Chapter 1
Introduction

1.1 Focus on terminal operators in hinterland networks

This research focuses on the liabilities of terminal operators who integrate the inland transport of goods into their service profile, which until recently mainly covered the handling of cargo in sea port terminals.

Terminal operators are logistic services providers who generally perform a wide range of services. Traditionally, their core business involved linking different modes of transport by performing the transshipment of goods from one means of transport to another.[1] These services included taking over and delivering goods on behalf of the sea carrier, loading onto and discharging from vessels or other means of transport, stowing goods on vessels, storing goods in terminals and performing customs related operations. However, recent developments show that some terminal operators have shifted their focus and are becoming involved in the transportation of goods beyond the premises of their sea port terminals. In addition to providing transshipment services at sea terminals, these terminal operators are carrying goods by different modes of transport between sea and inland terminals. This process has been referred to as Inter-Terminal-Transport (ITT). These inland terminals are located in the sea port's hinterland; a term with German origins which can be defined as the area over which a port draws the majority of its business.[2] Inland terminals in the hinterland of the port of Rotterdam are for example located in Venlo (the Netherlands), Duisburg (Germany) and Liège (Belgium). In doing this, these terminal operators take advantage of their strategic position in the supply chain and are able to bundle cargo, reduce the use of trucks and increase the use of more preferable modes of transport such as inland waterways and rail transport.

This can be illustrated by the case of the transport from a Seller of electronic devices in China to a Buyer with establishments in the Netherlands, Belgium and Germany. The Seller and the Buyer agree that the Seller arranges the transport to the port of Rotterdam and that the Buyer takes care of the further transport to the hinterland. The Seller therefore concludes a contract of carriage with a sea carrier. This sea carrier transports the goods by sea from Shanghai to Rotterdam and employs the terminal operator for the transshipment at the sea port terminal in Rotterdam. The Buyer subsequently concludes a contract with this terminal operator for the

1. The term transshipment (in German: *Umschlag*, in Dutch: *overslag*) is defined in para. 6.3.1.
2. The hinterland varies with respect to the commodity (cf. bulk versus containers), the time (cf. seasonal impact, economic cycles, technological changes, changes in transport policy, etc.) and the transport mode for which reason it is very hard, or even not feasible, to delimit the hinterland of a port. Notteboom (2008), p. 25-75. See for a study on the economic history of the port of Rotterdam and its Hinterland: Paardenkooper-Suli (2014).

inland carriage of the containers to inland terminals in the hinterland. In this contract, it is not agreed by which mode(s) of transport the carriage will be performed and this is left to the terminal operator's discretion. Thus, the terminal operator performs the following obligations. At the sea port terminal, the terminal operator first discharges the containers from the sea going vessel with a crane and places them in a stack. After several days, he brings some containers from the stack to the quay where an inland barge is moored, other containers to the railway tracks on the terminal and others to awaiting trucks. Then he loads the containers with cranes onto the inland barge, train and trucks and the containers are transported outside the sea port terminal to the hinterland. If the goods are stolen while the terminal operator is in charge of the goods in the period between their arrival in the port of Rotterdam and their subsequent arrival in the hinterland, the following questions may arise. When confronted with a claim for compensation, is it relevant where the goods were stolen and whether employees of the terminal operator were involved? Which legal regimes are applicable to the terminal operator's contracts? Is the contract concluded for the transshipment in the port a contract of carriage, contract of deposit or service contract? Is the contract for the inland carriage of goods from Rotterdam to the hinterland subject to international transport law conventions? Can the terminal operator rely on terms, such as exonerations or limits of liability, contained in his own contract or in that of the sea carrier?

1.2 Different roles and terminology

There is no uniform definition of a **terminal operator**. A typical terminal operator performs a variety of operations which are related to the carriage of goods but not the carriage of goods itself. The explanatory note to the failed UN Convention on the liability of operators of transport terminals in international trade 1991 describes terminal operators as:

> '… commercial persons or enterprises that handle goods before, during or after the carriage of goods. Their services may be contracted for by the consignor, the carrier or the consignee. Typically, they perform one or more of the following transport-related operations: loading, unloading, storage, stowage, trimming, dunnaging or lashing. The terms used in practice to refer to such enterprises are varied and include, for example: warehouse, depot, storage, terminal, port, dock, stevedore, longshoremen's or dockers' companies, railway stations, or air-cargo terminal.'

This definition covers a wide range of persons and enterprises. It covers stevedores in the sea port who load and discharge cargo into and from sea vessels or other means of transport as well as the warehouses at inland locations where products are stored, assembled and/or packed. In this study the term terminal operator will be used to refer to those who provide a broad range of services, mainly in connection with the transport of containers, like those mentioned in the definition above. The term **stevedore** will be used to refer to persons in the sea port area who typically perform the taking over and delivery of goods for the carrier at the terminal, the lifting of goods for the purpose of loading and discharge of vessels or other means

of transport and the performance of trimming, stowage and lashing. It is irrelevant whether the operations are carried out in sea port areas or at inland locations.

Furthermore, in cases where goods are stored for a number of days at the terminal before or after the stevedoring has taken place and a separate independent obligation under a warehousing or deposit contract has been undertaken, the legal term **depositary** will be used to describe the person providing this service. This legal term is used rather than the term warehouse(keeper) which is more common in practice.

Terminal operators are now shifting their focus of attention from merely handling cargo in a terminal to connecting sea port areas with the hinterland. Thus, in addition to providing services related to terminal operations they assume the responsibility for the carriage of goods between the sea port and inland locations. The terminal operator who is the object of this study provides to his customers the service of transporting goods to inland locations as a carrier rather than as a freight forwarder. This is because the terminal operator who is the object of this study regards it commercially more attractive to provide the service as a carrier. Maritime or multimodal carriers who undertake the carriage to or from inland locations and who employ the terminal operator for the inland stage often require him to take on the responsibility as a carrier rather than as a freight forwarder. Moreover, also for other clients of the terminal operator, such as cargo interests who directly employ the terminal operator for the inland transport, it can be commercially attractive. When performing Inter-Terminal-Transport, the terminal operator is thus responsible for the goods as a carrier under transport law. Moreover, it can successfully be argued that this is also the case during the transshipment, which includes the lifting and transportation of goods between stacks or means of transport within the terminal. When performing carriage of goods, the term **carrier** will be applied.

1.3 Research questions and structure

The starting point of this research is that the terminal operator is now performing a variety of logistic services which may be subject to different legal regimes. This gives rise to the following main research question:

> What is the legal position of terminal operators performing services in the sea port and hinterland networks?

This central question revolves around the applicability of different legal regimes to the terminal operator's contract(s) and focuses on the legal risks and liabilities involved in the performance of a variety of logistic activities.

The central question is addressed in three parts which are divided into eight substantive chapters.

Part I of this research explores the activities which are performed by these terminal operators, after which an overview will be given of the relevant legal framework. The first part of this research is divided into three chapters (Chapter 2-4). Chapter

2 addresses the question: What activities are performed by terminal operators active in sea ports and hinterland networks and what logistic developments have taken place in the last one and a half centuries which have led to this transport integration by terminal operators? After discussing the logistic background of the wide range of activities performed by terminal operators, Chapter 3 focuses on the question: What legal regimes are applicable to a service contract, contract of deposit and contract of carriage? The aim is to give an overview of the legal regimes which are applicable to the performance of contractual obligations by the terminal operator in different roles and explore to what extent the terminal operator enjoys freedom of contract. When performing obligations which are subject to different (mandatory and non-mandatory) legal regimes, the terminal operator's objective can be to design a uniform contractual liability regime which covers all obligations. Thus avoiding problems which arise when diverging legal regimes are or might be applicable. Chapter 4 therefore raises the question: Can a valid uniform contractual liability regime be designed which would comply with the legal regimes applicable to the contract concluded by the terminal operator?

After the analysis of the distinctive legal regimes applicable to a wide range of obligations performed by terminal operators, **Part II** explores the subject of mixed contracts. A 'mixed contract' is one which is concluded for the performance of a combination of obligations subject to different legal regimes. Obligations of a different legal nature are mixed together in one obligatory agreement. The main focus of attention in this section is on how best to approach these mixed contracts and how to apply these approaches to transport integration by terminal operators? It is important to demarcate the different legal regimes in order to be able to determine which rules are applicable during the process of transshipment and transport of goods. The subject of mixed contracts is explored in Chapters 5 and 6. Various doctrines and types of mixed contracts are discussed in Chapter 5. These are then applied to the position of a terminal operator performing transshipment and inland carriage of goods in Chapter 6. It serves to determine the beginning and end of the contract of carriage. Moreover, the question arises whether the transshipment, when goods are lifted for the purpose of loading and discharge and brought from one means of transport to another, can be considered as carriage of goods subject to transport law and whether the transshipment constitutes an independent transport stage under multimodal contracts of carriage.

The reason that the demarcation of legal regimes, as discussed in Part II, serves a practical purpose and one of the main differences between the legal regimes discussed in Part I is the terminal operator's liabilities towards third parties such as cargo owners or ship owners who do not have a contractual relation with the terminal operator. The terminal operator's legal position towards these third parties will, therefore, be discussed in **Part III**. This part addresses the rights and obligations of third parties and how these affect the legal position of terminal operators. The central questions are therefore: In what situation can the terminal operator be faced with extra-contractual claims from third parties? What is the legal position of the terminal operator as a service provider, depositary and carrier when faced with extra-contractual claims from third parties?

This study aims to provide an overview of the relevant legal regimes within the law of obligations in general and the rules applicable to the nominate contracts of carriage, services and deposit in particular, and to determine rules for their applicability in order to enable operators of transport terminals involved in a wide range of services including the transport between sea and inland terminals to explore their available options and to adequately deal with their legal risks and liabilities.

1.4 Research method

This thesis can be classified as a classic doctrinal legal study. Its primary sources are legislation which can be found on national and international level. In order to reach the objective stated above, it involves a comparative law study in which legislation, doctrine and case law are analysed and compared. The functional method is used when focusing on answering the specific research question.[3]

On national level, the study focuses on the general law of obligations and on legislation regarding nominate contracts, i.e. contracts specifically regulated by law. For the reasons mentioned above, importance is given to the legal rules applicable to contracts of services, deposit and carriage. First of all, the national laws of the Netherlands, Germany and England are compared.[4] Dutch law is taken as a starting point from which the laws of Germany and England are discussed. However, Belgian law represents an interesting divergent view on certain aspects of the research and in those cases Belgian law is also discussed. These legal systems were selected because the terminal operator who is the focus of this study performs its obligations in these countries and the law which governs the terminal operator's performance is, in most situations, that of these countries.[5] English law was selected because it represents a dominant view on (maritime) transport law. To find a common ground between these European legal systems, reference is additionally made to the European principles which find their reflection in the Draft Common Frame of Reference (DCFR) and the Principles of European Contract Law (PECL).

The conventions which govern the legal position of the terminal operator on an international level are then examined. There are a large number of distinctive international conventions covering the carriage of goods by different modes of transport. Some of these not only contain rules governing the conduct of carriers but also that of their servants, agents and other independent contractors (e.g. in the Rotterdam Rules). Several conventions govern the carriage of goods by sea. The countries examined in this study are all party to the Hague Rules[6] (hereafter also referred to as HR). The Netherlands and England are also party to the Visby Protocol[7]

3. Zweigert and Kötz (1998), p. 34.
4. In this study, English law is understood as the law which is in force in the jurisdiction of England and Wales. Within the United Kingdom three legal systems can be distinguished: England and Wales, Scotland and Northern-Ireland.
5. This can be in case of contractual claims due to a choice of law clause in the terminal operator's contract or the law applicable to an extra-contractual claim brought against the terminal operator.
6. International Convention for the Unification of Certain Rules of Law relating to Bills of Lading, Brussels, 25 August 1924.
7. Protocol to Amend the International Convention for the Unification of Certain Rules of Law Relating to Bills of Lading of 25 August 1924, Brussels 21 December 1979.

which amended the Hague Rules (hereafter referred to as the Hague Visby Rules or HVR). Although Germany is not party to the HVR some important rules have been taken over in its national legislation. For this reason, the HVR form the basis of this research when it concerns the carriage of goods by sea. The Hamburg Rules[8] (hereafter also referred to as HHR[9]) and the Rotterdam Rules[10] (hereafter also referred to as RR) are also discussed. The Rotterdam Rules, although not yet in force, are taken into account because they introduce the new concept of 'the maritime performing party' which will become extremely relevant for terminal operators should the convention enter into force. When transporting goods from the sea port to the hinterland networks, the terminal operator usually makes use of inland waterways, rail or road. This study looks at goods transported between the sea port in Rotterdam and the inland terminals in the Netherlands, Germany and Belgium. These countries are party to the same inland transport conventions and for this, CMR,[11] CMNI[12] and COTIF-CIM[13] are examined. England is also party to these inland transport conventions, except CMNI. As the terminal operator in this study is generally not involved in carrying goods by air the legislation concerning carriage by air is not taken into account except for some occasional references. Although a number of conventions cover international carriage by air, reference is generally only made to the Montreal Convention[14] (hereafter also referred to as MC) given the large number of countries currently party to this convention. Finally, the United Nations Convention on the Liabilities of Operators of Transport Terminal in International Trade[15] (hereafter referred to as OTT) is studied. This convention is however not in force (and it is only dealt with insofar as it regulates the liability of terminal operators to third parties in Part III).

In order to obtain a fuller understanding of relevant national law and conventions, legislative history, if publicly available, is studied as is the interpretation given by national courts and the legal literature of the selected jurisdictions. Save for exceptional cases, case law and literature research was concluded on 18 March 2017. The abovementioned legislation on national and international level, case law and doctrine is analysed and compared in order to gain insight in the way the legal position of terminal operators performing a variety of services is currently regulated in different legal systems and to find a common core which can be used to identify the best solution to the problem posed in the research questions.

8. United Nations Convention on the Carriage of Goods by Sea, Hamburg, 30 March 1978.
9. In order to distinguish the Hamburg Rules from the Hague Rules, the Hamburg Rules are referred to as HHR. The commonly used abbreviation HH stands for *Hansestadt Hamburg* (Hanseatic city of Hamburg).
10. United Nations Convention on Contracts for the International Carriage of Goods Wholly or Partly by Sea, New York, 11 December 2008.
11. Convention on the Contract for the International Carriage of Goods by Road, Geneva, 19 May 1956.
12. Budapest Convention on the Contract for the Carriage of Goods by Inland Waterway, Budapest, 22 June 2001.
13. The Convention concerning International Carriage by Rail (COTIF), 9 May 1980 as amended by the Protocol of Modification, Appendix B (CIM), Vilnius, 3 June 1999.
14. Convention for the Unification of Certain Rules for International Carriage by Air, Montreal, 28 May 1999.
15. United Nations Convention on the Liabilities of Operators of Transport Terminal in International Trade, Vienna, 19 April 1991.

Chapter 2

Background: Transport integration by terminal operators

2.1 Introduction

Before focusing on the legal implications carried by the transport integration in the following chapters, this chapter first gives a brief overview of the logistic background to the situation. Paragraph 2.2 discusses relevant logistic developments which have taken place since the second half of the twentieth century. Paragraph 2.3 focuses on cargo handling operations performed at terminals, and paragraph 2.4 discusses the integration of inland transport services into the terminal operator's traditional service profile.

2.2 Logistic developments

The transport container was invented in the mid twentieth century and has radically changed global transport since then. Article 2.1 of the International Convention for Safe Containers 1972 defines a container as follows:

> 'Container means an article of transport equipment:
> (a) of a permanent character and accordingly strong enough to be suitable for repeated use;
> (b) specially designed to facilitate the transport of goods, by one or more modes of transport, without intermediate reloading;
> (c) designed to be secured and/or readily handled, having corner fittings for these purposes;
> (d) of a size such that the area enclosed by the four outer bottom corners is either:
> (i) at least 14 sq. m. (150 sq. ft.) or
> (ii) at least 7 sq. m. (75 sq. ft.) if it is fitted with top corner fittings;
> the term "container" includes neither vehicles nor packaging; however, containers when carried on chassis are included.'

A container is a standardized unit used for the storage and transport of goods.[16] Its universal characteristics allow it to be easily interchanged between ships, trains[17] and trucks by standardized handling equipment without the need to rehandle the contents in the container. Before the introduction of the container, cargo in ports was handled in much the same way as it had been done for centuries. After a ship arrived in the port, numerous longshoreman gathered at the quay to discharge the

16. A container is generally 20 or 40 feet long, 8 feet wide and 8 or 8.5 feet high. The container which is considered a 20-foot equivalent unit is referred to as a TEU and the 40-foot container as two TEU. These standards are set by the International Organization for Standardization (ISO).
17. Containers which are used for train transport have however different dimensions.

cargo from the holds and the outbound cargo was loaded onto the ship at the same time. This often led to a game of 'maritime Tetris'. It was a time consuming process which caused long delays at the port, was expensive and prone to criminal activity. The introduction of the container changed everything dramatically. The container was invented by the US military during the second world war and was used for commercial purposes in the late 1940s, early 1950s. Within a few decades after its invention, nearly 90% of countries in the world had container ports.[18] The first container arrived in the port of Rotterdam in 1965.[19] The transport sector rapidly modified its infrastructure to facilitate the use of these standardized units. Vessels and other means of transport were adapted to be able to carry these containers, specialized container terminals with cranes were created, and information and communication technology was introduced. This evolution in the logistic supply chain shifted the focus from unimodal to integrated transport systems. In the pre-container era the supply chain was predominantly focused on unimodal transport unless practically impossible as in intercontinental transport. However, the introduction of the container removed these barriers and led to an efficient and automated transshipment of goods from one means of transport to another. It has since become possible to combine several modes of transport in cases where it had previously been considered difficult as in cases of transport over small distances. The carrier has begun to integrate these different modes of transport by organizing the whole trajectory leading to multimodal transport. The reduced costs of transport associated with this development enhanced global trade and, it has been said that 'the container has been more of a driver of globalization than all trade agreements in the past 50 years taken together.'[20]

This evolution in the logistic supply chain and the reduced transport costs associated with this development resulted in a vast increase in the volume of goods transported world wide. Due to the division of labour, products could be produced at optimal locations on the other side of the world and be transported in containers to their consumers. Large containerships arrive daily in sea ports and containers are discharged and stored for a period of time in sea port terminals. The terminal operator takes care of the containers in stacks until they are released by the sea carrier, cleared by the customs authority and picked up by cargo interests (or those working on their behalf). In many cases it can take up to 45 days before the goods are removed from the terminal. This leads to congestion in port terminals. As the majority of containers are picked up individually from the terminal by trucks, this can often result in congestion on the roads around the port. In spite of the many benefits these logistic developments have had, they have also had a negative impact upon the environment.

18. 'Containers have been more important for globalisation than freer trade', 18 May 2013, www.economist.com/news/finance-and-economics/21578041-containers-have-been-more-important-globalisation-freer-trade-humble (lastly retrieved on 25 September 2017).
19. Kuipers (2014).
20. 'Containers have been more important for globalisation than freer trade', 18 May 2013, www.economist.com/news/finance-and-economics/21578041-containers-have-been-more-important-globalisation-freer-trade-humble (lastly retrieved on 25 September 2017).

In an attempt to avert these negative consequences, some terminal operators have started to integrate the transport of goods between the sea port and terminals they have created in the hinterland into their logistic profile.[21] These terminal operators may be in a better position to organize this than the traditional logistic actors like freight forwarders and multimodal carriers. They have developed what have become known as 'extended gates'. Some terminal operators have created a network of inland terminals in easily accessible areas which are closer to their final destination and which are regarded as an extension of the sea port by their clients, the sea carriers and the customs authority. In this way, the gate of the sea port terminal has been extended all the way into the hinterland. Inter-terminal-transport (ITT) is treated the same as the movement of cargo within the premises of the terminal. Containers can be pushed out of the port area before they are released or cleared by the customs authority. Moreover, the terminal operator can bundle the cargo and load to full capacity onto a more sustainable means of transport like trains and inland barges which can travel during less congested moments of the day and week. Goods can be collected from or brought to these inland locations by the cargo interests. Terminal operators who extend their activities to include terminal operations as well as inland transportation are taking the integration process a step further.[22]

2.3 Terminal operations

A wide variety of services can be performed at the terminal. The kinds of operations vary as do the characteristics of the terminal and its equipment depending on the types of cargo handled. Most terminals are specialized and do not handle all types of cargo. This study focuses on terminals specialized in container transport. But first a distinction must be made between bulk cargo and general cargo. The term bulk cargo covers materials which are carried in large volumes. It can consist of liquid bulk such as oil products and chemicals or of dry bulk such as grain, ore and coal. These commodities can be transported by specialized means of transport such as tankers or specially designed trucks, trains and barges. The terminals which serve this type of cargo employ specialized equipment to load and discharge the cargo from the means of transport and to move the goods within the terminal. They have equipment such as pumps, tubes, grabs, elevators and conveyer belts depending on the type of bulk cargo involved. Bulk cargo is also regularly transported by pipeline. Dry bulk can also be transported in this way but first a 'slurry' — a mix of the product with liquids such as water — is created in order to transport the goods more easily.[23]

These commodities transported in bulk can be distinguished from general cargo in that general cargo usually consists of manufactured or packaged products. Al-

21. Terminal operators are not the only ones to be shifting their focus of attention to the hinterland, some port authorities are doing so as well. See for a study on the role of port authorities: Van der Lugt (2015); Lugt, Langen and Hagdorn (2015).
22. See the report of ECT on 'The future of freight transport': www.ect.nl/sites/www.ect.nl/files/ect_boekvisieect_04k_nl_lr.pdf (retrieved on 8 October 2013). For further information on this development I refer to Veenstra, Zuidwijk and Van Asperen (2012), p. 14-32.
23. De Wit (1995), p. 8.

though bulk cargo can be shipped in containers it is usually general cargo which is containerized. These products are mostly 'stuffed' in the container at the premises of the consignor. The container is then 'stripped' of its contents at the place of destination when the discharged goods are delivered to the consignee. As a result of this, the handling of the cargo inside the container has been eliminated from the transport. This has dramatically improved the process of transshipment. Cargo consisting of items such as boxes, bags, bales, crates and drums does not have to be separately handled during loading and discharge when the goods are transferred from one means of transport to another. Instead, the fully loaded container is lifted by a crane with spreaders. A large rectangular frame fits over and locks into the container's corner fittings and lifts it from one means of transport and, either places it in a stack, and/or onto another vehicle for further transport to its destination.

The means of transport have also adapted to deal with containers more efficiently. Container vessels operate at sea or on inland waterways. Progress in the development of technology for inland barges has been slower than for sea going vessels. The capacity of the latest seagoing container vessels increased to almost 22,000 TEU in 2017. These cellular containerships contain cargo holds specifically constructed for rapid loading and discharge and to keep containers secure while at sea. A container chassis structure has been developed which is similar for both transport by road and by rail.[24]

After discharge, a container may immediately be transferred to the following means of transport but it may also remain in the stack at the container terminal for some time. Immediate transshipment is possible when inland means of transport, such as barges, trucks and trains, have direct access to the gantry crane used for loading and discharging sea vessels. In this way, the crane can discharge the goods from the sea vessel directly onto the subsequent means of transport in one single movement. If direct transshipment is not possible or desired, containers remain initially at the container terminal. The container's standardized measurements allow it to be stacked easily and its watertight construction means there is no need for additional shelter. The container functions as a mini-warehouse. Most container terminals employ separate stacks for inbound, outbound or empty containers which can be further subdivided per shipping line or destination. Efficient management of these stacking areas substantially reduces the necessity to lift and reshuffle containers, thus resulting in a decrease in the time needed for the loading and discharge of vessels and to a decrease in the space required at the terminal.[25]

Modern sea port terminals are large open spaces which are well connected to the available infrastructure and closed off by fences. These areas are filled with container stacks, cranes and marshalling yards used to move the container between the sea vessels and other vehicles such as inland barges, trains and trucks. Special-

24. De Wit (1995), p. 13.
25. For research aimed at optimizing the stacking operations by developing methods for minimising the makespan (the time taken for a particular job) of container yard cranes and for minimising the number of container reshuffles see: Gharehgozli (2012).

ized equipment like yard trucks, automated guided vehicles (AGV's), mafi-trailers,[26] fork-lift trucks and straddle carriers are used to move the containers within the premises of the terminal. The terminals are connected to different types of infrastructure to guarantee accessibility and ensure an efficient supply chain. Sea vessels can berth at quays with large gantry cranes built with sufficient height and depth to reach all types of container vessels. Some terminals have separate quays for handling sea vessels and inland barges whereas others serve both types of vessels at the same location.[27] Terminals also have gates with entrances to the road where trucks can be checked in and out. Large container terminals have their own railway station which is directly connected to the national railway network.

In modern terminals like the ones built in the port of Rotterdam on the '*Tweede Maasvlakte*', operations are managed centrally in operating rooms and container handling is automated. Large terminals of 86 hectare can already be run by approximately 400 staff members, most of whom are in offices.[28] This ensures the safe, swift transshipment of goods as the risk of human error and the handling time are minimized. The cranes are operated at a distance by specialized crane operators and handling operations like stowing and stacking are scheduled and controlled by computer systems. These computer systems replace or assist human experts in all aspects of the operation of seaport container terminals. Specially designed algorithms and modeling tools are used to increase the terminal's productivity.[29] These computer systems are also used for stowing and trimming the cargo. Detailed stowage plans are drawn up and each container is efficiently allocated a suitable slot. Computer programs calculate the allocation of the weight of the various containers in an appropriate manner for the safety of the ship while taking into account which port of call serves as the discharge port for each container.

The exact weight of the containers is an essential piece of information when calculating the stowage plan. The International Convention for the Safety of Life at Sea (SOLAS) has therefore recently been amended to include rules on container weight verification requirements.[30] The regulations regarding Verified Gross Mass (VGM) were introduced into SOLAS amending regulation VI/2 in order to guarantee the safety of the ship, crew, stevedores, cargo and safety in maritime traffic. The verified packed weight of a container is now a precondition for loading onto a vessel for international transport. The shipper is responsible for the verification of the packed container's weight. The vessel operator and marine terminal operator are in violation of SOLAS if they load a packed container onto a vessel without proof of the verified container weight.[31] Some terminals are equipped with gantry cranes which

26. The term Mafi-trailer is a generic term which refers to a trailer used by terminal operators for loading and discharge of goods. The name Mafi originates from the German company, Mafi-Transport-Systeme GmbH who produced this transport system.
27. See for a research on the planning of the distribution of inland barges in order to solve the problems concerning the handling of barges in sea port terminals: Douma (2008).
28. 'APM Terminals MVII: snel, groen, veilig. Revolutie aan de diepzeekade', www.maasvlakte2.com/uploads/magazine_mv2_2013.pdf (retrieved on 29 March 2016).
29. Günther and Kim (2005), p. 5.
30. The SOLAS conventions which includes these rules on container weight verification requirements came into force on 1 July 2016.
31. SOLAS regulation VI/2.6.

can measure the weight of the containers during lifting before they are loaded onto a ship.[32]

Some terminals are able to store goods under customs control. Goods that arrive from outside the European Union (EU) and enter the customs territory can be stored under the supervision of the customs authority. For this, terminals need a special license which is only provided after requirements concerning safety and administrative procedures are met. Goods may be stored in these secured areas for a period of time during which no import duties and other import taxes are due. Furthermore, certain trade policy and agricultural policy measures, import bans and restrictions are not applied. The customs authority exercises physical and administrative supervision over all goods under customs control. If the storage facility and administrative accounts in the terminal are seen as reliable, less physical control is exercised and the customs follow the goods on paper. Furthermore, based on a risk assessment some goods are selected for an inspection. Some terminals are equipped with their own high-tech scanning gear so as to avoid time-consuming, costly inspections. A number of different types of storage facilities are controlled by customs, these include temporary storage premises (RTO), customs warehouses ranging from type A to F, free warehouses and free zones. Goods can remain in storage for a limited or unlimited period of time depending on the type of facility. Large terminals in the sea port area are usually RTOs where goods can be temporarily stored for up to 45 days. All goods must obtain a new destination within this period. This could be, e.g. for import, for transport under customs control (8 day permit) or for placement in a customs warehouse (for an unlimited period of time). A customs declaration must be obtained before any goods can be removed from the storage location. This declaration must be filed by the cargo interests unless the storage facility has obtained a separate authorization from the customs authority. This is why goods often remain at the sea port terminal for up to 45 days depending on the initiative taken by the cargo interests and the customs procedure. Inland terminals which are not in the vicinity of a customs office can only qualify as warehouse type C, D or E. Goods can be stored in these types of customs bonded warehouses for an unlimited period of time.

A growing number of container terminals can be found at inland locations along rivers as the necessary investments have been made to develop their cargo handling infrastructure. These inland terminals can be reached by inland barges and preferably also by trains and have similar features to sea port terminals albeit on a smaller scale. The quays are equipped with cranes for loading and discharging inland barges. Straddle carriers are often used for stacking and moving containers and are able to stack containers up to four units high. Containers are stored in stacks until further transport to the sea port or until transport to the consignee can be arranged. Some terminals also offer activities like physical distribution or facilitate customs related services or inspections. These inland terminals are located

32. See: Eckardt (2016), p. 54-58; Piltz (2016), p. 59-62; Van Leijen and Methorst-Smaling (2016), p. 17-20. The topic of declaring container weights is outside the scope of this research. See for an analysis of the consequences and legal problems concerned with inaccurately declaring the weight: Kofopoulos (2014), p. 279-289.

in areas close to the destinations where the consignors or consignees are established.[33]

2.4 Integration of inland transport

Some terminal operators have successfully integrated Inter-Terminal-Transports (ITT) into their traditional service profile and have been able to take control of the inland flow of goods.[34] They might even be in a more favourable position than others, like freight forwarders and multimodal transport operators, who had once held the lead. Large terminals like ECT[35] are capable of making arrangements with their customers and the customs authority to treat selected inland terminals as extensions of the sea port terminal. The gate of the sea port terminal is thereby metaphorically extended to include the inland terminals, and the carriage of goods between the sea port terminal and the inland terminal in the hinterland is treated in the same way as the movement of cargo within the sea port terminal. This way, the terminal operator proactively transports the goods to and from the hinterland without having to wait for the release by the sea carrier, the customs clearance and collection by other parties. If a large flow of containers arrive at the port, the terminal operator can create space by pushing containers into the hinterland, resulting in less congestion at the terminal.[36]

One of the key aspects of the extended gate concept is the arrangement made with the customs authority. The terminal in the sea port is a temporary storage premises (RTO) where goods can be stored for up to 45 days. As goods cannot be removed from the terminal without a customs declaration, valuable space is often occupied for a considerable period of time. So, pressure is put on cargo interests to obtain this authorization from the customs authority and determine another destination for the goods. However, a simplified procedure for the removal of containers from the sea port terminal can be followed pursuant to an agreement with the customs authority. The terminal operators are authorized to make the necessary declarations and remove the containers from the sea port terminal and transport them to the inland terminal before they are cleared by customs. The inland terminals in the hinterland are customs bonded warehouses where goods can remain for an unlimited period of time. What is more, the customs supervisions and inspections can be transferred to other locations in the country reducing the workload and the time pressure of the customs authority in the port area. Although the practical

33. It is for this reason that the inland logistic hub of Venlo has been ranked as top European logistic location. 'Rotterdam climbs to second place in ranking of top European logistics locations', 16 February 2016, www.portofrotterdam.com/en/news-and-press-releases/rotterdam-climbs-to-second-place-in-ranking-of-top-european-logistics?utm_source=Haven%20in%20Bedrijf%20Nieuwsbrief&utm_campaign=7be0d214d8-Nieuwsbrief_Haven_in_Bedrijf_februari_2016&utm_medium=email&utm_term=0_02497fa59f-7be0d214d8-71893225&ct=t%28Nieuwsbrief_Haven_in_Bedrijf_februari_2016%29&mc_cid=7be0d214d8&mc_eid=4dd832e1e7 (retrieved on 29 March 2016).
34. See also: Smeele and Niessen (2013), p. 95-108.
35. Europe Container Terminals, part of Hutchinson Port Holding (HPH), is a major deep sea terminal operator in the port of Rotterdam.
36. Van den Berg has been studying the development of inland networks by terminal operators into depth and has found that similar initiatives are being developed by other terminals such as DP World, ECT, APMT, Eurogate, SIPG and PSA. Van den Berg (2015), p. 70-72.

relevance of these extended gates depends, to a large extent, on these arrangements with the customs authority, the legal implications of transport integration discussed in this study are unrelated to these arrangements. This study is therefore also relevant for other transport integrators who do not have arrangements with the customs authority.

Taking control over the inland flow of goods has brought about some changes for the terminal operator and for the maritime and business community at large. Currently, the main customers of terminal operators are sea carriers or multimodal carriers who are responsible for the sea stage of the transport. If they assume responsibility for both the sea stage and the loading and discharge of goods to and from the seagoing vessels, they subcontract and delegate the performance of certain transport related services to the terminal operators in the port. The terminal operators' commercial success is, therefore, dependent on their business relation with sea carriers. However, this is currently changing as some carriers are acquiring sea port terminals of their own and terminal operators are increasingly offering their services directly to shippers. Shippers, or their forwarding agents, are booking inland transport directly with terminal operators. By attracting the cargo of shippers to their terminals, the terminal operator's bargaining position towards the sea carriers has improved. It is of strategic importance for the operators of sea terminals that their port (i.e. their terminal) is on the list of ports of call (i.e. terminals) that are regularly visited by the vessels operating the shipping lines. It is beneficial for all if the terminal gathers a substantial volume of cargo from shippers and receivers in its hinterland. Moreover, terminal operators become increasingly attractive for sea carriers or multimodal carriers if they provide an additional service to carry goods to inland terminals instead of merely handling their cargo in the sea port terminal. Providing this extra service makes the terminal operator more competitive when compared to other terminals, which is an important advantage in view of the increased competition between terminals at *Maasvlakte 2*.

Inter-Terminal-Transport, when organized by terminal operators can lead to a reduction of costs due to economies of scale and to an increased use of different modes of transport like inland waterways and rail.[37] Operators can collect and bundle large quantities of cargo and load freight trains and inland barges to their full capacity at a sea terminal. The same applies to inland terminals, which can serve as collection points for containers with export products or for empty containers returning to the sea port. These terminals therefore need well established connections to the rail infrastructure and direct access to inland waterways. The frequent operation of freight trains can be arranged and inland barge operators can coordinate reliable and frequent transport between inland terminals and the sea port.[38] It is clear that the establishment of a stable and reliable hinterland connection is of fundamental importance. The use of road trucks between the sea port and inland terminals has been reduced to a minimum and trucks are only used for the 'first'

37. Ypsilantis and Zuidwijk (2013).
38. See for example an initiative of four independent terminals in the Brabant region (NL). A joint subsidiary — Brabant Intermodal — is coordinating shipments from the deep sea terminal hinterland terminals. Their aim is to provide reliable logistic services with high frequencies and larger shipments. www.brabantintermodal.com/ (retrieved on 30 March 2016).

or 'last mile' to reach the cargo interests or warehouses from where the goods are distributed.[39]

This approach is not only more efficient, it is also more sustainable.[40] The increased use of inland barges or freight trains has significantly reduced the use of trucks for the inland transport of goods. This has led to less congestion on roads in and around the sea port and an optimized supply-chain contributes to a reduction of CO2 emissions. This type of freight integration is supported at policy level of the EU which addressed it in the 'CT-Directive'.[41]

In 2013, road carriage had the biggest market share among inland transport modes in the EU. 74,9% of total inland freight was transported by road, compared to 18,2% for transport by rail and 6,9% for transport by inland waterways. Although the shares of rail and inland waterways transport have noticeably increased, a considerably large portion of freight in Europe is still transported by road.[42] International transport law conventions contain no rules that can oblige carriers to make use of more sustainable modes of transport.[43] As the obligation to carry goods by environmentally friendly modes of transport is not part of an existing legal framework, local authorities and private entities have come up with solutions to encourage sustainable decision making. The Port of Rotterdam has introduced policy measures aimed at improving the modal split. Concessions granted in the *Maasvlakte 2*-project impose certain targets on the distribution of cargo over various modes of transport upon sea terminal operators exploiting terminals in this area.[44] The Port of Rotterdam aims to gradually decrease the share of road transport and increase the share of transport by rail and inland waterways. To pursue this objective, modal split obligations were inserted into concession contracts aiming at a share of 35% for cargo leaving the terminal by road by the year 2035. At the same time, an increase in the use of rail to 20% and in inland barges to 45% is required. Non-compliance with these obligations may lead to heavy financial penalties on the relevant terminals. The container terminals are therefore required to contribute to the 'modal shift' and to influence the increased use of inland barges and freight trains. In 2014, a slight majority of containers which arrived in the port of Rotterdam by sea were still transported to the hinterland by road.[45] It is therefore important that terminal operators reduce the number of containers leaving their terminal by truck.

39. See for a research on the main operations and challenges when scheduling containers for inland transport: Fazi (2014). This research provides mathematical models and algorithms in order to choose the most efficient mode of transport per consignment.
40. See also: Eftestøl-Wilhelmsson (2011), para. 1.
41. Council Directive 92/106/EEC of 7 December 1992 on the establishment of common rules for certain types of combined transport of goods between member states. See for further information: http://eur-lex.europa.eu/legalcontent/EN/TXT/?uri=CELEX:31992L0106 (retrieved on 30 March 2016).
42. The modal split outlined here is based on the total inland freight transport performance expressed in tonne-kilometre. http://ec.europa.eu/eurostat/statistics-explained/index.php/Freight_transport_statistics_-_modal_split (retrieved on 30 March 2016).
43. Eftestøl-Wilhelmsson (2011), para. 3.
44. Van den Berg (2015), p. 116.
45. According to the information on the modal split provided by the Port of Rotterdam in 2014 the distribution of containers over the inland modes of transport was: 53.4% by road, 10.9% by rail and 35.7% by inland waterways. www.portofrotterdam.com/sites/default/files/Modal%20split%20maritieme%20containers%202014-%202011.pdf (retrieved on 30 March 2016).

It is clear that a terminal operator who is in control of the inland flow of goods is in a better position to influence the decision making process and to comply with these requirements.

In order to meet these requirements and to select the most appropriate mode of transport for Inter-Terminal-Transport, it is essential that the contract of carriage concluded with the terminal operator responsible for the goods as a carrier, gives the latter full discretion as to how goods are transported. However, carriers are not always free to choose the mode of transport for the performance of the contract. Some contracts of carriage are mode specific and do not allow the use of alternative modes of transport. Such contracts reduce the carrier's flexibility. It is therefore important to conclude optional contracts of carriage which enable the carrier to choose the most appropriate mode of transport at the time of performance of the contract. At that time the carrier can correctly assess the most appropriate method of inland transport based on the capacity of the available means of transport, the saturation of certain infrastructure, the costs involved in the transport and the characteristics of the particular shipment including its time constraints.[46] Arguably, this vertical integration does not only make the terminal operator more competitive with other terminals in the region, but also contributes to an optimized supply-chain which can be beneficial for the community at large.

46. See the advisory report 'Partituur naar de top' of Topteam Logistiek. www.rijksoverheid.nl/documenten-en-publicaties/rapporten/2011/06/17/partituur-naar-de-top.html, p. 14. (retrieved on 18 October 2013). For optional contracts of carriage and the applicable transport law regime I refer to para. 3.4.2 and 3.4.3.