 2010, pp.21, 23). They are able to solve problems that could not be solved by any single firm acting alone (Svendsen 1998, p.xi; Co & Barro 2009, pp.605–607; Savage et al. 2010, pp.21–22). Through this cooperation, stakeholders enjoy benefits not available to other opportunistic firms (Jones 1995, p.422).

### 2.1.5 Conclusion

The literature on stakeholder management theory highlight the difference between those stakeholders having the capacity to affect or be affected and those who should be taken into account, but are not directly influencing or influenced by the firm's day to day business. Stakeholders have multiple interests and sometimes these interests can vary between members of a similar group. Regardless, stakeholders are likely to act to protect their interests. They will take action for both material reasons, such as collectively taking advantage of shared money, hardware, software, labor, etc. as well as non-material reasons including consensus with the group or improved coordination, leadership or social engagement.

Prior research revealed that while stakeholders have the capacity to present both opportunities and threats to other stakeholders, firm-stakeholder engagements are typically developed on a foundation of trust, cooperation, loyalty, fairness, and long-term commitment. Additionally, stakeholder collaboration is believed to be a source of competitive advantage for a firm when successfully executed. Power was identified as a tricky characteristic in that it may afford an opportunity to take the lead in accomplishing a common goal, however when abused it carries the risky perception of being used as a "bullying tactic", having an adverse effect. The most successful endeavors are positive in nature and involve close collaboration with other stakeholders who strive to achieve a "win-win" outcome in which the parties achieve the project's goals without sacrificing one another's benefits.

Loyalty, honesty, integrity, persistence, effort, balanced information, shared control, and trust are critical requirements to facilitating a successful collaborative endeavor. Collaboration enables parties to pool resources, capitalize on complementary capabilities, achieve economies of scale, innovate, mitigate problems such as free-riding and opportunism, reduce negotiation, monitoring enforcement, and operation costs, and improve the efficiency of executing formal and informal contractual arrangements. Through collaboration stakeholders develop a common definition to a common problem and are able to solve problems that could not be solved by any single firm acting alone.

## *2.2 Hinterland Transportation*

In this section an overview of international containerized transportation – more specifically, the manner in which freight is transported from and into the hinterland (of Rotterdam) – will be delivered. The roles and responsibilities of different actors involved in coordinating and executing hinterland transportation will be discussed in detail. Lastly, recent developments in hinterland transportation, inland terminals, and the overall market will be elaborated with respect to how the stakeholders affect or are affected by the market for international container transportation.

### 2.2.1 Overview of international containerized transportation

The demand for international containerized transportation, specifically transportation to and from the hinterland of a deep sea port, is of a derived nature. The need comes as a result of two companies, each located in the hinterlands of two different countries separated by a large body of water, who have engaged in international trade. The cargo owners have to arrange international ocean transport of the container from the exporting facility in one country to the importing facility in another.

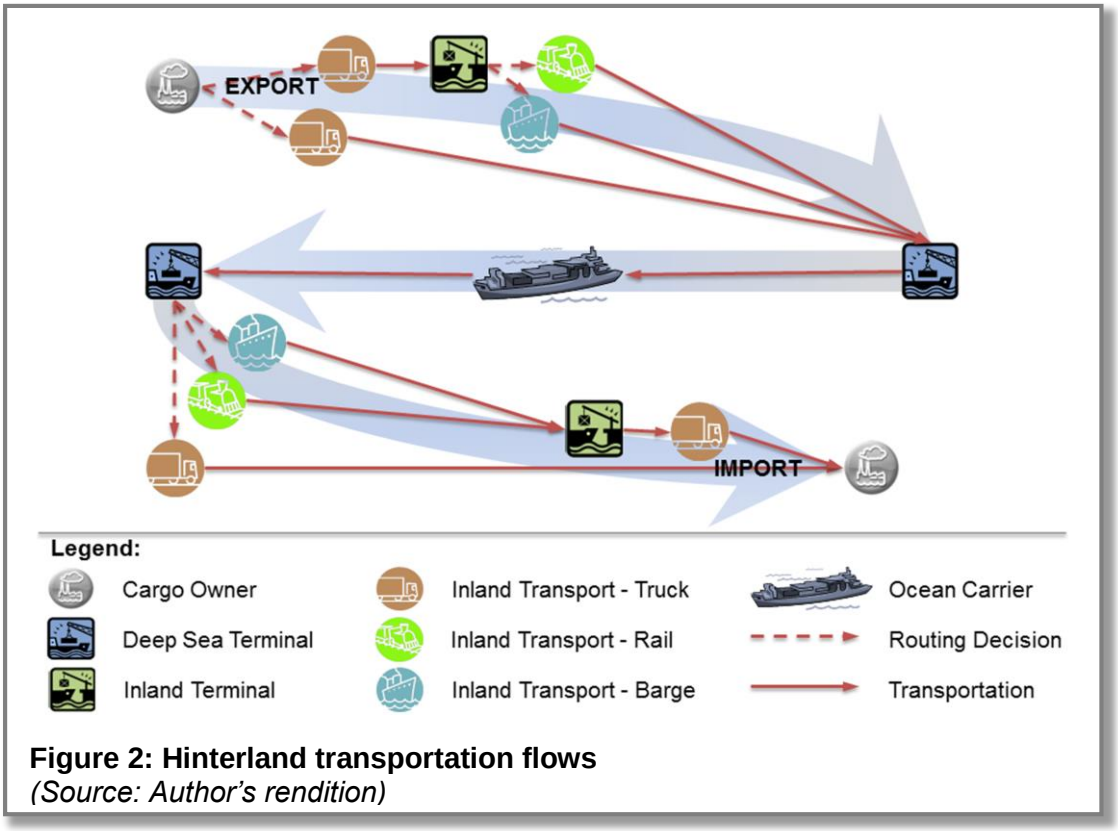


**Figure 2: Hinterland transportation flows**
*(Source: Author's rendition)*

Organizing the sea leg of the journey is easy relative to the more complex endeavor to orchestrate the land legs from origin hinterland to origin deep sea terminal (*pre-carriage*) and from the destination deep sea terminal to the final destination (*on-carriage*) in the hinterland. Figure 2 depicts the transportation flow from export facility to import facility, the actors involved in *physically* transporting a container from origin to destination, and points at which transportation routing decisions must be made.

The sea leg – port to port transportation via ocean – is relatively straightforward. It entails a deep sea terminal operator at the origin port transferring the container from their stack area onto an ocean going vessel, an ocean carrier navigating the vessel from origin port to destination port, then another deep sea terminal operator at the destination port transferring the container from the ocean going vessel to their stack area.

The land legs involve many decisions and many more actors. Export hinterland transportation starts from the export facility where there are two transport options, both involving truck transportation. This assumption, of course, precludes facilities with direct access to rail or barge loading capabilities on site. The fastest, most reliable and flexible option is to truck the container directly to the deep sea terminal. Unfortunately this is also generally a more expensive option and contributes the most to $CO_2$ emissions.

An alternative would be to truck the container a much shorter distance to an inland terminal in the hinterland near the export facility. From there, the inland terminal operator transfers the container from the truck to their storage stacks and later, depending on their capabilities (i.e. if the inland terminal has access to both rail and

inland barge or only one mode), from the stack area to an inland barge or rail car. In the case of the inland terminal having access to both rail and barge services, another routing decision must be made, whereas if the terminal has access to only one service, the next mode of transportation will be a given. At the origin deep sea terminal, the deep sea terminal operator transfers the container from the arriving mode of inland transportation and places it in the appropriate stack storage area until it is loaded onto the outgoing ocean going vessel.

Import hinterland transportation begins at the destination deep sea terminal. Like with export hinterland transportation, from destination deep sea terminal to the import facility in the hinterland there are three possible modes of transportation: road, rail, and inland barge. Upon their arrival, the deep sea terminal operator will transfer the container from the storage stack area to the respective inland transportation mode. Via truck, the container can be transported directly to the import facility. Alternatively, in a less costly and more environmentally friendly manner, the import container can be transported to the hinterland to an inland terminal in closer proximity to the import facility via rail or inland barge, again depending on the inland terminal's capabilities. The inland terminal operator will transfer the container from the train or inland barge to their storage stacks. As a final step, the inland terminal operator will transfer the container from their storage stacks to a truck who will deliver the container locally to the import cargo owner's facility.

### 2.2.2 Hinterland transportation stakeholders

Thus far the roles of cargo owners, deep sea terminal operators, ocean carriers, road, rail and inland barge transportation providers and inland terminal operators as actors in international container transportation have been introduced at a high level. In this section several additional actors will be introduced and a more detailed discussion of the different roles and responsibilities as well as how they affect or are affected by the market for international container transportation will be provided.

#### *2.2.2.1 Cargo owners*

As previously mentioned in section 2.2.1, *cargo owners* and their need to physically transport containerized goods are the driving force from which demand for international transportation is derived (de Langen et al. 2013, p.370; Deidda et al. 2008, p.505). In the literature, the cargo owners are also referred to as trader, manufacturer, consumer, corporation, shipper, receiver, importer or exporter (Graham 1998, pp.129, 132; Notteboom & Winkelmans 2001, pp.71–72; Pielage et al. 2007, p.19; Deidda et al. 2008, p.507; Veenstra et al. 2012, p.14). Throughout this research the term "cargo owner" is used interchangeably to refer to both the shipper and consignee. The actual responsibility for arranging transportation is defined by the INCOTERMS of the sale/purchase agreement between the two parties. The INCOTERM negotiated will bear influence on their interaction with other stakeholders depending on where they relinquish or assume responsibility for arranging transportation (Anon 2010).

For example, an exporter selling on an FOB term, who has responsibility to arrange pre-carriage to the departure port, will already need to have booking details of the sailing arranged by the importer which can be shared with relevant stakeholders

even though the exporter has no responsibility for arranging or paying for the ocean transportation and on-carriage themself.

In a different scenario, an exporter selling on a term which only requires them to arrange transportation up to the destination port (e.g. “DAT ECT Delta Terminal, Rotterdam, NL” or “CFR Rotterdam, NL”) will be in a position to collaborate effectively with stakeholders in arranging pre-carriage and ocean transportation but have little information available to pass along regarding the itinerary following arrival at destination. Such information is not necessary to fulfill their obligations at origin, but is incredibly valuable for the parties arranging hinterland transportation at destination. In this case, stakeholders at destination are reliant upon the importing cargo owner to make themself visible so that efficient on-carriage arrangements can be organized.

The problem of information will reappear in later sections, although further analysis related to INCOTERMS is out of scope for this research. Regardless of the specific responsibility the shipper or consignee has on account of the selected INCOTERM, one or the other is responsible for engaging with the stakeholders as described below for the portion of the transportation they *are* responsible, and for this reason they are referred to interchangeably as “cargo owners”. Throughout the shipment, this is the collection of people who own the goods being transported.

In some cases, cargo owners design the door-to-door services themselves, however they generally outsource most or all of the transportation. Cargo owners can arrange this transportation in either a “one-stop-shop” approach by purchasing door-to-door transport from an ocean carrier or freight forwarder or by negotiating the various components of the journey independently (de Langen et al. 2013, p.370; Notteboom & Winkelmans 2001, pp.74, 78). The pre- and on-carriage of the transportation purchased from inland transportation operators, freight forwarders or inland terminal operators is referred to as *merchant haulage* – although they likely are not actively involved in physically moving the container from point to point themselves – because they, the “merchant”, or the actor enlisted to execute on their behalf, arrange the pre- or on-carriage as opposed to the ocean carrier. In the case that the ocean carrier arranges pickup or delivery from or to the cargo owner’s door, it is referred to as *carrier haulage* (Graham 1998, p.136; Pielage et al. 2007, p.22; Deidda et al. 2008, p.505; Rodrigue et al. 2010, p.522; Veenstra et al. 2012, p.23). A new concept in hinterland transportation, particularly in northern-Europe, is *terminal haulage* where the deep sea terminal offers pre- and on-carriage. This concept will be discussed later in the paper.

Also related to transportation, but not actually an act of physical movement, would be the interaction cargo owners have with Customs authorities (often via customs brokers) and inspection agencies. While these actors are not expounded upon in this research, it is worth mentioning them due to the impact delays with respect to these activities have on hinterland transportation.

Prior research indicates that cargo owners make their transportation decisions based on quality of service considering cost, transit time, sailing frequency, reliable and flexible transportation, sustainability and availability of services (Notteboom & Winkelmans 2001, p.71; Graham 1998, p.129; Pielage et al. 2007, p.20; Deidda et al. 2008, p.503; Van den Berg & De Langen 2014, p.10). Cargo owners dislike fluctuating rates (Graham 1998, pp.133–134).

#### *2.2.2.2 Ocean carriers*

*Ocean carriers*, as the name implies, own or charter ocean going vessels which are active in the port to port transportation of international cargo via containers (Graham 1998, p.132; Van den Berg & De Langen 2014, pp.3, 4). They are the only party which has a commercial relationship with deep sea terminal operators from which stevedoring services are procured to load and unload their vessels upon arrival. Ocean carriers are "asset heavy" and as a result remain focused on reducing operating cost (Franc & Van der Horst 2010, pp.559–560; de Langen et al. 2013, pp.370–371). To do so, some of the strategies enlisted include: slow-steaming, increasing carrying capacity via larger ships, and vessel-sharing agreements with other ocean carriers in their alliances (Notteboom & Winkelmans 2001, p.76). Impact of these strategies will be further discussed in section 2.2.3.

Ocean carriers sell their port-to-port ocean transport services to cargo owners and freight forwarders. As margins on this basic product are quite slim and in an effort to differentiate themselves from other ocean carriers in the market, carriers have been increasingly venturing into the arena of hinterland transportation (Graham 1998, pp.130, 137; Notteboom & Winkelmans 2001, pp.74–75; Franc & Van der Horst 2010, p.558; de Langen et al. 2013, pp.370–371; Van den Berg & De Langen 2014, p.2). Depending on their familiarity and comfort level in the local market, they have done so via vertical integration with inland transportation modalities or via procuring the hinterland transportation services from inland transportation operators or deep sea or inland terminals offering hinterland transportation services. The pre- or on-carriage procured or offered via vertical integration and sold to freight forwarders or cargo owners is referred to as *carrier haulage* because the ocean carrier is responsible for directing hinterland routing decisions (Rodrigue et al. 2010, p.522).

Ocean carriers' motivations for expanding their scope are to reduce logistics costs associated with inland transportation, storage and container repositioning and to increase their competitiveness through differentiation. They view inland terminals as a means of providing services to major clients (Rodrigue et al. 2010, pp.522–523; Van den Berg & De Langen 2014, p.3).

#### *2.2.2.3 Deep sea terminals*

*Deep sea terminal operators* are in a unique position in that they interact with, affect, and are affected by numerous international transportation stakeholders in the course of doing business, but, as indicated above, have commercial relationships with only a few actors: port authorities and ocean carriers.

Deep sea terminal operators are paid terminal handling charges by ocean carriers for loading and unloading ocean going vessels which call on the terminal (de Langen et al. 2013, pp.370–371; Pielage et al. 2007, p.30). Additionally, their contracts may include provisions for the storage of empty containers, although this is becoming less attractive as the cost of real estate in the port area comes at a premium. At the same time, ocean carriers are looking to points in the hinterland as alternate empty container depots as this facilitates cost reduction in terms of empty container repositioning (Franc & Van der Horst 2010, p.562; Veenstra et al. 2012, p.21). Since empty container storage is not a core business function for a deep sea terminal operator, the trend does not have a negative effect.

Naturally the ocean carriers who call on a deep sea terminal operator are doing so on account of having import or export cargo coming in or out of that port and their customers have a need for the containers to be transported to or from cargo owner facilities in the hinterland. To fulfill this need, deep sea terminal operators have to engage with cargo owners and freight forwarders, either directly or indirectly via the inland transportation providers or inland terminal operators arranging hinterland transportation. Interaction involves communication related to scheduling and the physical movement of containers between the storage stacks and inland transportation modality. Unannounced or delayed arrivals, modality changes and overall lack of information about hinterland transportation modality significantly affect operational performance in a negative way by causing increased dwell times, additional, unnecessary housekeeping moves and congestion (Veenstra et al. 2012, pp.14–15, 22).

With ocean carriers as their only commercial relationship, deep sea terminals are motivated to meet the demands of their customer to achieve consistent overall berth times via improved handling performance in an environment of increasing call sizes. The result is that the ocean going vessels tend to receive priority attention at the expense of servicing inland barges in particular (Pielage et al. 2007, p.21; Veenstra et al. 2012, p.21). The *terminal haulage* trend introduced earlier, whereby deep sea terminal operators are expanding the scope of their business to offer hinterland transportation by means of 'extended gate' services, has broadened the portfolio of stakeholders who can be considered their suppliers and customers. Deep sea terminals have made investments in inland terminals and have partnered with inland transportation providers so that they too can offer additional services to ocean carriers, freight forwarders and cargo owners. Through this strategy, not only do they generate additional revenue, but also improve terminal efficiency and make progress toward achieving the required modal split targets imposed by the Port Authority in the case of Rotterdam (de Langen et al. 2013, p.373; Franc & Van der Horst 2010, pp.558, 561; Pielage et al. 2007, pp.26–29; Veenstra et al. 2012, p.15).

#### *2.2.2.4 Inland transportation providers and inland terminals*

*Inland transportation providers* and *inland terminals* are discussed together since their functions go hand in hand. In many cases an inland terminal was established as a result of a transportation provider having sufficient real estate to expand their operations. In other cases, these company types function independently.

*Inland transportation providers* include trucking companies, rail operators and inland barge companies (de Langen et al. 2013, pp.370–371; Pielage et al. 2007, p.19). These stakeholders are involved in physically moving containers over land or inland waterway between the deep sea terminal and points in the hinterland, including inland terminals and cargo owner facilities. They face outwardly toward cargo owners and inward toward terminals and other transportation providers (Graham 1998, pp.130, 132). Many offer additional value-added services, such as warehousing (Pielage et al. 2007, pp.35–36). They sell their services to ocean carriers, freight forwarders, deep sea or inland terminal operators offering terminal haulage and directly to cargo owners.

Perhaps the biggest challenge for inland transportation providers, like ocean carriers, is operational cost control. They suffer from inefficiencies due to empty

backhaul situations and asset underutilization (Pielage et al. 2007, p.21); strategies such as “street-turns”—in which the empty backhaul to port is avoided by filling the emptied import container in the hinterland with cargo of an export shipment with the same ocean carrier to be returned to the port—have been effective in helping to control costs (Deidda et al. 2008, p.503).

*Inland terminals* perform similar activities as deep sea terminals but are located in the hinterland of the port. They can be barge, rail or barge and rail terminals and are accessible by truck. The fundamental characteristics of an inland terminal are that they have the ability to handle containers, they offer value added services, such as consolidation/deconsolidation, transloading or light manufacturing, they serve as a dedicated link between the deep sea port and a high capacity corridor, and permit economies of scale in inland distribution (Rodrigue et al. 2010, pp.579–522). Inland terminals enable a modal shift of loaded and empty containers from barge/rail to truck and vice versa and can be seen as an extension of the sea port (Veenstra et al. 2012, pp.14, 20–21; Deidda et al. 2008, p.507; Rodrigue et al. 2010, p.522).

Inland terminal operators contract with modal carriers (barge, rail, truck) and devise and operate movement networks. The intermodal journey is often accomplished via multiple legs, each with different tariffs, yet in many cases they are sold at one tariff to the cargo owner (Graham 1998, p.135; Pielage et al. 2007, p.26). The hinterland transportation leg is more expensive relative to the overall door-to-door movement and, as such, creativity is necessary to assure costs are kept under control (Van den Berg & De Langen 2014, p.2; de Langen et al. 2013, p.368; Graham 1998, p.135; Notteboom & Winkelmans 2001, p.74). Real estate in the hinterland is often available at a significantly lower cost making it an attractive alternative for ocean carriers to partner with inland terminals to establish empty container depots (Pielage et al. 2007, pp.35–36).

#### *2.2.2.5 Freight forwarders*

Freight Forwarders excel in organizing logistics services on behalf of cargo owners (Notteboom & Winkelmans 2001, p.74). Freight forwarders generally do not own vessels, trains, terminals or trucks, but rather purchase these transport services. They work closely with the individual transportation providers and the cargo owners and are responsible for design and integration of the deep sea and hinterland activity into the cargo owners’ supply chain activity. Additionally they provide logistics consultancy services or freight consolidation, deconsolidation and transloading operations to their clients. (Graham 1998, pp.132, 136; de Langen et al. 2013, pp.370–371; Rodrigue et al. 2010, pp.522–523).

#### *2.2.2.6 Port authority*

*Port authorities* lease the land in the port area to the deep sea terminal operator and impose requirements and restrictions, by which the terminal operator must abide, to facilitate the overall development of the port community (de Langen et al. 2013, pp.370–371). In the case of Rotterdam, one such requirement is the new modal split target which will be explained in section 2.2.3 (Veenstra et al. 2012, p.22). Port authorities develop information systems and participate in planning or implementation of new intermodal logistics systems (Notteboom & Winkelmans

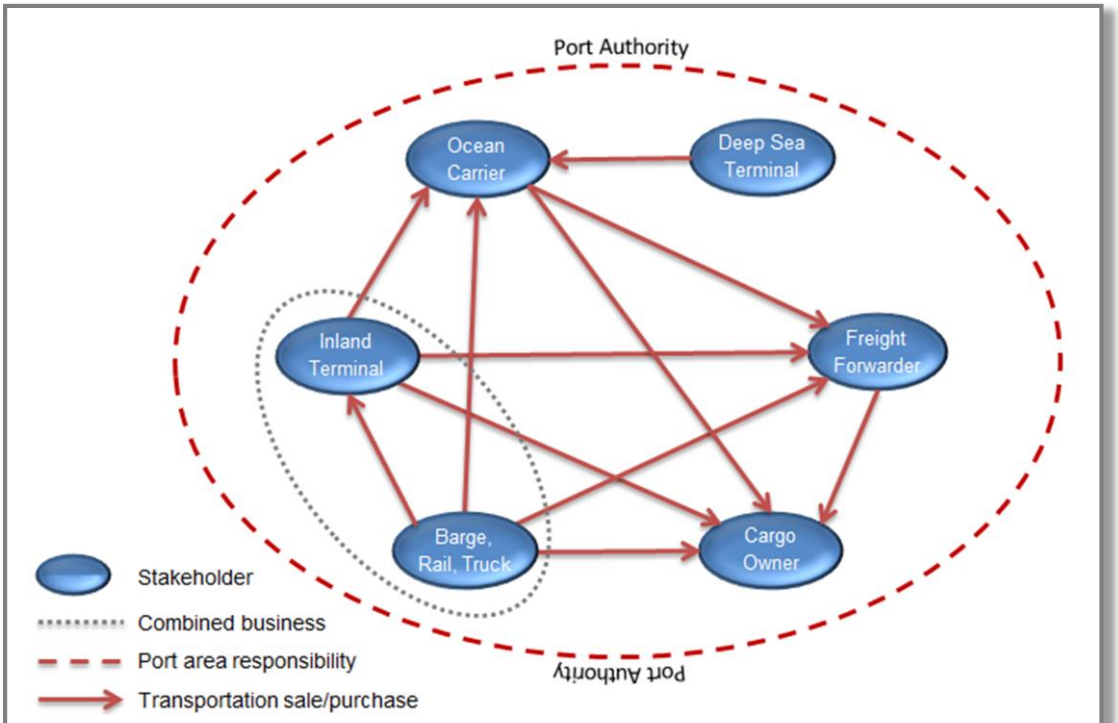


**Figure 3: Stakeholder relationships in hinterland transportation literature**
*This figure summarizes the complex web of relationships involved in coordinating international containerized transportation identified in the literature.*

*(Source: Author's rendition)*

2001, pp.84–85). They act as facilitators in the supply chain, although they do not have responsibility for organizing or physically transporting goods for cargo owners (Notteboom & Winkelmans 2001, p.79).

In the current environment, ports are no longer able to attract cargo simply as a result of being a natural gateway to the hinterland. They must constantly reassess their port strategy to assure that their clients are able to create quality, reliable transportation chains through their port. They are interested in the general overall efficiency of the port and the growth of trade (Notteboom & Winkelmans 2001, p.79; Rodrigue et al. 2010, p.524). Port authorities have to be prepared to constantly adopt new roles in order to cope with the changing market environment (Notteboom & Winkelmans 2001, p.71).

Figure 3 summarizes the complex web of relationships involved in coordinating international containerized transportation identified in the literature. Section 2.2.3 will introduce the conditions in the current maritime transportation market and describe their influence on the market for hinterland transportation.

### 2.2.3 The market for hinterland transportation

To understand the market for hinterland transportation, it is first necessary to envision the environment for maritime transport overall. In recent years, ocean carriers have experienced increasing competition and to survive, have had to take

cost-reduction measures (SteadieSeifi et al. 2014, p.11). Included are the deployment of larger vessels and slow-steaming strategies. Slow-steaming significantly reduces the amount of bunker fuel consumption, but affects sailing time. In addition to lower fuel consumption, larger vessels realize cost savings by creating economies of scale, thus lowering the overall costs per unit (Graham 1998, p.130; Franc & Van der Horst 2010, p.559). Economies of scale, though, are only realized if the vessels are full, so to better utilize their assets, ocean carriers form operational alliances. Through vessel sharing agreements, carriers sell slots on one another's ships. In joining forces individual carriers gain more frequent access to more markets than they could do singularly (Graham 1998, p.132; Notteboom & Winkelmans 2001, p.76). Disadvantages to slow-steaming, larger vessels and vessel-sharing strategies are twofold.

For one, larger ships translate to larger call sizes in the deep sea terminals, putting pressure on the deep sea terminal operators to handle more containers at one time. To make up for the longer sailing time, ocean carriers cannot suffer increased berth times and expect the deep sea terminals to handle this increased call size in the same timeframe as with smaller call sizes. Not only are there operational peaks and valleys on the water side operations, but also on the land side as an increased number of inland transportation providers arrive at the same time to collect or drop off containers. As a result, there is a significant amount of congestion and unnecessary housekeeping activity at the terminals (Notteboom & Winkelmans 2001, p.82; Veenstra et al. 2012, p.22).

Secondly, as ocean carriers collaborate to gain operational efficiencies, they become more homogeneous. Everyone offers the "same" product. In order to differentiate themselves in the marketplace, ocean carries look to expand their scope into offering value added services such as hinterland transportation. One of the ways they have been doing this is by establishing inland hub centers and trunk haul relationships with hinterland service providers (Franc & Van der Horst 2010, pp.558–560; Notteboom & Winkelmans 2001, pp.79, 82; Graham 1998, pp.130, 137).

The above environment for the sea-leg of the overall international transportation of containerized cargo has a profound influence on the corresponding hinterland transportation. As a result of, or possibly in anticipation of further increased volume coming into and out of Rotterdam's deep sea port area, the Port Authority has implemented modal split targets for the deep sea terminal operators. More specifically, they will be responsible for delivering a 20/45/35 split for barge/rail/truck (Veenstra et al. 2012, p.22). This is a challenge for deep sea terminals since they do not control the decisions related to hinterland transportation. Further, they have a difficult time collecting information which would facilitate operations to more efficiently support barge and rail freight. Increasing container throughput raises the issue of capacity and quality of hinterland transportation (Pielage et al. 2007, p.20; Veenstra et al. 2012, p.24).

Landside activity is management intensive and makes up a significant portion of the overall transport cost (Graham 1998, p.135; Notteboom & Winkelmans 2001, p.74; de Langen et al. 2013, p.368; Van den Berg & De Langen 2014, p.2). Additional actors entering the market for hinterland transportation increases competition and pressures hinterland transportation providers to lower costs (de Langen et al. 2013, p.367). While they don't have the same modal split target responsibility as do the

deep sea terminal operators, stakeholders offering hinterland transportation also find opportunity in making better use of barge and rail services as they generally offer a lower cost per unit. Hinterland transportation providers operate in a volatile haulage market with operational inefficiencies up to and in the port. They are faced with the obligation to meet cargo owners' delivery requirements and often cause a need to resort to trucking as a result (Graham 1998, p.136; Pielage et al. 2007, pp.35–36; Veenstra et al. 2012, p.27).

Deep sea terminal operators are in a tough position in that they have a commercial obligation to the ocean carriers on the water side of their operation. With limited resources (ie quay wall and quay cranes), they often have to make the decision between servicing an ocean-going vessel or an inland barge. The inland barge is often delayed, and as a result, barge operators build buffer time into their operation to account for the unpredictability (Pielage et al. 2007, p.21). Similar to ocean-going vessels, barge operators have an interest in fully utilizing their assets, thus may arrange their voyage to the port when there is enough volume. To increase the volume, they are calling on multiple terminals during the voyage, which accentuates the problem at the next terminal when there is a delay at an earlier terminal. Naturally, the unpredictable schedule leaves little incentive for the deep sea terminal to make them a priority (Notteboom & Winkelmans 2001, pp.74–75; Pielage et al. 2007, pp.21, 23–24).

### 2.2.4 Conclusion

Literature on the topic of hinterland transportation reveals that the process is complex and there are a significant number of stakeholders, each with distinct motivations. This is clearly a market where stakeholder management is necessary in order to survive; any single operator functioning in a silo will certainly fail. Recognizing these challenges, actors actively seek creative ways to more efficiently use hinterland transportation options. Graham (1998, p.143) describes this as a challenge of figuring out "how to steer intermodal container shipping through the narrow strait between the rocks of destructive competition and overconcentration of power".

Literature provides examples of multi-trade alliances for joint network financing and operation of inland depots, dedicated deep sea terminals, increased scale of operations, barge-hub terminals, vertical integration, freight collection/drop off in the hinterland to reduce the number of calls in the deep sea port, street-turn strategies, and "extended gates" (Graham 1998, p.137; Notteboom & Winkelmans 2001, pp.74–75, 78, 87; Pielage et al. 2007, p.25; de Langen et al. 2013, p.53; Veenstra et al. 2012, p.21). Synchromodality is another strategy, which will be elaborated in section 2.3.

## *2.3 Synchromodality*

Much of the early literature on synchromodality is published in Dutch and, as such, this overview is a compilation of translated definitions given in other research.

Synchromodality is a new transportation strategy introduced in 2010 by the Strategisch Platform Logistiek and was part of the advice given to the government of

the Netherlands regarding the development of the Dutch logistics industry (van der Burg 2012, p.14).

Van der Burg (2012, p.33) defines synchromodal transport as “flexible and reliable transport for which at least two modalities are simultaneously available; the modal choice is no longer pre-determined; all infrastructure, services and stakeholders are adapted to one another; and product flows are bundled, in such a way that the most suitable modality can be chosen given both the requirements of each individual order and the aggregated demand for transport.”

In their pilot study of the possibilities of implementing a synchromodal transport system on the corridor from Rotterdam to Tilburg, Lucassen and Dogger (2012, p.3) define synchromodality as “as constantly tuning inside and between good chains, transport chains and infrastructure so that given the aggregated transport demand, and at any moment in time, the best modality can be chosen.”

Riessen (2013, p.16) refers to synchromodality as “an intermodal transportation network with online planning able to adapt in real-time to meet delivery requirements.” In his research, ‘online planning’ means that transportation can be adapted in the process in the case of changes. The difference between synchromodal transportation and intermodal transportation is the *dynamic planning* aspect (Riessen 2013, p.16).

The key points of the synchromodality concept are that the modality of inland transportation is not defined in advance, there are multiple modes of transportation available on a given corridor, cargo flows of various customers on a given corridor are considered in aggregate, and modal routing is taken such that both the shipper’s delivery requirements are satisfied and the network of available transportation modalities is optimized.

Synchromodal transport is expected to make use of more economically and environmentally efficient modes of transportation. In doing so, the benefits would be lower negative externalities, such as air pollution and road congestion, improved utilization of all hinterland transportation modality assets, increased transportation reliability, and lower transportation cost. The benefits to the cargo owner are not expected to be substantial beyond realizing a reliable hinterland transportation system, however the transportation providers will benefit from the optimal utilization of their assets and the infrastructure (van der Burg 2012, pp.20–23; Lucassen & Dogger 2012, p.4).

Pricing of a synchromodal product has been identified as a challenge. As was identified in section 2.2.2.1, cargo owners are motivated by low cost and reliable service and moreover, they dislike fluctuating rates. It becomes the challenge then for transportation providers first to demonstrate a synchromodal system is able to deliver reliable service. Making it more difficult is identifying what the cargo owners’ idea of cost is, considering the modality used is not known in advance. It is critical to offer a single rate for synchromodal transportation, otherwise cargo owners will be motivated to choose the low-cost modality, stripping away the flexible planning dynamic of synchromodal planning. To combat this, price incentives might be used to engage customers (Lucassen & Dogger 2012, pp.4, 69).

It is essential for cargo owners to make mode-free or amodal bookings with their transportation provider. Mode free bookings allow operators the freedom to choose

the inland transport modality and switch between modalities if needed. Greater flexibility in the modality can increase utilization of different modalities and the underlying infrastructure (Lucassen & Dogger 2012, pp.4, 6).

Synchromodal transportation planning requires joint effort and coordination throughout the entire chain. Considering the number and variety of stakeholders involved in the planning process, formal processes for cooperation are required in order to align all stakeholders' interests. Businesses will need to agree on roles and responsibilities, acknowledging in some cases that traditional roles will change. Alignment on cost and gain sharing will also need to be worked out in advance. A successful endeavor will be built on trust, honesty and commitment to the initiative and information sharing will be essential (Lucassen & Dogger 2012, p.3; Riessen 2013, p.16).

Riessen (2013, p.135) provided several examples of operational information sharing which would improve the synchromodal planning process. They include 1) GPS systems to monitor train and barge movements, 2) synchronized information between terminal operating systems and network transport bookings, 3) EDI connections with clients to synchronize booking information, and 4) automated triggers to request customs releases or to request missing client information.

As mentioned earlier in this section, the topic of synchromodality is not frequently referenced in the literature, although it is receiving additional attention in reaserch. For example, a Google Scholar search of 'synchromodality' around April 2014 resulted in approximately 17 hits, of which 8 were valid. The remaining referred to synchromodality in education and were irrelevant for this study. By August 2014 the same search resulted in approximately 60 hits, of which two-thirds were related to transportation. Of these a large portion simply mentioned synchromodal transportation, although the primary topic involved some type of hinterland transportation. The valid matches largely included technical themed research at the master's level from studies at various universities in the Netherlands conducted in late-2013 to early-2014. They were only recently made available online. While a challenge for locating literature for this study, the encouraging observation is that other are actively investigating the concept.

Technical studies such as Riessen (2013) and Fan (2013), both studying at Delft University of Technology, focus on the synchromodal network *design*. Research centers on modelling different networks *quantitatively* and key factors related to the design continue to come back to transport volume or identifying 'high corridor lanes'. While pricing is raised as a consideration in positioning this concept in the market, and the difficult task of aligning the interests of the stakeholders involved is acknowledged, there is a gap in the research with respect to the commercial aspects, specifically *how* to generate the volumes necessary to create 'high corridor lanes.'

# 3 Hypothesis

The literature review of stakeholder management theory revealed several key principles: 1) there are multiple stakeholders, 2) each with varying interests, 3) who are motivated to take action to protect their interests and 4) that a successful strategy for engaging stakeholders is collaboration. Collaboration requires trusting relationships and an ability to communicate and share information symmetrically. Through collaboration stakeholders develop a common definition to a common problem and are able to solve problems that could not be solved by any single firm acting alone.

In the literature on hinterland transportation, a number of stakeholders were identified along with various resources or capabilities they bring to the table and interests they have.

With intermodal hinterland transportation, there are multiple stakeholders. A shipment is dispatched to that modality and, while there are generally multiple modes of transportation to coordinate for the intermodal route (by rail or barge) and the last mile delivery (by truck), there is not dynamic coordination of multiple intermodal routes. For the sake of this description, the last mile via truck will be considered as an extension of the rail or barge transport. Alternatively, transportation via truck between the port and the cargo owner directly would be viewed as a third, competing mode of transportation. If there is a change and a mode of intermodal transportation will no longer suffice, the transportation order is cancelled and the services of that provider are no longer required. In essence each mode on a given route is an independent “business” and in competition with alternative modes. Granted, the stakeholders of that “business” must work together so that they are competitive in the market of the given inland route, however it does not compare to the level of coordination and cooperation required of the stakeholders in a synchromodal network.

Synchromodal transport is a strategy which offers the advantage over intermodal hinterland transportation in its use of dynamic planning and real-time switching. By doing so, it promises to deliver lower negative externalities, improved utilization of all hinterland modality assets, increased transportation reliability, and lower transportation cost. The challenge for synchromodal transport operators is to identify how to generate the volumes necessary to create ‘high corridor’ lanes in which the synchromodal concept will thrive. The synchromodal process is complex and there are many stakeholders involved who all need to be aligned, or synchronized, in order for the process to work. In a synchromodal transportation network, the various modes of intermodal transportation, including the option via truck directly between deep sea terminal and cargo owner, must operate in concert with one another to be successful as a network, independent of whether an individual modality is used on a given transport order.

An analogy can be made to the game of basketball. An individual player may excel at making three-point shots and need to work with his trainers to build up strength and refine his accuracy. This individual player would represent intermodal transportation. During the game, however, he may not always be in a position to take the shot. There may be defensive players in the way or he may not have a good angle. The *team* is better off though, if this player sees his open teammate and

passes the ball so that they can make the easier shot. The team scenario would represent synchromodal transportation. In the latter case, the team still scores the points, although the individual player making the shot was different. At the end of the game, the team with the most points wins. The team is stronger than the individual all-star on account of having a collection of individual strengths to be utilized in conjunction as needed given the circumstances so that the outcome at the end is a "win" for the team. The coordination of the stakeholders required for an individual player or an intermodal transportation company to be successful will vary greatly from the collaboration required of a basketball team or a synchromodal transportation network.

As synchromodal transportation is a strategy which can be used to conduct hinterland transportation, it is logical to assume the resources/capabilities and interests identified in the literature for hinterland transportation providers *in general* would also pertain to *synchromodal* transportation providers. Synchromodal transportation itself then can be personified as a stakeholder in that it has both deliverables (resources/capabilities) and requirements (interests). Pulling all stakeholders together, Table 3 summarizes each party's resources/capabilities and interests. It becomes clear that resources or capabilities of one stakeholder are of interest to another in order for them to succeed.

Since multiple synchromodal stakeholders and their varying interests (the first two principles of stakeholder management theory) have already been developed, the next logical question then leads to the main research question of this thesis, *"What is the opportunity for stakeholder management theory to be applied to further develop the market for synchromodal transportation?"*

The hypothesis is that concepts from stakeholder management theory can be applied to the synchromodal transport concept to understand the stakeholders and identify ways in which stakeholder relationship *strengths* can be capitalized to unlock the market for synchromodal transportation.

As the synchromodal transportation concept is new, the process complex, and the stakeholders heterogeneous, the Delphi Method will be used to analyze the stakeholders with respect to their role in synchromodal transportation. Chapter 4 will explain the Delphi Method and detail its incorporation into the research design. At a high level, the research will consist of questionnaires of subject matter experts involved in various parts of the hinterland transportation process. Questions will be geared around confirming the stakeholders relationships with one another and the nature of their relationships, how hinterland transportation is presently organized, what factors are most important in making hinterland transportation decisions and finally their familiarity with synchromodal transportation.

**Table 3: Stakeholder resources/capabilities and interests from literature**

| STAKEHOLDER | RESOURCES & CAPABILITIES | INTERESTS |
|---|---|---|
| **Port Authority** | • Real estate in port area<br>• Commercial relationship with deep sea terminals<br>• Responsibility to develop port community | • Quality, reliable transportation chains through their port to assure manufacturing companies in the hinterland, ocean carriers and freight forwarders continue to route freight through their port |
| **Deep Sea Terminal** | • Real estate<br>• Commercial relationship with or responsibility to (water side) ocean carriers<br>• Responsibility to engage with inland transport providers | • Information to facilitate efficient terminal operations both water side and land side |
| **Ocean Carrier** | • Ocean vessels<br>• Ocean transport order<br>• Commercial attention of DS terminal<br>• May have information about hinterland transport arrangements<br>• Commercial relationship with or responsibility to cargo owners and freight forwarder | • To be differentiated from competing ocean carriers<br>• Lower logistics costs for inland transportation and equipment repositioning |
| **Freight Forwarder** | • Commercial relationships with or responsibility to cargo owners for inland transportation and other value added services such as brokerage, supply chain consulting, warehousing, etc.<br>• Commercial attention of inland transport/terminals and ocean carriers<br>• Information about (or control over) inland transportation routing | • Maintain relationship with cargo owners<br>• Profit margin on selling inland transportation |
| **Inland Transportation and Terminals** | • Inland real estate<br>• Inland transportation vehicles<br>• Inland transportation orders<br>• Commercial relationships with cargo owners, freight forwarders and ocean carriers<br>• Transactional relationships with deep sea terminals<br>• Information about the inland origin/destination of containers to/from the deep sea terminal | • Cargo volume to maximize asset utilization and lower operational costs |
| **Cargo Owner** | • Cargo to be transported<br>• Information about transportation arrangement | • Low cost, quality service, short transit time, frequency, reliability, flexibility |
| **Synchromodality (as a stakeholder)** | • Flexible access to multiple hinterland transportation modalities<br>• Increased reliability of hinterland transportation<br>• Lower transportation costs through improved utilization of hinterland transportation assets<br>• Lower negative externalities as a result of modal choices | • Hinterland transportation volume, control over routing decisions (amodal bookings) |

*(Source: Author's summary of stakeholder resources/capabilities and interests identified in literature)*

# 4 Research Methodology

To understand the place synchromodality holds in the market for hinterland transportation of international containerized cargo, it is first necessary to understand the complex dynamics of international transportation with a particular attention to the landside connectivity to the hinterland. Considering the exceptionally high number of actors having a stake in the process, either through direct involvement or as a result of the decisions taken by other stakeholders, stakeholder management theory is selected as a framework for evaluating the existing situation.

Chapter 2 was dedicated to evaluation of the literature, including academic articles, books, and company websites to build a theoretical foundation defining stakeholder management theory, hinterland transportation and synchromodality. In section 2.1, the literature search of stakeholder theory was focused on defining 'stakeholder', determining what motivates them to take action and various strategies for engaging stakeholders. Additional attention was paid to developing an understanding of the literature related to strategies of collaboration. Building upon this, literature on hinterland transportation was then evaluated. Section 2.2 starts with an overview of how international containerized cargo is transported from door-to-door, then further elaborates on the roles, responsibilities and interactions of various stakeholders involved, finally concluding with a discussion on relevant industry trends focusing on how the stakeholders in the market for hinterland transportation affect or are affected. The last section (section 2.3) was dedicated to investigating the concept of 'synchromodality' in terms of what is required, what it promises to deliver and challenges remaining to the further deployment of such a strategy.

Because of the heterogeneity of the stakeholder relationships identified, the complex system for organizing international containerized transportation to the hinterland – particularly on account of the absence of one clear method of organization – and the limited prior research on the topic of synchromodality, the Delphi research approach was used for this study. In the next two sections a description of the Delphi Method, when it is applicable, and how it is used are presented (section 4.1) followed by a recap of how the technique was applied in this research (section 4.2). Research limitations are summarized in section 4.3.

## *4.1 Delphi Method*

Named after the famous oracle at Delphi (Hasson et al. 2000, p.1008), the 'Delphi Method' is the name of the technique used in "Project DELPHI" by the RAND Corporation in the mid-1950s. "Project DELPHI" was a research experiment sponsored by the United States Air Force and designed to make use of expert opinion to select, from the perspective of a Soviet strategic planner, an optimal US industrial target and to estimate the number of bombs necessary to diminish its production capacity to a defined amount (Dalkey & Helmer 1963, p.458; Linstone & Turoff 2002, p.10).

The Delphi method objective is to obtain the most reliable opinion consensus from a group of experts via an iterative, multi-stage process of individual questioning – by interview or questionnaire – avoiding direct confrontation of the experts with one another (Dalkey & Helmer 1963, pp.458–459; Hasson et al. 2000, p.1008). This

method deliberately attempts to avoid the disadvantages of other uses of expert opinion involving confrontation. Whereas direct confrontation can lead to hasty generation of preconceived notions, defensive standpoints, closed mind toward novel ideas, or the 'bandwagon' effect, the non-confrontational approach is more conducive to independent thought and facilitates the gradual formation of a considered opinion. That said, significant discretion must be taken when conducting the experiments and presenting feedback of other expert responses so as to avoid bias (Dalkey & Helmer 1963, pp.458–459).

In the e-book edition of their 1975 publication of the same name, Linstone and Turoff (2002, p.4) argue that the particular circumstances of the needed group communication of a particular application determine the appropriateness of utilizing Delphi, not the nature of the application. One or more of the following properties could warrant the need for employing Delphi:

- The problem does not lend itself to precise analytical techniques but can benefit from subjective judgments on a collective basis.
- The individuals needed to contribute to the examination of a broad or complex problem have no history of adequate communication and may represent diverse backgrounds with respect to experience or expertise.
- More individuals are needed than can effectively interact in a face-to-face exchange.
- Time and cost make frequent group meetings infeasible.
- The efficiency of face-to-face meetings can be increased by a supplemental group communication process.
- Disagreements among individuals are so severe or politically unpalatable that the communication process must be refereed and/or anonymity assured.
- The heterogeneity of the participants must be preserved to assure validity of the results, i.e. avoidance of domination by quantity or by strength of personality ("bandwagon effect").

The Delphi is a group facilitation technique that seeks to obtain consensus from a panel of experts through a series of structured questionnaires, or 'rounds'. The questionnaires are completed independently and anonymously, without the need for bringing the panelists together physically. The initial round may be qualitative to solicit comments from the panel, with the next round quantitative in nature. Alternatively, qualitative data can be collected in advance through focus groups or interviews and the first round of the Delphi can be quantitative based on the findings. Feedback from previous rounds are summarized and statistical analysis of the responses help to formulate questions for the next round. This process is repeated until consensus is obtained or the number of returns for each round decreases. By using successive questionnaires in an anonymous environment opinions are obtained in a non-adversarial manner (Hasson et al. 2000, pp.1009–1010).

## *4.2 Research Design*

The literature on stakeholder management theory highlighted the existence of multiple stakeholders having an influence on or being affected by the outcome of another stakeholder's influence, having varying interests and who are motivated to protect their interests and improve the results of their objectives. They do this by

aligning with other stakeholders to pool resources, capitalize on complementary capabilities, achieve economies of scale, innovate, mitigate problems, reduce costs, and improve the efficiency of executing formal and informal contractual arrangements.

Literature on international containerized cargo transportation, specifically transportation to and from a port's hinterland reveals an extensive list of stakeholders involved in the process. Further, there is no clear leading firm as the relationships are complex in the way that services can potentially be combined together.

Research on the topic of synchromodality is limited given the development of the concept is only in its infancy stage. Studies thus far are of a technical nature and primarily revolve around the operational aspects of the proposed network. The common theme in the existing literature is the volume requirement necessary for such a strategy to succeed.

The objective of this study is to apply the knowledge related to successful collaborative stakeholder relationships with the extensive list of stakeholders in the business of international containerized transportation to the hinterland to identify where there are opportunities to generate the necessary volume to make a synchromodal strategy feasible. Considering the circumstances of this objective, application of the Delphi method would be relevant.

This Delphi experiment for this study was conducted in two rounds of questioning: 1) personal interviews conducted between June 25 and August 2, 2014 and 2) an online survey conducted in the weeks of August 4$^{th}$ and August 11$^{th}$, 2014.

### 4.2.1 Delphi round one: Personal interviews

Delphi round one involved a series of personal interviews with a subject matter expert panel including one port authority (Port of Rotterdam), two deep sea terminal operators (ECT, APMT), one ocean carrier (APL), and three freight forwarders (Kuehne+Nagel, Panalpina, Expeditors).

Participants were targeted due to their company's location in Rotterdam and because their company type was identified in the literature review as a stakeholder in the process of international containerized transportation to or from the hinterland of the port of Rotterdam. Panel participants were deemed 'subject matter experts' on account of their experience in sales, marketing, business development, or operations of their field.

Interviews were conducted between June 25 and August 1, 2014 and lasted approximately one hour each. Each interview was prefaced with an explanation of synchromodal transportation based on the findings of the literature review. Participants were advised that the purpose of the research was to identify the dynamics of the different relationships occurring so that conclusions could be drawn as to where the opportunity for synchromodal transport might lie. Interviewees were then asked to share their experiences related to synchromodal transportation if their company was involved or hinterland transportation in general. The remainder of the conversation was semi-structured.

The goal of each interview was to gain insight on four main topics: 1) familiarity and company involvement with 'synchromodal transport', 2) how hinterland transportation is organized, 3) the stakeholders they engaged with and the nature of those relationships, and 4) what factors were most important in making hinterland transportation decisions. An interview question list used during the interview process to facilitate conversation is provided in appendix 8.1. These questions were used to encourage interviewees to elaborate on the target topic areas. Notes were taken to record all conversations, however only the last two were voice recorded and transcribed. Notes from the interviews were coded, summarized and reviewed looking for comments to be included in Delphi round two. Summary of the interview content can be found in appendices 8.1.1 through 8.1.4 and will be elaborated in Chapter 5.

### 4.2.2 Delphi round two: Online survey

Delphi round two consisted of a self-administered online survey. Questions for the survey were structured in alignment with the four insight-seeking objectives of round one and contained multiple choice, rating, and free-response questions. Options for multiple choice questions were generated on the basis of the information gathered in the literature review and enhanced with comments raised during the interviews of round one. All questions included an 'other' option allowing the participant to provide his/her own response in the event the choices provided did not represent their situation. A copy of the survey questions can be found in appendix 8.2 along with an analysis of the responses, which will be covered in Chapter 5. Below, the nuances and intent of each question will be described.

*Q1 (Respondent's primary function): Which of the following best describes your company's primary function?*

Question 1 was a demographic question included as a mechanism enabling the responses to other questions to be sorted for further analysis. This multiple-choice question requested the survey-taker to select only one response identifying their company's primary function. Considering the literature review revealed that it is quite common for inland terminals to also offer inland transportation services, and this sentiment was confirmed during the interviews, options were included for these functions separately as well as *combined* inland transportation provider *and* inland terminal operator.

*Q2 (Stakeholder purchases from): When organizing inland transportation, from which of the following parties do you PURCHASE inland transportation? (Check all that apply)*

*Q3 (Stakeholder sells to): When organizing inland transportation, to which of the following parties do you SELL inland transportation, regardless of whether your company actually operates the mode of transportation sold? (Check all that apply)*

Questions 2 and 3 were designed to allow mapping of the relationships between the stakeholders in question 1 and other stakeholders. These questions requested the survey-taker to identify the parties *from which* they purchase (question 2) and *to which* they sell (question 3) inland transportation. Similar to question 1, these questions were also multiple-choice and responses derived from the literature

review as well as interview responses. Unlike question 1, however, questions 2 and 3 allow for the survey-taker to select all options that apply since various combinations can be organized to transport goods to or from the hinterland. Additional options were provided to address the situations where the panelist is not involved in purchasing or selling inland transportation.

*Q4 (What's important?): What factors are most important to you/your customer when selecting the mode of inland transportation? (Check all that apply)*

The intention of question 4 was to validate customer motivations – what is important to them in selecting inland transportation modality. This question is also an unrestricted multiple-choice multiple response scale to allow for a variety of options to be selected.

*Q5 (Stakeholder experience ratings): On a scale from 1 (extremely negative) to 5 (extremely positive), please rate your experience engaging with each of the various inland transportation stakeholders.*

Question 5 was set up as a multiple rating list scale. Panelists were asked to rate their experience engaging with each of a list of stakeholder types on a scale from 1 to 5 where 1 represented extremely negative experiences and 5 represented extremely positive experiences. 'Experience' was defined to be in consideration of the following criteria in order to provide consistency in evaluating the relationships: level of trust, ability to communicate, share information, collaborate and resolve conflict with the respective partner. As this question had the potential to extract the most candid feedback about relationships, a 'comments' box was included with each stakeholder group to encourage specific examples to support the rating if the panelist chose to elaborate. If there is no engagement with a given stakeholder, 'not applicable' (N/A) was available as a rating option.

As questions 6, 7, and 8 all pertained specifically to synchromodal transportation, definitions of both intermodal and synchromodal transportation were offered for reference. This was done to serve as a reminder for the participant and to drive a consistent interpretation of the terminology.

*Q6 (Familiarity with synchromodality): [Definitions of Intermodal and Synchromodal transport provided] Please refer to the above definitions when answering this question. Which statement best describes your familiarity with "synchromodal transportation"?*

Question 6 was a single response multiple-choice question relating to a statement about the participant's familiarity with synchromodal transportation. Available options were taken directly from comments made during the first round interviews, with some additions to round out the choices. The survey questions were pre-tested prior to launch and feedback revealed that there was a gap in the options, particularly with respect to the choice of "I have heard of synchromodal transportation, but my company IS NOT currently using/offering this service." As a result, two additional options were added ("…and my company IS currently using/offering this service." and "…and my company is currently exploring how to make better use of this kind of service."). The improvement 1) counterbalanced the option of "…IS NOT using…" and 2) offered an option in between for the panelist who technically was not currently offering the product, but was looking for how it could be applied in their

case. They provided options with a more positive tone in an attempt to avoid leaving a participant with only the “other” option to express their position.

*Q7 (Advantages of synchromodal transportation): In your opinion, what are or would be the ADVANTAGES of synchromodal transportation? Please consider those aspects which would justify an INCREASED use of this product.*

*Q8 (Disadvantages of synchromodal transportation): In your opinion, what are or would be the DISADVANTAGES of synchromodal transportation? Please consider those aspects which would PREVENT or justify a DECREASED use of this product.*

Questions 7 and 8 were free-response questions asking the survey-taker to provide candid feedback, in their own words, about their perception of the advantages and disadvantages of the synchromodal transportation concept. Participants were asked to respond in terms of the aspects which would cause an increased or decreased use of the product.

*Q9 (Additional comments): OPTIONAL: Please provide any additional comments related to intermodal and/or synchromodal transportation.*

Lastly, question 9 was offered as a final opportunity for the experts to provide comments with respect to intermodal and/or synchromodal transportation in general. This question was another free-response question and if additional Delphi rounds were conducted, this would serve as a potential source of additional material for questions or question refinement.

Upon finalization of the survey questions, the online survey was built using Survey Monkey (www.surveymonkey.com). Recipients were emailed a link to the survey. In the Delphi Method spirit, questionnaires should be conducted under conditions of anonymity thus the distribution option which only identifies the respondent by a respondent number was selected. The uncustomized access link allowed for the survey to be distributed to additional parties (if available) simply by emailing the link.

Prior to distributing the email containing the link to the online survey and request for participation, a personal phone call was attempted to each of the original panel of experts. This was done to provide advance notice of the request in order to avoid it being overlooked. Additionally, this afforded the opportunity to ask for additional support in making contact a broader network of ocean carriers, inland transportation providers and/or inland terminal operators. A total of 11 responses were received to the round two survey.

### *4.3 Limitations*

There were several challenges and/or limitations encountered during this research process.

*Time:*

Due to the limited amount of time for completing this research, it was structured as a qualitative study rather than quantitative. A representative breadth of company types were acquired for personal interviews, however not large enough to conduct

statistical analysis. Future researchers could expand the survey size so that quantitative analysis could be conducted.

*Familiarity with 'synchromodality':*

'Synchromodality' is not a widely used term at this time and, as such, many company responses to request for interview were rejected indicating 'synchromodality' was "out of scope". Once the wording of the request was modified to also reference "intermodal", there seemed to be a slight improvement in the response rate. Future researchers should consider the familiarity of the topic at the time of their research and make adjustments as necessary to include more common terminology related to the concept.

*Transcripts & Voice recording*:

During all interviews detailed notes were taken and typed immediately following the session. Voice recording and interview transcription are also available for the last two interviews conducted. Transcription offers a means for revisiting the conversation to extract additional details and quotations. It is believed that the relevant examples and opinions were thoroughly captured through the note-taking process; however transcription of each interview for future research would be recommended.

*Geography:*

Personal interview contacts were targeted from the company's respective office in Rotterdam, given the proximity to the port. It was revealed during the interviews that many companies are operationally- and sales- affiliated with the country in which they are located. Much freight passing through the port of Rotterdam originates from or is destined for countries beyond the Netherlands and some, not all, interviewees were limited in their ability to provide working examples of successful synchromodal operations that they personally were involved in. An alternative angle on this limitation is that they had a much more critical perspective on what synchromodality needs to deliver in order for it to be a success, which may actually improve the critique of the concept and offer more robust product development given they are a tougher customer to sell. If time allows, future research should be broadened to include representation from additional geographical areas in Rotterdam's hinterland.

# 5 Results

In this section, findings from the seven interviews of Delphi round one will be summarized and bridged to the online survey question(s) of Delphi round two. Then meaningful observations will be extracted as they pertain to an opportunity for synchromodal transportation in Rotterdam's hinterland.

As explained in section 4.2.1, the conversations were semi-structured and the goal of each interview was to gain insight on four main topics: 1) familiarity and company involvement with 'synchromodal transport', 2) how hinterland transportation is organized, 3) the stakeholders they engaged with and the nature of those relationships, and 4) what factors were most important in making hinterland transportation decisions.

## *5.1 Stakeholders*

With respect to the stakeholders involved in hinterland transportation and with whom they engaged, interviews consistently highlighted seven major groups of stakeholders: 1) the Port Authority, 2) deep sea terminal operators, 3) ocean carriers, 4) freight forwarding companies, 5) inland terminals, 6) inland transportation providers, and 7) the cargo owners. A summary of the stakeholders identified and the number of interviews in which they were raised, can be found in Appendix 8.1.1.

Deep sea terminal operators, ocean carriers, freight forwarding companies and inland transportation providers, specifically barge, rail, and truck, were identified in all seven interviews. Inland terminals were discussed in 6 of the seven interviews and in two interviews, inland terminals who also provide a mode of inland transportation were specified. Aside from these two cases, inland transportation operators and inland terminal operators were referred to independently.

Cargo owners, the reason for transporting the cargo in the first place, were identified in only 6 interviews. The one interview where this stakeholder group was not discussed was with a deep sea terminal operator. This can be attributed to the fact that there are several layers of transaction between the two parties and day-to-day interaction likely does not take place. Similarly, this is the same logic justifying the Port Authority's appearance in only three conversations. They, themselves communicated that they do not actively participate in hinterland transportation, although they are influential in shaping the policies that eventually relate to other stakeholders—they're simply not involved in the day-to day business.

As these seven stakeholder groups were also identified in literature on hinterland transport and synchromodal transport, they were selected as the representative list of stakeholders for the survey of Delphi round two. In addition, as explained in section 4.2.2, an eighth category, *combined inland terminal and inland transportation provider,* was included. These groups appear in questions 1, 2, 3, and 5. In all questions, "other" was provided as an option in the event a category was not yet identified.

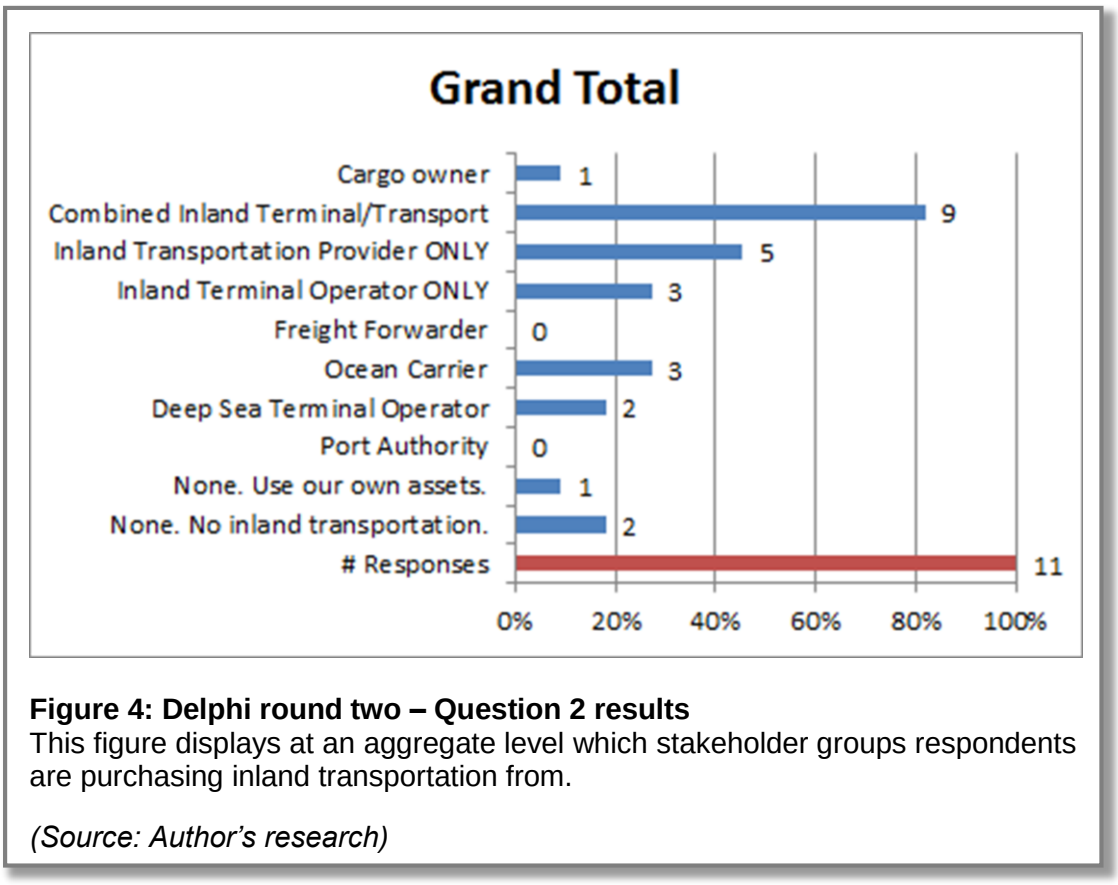


**Figure 4: Delphi round two – Question 2 results**
This figure displays at an aggregate level which stakeholder groups respondents are purchasing inland transportation from.

*(Source: Author's research)*

Question 1 (Q1: Respondent's primary function) was designed to collect demographic information about the survey participants. The personal call to round 1 participants advising of the follow up survey and the accompanying request for support reaching additional stakeholder groups was successful; eleven parties participated in the online survey. Of the eleven respondents, five were ocean carriers (an underrepresented group in round 1), three were freight forwarders, and there was one each from the combined inland terminal/transport, deep sea terminal operator, and Port Authority categories. Unfortunately there was no representation from the inland terminal ONLY or inland transportation (barge, rail, truck) ONLY category. Question 1 and a summary of its results can be found in appendix 8.2.2.

The information collected from personal interviews of Delphi round one and the results of round two question 1 validate the major stakeholder groups identified in the literature review of hinterland transportation. These combined findings begin to lay the foundation for answering the research sub-question, "Who are the stakeholders of synchromodal transportation?" The answer to this question will be further developed in section 5.2. Understanding who the key actors in hinterland transportation are and given that synchromodal transportation is an alternative strategy for organizing hinterland transportation, it is logical to conclude the same actors could be stakeholders in the market for synchromodal transportation.

## *5.2 Stakeholder Relationships*

Regarding stakeholder engagement with other stakeholder groups, the interviews of Delphi round one largely confirmed the relationships identified in the literature and described in section 2.2. In addition to this, two new relationships were presented: freight forwarders selling to other freight forwarders and trucking companies buying intermodal or synchromodal transportation from combined inland terminal/transport companies. Round two survey questions 2 (Q2: Stakeholder purchases from) and 3 (Q3: Stakeholder sells to) were designed to be analyzed in conjunction with question 1 to map the stakeholder relationships.

The aggregate responses to question 2 are displayed in Figure 4 and a more detailed breakdown by respondent type is offered in appendix 8.2.3. From a procurement perspective, all respondents who procure inland transportation (9 of 11), are purchasing from combined inland terminal/transport companies. Two companies responded to question 2 with “None. My company does not organize inland transportation.”)

Drilling further, the Port Authority and the deep sea terminal were the ones indicating non-involvement in organizing inland transportation. The remaining respondents of question 2 – ocean carriers, freight forwarders, and combined inland terminal/transport providers – reveal the following relationships from the procurement perspective:

- Ocean carriers purchase inland transportation from combined inland terminal/transport providers, inland transportation ONLY providers, inland terminal ONLY operators, and deep sea terminal operators,
- Freight forwarders purchase inland transportation from cargo owners, combined inland terminal/transport providers, inland transportation ONLY providers, inland terminal ONLY operators, ocean carriers and deep sea terminal operators, and
- Combined inland terminal/transport operators purchase inland transportation from other combined inland terminal/transport operators and they use their own assets.

The aggregate responses to question 3 are displayed in Figure 5 and a more detailed breakdown by respondent type is offered in appendix 8.2.4. From a sales perspective, all respondents who sell inland transportation (9 of 11), for the most part, sell inland transportation to cargo owners. The Port Authority and deep sea terminal again responded with “My company does not offer inland transportation.”

The remaining respondents of question 3 – ocean carriers, freight forwarders, and combined inland terminal/transport providers – reveal the following relationships from the sales perspective:

- Ocean carriers sell inland transportation to combined cargo owners and freight forwarders,
- Freight forwarders sell inland transportation to cargo owners, combined inland terminal/transport providers and ocean carriers, and
- Combined inland terminal/transport operators sell inland transportation to cargo owners, other combined inland terminal/transport operators, freight forwarders, ocean carriers and deep sea terminal operators.

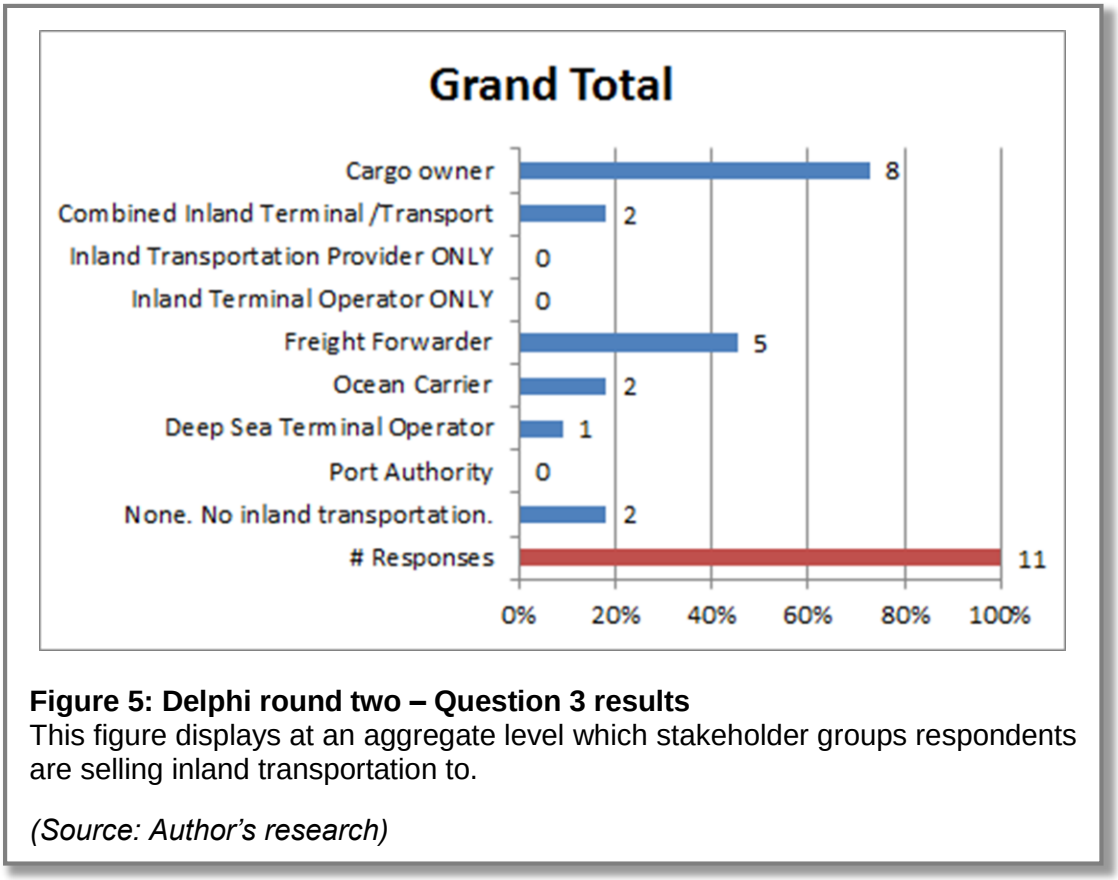


**Figure 5: Delphi round two – Question 3 results**
This figure displays at an aggregate level which stakeholder groups respondents are selling inland transportation to.

*(Source: Author's research)*

Figure 6 is an updated diagram representing the hinterland transportation stakeholder relationships as identified through this research. The extent of intra-stakeholder group commercial activity and the exhausting list of possible combinations as were exposed in this research were not highlighted in the literature. This research revealed, through the responses to question 2, that freight forwarders were procuring inland transportation from cargo owners and similarly in question 3 that freight forwarders were selling to combined inland terminal/transport providers and ocean carriers. The same respondent (Respondent #3) who gave these responses, also indicated a sales relationship with cargo owners, which was expected. Future research with a larger sample size might confirm this as a trend or reveal it as an anomaly. Considering the personal interview portion of this study revealed an unexpected relationship where trucking companies procure inland barge/rail transportation from combined inland terminal/transport companies, this survey respondent's data will be considered valid, albeit not discussed in literature thus far.

In section 5.1, the stakeholder groups of synchromodal transportation were confirmed. Building upon this by asking subject matter experts to map from which groups they purchase and to which groups they sell inland transportation, it is now clear which parties are dealing with one another and in which capacity. There are some stakeholders who have clear roles which cannot be (easily) duplicated by others. For example, ocean carriers and inland transport providers own assets and will always be present in the process for their capacity to physically transport goods via their assets. The literature, and confirmed by the research to this point, reveals that some process steps are not clearly defined exclusively to one stakeholder

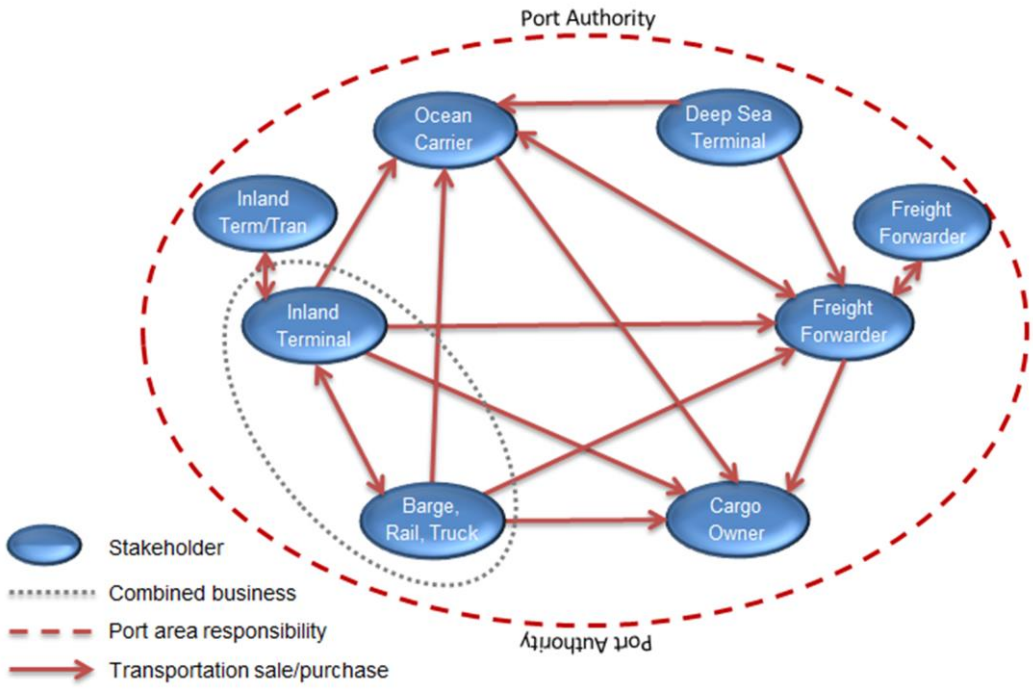


**Figure 6: Stakeholder relationships in hinterland transportation research**
*(Source: Author's rendition)*

group. Selling inland transportation to a cargo owner, for example, does not require ownership of transport vehicles and can be conducted by inland terminals, inland transportation providers, ocean carriers or freight forwarders.

### *5.3 Stakeholder Relationship Quality*

As was learned in section 2.1.4, a successful collaborative endeavor requires a trusting relationship, an ability to communicate and to share information symmetrically. The quality of existing relationships will reveal the strongest market advantages upon which to capitalize as well as those in need of repair. Personal interview conversations combined with findings of round two question 5 provide the most relevant insight on the relationships between various synchromodal transport stakeholders and serve as the basis for the recommendations offered in Chapter 6.

Delphi round one personal interviews uncovered several cases of strained stakeholder relationships. Specifically, it was revealed that early attempts at stakeholder engagement to encourage information sharing were done in an aggressive manner without an incentive offered in return. The same discussion indicated that although the approach recently is more of an asking nature, there is still little motivation to actively engage considering the lack of benefit offered in return. Similar conversations with other companies in the same stakeholder group seemed to be a bit more promising in their structure, although still remain strained. This strained relationship prompted the comments in Recommendation #5 that deep sea terminal operators should focus on terminal operations and convey information

unbiasedly to promote the kind of actions, regardless of the party calling on the terminal, which would help improve operations and their ability to service them.

An overarching theme throughout all interviews was the difficulty in acquiring or connecting information streams. This is the single biggest obstacle related to efficient hinterland transportation be it intermodal or synchromodal. Lack of information prevents efficient use of resources and impairs the ability to expand services in appropriate geographic areas. Several personal interviews and a comment in survey question 5 related to the use of information tools managed by the Port Authority in a positive manner, which is the basis for the Recommendation #1.

Different interviews provided examples of how the inability to fully exploit information *within the same company* creates obstacles. An example was given where systems from different divisions of the same company lack the ability to transfer information, although both sides acknowledge the other has the information; another observation was made by a forwarder who claimed that it works to their advantage when ocean carriers fail to identify import/export matching opportunities when (it appears that) their inbound and outbound teams are not communicating. Examples such as this back up the comments in Recommendation #2.

The next two observations provided substantial insight on participants' opinions about what holds them back and what it would take to encourage more collaboration. These revelations will be reflected in Recommendation #2 through 5. Interviewees revealed their reluctance to share information is to protect the market share they already have. Ironically, though, they recognize its ability to contribute to the network's efficiency, which in turn would reduce cost, which, if passed on to them, would improve their ability to operate in the market. The problem is that there is not confidence in the system that another party will share the savings generated in reward for sharing the information. Facilitating information flow, in many cases, will involve significant investment in human or IT resources and it's not clear that the costs will be recovered, thus little investment is made in this area. Examples where companies *had* invested resources in developing communication platforms demonstrated an ability to more efficiently operate.

Relationships have a strong influence on stakeholders' ability to operate in the market. Relationships built on a foundation of trust, collaboration, commitment and accountability were recognized as opportunities. Partners willing to commit to and be accountable for service level, for example, would facilitate their customer (a freight forwarder) having enough confidence to offer the same in turn to their customer (a cargo owner)—an offering which would differentiate them in the market. Strong partnerships appear to be successful when there is clear alignment on the roles and responsibilities and a system for checks and balances of the process are established. Further, there are incentives or rewards *in both directions* for stakeholders' participation. Examples of unwillingness to commit and be accountable, finger-pointing in cases of service breakdown, and favoritism were offered by interviewees and perceived negatively in terms of their effect on hinterland transportation.

A detailed summary of the opportunities and challenges related to hinterland transportation are provided in appendices 8.1.3 and 8.1.4 respectively. Each list is sub-divided into major categories of opportunities and challenges. The count listed

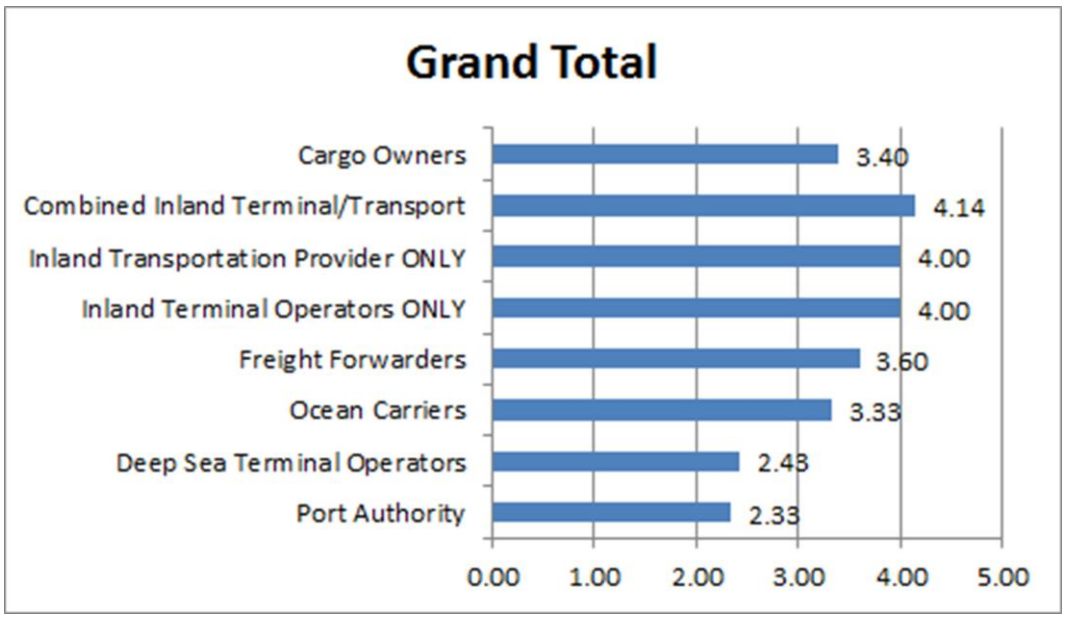


**Figure 7: Delphi round two – Question 5 results**
This figure displays at an aggregate level the respondents ratings of various stakeholders with whom they interact. The scale ranged from 1 – Extremely Negative to 5 – Extremely Positive.

*(Source: Author's research)*

next to each opportunity/challenge indicates the number of interviews in which the given topic was raised.

Survey question 5 in the second Delphi round was implemented to validate the discussions related to relationships amongst various stakeholders. Participants were asked to rate their experience engaging with various stakeholder parties considering their level of trust, ability to communicate, share information, collaborate and resolve conflict with the respective partner. The rating scale choices ranged from 'Extremely Negative' to 'Extremely Positive'. 'Not applicable' (N/A) and non-responses were not calculated in the average ratings. Considering the extensive input offered in round one on these topics, an 'Other' box was included in each stakeholder category to allow respondents to elaborate on their rating if so desired. The aggregate responses to question 5 are displayed in Figure 7 and a more detailed breakdown by respondent type is offered in appendix 8.2.6.

The ocean carrier respondents provided the most detailed responses in that they collectively provided ratings for all of the stakeholder groups. Freight forwarders also offered a fairly representative evaluation, although no ratings were given to inland transportation, inland terminal operators or cargo owners. It is assumed that the limited ratings provided by other stakeholder group categories are indicative of the lack of interaction between the respective stakeholding groups in general or that a larger sample size would reveal a more thorough evaluation of the overall system. Aside from the ocean carrier respondents, it appears that evaluations were given in cases where the respondent felt strongly about the rating they offered.

As a whole, inland transportation providers and inland terminal operators, either individually or combined, received the highest ratings. The scores were consistently high regardless of the respondent type. Interestingly, deep sea terminal operators don't have commercial relationships with inland transportation/terminal operators, but indicate strong relationships with them. The high relationship scores from all respondent types justify Recommendation #4, that inland terminals/transportation providers should coordinate dispatch of synchromodal transportation assets.

On the other hand, deep sea terminal operators consistently received low scores, although the ocean carriers rated them only slightly higher than freight forwarders did. The challenges of congestion and lower priority given to barge operators were prevalent in the literature and a reoccurring theme throughout the round one interviews of this study. These challenges, regardless of their root cause, were identified as obstacles preventing additional utilization of intermodal (barge/rail) services. The survey scores coincide with opinions expressed in the personal interviews. Additionally, deep sea terminals carry the most responsibility for achieving the modal split targets imposed by the Port Authority. As such, their approach at pushing for *any* information to facilitate efficiency related to hinterland modalities was apparently received poorly. The opinion of deep sea terminal operators of freight forwarders appears to be reciprocal as they rated the relationships with one another as 'Negative'. As mentioned earlier, the comments in Recommendation #5 stem from these observations.

Cargo owners, freight forwarders and ocean carriers overall were rated in the Neutral to Positive range. The relationships between freight forwarders and ocean carriers appear to be in good order with them giving themselves and each other scores of Neutral to Positive. Both freight forwarders and ocean carriers ranked the relationships with freight forwarders higher than relationships with ocean carriers. This indicates 1) that there is intra-group interaction and 2) that it is slightly more difficult dealing with ocean carriers than freight forwarders. As a result, it is logical to conclude cargo owners will have a more positive experience working with freight forwarders. This, combined with interview feedback from freight forwarders that inland transportation is not a core activity, that they would be willing to relinquish control over this *if* the ocean carrier was willing to share in the savings generated and was willing to take responsibility for disruptions in the service they sell, substantiate the extended list of conditions in Recommendation #2.

## *5.4 Stakeholder Motivations*

Another principle of stakeholder management theory is that stakeholders have varying interests and various factors will motivate stakeholders to take action either in alignment with a focal firm or against. So what is it that stakeholders in international containerized transportation to Rotterdam's hinterland want? What motivates these groups to take action?

In the personal interviews of Delphi round one, interviewees shared their experiences as they pertained to hinterland transportation. If they had examples of attempted or successful involvement with synchromodal transport, it was elaborated. As a proxy, the conversation also reflected on non-synchromodal hinterland transportation. In either case, an inventory of various motivations of the stakeholder groups described was taken. At different times, the interviewee was probed to

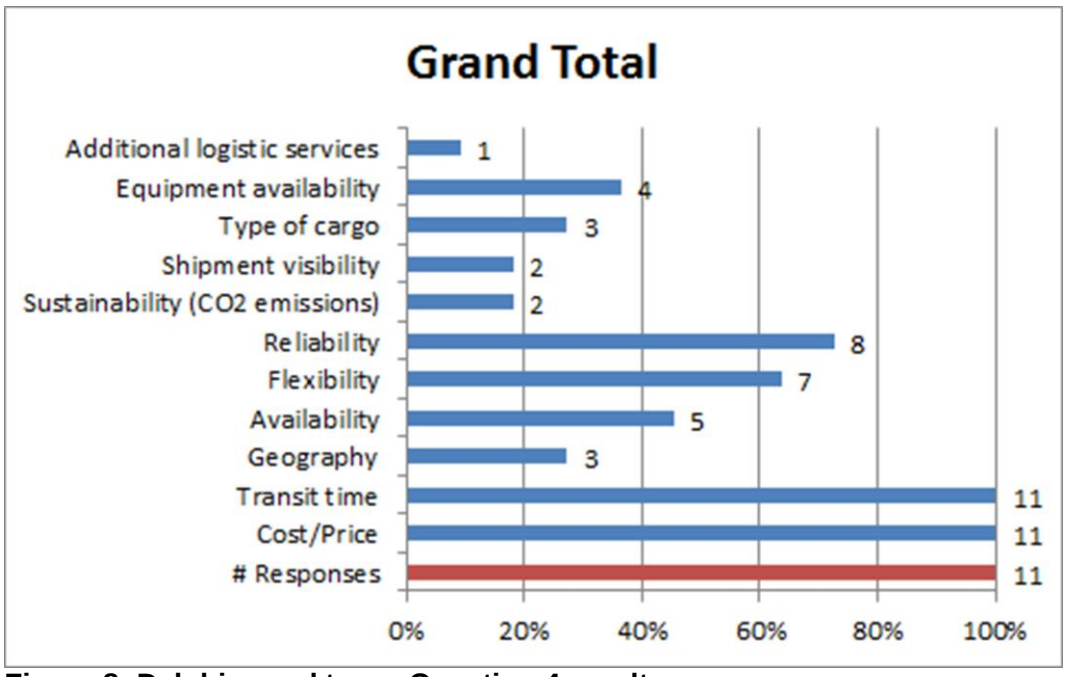


**Figure 8: Delphi round two – Question 4 results**
This figure displays at an aggregate level the respondents indication of the most important factors considered when selecting the mode of inland transportation.

*(Source: Author's research)*

specifically reflect on what motivated them and/or the given stakeholder in that situation. Appendix 8.1.2 depicts various motivations, summarized by stakeholder group, that were discussed during the interviews. The list was consistent with drivers identified during the literature review process and, as such, there are no anomalies upon which to elaborate in this section.

Details from this list were used to construct round two survey question 4. The objective of this question was to have the survey-takers confirm from a consolidated list which factors were most important to them (in their capacity as a transportation buyer) or their customers in making their inland transportation modality decision. For this question, motivations of the Port Authority and deep sea terminal were disregarded in terms of inclusion as response options. This was decided because, for the large part, they are not or are limitedly involved in hinterland transportation. One exception was made for the environmental sustainability motivation because this was identified as a deliverable in the synchromodality literature. *Sustainability ($CO_2$ emissions)* was included as an option to record if inland transportation routing decisions were actually inspired by this deliverable. The remaining options were taken from the motivations identified for ocean carrier, freight forwarder and cargo owner stakeholder groups. The aggregate responses to question 4 are displayed here in Figure 8. The question itself including options and a more detailed breakdown of the results by respondent type can be found in appendix 8.2.5.

Each of the 11 survey respondents indicated that cost/price and transit time were important factors in deciding inland transportation modality. Reliability, flexibility, and availability of service were the next highest priorities as a whole. While the literature

and personal interviews touted additional services at inland locations as a differentiator in the market, the survey respondents in this study did not substantiate the belief. Similarly, environmental sustainability in itself does not seem to motivate stakeholders when deciding inland transportation modality. To the extent that operating more sustainably contributes to reducing operating cost allowing a lower price point in the market is not discernable from this question.

At the respondent stakeholder group level there appears to be some variation between the next most important factor after cost/price and transit time. Deep sea terminal operators and freight forwarders indicate this to be flexibility while the Port Authority and ocean carriers believe it to be reliability. Customers' revealed preference for lower cost, paired with asset-owning stakeholders' ability to control operational cost drive Recommendation #s 2 and 4.

## *5.5 Implications for Expansion of Synchromodal Transportation*

Thus far the discussion has had a more general scope in evaluating opinions related to hinterland transportation as a whole, which was necessary as it is the foundation from which synchromodal transportation originates. It is important to have a firm understanding of the parties involved and using hinterland transportation as this also provides insight as to the obstacles a synchromodal transport provider must overcome to expand their position in the larger hinterland transportation market. Further, a firm grasp on the synergies already in place will facilitate their ability to grow.

As the quality of stakeholder relationships as they pertain to international containerized hinterland transportation was already expanded in section 5.3, it is not necessary to repeat the discussion related to the Delphi round one interviews. It is now time to turn the focus specifically to the expert opinions uncovered as they relate to synchromodal transportation. Questions 6, 7 and 8 were designed to isolate and extract their thoughts on synchromodality.

Question 6, which can be found in appendix 8.2.7 along with the responses by stakeholder group type asks the survey-taker to identify the single statement which best describes their familiarity with synchromodal transportation. Of the 11 survey respondents, 10 answered this question. Five, including the deep sea terminal operator, two of five ocean carriers, and two of three freight forwarders indicated that they have heard of synchromodal transportation and their company IS using or offering this service. One ocean carrier claimed that they are NOT using synchromodal transport.

As expected based on the personal interview, the Port Authority indicated they do not use it, but they are affected by other stakeholders' decisions with respect to synchromodal transportation. This is consistent message as was delivered in the personal interview in that the deliverables of the synchromodal initiative closely align with their longer term objectives to reduce roadway congestion through improved inland transport modal splits and to position Rotterdam as a reliable port, capable of delivering commercial benefits to its hinterland customers. They see synchromodal transportation as being conducive for achieving those goals.

Of the remaining respondents, one combined inland terminal/transport operator and a freight forwarder indicated that they are aware of synchromodal transportation and their company is currently exploring how to make better use of this kind of service. As synchromodality is a new concept and still in its development stage, this position is encouraging.

The last respondent, an ocean carrier, marked 'Other' and provided this interesting perspective: *"The concept is very attractive to the party which is planning the actual transport, because the planning stays flexible [sic]. The consignee just wants its goods on time against the best price, therefore what you sell is not much more interesting."* They do not indicate if they are actually using synchromodal transportation, but it does offer a suggestion as to how it should be marketed to various parties.

Questions 7 and 8 along with the responses are documented in appendices 8.2.8 and 8.2.9, respectively. Ten out of 11 participants provided comments on advantages of synchromodal transportation (question 7) while 9 of 11 commented on disadvantages (question 8). The questions were constructed as free-response questions which typically require additional thought and effort, yet deliver candid, unrestricted opinions, so the high participation rates were extremely valuable.

As far as advantages are concerned, by far, respondents recognized the capacity synchromodal transportation has to deliver lower cost through more optimized use of the network. Both lower cost and optimization/efficiency were cited by four of 10 participants. Closely behind, sustainability, reliability, flexibility and the capability to be responsive were all recognized as positive attributes of synchromodal transportation. Participants seem to have a clear understanding of how the concept translates free information sharing, collaboration and consolidated volume into improved asset utilization, which in turn contributes to lower costs.

With respect to disadvantages, however, issues previously raised regarding the lack of confidence in the willingness of other parties to share the benefits generated emerge again as disadvantages of participating in in a synchromodal transportation network. It is highly recognized that this structure is much more complex and will require a higher level of structure, accountability and trust. They acknowledge a level of control must be sacrificed and, in joining forces to create volume synergies, the level of differentiation in the market decreases. There is reservation when it comes to fully committing to the process due to the absence of clear rules detailing roles, responsibilities and compensation for contributions to the process.

Several additional disadvantages advise of the lack of trimodal inland points in the Netherlands and a concern over higher pricing of synchromodal services.

To conclude the survey, question 9 and its responses, found in appendix 8.2.10, offered one last opportunity for the participant to provide commentary on the topics of intermodal or synchromodal services. Feedback given reiterated points raised throughout the research process.

## *5.6 Conclusion*

The key principles of stakeholder management theory are 1) there are multiple stakeholders, 2) each with varying interests, 3) who are motivated to take action to protect their interests and 4) that a successful strategy for engaging stakeholders is

collaboration. Collaboration requires trusting relationships and an ability to communicate and share information symmetrically. Through collaboration, stakeholders can achieve things beyond what they could acting independently.

Literature on hinterland transportation demonstrated various stakeholder groups for the resources or capabilities they possess and their interests. Considering synchromodality is a strategy for hinterland transportation, this list can be extended to assume these are also the motivations of synchromodal stakeholders.

The results described in section 5.1 - 5.2 establish which synchromodal stakeholder groups exist, which groups interact with one another and their capacity in the sale/purchase of (synchromodal) hinterland transportation. The results described in section 5.4 reveal the various interests synchromodal stakeholders are motivated to pursue. Section 5.3 demonstrates the quality of the relationships amongst synchromodal stakeholder groups based on the core requirements of successful collaboration, a strategy identified for managing stakeholder groups.

To this point, findings based on questionnaires related to hinterland transportation have been extended to synchromodal transportation on account of it being a strategy for providing hinterland transportation. The results described in section 5.5 validate this as an appropriate extension.

Overall, stakeholders know about synchromodality and recognize its deliverables. The opportunity is in lowering the barriers to allow proper alignment so as to realize the acknowledged benefits of synchromodality. Stakeholders can do this by implementing adequate checks and balances, sharing realized cost savings and removing temptation for finger-pointing in cases of process breakdowns. In Chapter 6, several recommendations as to how this can be accomplished will be offered based on the observations detailed in this chapter.

# 6 Discussion and Conclusion

The objective of this study was to apply the knowledge related to successful, collaborative stakeholder relationships with the extensive list of stakeholders in the business of international containerized transportation to the hinterland to identify where there are opportunities to generate the necessary volume to make a synchromodal strategy feasible. Considering the circumstances of this objective, the Delphi method was used after conducting a thorough literature review of stakeholder management theory, hinterland transportation, and synchromodality.

Stakeholder management theory is a strategy in which a focal firm takes into consideration parties beyond the immediate input-output contributors such as suppliers, customers, employees and shareholders. It expands its scope to consider stakeholders related to the firm, which affect or are affected by the firm's actions. Stakeholders often have various interests, which may or may not be in alignment with other stakeholders, but will nevertheless act to protect their interests. Stakeholders have the capacity to present both opportunities and threats to other stakeholders. One successful strategy identified for achieving a competitive advantage in the market is through collaborating with stakeholders to create "win-win" outcomes in which the parties achieve the project's goals without sacrificing one another's benefits. Loyalty, honesty, integrity, persistence, effort, balanced information, shared control, and trust are critical requirements to facilitating a successful collaborative endeavor. Collaboration enables parties to pool resources, capitalize on complementary capabilities, achieve economies of scale, innovate, mitigate problems such as free-riding and opportunism, reduce negotiation, monitoring enforcement and operation costs, and improve the efficiency of executing formal and informal contractual arrangements. Through collaboration stakeholders develop a common definition to a common problem and are able to solve problems that could not be solved by any single firm acting alone.

Close examination of the hinterland transportation of international containerized cargo revealed an extensive list of stakeholders to the process, an endless list of possible combinations in which they might engage to provide hinterland transportation, and a number of important factors driving their routing decisions. Primary hinterland transportation stakeholders were identified as cargo owners, inland transportation providers (including barge, rail and truck operators), inland terminals, freight forwarders, ocean carriers, deep sea terminals, and port authorities.

Several elements of stakeholder management theory were revealed in this research. First, the list of stakeholders mentioned above was identified. Next inventory was taken of the different motivations of these stakeholders. Literature and the questionnaires related to this study revealed that cost/price and transit time are the most important factors motivating decisions with regards to inland transportation modality. In addition to this, reliability, flexibility and availability of services are important. To deliver these requirements, information is critical. Information was also identified as a key requirement of a successful collaborative stakeholder strategy. Through improved access to information in a timely manner, network efficiencies can be delivered via terminal operations improvement, reduced or eliminated costs to reposition empty equipment, improved utilization of transportation assets and an

increased use of more cost effective transportation modes, while at the same time achieving cargo owners' pickup/delivery requirements.

The third element of stakeholder management theory encountered was the impact integrity, persistence, effort, balanced information, shared control, and trust have on facilitating a successful collaborative endeavor. Through open dialogue and the survey of this study, examples of engagements where these elements are present demonstrate positive performance of the collaborative initiative. Feedback related to the lack of trust, confidence, commitment, accountability or reward in exchange their effort, cause a reluctance to give up control in order to participate collaboratively. Quantification of the strength of various stakeholder relationships provides insights on where the opportunities lie for either further developing an already positive relationship or for improving a damaged one.

This research set out to understand the following:

*"What is the opportunity for stakeholder management theory to be applied to further develop the market for synchromodal transportation?"*

The hypothesis was that concepts from stakeholder management theory could be applied to the synchromodal transport concept to understand the stakeholders and identify ways in which stakeholder relationship strengths can be capitalized to unlock the market for synchromodal transportation.

The conclusion, based on the results from this research, is that the hypothesis can be confirmed. Synchromodal transport networks need to take into consideration parties beyond the immediate input-output contributors and consider those stakeholders related to them which affect or are affected by their actions. It has been demonstrated that the stakeholders of synchromodal transport have various interests which are not in alignment with other stakeholders in many cases. More specifically, stakeholders seem to be misaligned in *how* they realize their interests. Several opportunities, which will be discussed in the next subsections, have been identified for stakeholders to collaborate differently and improve alignment.

In summary, stakeholders should realign through establishing clear roles and responsibilities related to how they can pool resources, capitalize on complimenting capabilities of each firm and achieve the economies of scale necessary to realize the promised benefits of synchromodal transportation. Since stakeholders have limited prior experiences with synchromodal transport strategies, formal contracts may be necessary to establish faith that all stakeholders will do their part to avoid the need for aggressive strategies. Strategies should define the firms' expectations in terms of what it wants to achieve and the commitments it is willing to make to achieve the common goals. Action is driven according to the firms' expected values and payoffs related to the outcome, so it is necessary to be selective in engaging stakeholders to develop clear membership guidelines such that costs for all individuals conducting business is reduced overall. Interviewees and survey participants reiterated a desire to have these boundaries to create more confidence in the system. Collaboratively defining clear roles, responsibilities and rewards of each stakeholder in their agreements will enable the network collectively to define the common objective and structure their interaction and joint resources to achieve goals that could not be accomplished by any single stakeholder acting alone.

Questions related to perceived advantages of synchromodality revealed an understanding of what the model had to offer while questions related to perceived disadvantages point to structure. Assuming the agreements can be put into place, the responsibilities should be aligned with the strengths of each stakeholder. As mentioned in section 5.2, there are several functions, such as terminal operations, ocean transport or inland transport, which very specific stakeholders can perform with their assets. The sale of these services, on the other hand, has been demonstrated can be conducted in a number of ways. As such, stakeholder management theory is necessary to evaluate stakeholders' motivations for action along with the resources/characteristics they possess as it then becomes clear that these attributes are exactly what others require to achiever their objectives. More specifically applied to a synchromodal transport network, understanding the attributes given stakeholders possess will reveal on which parties the synchromodal *network* will rely in order to achieve *its* objectives.

An analysis of the quality of existing relationships provided insight as to which parties have a competitive advantage and thus are in a better position to assume responsibility for those functions which can be conducted by various stakeholders. Alternatively, weak relationships reveal opportunities for improvement or functions a stakeholder might relinquish to a better suited stakeholder in the network in order to focus on an area of strength. In doing so, the synchromodal network as a whole is better aligned to succeed in the market.

From this research, several recommendations can be drawn.

## *6.1 Recommendation 1*

The Port Authority has no active involvement in the procurement, sale or investment in hinterland transportation activities. They do, however, have access to information, particularly information related to the balance of trade of import and export containers passing through the port of Rotterdam. While they are beneficial in the initiative to increase the use of rail and barge transportation to the hinterland, Delphi round one interviews revealed that ocean carriers are reluctant to make investments in inland depots on account of not having visibility to the balance of trade. The Port Authority could make use of their "big data", for example customs data, and publish periodic reports indicating the origins, hinterland destinations and container volumes passing through the Port of Rotterdam. Ocean carriers can use this information to identify and negotiate with appropriate inland terminals which would serve as suitable inland depots. Round one interviews also indicated, ICT platforms are good. Stakeholders gave positive feedback and examples of how tools such as InlandLinks and PortBase are used to their advantage. Engaging with stakeholders to identify best practices, then making this information available would help others as well.

## *6.2 Recommendation 2*

Ocean carriers are in a strong position to expand the market for synchromodal transportation, provided that it is done with several conditions in mind.

*Condition 1:* They should let freight forwarders have responsibility for last mile delivery. This allows the carrier to minimize human resource investment to deal with a large number of cargo owners and can instead focus on their core business, specifically on-time arrivals. All three freight forwarders interviewed advised they

already have the relationships with the cargo owners and are eager to protect them, however they do recognize the synergies ocean carriers are able to generate as a result of having visibility to multiple freight forwarder volumes. This translates to economies of scale and reduced costs. Interviewees also revealed there is market interest in CY service offerings as it relieves them from having to deal with issues in the port.

*Condition 2:* The savings generated by the economies of scale have to be shared with the freight forwarder. The literature review on stakeholder management suggests stakeholders will take action according to expected values and payoffs related to the outcome of the focal firm's (in)action. They must perceive that their input into the process (information or relinquishment of control) will result in an equal reward, otherwise they will not take action in the initiative. With the shared savings, they in turn will pass some of the savings on to the cargo owner, realizing a bit for themselves, of course. Overall the combination results in a "win-win-win" relationship for all parties as they will have a stronger negotiating position with the customer and have incentive to bring the volume to the ocean carrier who is willing to share.

*Condition 3:* The exception to this recommendation would be the cases where the ocean carrier already has a contract direct with the cargo owner. In this case, if the rate is not already negotiated as a door move, the ocean carrier's sales team should pursue this additional business. Likely that cargo owner already has a significant volume if the contract is direct with the ocean carrier, otherwise they would be dealing with a freight forwarder. Chances are, the party currently arranging the inland transportation is facing free time limitations imposed by the ocean carrier, causing them to make inefficient backhaul arrangements to avoid detention charges. Even if there is not a corresponding export, there is surely an opportunity to make arrangements to store containers inland until there are enough to justify a less expensive rail or barge movement to reposition the empties. For the cargo owner, this would eliminate one additional transaction to arrange inland transportation if the ocean carrier was responsible for delivery to the door.

*Condition 4:* On that note, the fourth observation with regards to ocean carriers is that inland depots in general are well received both by the cargo interested party and the direct customer as it reduces the empty legs of inland transportation. This was identified in hinterland literature and confirmed through interview comments. While it is recognized that the cost would then be deferred to the ocean carrier, it is also assumed that the ocean carrier can reposition empties in aggregate at a lower cost. It is recommended to analyze the cost the other party would incur on the round trip trucking versus the aggregate cost of ocean carriers repositioning empty containers. Delphi round one Interviewee #7 suggested there is likely to be a premium covering the additional cost incurred, yet lower than what the other party would incur, which the ocean carrier could charge to justify taking responsibility for this activity.

*Condition 5:* Ocean carriers benefit from better, though not perfect, relationships with deep sea terminals as revealed by Delphi round two, question 5. Additionally, they are the primary customer of the deep sea terminal on the waterside and can use that relationship as an advantage. One of the primary complaints identified as an obstacle preventing increased use of inland barge is the delay incurred at the deep sea terminal on account of, among other things, the ocean-going vessel

having priority at berth. Hinterland transportation literature recognized this as did all round one interviewees. By controlling the transportation to an inland CY, the ocean carrier is also the “customer” on the land side and the original relationship on the waterside can be leveraged on behalf of the sub-contracted inland transportation providers to assure a good land side service level as well. The benefit that can be offered in exchange can be the next modality information the deep sea terminals seek.

*Condition 6:* Lastly, in marketing a synchromodal service to an inland CY, an ocean carrier can distinguish themselves in the marketplace by taking accountability for the overall transit time. It was also revealed in the literature and in the personal interviews of this study that although common rating of barge/rail services are being introduced, there is not an offer in the event trucking must be utilized. Further, the poor on-time performance of ocean going vessels contributes to the need for trucking. All interviewees of this study, except the ocean carrier, referenced the carriers’ poor on-time performance (versus their published transit times) as a contributing factor in the congestion experienced in the deep sea ports. Diligent communication with the client should take place to understand and agree upon a combined ocean and hinterland lead time. Pricing should be set according to the means “typically” necessary to meet that time, understanding that there will be exceptions. This should be coupled with a robust periodic performance evaluation agreement in which both the carriers’ network performance *as well as* the cargo owner’s (or forwarder’s) requirements are checked. Interviewee #6 and #7 both discussed pricing of synchromodal transportation and had differing opinions about the possibility of a single rate. One thought it could work, while the other had reservations; both confirmed a review process would be a requirement regardless. The system for reconciling or adjusting the rate when performances are outside of agreed upon bounds should be established in advance.

## *6.3 Recommendation 3*

Cargo owners, directly or by means of their freight forwarders, should seek partnerships through which they can confidently provide information on required pickup or delivery dates and trust that their partner will delivery accordingly, regardless of the mode they deem necessary to satisfy that requirement. Delphi round one interviewees recognized cargo owners (or freight forwarders) hang on to control of hinterland transportation, shying away from synchromodal services where they would have to relinquish control, because delivery is not consistent achieved. They felt that by retaining control of this decision they were in a better position to react and to control their costs. Freight-selling parties can facilitate cargo owners’ confidence in the service they sell by removing the cargo owners’ incentive to micro-manage the routing decisions. This was concluded in the synchromodality literature and validated in the Delphi rounds where each participant claimed cost was a determining factor in making routing decisions. Offering consistent rates for synchromodal transport, regardless of barge, rail or truck, will eliminate motivation to cherry pick modality based on rates. Similarly, the freight selling party must take accountability to deliver (as mentioned in the recommendation to ocean carriers) regardless of who in their network is actually performing the hinterland transportation. Examples were given by interviewees of stakeholders finger-pointing in instances of delayed shipments in an attempt to offer their own value-added services as a means for preventing similar instances in the future. To avoid opportunistic behavior, which was identified as an obstacle to collaborative

relationships in the stakeholder management literature, would mean an increased level of responsibility and mature agreements are in place with sub-contracted transportation providers. Two interviewees discussed a single rating system for (bi)trimodal hinterland service possibilities with a strong system of accountability and checks and balances. Doing so, however, will take away the incentive to define modality out of necessity. Literature indicated relationships between stakeholders can involve formal contracts, but this is not a requirement. As the synchromodal concept is new and historic performance does not demonstrate consistency sufficient for cargo owners to relinquish control, a formal contract may be in order to demonstrate both parties' commitment to the concept.

## *6.4 Recommendation 4*

(Combined) inland terminal and transportation operators are also in a solid position to have a seat at the synchromodal table. Relationship analysis in Delphi round two, Question 5 of this study indicated that this stakeholder group currently enjoys positive relationships with all stakeholders surveyed, which is an advantage. Survey participants were instructed to consider level of trust, ability to communicate share information, collaborate and resolve conflict when answering this question. These elements are characteristics of successful collaborative stakeholder strategy requirements and indicate their taking the lead to coordinate synchromodal transport would be positive. Additionally, inland terminals even if it is only on a bi-modal basis (barge + truck or rail + truck), have access to multiple modes of transportation at their facility. They can market synchromodal transport to ocean carriers, forwarders or cargo owners, although the above recommendations would also apply. Establish clearly defined agreements with the transport purchasing parties and take accountability for the services sold, regardless of the mode required to fulfill. Follow up regularly to evaluate performance and modify the agreement. Their position in the network enables various commercial possibilities allowing for a degree of differentiation to exist in the marketplace.

Although there are challenges at the deep sea terminals with regards to delays and congestion with landside connections, (combined) inland terminal and transportation operators have maintained a high relationship rating. In particular the current barge scheduling process was identified as a challenge. An example of success with this regard was given by round one interviewee # 5 describing the rail segment where fixed window appointments were established. It was identified as an area of opportunity for the barge objects as well. Literature revealed at the present time intermodal volumes do not always guarantee a fully utilized asset, motivating a delayed call until the asset can be better utilized. Stakeholder management literature specific to collaboration reveals it will enable parties to pool resources to achieve economies of scale. To generate consistent calls at the terminal and at the same time generate volume, (combined) inland terminal and transportation operators should explore operational alliances within their shareholder group, similar to those in place in the ocean-going vessel market. This slot-sharing concept would allow for a string service to be established with consistent schedules for calling on the deep sea terminals. From the commercial aspect, each individual party can maintain its independence.

## *6.5 Recommendation 5*

Last, but not least, the opportunity for deep sea terminals to contribute to increasing the market for synchromodal transport is to focus on their core business as a

stevedore. There is a severe image issue to overcome as revealed by round two survey question 5 and raised in three different interviews. It can be improved by demonstrating consistent, improved service across all inland modalities and ocean going vessels. As carrier haulage increases, indirectly the inland modes can be processing freight on behalf of the ocean carriers who are commercial customers on the water side. A terminal operator who is aware of his stakeholder environment will acknowledge relationships, although long term, change over time. The firm which anticipates the impending change better will enjoy a stronger position in the market.

Two primary issues were raised contributing to frustration with deep sea terminals; congestion and preferential treatment. Stakeholder management literature described stakeholders having a motivation to take action against a focal firm if they perceive the (in)action they are taking to affect them in a negative way. Action in this case, where they perceive the preferential treatment to negatively affective their ability to be treated equally, stakeholders take action by stepping away from their additional synchromodal services. Relationships can be improved through proactive communication with inland transportation modalities to share the kinds of actions they can take to improve turnaround time at the port. Be it the “fixed window” concept, appointments, advanced communication of certain data elements, etc., articulate what it takes to improve the experience for both parties. To overcome the preferential treatment stigma, communication should be focused on promoting *behavior* that will receive preferential treatment, rather than promoting a given inland transportation company. As mentioned several times earlier, deep sea terminals must then take accountability to deliver.

## *6.6 Future Research*

There are several areas future researchers of this topic could explore.

The first suggestion would be to repeat the Delphi process using the findings of this research as the basis of the first round questionnaires to collect reactions to the findings and recommendations. The survey step could then be refined and used to validate or sharpen these findings.

A second suggestion would be to execute the survey process with a larger audience. Additional ocean carriers, freight forwarders, cargo owners etc. each have industry associations who can help facilitate distribution of the survey. A larger data set covering the same topics could help to identify anomalies or uncover additional relationship nuances.

Lastly, as identified in section 4.3, it would be of interest to repeat this research in a wider geography of Rotterdam’s hinterland. Additional analysis could investigate if the same motivations an relationship dynamics exist further into the hinterland where trucking is less cost effective.

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# 8 Appendices

## *8.1 Delphi Round 1: Interview Guide for Personal Interviews*

**Synchromodal Transport**

- Familiarity with synchromodality?
- Is your firm currently using/offering synchromodal transport?
- Has your firm been approached regarding synchromodal transport opportunities?
- If so,
    - By whom? (specific company or type of firm in general)
    - How have you been approached regarding synchromodal transport? (Aggressively, from a power position? Collaboratively?)
    - What was the request? Offer?
- What do your customers expect from a synchromodal service?
- What are(would be) the advantages/disadvantages of synchromodal transportation?

**Intermodal/CY/Extended Gate Transport**

- How do you arrange intermodal transport?
- How do you decide which mode (truck, rail, barge) to use?
- What has the experience been line to coordinate rail? Barge? Truck?
- Is intermodal your core business (profit center)?
- Would it matter to you if another party coordinated?
- What would you want in return to let another party coordinate?
- Have you explored or are you using carriers' CY services?
- What is the selling proposition with these services?
- What do your customers expect of their intermodal service?
- What are(would be) the advantages/disadvantages of intermodal transportation?

### 8.1.1 Summary of stakeholders

| STAKEHOLDERS | COUNT |
|---|---|
| Port Authority | 3 |
| Deep Sea Terminal | 7 |
| Ocean Carrier | 7 |
| Freight Forwarder | 7 |
| Inland Terminal* | 6 |
| Inland Transportation*<br>• Barge<br>• Rail<br>• Truck | <br>7<br>7<br>7 |
| *Reference to combined inland transportation and terminal | 2 |
| Cargo Owner | 6 |
| Other | 0 |

*(Source: Author's summary of topics referenced in personal interviews of Delphi round one)*

### 8.1.2 Summary of stakeholder motivations

| STAKEHOLDERS & MOTIVATIONS | COUNT |
|---|---|
| **Port Authority** | |
| • Modal shift targets | 2 |
| • Good service to hinterland customers | 1 |
| • Reduce road congestion | 1 |
| • Reduce $CO_2$ emissions | 1 |
| **Deep Sea Terminal** | |
| • Modal forecast information (at time of or before vessel arrival) | 2 |
| • Inland destination information | 1 |
| • Appointment 24 hours in advance (hinterland transportation) | 1 |
| • Modal split | 1 |
| **Ocean Carrier** | |
| • Market share/revenue | 2 |
| • Control over or insight about equipment (containers) | 1 |
| **Freight Forwarder** | |
| • Agreements to guaranteed transit time | 1 |
| • Lower cost | 2 |
| • Fast transit time | 1 |
| • Balance of trade (import/export mix) | 1 |
| **Inland Terminal*** | 0 |
| **Inland Transportation*** | 0 |
| **Cargo Owner** | |
| • Truck | 3 |
| • Consistent performance | 3 |
| • Timeliness | 4 |
| • Low cost/price | 4 |
| • Reliability | 2 |
| • Additional services | 1 |
| • Frequency | 1 |
| • Capacity | 1 |
| • Flexibility | 1 |

*(Source: Author's summary of topics referenced in personal interviews of Delphi round one)*

### 8.1.3 Summary of opportunities in hinterland transportation

| OPPORTUNITIES IN HINTERLAND TRANSPORTATION | COUNT |
|---|---|
| ***RELATIONSHIPS*** | |
| Cooperation and communication through common platforms lead to reliability and consistency of service | 3 |
| Collaborative approach to encouraging modal info sharing | 2 |
| Proactive communication with stakeholders to check on the relationship | 2 |
| Customers willing to pay for the right services, but also customers are willing to accept slower service for lower cost. Communicate to find out what suits them best | 2 |
| Two-way incentives | 1 |
| Facilitate others letting go through commitment to consistent delivery of promises at the expense of individual gains on isolated itineraries/shipments for the greater good of network efficiency | 2 |
| ***STRATEGY*** | |
| Barge/rail/inland terminal as a warehousing/storage strategy (cost savings for cargo owner "floating storage" or carrier compared to prime real estate at deep sea terminal) | 3 |
| Strategic relationships with other stakeholders in the same category to develop solutions, share operational resources | 2 |
| Bimodal (not just trimodal) possibilities for synchromodal transport | 2 |
| Common rates for barge/rail and communicated transit time makes life easier | 1 |
| Single rate for (bi)trimodal hinterland service possibilities with strong system of accountability and checks & balances | 2 |
| Dedicated deep sea/barge quays or quay times | 1 |
| Preferred customer status at deep sea terminal because of advanced communications of mode, customer, container #, booking, stowage plans, positioning of (rail/barge) objects | 1 |

*(Source: Author's summary of topics referenced in personal interviews of Delphi round one)*

| OPPORTUNITIES IN HINTERLAND TRANSPORTATION *(continued)* | COUNT |
|---|---|
| ***MARKET SHARE*** | |
| Market interest in CY offerings | 3 |
| Good services plant to port (and vice versa) is a good way to differentiate (through good intermodal services) | 2 |
| Additional communication to sales forces about the inland terminal possibilities and benefits | 3 |
| Use data of balance of trade insight to offer services | 1 |
| ***EFFICIENCY*** | |
| Equipment availability at inland points close to cargo owner increases flexibility and lowers transportation cost | 3 |
| Synchromodal or other hinterland transportation offers enable freight forwarders and cargo owners to avoid dealing with barge delays at deep sea terminals | 1 |
| Efficient use of equipment through better view of volumes and import/export matching and avoiding empty backhauls or repositioning costs | 1 |
| ***INFORMATION*** | |
| Use intelligence (historical information) to make statistical predictions about next mode | 2 |
| Promote services via inlandlinks, Portbase; incorporate use of common IT sources where possible | 2 |
| (Proactively) provide visibility at the container level | 1 |
| ***COMMITMENT & ACCOUNTABILITY*** | |
| Capture data regarding frequency of mode change shipments and root cause | 1 |
| Incentive scheme for ocean carriers to be on time | 1 |
| Commitment of guaranteed service time can have chain effect down to customer (Ocean carrier --> Freight forwarder --> Cargo owner) | 1 |

*(Source: Author's summary of topics referenced in personal interviews of Delphi round one)*

| **OPPORTUNITIES IN HINTERLAND TRANSPORTATION** ***(continued)*** | COUNT |
|---|---|
| ***OTHER*** | |
| Freight forwarder retains control of last mile delivery to cargo owner | 1 |
| Additional benefit of intermodal services to destinations further into the hinterland | 2 |
| Implement appointment system at deep sea terminals and encourage advance scheduling | 2 |

*(Source: Author's summary of topics referenced in personal interviews of Delphi round one)*

### 8.1.4 Summary of challenges in hinterland transportation

| CHALLENGES IN HINTERLAND TRANSPORTATION | COUNT |
|---|---|
| ***INFORMATION GAP*** | |
| Additional communication levels to communicate changes (when using CY) | 1 |
| Poor information (from ocean carrier) to terminal. Bad/no modality information causes big problems at deep sea terminals (rework). Lack of timely advanced information to deep sea terminal (from barge, from ocean carrier) | 3 |
| Container return rules based on "safe" bet because of lack of information about trade possibilities | 2 |
| Barge/rail scheduling based on "safe" beet (ie ETD of mother vessel) due to lack of information about container availability at deep sea terminal. This causes peaks/valleys and congestion. | 1 |
| Inbound/outbound departments (of same company) not talking with one another | 1 |
| Having information and systems, but systems not allowing communication with other systems | 1 |
| Container industry not sharing information about the "package" (similar to UPS); seems that the technology is there, but not used) | 1 |
| ***MARKET SHARE*** | |
| In synchromodality, trucks lose business to/from deep sea port. | 1 |
| Origin (sales) offices are unaware of inland terminal products/concept. | 2 |
| Sales sees hinterland transportation as additional work | 2 |
| Imbalance of trade (import/export) | 2 |
| Inefficiencies in synchromodal / inland transportation and companies are making money off of it | 1 |
| Ocean carriers focus on port to port transport (assuring global connections - core business) and don't have abundant resources to be agile, flexible, hands on where needed. | 1 |
| Steamship lines not promoting CY services consistently. Examples of some freight forwarders being contacted, others not. | 1 |

*(Source: Author's summary of topics referenced in personal interviews of Delphi round one)*

| CHALLENGES IN HINTERLAND TRANSPORTATION *(continued)* | COUNT |
|---|---|
| ***COMMITMENT & ACCOUNTABILITY*** | |
| Mother vessel poor on-time performance versus published schedule | 2 |
| In CY services/extended gate services, a premium is still charged for truck/expedites | 1 |
| Customers not making long-term deals (during period of stable rates) | 1 |
| Carrier is not committed to overall transit time. Lack of accountability for modal usage (i.e. modality required for the chain as a result of actions) | 2 |
| Lack of commitment to being accountable for schedule □ finger pointing; commitment, but as a gesture to good customer, not as SOP | 2 |
| ***BARGE SERVICES*** | |
| Trucks serviced quickly but scheduled barges are postponed or delayed at the deep sea terminal when the mother vessel arrives | 3 |
| Unreliable barge services when the water level drops (contingency plan?) | 1 |
| Heavy congestion at deep sea terminal (barge) | 2 |
| Shared quays at deep sea terminals for ocean going vessels and barge | 1 |
| ***PROCESS*** | |
| Modality is defined out of habit | 1 |
| Barge/rail appointments are booked late (short notice) and no berth availability | 1 |
| Like with ocean-going vessels, delays at one terminal causes late arrival at next terminal call | 1 |
| Carrier is not committed to overall transit time. Lack of accountability for modal usage (i.e. modality required for the chain as a result of actions) | 1 |

*(Source: Author's summary of topics referenced in personal interviews of Delphi round one)*

| **CHALLENGES IN HINTERLAND TRANSPORTATION *(continued)*** | COUNT |
|---|---|
| ***PROCESS (cont.)*** | |
| Singular view of supply chain planning creates sub-optimal use of resources | 1 |
| "Safe" pricing causes pricing too high versus another carrier offering the optimal routing | 1 |
| ***OTHER*** | |
| The Netherlands has few trimodal terminals, mostly barge+truck or rail+truck, compared to Germany which has more trimodal terminals | 2 |
| Netherlands is a small country so not a big "wow" factor with barge/rail pricing versus truck. Much bigger impact with distance as round-trip trucking becomes unviable | 2 |
| Forceful approach to request next mode information | 1 |
| Preferential treatment of barge carriers (EGS over others at ECT, inland terminal charging higher pricing to third party barges calling their terminals) | 2 |
| Lose interaction with the customer by giving up last mile delivery | 1 |
| Challenge (internally) at execution level. Problems letting go of control of transport (customer, forwarders, intermodal operations departments) | 1 |

*(Source: Author's summary of topics referenced in personal interviews of Delphi round one)*

## *8.2 Delphi Round 2: Questions for Online Survey*

### 8.2.1 Survey Introduction

**Erasmus University Rotterdam**
**2013/2014 MSc Maritime Economics & Logistics Thesis Research**
**SYNCHROMODALITY**

**Welcome to My Survey**

Thank you for participating in this survey. Your feedback is important and valuable in completing the research for my Master's Degree.

In the following pages, you will be asked a series of 9 questions related to the topic of inland transportation of ocean-going containers. Please consider the following definitions:

**Intermodal transportation:**
Transportation of containers in a chain of different modes.

**Synchromodal transportation:**
Transportation over an intermodal network, but with dynamic adaptation of the planning when information about changes and disturbances becomes available. With synchromodal transport, a mode-free booking is made by the shipper. The logistics service provider is then enabled to constantly tune their planning, considering the aggregated transport demand, and at any moment in time, select the best modality to both meet the delivery requirements of the customer and efficiently make use of the available infrastructure in their network.

Thank you in advance for your participation.

Julie Cervenka
MSc Student at Erasmus University Rotterdam
Maritime Economics & Logistics

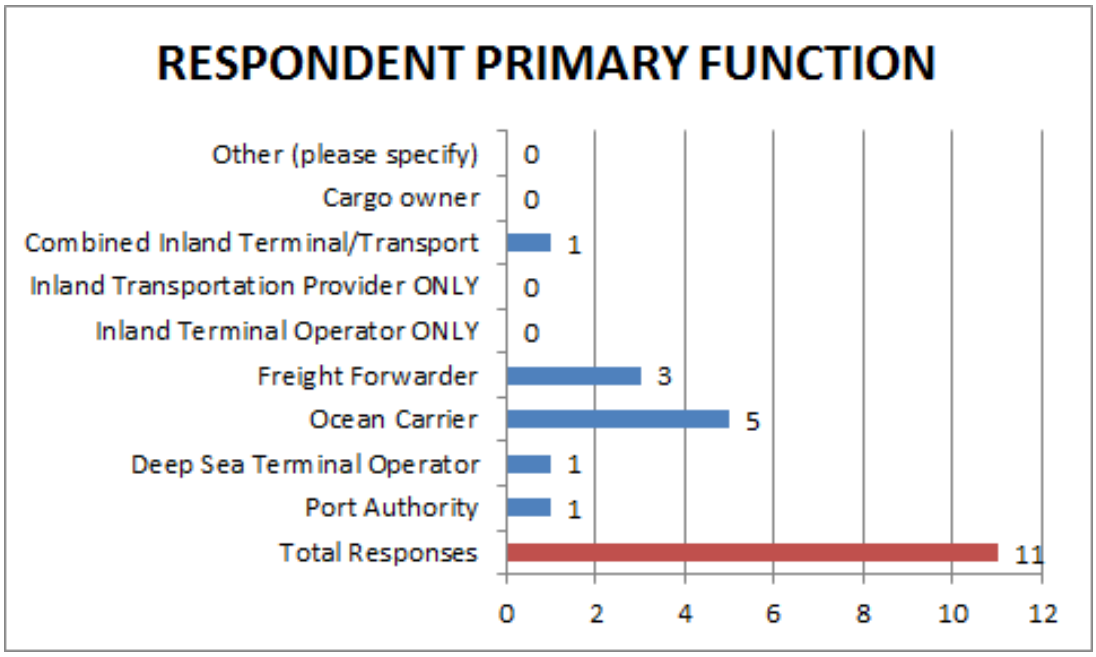
### 8.2.2 Question 1: Respondent's primary function

**Erasmus University Rotterdam**
**2013/2014 MSc Maritime Economics & Logistics Thesis Research**
**SYNCHROMODALITY**

**1. Which of the following best describes your company's primary function?**

- ○ Port Authority
- ○ Deep Sea Terminal Operator
- ○ Ocean Carrier
- ○ Freight Forwarder
- ○ Inland Terminal Operator ONLY
- ○ Inland Transportation (barge, rail, truck) Provider ONLY
- ○ Combined Inland Terminal Operatory and Inland Transportation (barge, rail, truck) Provider
- ○ Cargo owner
- ○ Other (please specify) _____

**Question 1 Responses: Respondent's primary function**



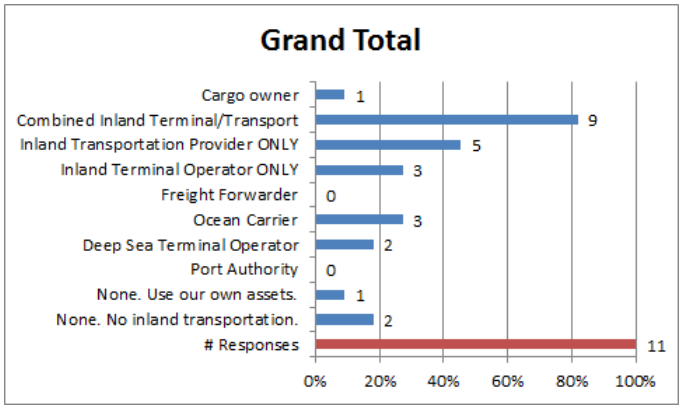
### 8.2.3 Question 2: Stakeholder purchases from

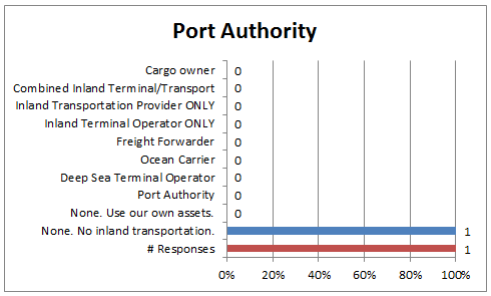
**Erasmus University Rotterdam**
**2013/2014 MSc Maritime Economics & Logistics Thesis Research**
**SYNCHROMODALITY**

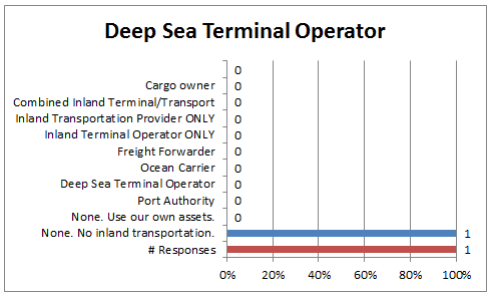
**2. When organizing inland transportation, from which of the following parties do you PURCHASE inland transportation? (Check all that apply)**

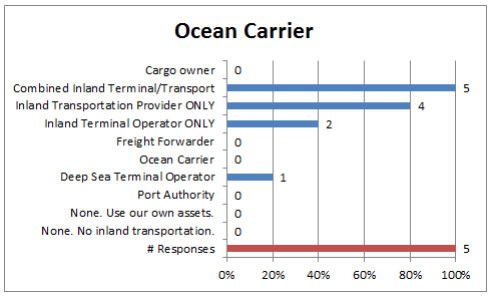
- ☐ None. My company does not organize inland transportation.
- ☐ None. My company is a barge, rail, or trucking company and we operate the service(s) with our own assets.
- ☐ Port Authority
- ☐ Deep Sea Terminal Operator
- ☐ Ocean Carrier
- ☐ Freight Forwarder
- ☐ Inland Terminal Operator ONLY
- ☐ Inland Transportation (barge, rail, truck) Provider ONLY
- ☐ Combined Inland Terminal Operatory and Inland Transportation (barge, rail, truck) Provider
- ☐ Cargo owner
- ☐ Other (please specify)

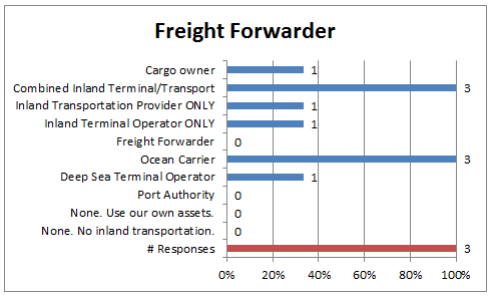
## Question 2 Responses: Stakeholder purchases from

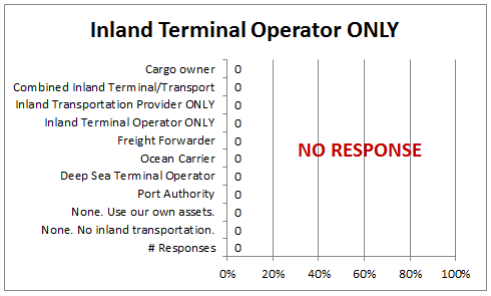


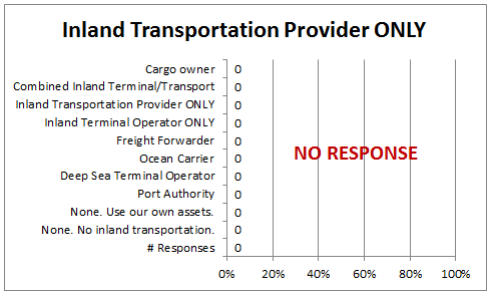



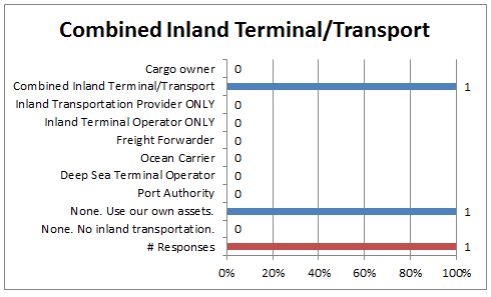



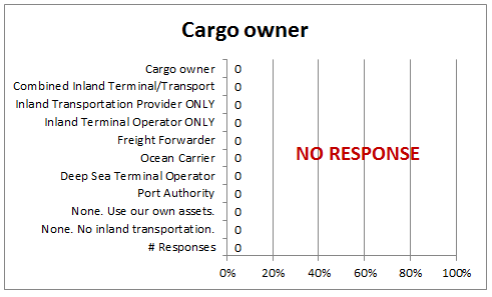



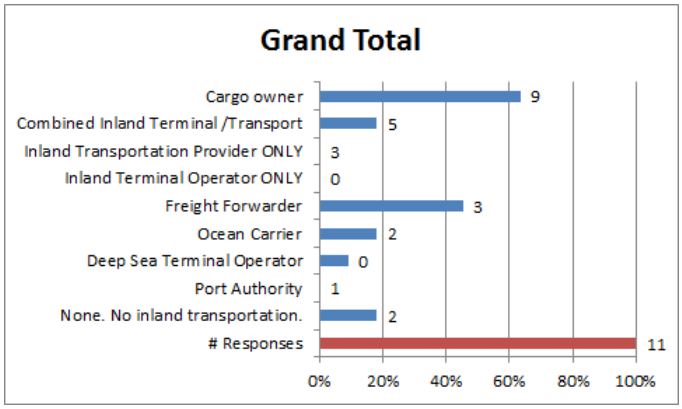
### 8.2.4 Question 3: Stakeholder sells to

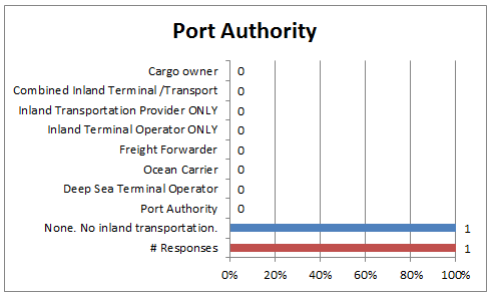
**Erasmus University Rotterdam**
**2013/2014 MSc Maritime Economics & Logistics Thesis Research**
**SYNCHROMODALITY**

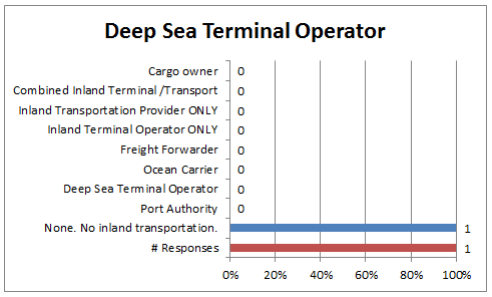
**3. When organizing inland transportation, to which of the following parties do you SELL inland transportation, regardless of whether your company actually operates the mode of transportation sold? (Check all that apply)**

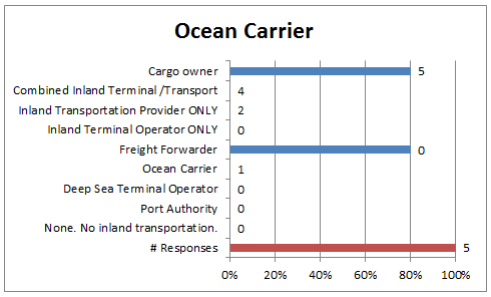
- ☐ My company does not offer inland transportation.
- ☐ Port Authority
- ☐ Deep Sea Terminal Operator
- ☐ Ocean Carrier
- ☐ Freight Forwarder
- ☐ Inland Terminal Operator ONLY
- ☐ Inland Transportation (barge, rail, truck) Provider ONLY
- ☐ Combined Inland Terminal Operatory and Inland Transportation (barge, rail, truck) Provider
- ☐ Cargo owner
- ☐ Other (please specify)

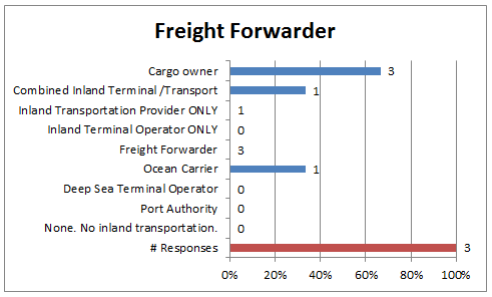
## Question 3 Responses: Stakeholder sells to

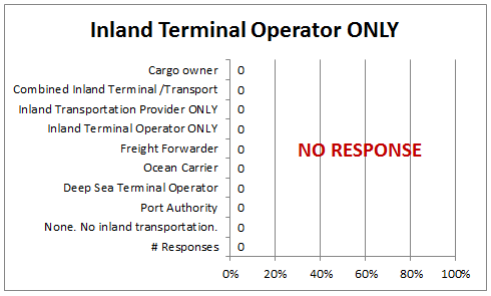


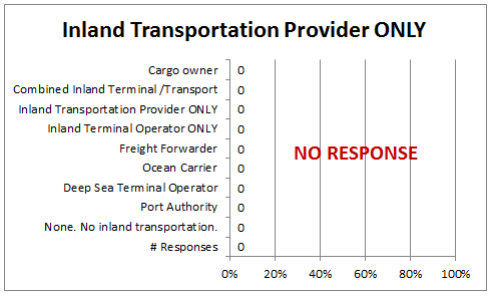



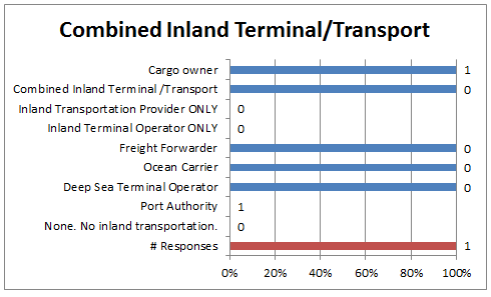



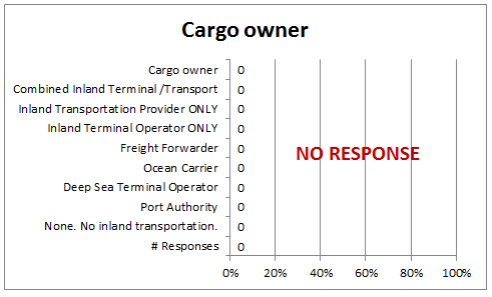



### 8.2.5 Question 4: What's important?

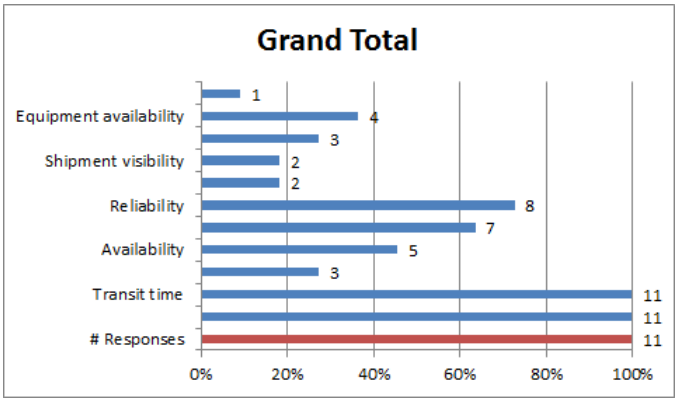
**Erasmus University Rotterdam**
**2013/2014 MSc Maritime Economics & Logistics Thesis Research**
**SYNCHROMODALITY**

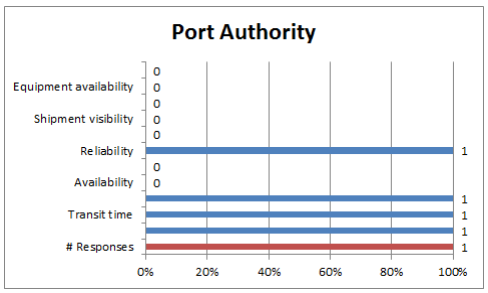
**4. What factors are most important to you/your customer when selecting the mode of inland transportation? (Check all that apply)**

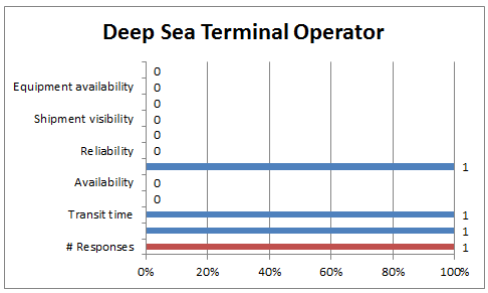
| | | |
|---|---|---|
| ☐ Cost/Price | ☐ Flexibility | ☐ Type of cargo |
| ☐ Transit time | ☐ Reliability | ☐ Equipment availability |
| ☐ Geography | ☐ Sustainability (CO2 emissions) | ☐ Availability of additional logistic services (i.e. warehousing, inspection, etc.) |
| ☐ Availability | ☐ Shipment visibility | |

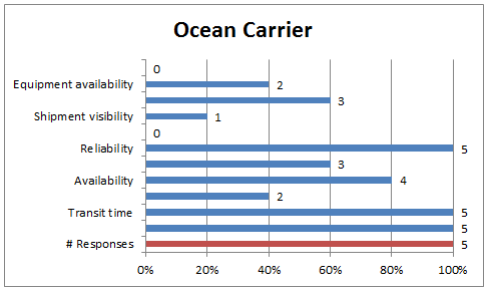
☐ Other (please specify) _____

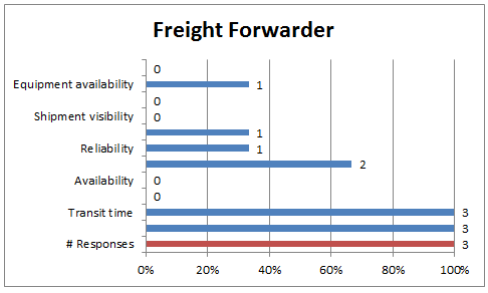
## Question 4 Responses: What's important?

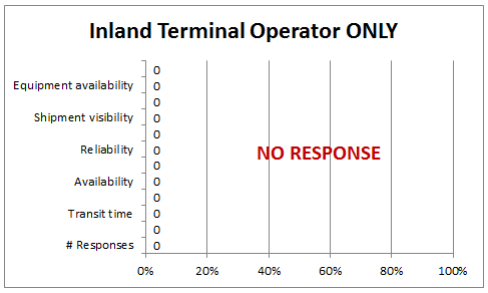


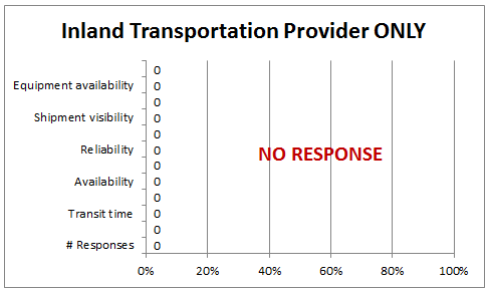



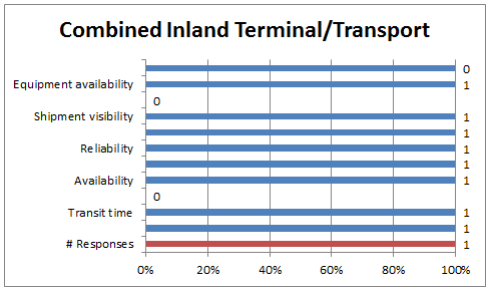



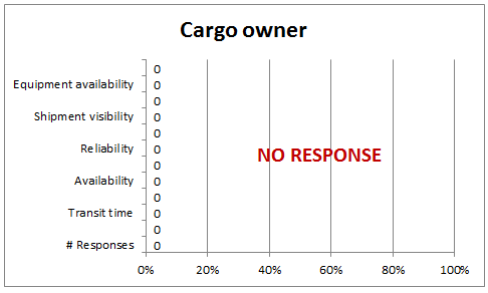



### 8.2.6 Question 5: Stakeholder experience ratings

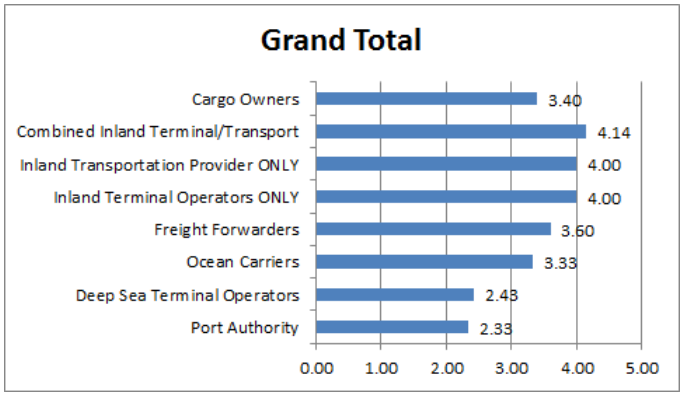
**Erasmus University Rotterdam**
**2013/2014 MSc Maritime Economics & Logistics Thesis Research**
**SYNCHROMODALITY**

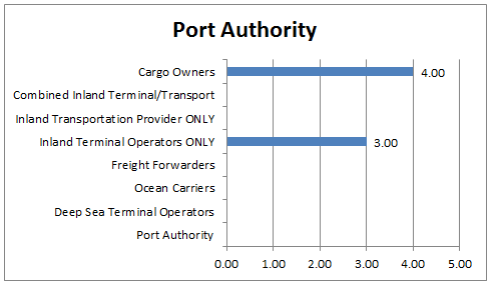
**5. On a scale from 1 (extremely negative) to 5 (extremely positive), please rate your experience engaging with each of the various inland transportation stakeholders.**

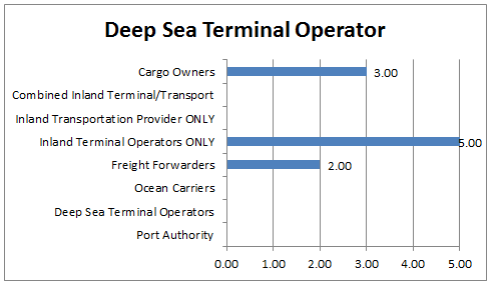
**In your response, consider the level of trust, ability to communicate, share information, collaborate and resolve conflict with the respective partner. If you do not interact with a stakeholder, select N/A. You can use the comment box after each stakeholder to elaborate on your experience.**

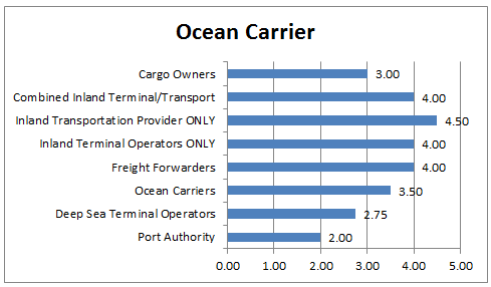
| | Extremely Negative | Negative | Neutral | Positive | Extremely Positive | N/A |
|---|---|---|---|---|---|---|
| **Port Authority** | ○ | ○ | ○ | ○ | ○ | ○ |
| Comments: | | | | | | |
| **Deep Sea Terminal Operators** | ○ | ○ | ○ | ○ | ○ | ○ |
| Comments: | | | | | | |
| **Ocean Carriers** | ○ | ○ | ○ | ○ | ○ | ○ |
| Comments: | | | | | | |
| **Freight Forwarders** | ○ | ○ | ○ | ○ | ○ | ○ |
| Comments: | | | | | | |
| **Inland Terminal Operators ONLY** | ○ | ○ | ○ | ○ | ○ | ○ |
| Comments: | | | | | | |
| **Inland Transportation (barge, rail, truck) Providers ONLY** | ○ | ○ | ○ | ○ | ○ | ○ |
| Comments: | | | | | | |
| **Combined Inland Terminal Operators and Inland Transportation (barge, rail, truck) Provider** | ○ | ○ | ○ | ○ | ○ | ○ |
| Comments: | | | | | | |
| **Cargo Owners** | ○ | ○ | ○ | ○ | ○ | ○ |
| Comments: | | | | | | |
| **Other (specify in comment box)** | ○ | ○ | ○ | ○ | ○ | ○ |
| Comments: | | | | | | |

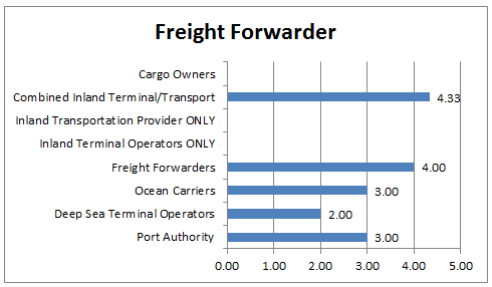
## Question 5 Responses: Stakeholder experience ratings

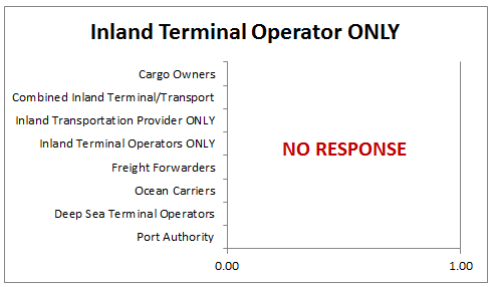


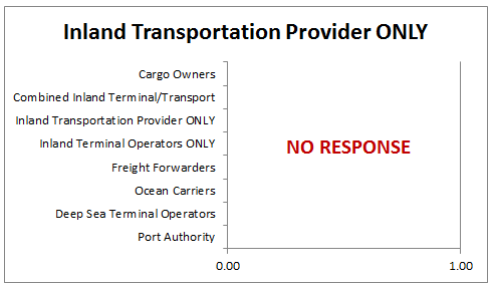



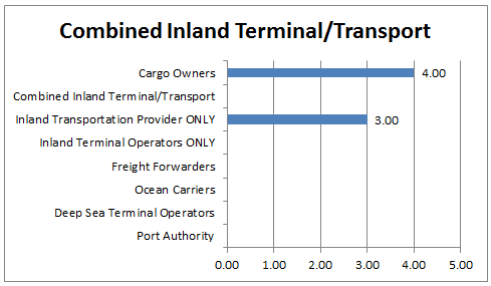



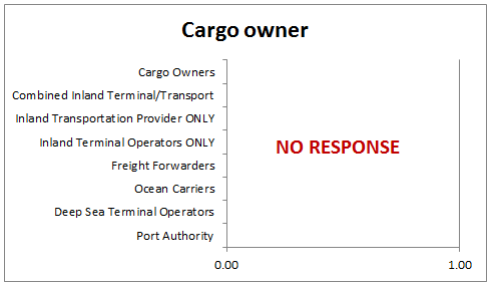



### 8.2.7 Question 6: Familiarity with synchromodality

**Erasmus University Rotterdam**
**2013/2014 MSc Maritime Economics & Logistics Thesis Research**
**SYNCHROMODALITY**

**DEFINITIONS**

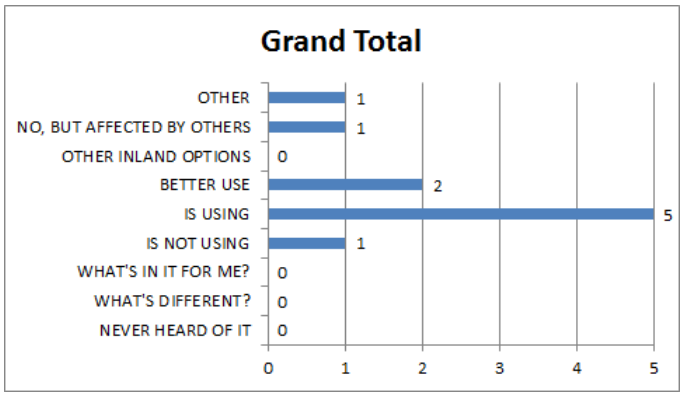
**Intermodal transportation:**
Transportation of containers in a chain of different modes.

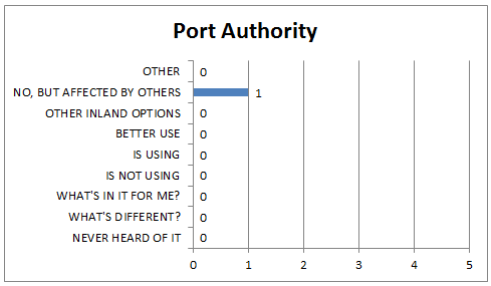
**Synchromodal transportation:**
Transportation over an intermodal network, but with dynamic adaptation of the planning when information about changes and disturbances becomes available. With synchromodal transport, a mode-free booking is made by the shipper. The logistics service provider is then enabled to constantly tune their planning, considering the aggregated transport demand, and at any moment in time, select the best modality to both meet the delivery requirements of the customer and efficiently make use of the available infrastructure in their network.

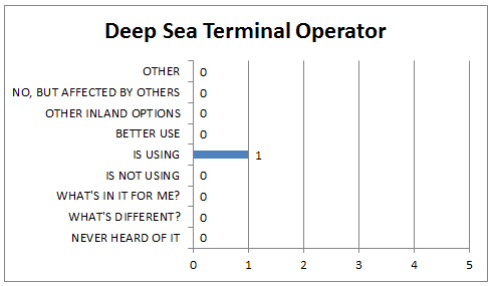
**6. Please refer to the above definitions when answering this question.**
**Which statement best describes your familiarity with "synchromodal transportation"?**

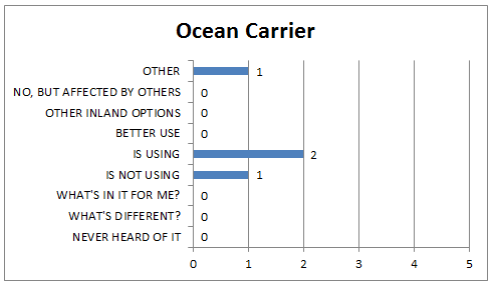
- ○ I have never heard of it before this survey. It sounds like a fancy name students make up for thesis research.
- ○ I don't understand what is unique about it. This describes the way business is normally done. We regularly need to change inland transportation modes to meet customers' needs.
- ○ The concept is interesting, but the product offered is not much more attractive than my current options for inland transportation. There would need to be more incentive for us to pursue it further.
- ○ I have heard of synchromodal transportation, but my company IS NOT currently using/offering this service.
- ○ I have heard of synchromodal transportation, and my company IS currently using/offering this service.
- ○ I have heard of synchromodal transportation, and my company is currently exploring how to make better use of this kind of service.
- ○ My company is not using/offering synchromodal transportation per se, but we have started to explore different ways to organize inland transportation in general (ie different modes, CY services, etc.).
- ○ My company is not or would not be actively involved in synchromodal transport but my company's ability to reach its goals can be affected by other companies' decisions with respect to synchromodal transport.
- ○ Other (please specify) _____

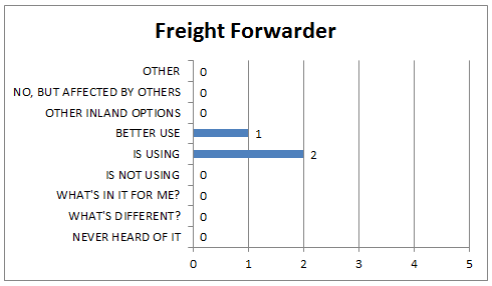
## Question 6 Responses: Familiarity with synchromodality

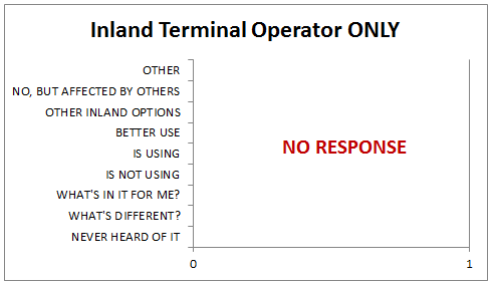


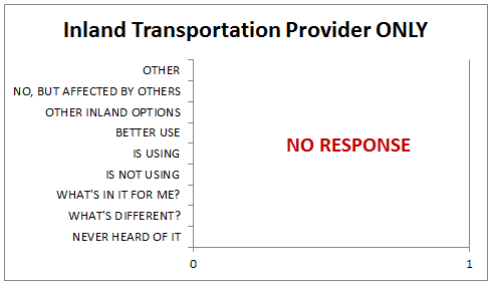



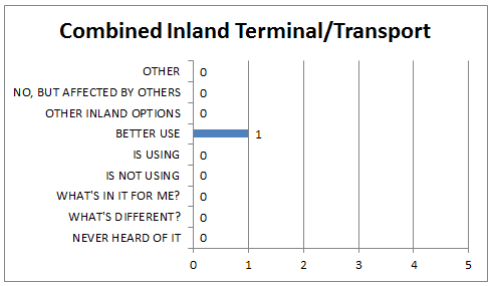



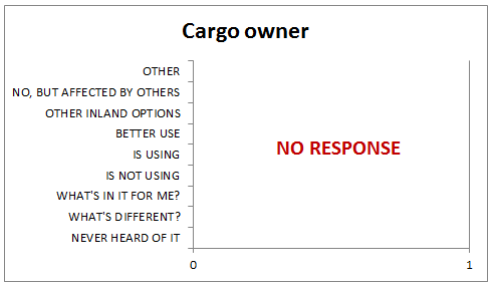



### 8.2.8 Question 7: Advantages of synchromodal transportation

**Erasmus University Rotterdam**
**2013/2014 MSc Maritime Economics & Logistics Thesis Research**
**SYNCHROMODALITY**

**7. In your opinion, what are or would be the ADVANTAGES of synchromodal transportation? Please consider those aspects which would justify an INCREASED use of this product.**

**Question 7 Responses: Advantages of synchromodal transportation**

| Respondent # | Primary Function | Comments |
|---|---|---|
| 1 | Freight Forwarder | by usage of the information the handling from/to terminals can be dealt with efficient and obtain a relliable part of the supply chain consistent |
| 2 | Freight Forwarder | quick reaction on actual situation optimizes transport from and to cargo owners |
| 3 | Freight Forwarder | flexibility and bring value into customers supply chain |
| 4 | Ocean Carrier | Not applicable within our company |
| 5 | Ocean Carrier | **NO RESPONSE** |
| 6 | Combined Inland Terminal Operatory and Inland Transportation (barge, rail, truck) Provider | A higher rate of utilisation of transport means and network capacity, a better service delivery against same or even better cost of operation. |
| 7 | Ocean Carrier | Reliability<br>flexibility<br>it weapons ourselves against terminal congestion |
| 8 | Deep Sea Terminal Operator | - more intermodal transportation --> less CO2<br>- Flexible<br>- Interesting pricing |
| 9 | Port Authority | Advantages could be improvement of reliability and optimal use of barge, rail and road. |
| 10 | Ocean Carrier | Competitive rates<br>Sustainable |
| 11 | Ocean Carrier | Lower cost price and CO2 emmision if you are able to use another modality given needed delivery date. |

### 8.2.9 Question 8: Disadvantages of synchromodal transportation

**Erasmus University Rotterdam**
**2013/2014 MSc Maritime Economics & Logistics Thesis Research**
**SYNCHROMODALITY**

**8. In your opinion, what are or would be the DISADVANTAGES of synchromodal transportation? Please consider those aspects which would PREVENT or justify a DECREASED use of this product.**

**Question 8 Responses: Disdvantages of synchromodal transportation**

| Respondent # | Primary Function | Comments |
|---|---|---|
| 1 | Freight Forwarder | diferentation by providers could be limited. less suppliers |
| 2 | Freight Forwarder | **NO RESPONSE** |
| 3 | Freight Forwarder | people preferences , shipments can be stuck betwee two modes of transport |
| 4 | Ocean Carrier | Not applicable within our company |
| 5 | Ocean Carrier | **NO RESPONSE** |
| 6 | Combined Inland Terminal Operatory and Inland Transportation (barge, rail, truck) Provider | Uncertainty about, or lack of clarity in sharing of the advantages synchromodality between partners in the network.<br>Also, who is the 'owner' of the network and its resources, i.e. what party is selling it to the market and taking the responsibility of the overall service level. In other words: (lack of) TRUST. |
| 7 | Ocean Carrier | costs<br>unclear agreements<br>discussion afterwards |
| 8 | Deep Sea Terminal Operator | - Complexity<br>- Intransparancy |
| 9 | Port Authority | Real synchromodality is in my opinion limited to trimodal operations, which are quite limited to a few trimodal terminals. Venlo, Tilburg in the Netherlands and some Rhine terminals such as Duisburg in Germany.<br>Other disadvantage is that customers will have to pay a price higher than the cheapest modality for the extra flexibility and reliability. The question is how many customers want to pay that higher price? |
| 10 | Ocean Carrier | - Consignee cannot decide transport mode upfront<br>- Truck is seen as reliable other transport modes less reliable - preference of direct truck over Synchromodal transportation |
| 11 | Ocean Carrier | No control of cargo, some commodities are not suitable for the other modalities |

### 8.2.10 Question 9: Additional comments

**Erasmus University Rotterdam**
**2013/2014 MSc Maritime Economics & Logistics Thesis Research**
**SYNCHROMODALITY**

**Last question...thank you for your participation!!**

**9. OPTIONAL:**
**Please provide any additional comments related to intermodal and/or synchromodal transportation.**

**Question 9 Responses: Additional comments**

| Respondent # | Primary Function | Comments |
|---|---|---|
| 1 | Freight Forwarder | to have everybody alligned some top down force needs to be taken - fixed instruction for everyone and the one's providing valuable information to streamline the operation from terminal to hinterland must benefit -> should get something in return |
| 2 | Freight Forwarder | **NO RESPONSE** |
| 3 | Freight Forwarder | A good way to bring value add to the customer , only thing which could be different is the pricing for this product , |
| 4 | Ocean Carrier | We, as a Shipping Comapny, are offering Intermodal Transportation to Inland terminal or on bais of door delivery |
| 5 | Ocean Carrier | **NO RESPONSE** |
| 6 | Combined Inland Terminal Operatory and Inland Transportation (barge, rail, truck) Provider | Well done so far! I am curious about the outcome… |
| 7 | Ocean Carrier | **NO RESPONSE** |
| 8 | Deep Sea Terminal Operator | **NO RESPONSE** |
| 9 | Port Authority | **NO RESPONSE** |
| 10 | Ocean Carrier | The concept is very attractive to the party which is planning the actual transport, because the planning stays flexibel. The consignee just wants its goods on time against the best price, therefore what you sell is not much more interesting. |
| 11 | Ocean Carrier | **NO RESPONSE** |