
Summary

Background

The Dutch government wants to see an increase in the proportion of waterborne container transport. The coalition agreement states that waterborne goods transport and inland shipping innovation will be promoted. The aim is to make use of the available capacity on waterways in order to reduce road and rail capacity problems. On average, inland shipping is also a slightly cleaner mode of transport than road transport. This modal shift to inland shipping should therefore reduce the level of pollutant emissions.

Cargo handling problems in ports

The government believes that inland vessel congestion at port terminals is one factor that is threatening the desired growth in waterborne container transport. Inland container vessels are primarily loaded and unloaded at the same quays as ocean-going ships. However, whereas there are contracts and mutual performance obligations between port terminals and the owners of ocean-going vessels, there are no such arrangements with the owners of inland waterway vessels. Therefore, ocean-going ships are often prioritised if the terminal is busy. This was not a problem in the past because it was still possible to load and unload inland waterway vessels on a large scale in between the ocean-going vessels. However, this is often no longer possible because of the increase in transshipment volume involving both ocean-going and inland shipping.

Waiting at seaport terminals causes inland ships to spend more time in the harbour, which leads to longer throughput times. This effect is intensified by the fact that inland vessels usually have to load and unload containers at multiple terminals in the same port (an average of nine terminals for Rhine transport). If an appointment at a given terminal overruns, this often leads to delays at the following terminals because the vessel fails to arrive on time and loses its loading/unloading slot at that terminal as a result.

Inland shipping companies incorporate margins to allow for the possibility that they will have to wait several times at terminals. This has a negative effect on their ability to compete with other hinterland modes of transport and can also have an impact on the businesses in the port area. Efficient and sufficient hinterland access via various modes of transport is increasingly important in the competition for business between individual ports.

Aim of the study

The State Secretary for Transport, Public Works and Water Management (V&W) indicated that the market parties involved are primarily responsible for solving the vessel handling problem. The government sees itself playing a supporting role, for example by acquiring knowledge about possible solutions and sharing this knowledge with the sector.

Therefore, the Civil Aviation and Maritime Affairs Directorate-General at the Ministry of Transport, Public Works and Water Management asked KiM (the Netherlands Institute for Transport Policy Analysis) to draw up a list of possible solutions to the problem of handling inland waterway vessels in seaports. This study focuses in particular on foreign ports and other transport modes, because a lot of research has already been carried out into possible solutions for inland shipping in the Netherlands. This report will also consider whether the government can play a role in achieving these solutions and what instruments they have at their disposal to do so.

Evaluation of initiatives in the Netherlands

The primary aim of this study is to find promising new solutions, but previous initiatives in the Netherlands are also considered in order to identify any lessons to learn from those experiences. A total of 23 initiatives between 1990 and 2008 have been reviewed. Almost half of those initiatives fall into the 'hardware' category. These initiatives focus on more efficient usage of the existing quay capacity using physical technology – such as the development of new vessels, new terminals and new transshipment techniques. Another large group of initiatives can be typified as 'orgware'. These initiatives focus on increasing the efficiency of organisational, economic or management processes using existing resources and technology. A third type of initiatives is described as 'software'. These initiatives focus on more efficient use of hardware based on information and communication technology (ICT).

It is notable that a large number of the hardware initiatives were unsuccessful. The technical concepts may well have produced good results on paper and in process simulations, but their implementation was blocked by insurmountable investment or organisational problems. Furthermore, the previous initiatives demonstrate that it is important to gather funds to cover joint costs and also to distribute joint profits fairly. The issue of fair distribution applies to both large and small initiatives. Private-sector organisations can usually handle fair distribution in the case of small initiatives. Where port-wide benefits are concerned, however, it is often more efficient if a 'public-sector party' – such as a port authority – handles distribution because of the lower transaction costs that are involved.

Another lesson is that some initiatives are unsuccessful due to a change in the balance of power between the parties involved: the parties may feel that they are becoming dependent on third parties and losing direct contact with clients. The companies involved often believe it is important that each company retains a clear commercial identity on the market.

Finally, it is important that parties realise that certain concepts will only achieve efficiency gains when they are applied with a specific, minimum scale in respect of the number of participants or a minimum transport volume. Some concepts demand a high level and/or long-term

commitment from inland shipping parties or from the authorities involved.

Foreign seaports

A lot of research has already been carried out into possible technical and organisational solutions at Dutch seaports (particularly Rotterdam). The Netherlands is a relatively exceptional case as regards the share of all transport to and from the hinterland taken up by inland shipping. Nevertheless, there are also foreign ports with similar problems. One of the aims of this report is to give an overview of the solutions devised (and in some cases implemented) in foreign ports and to draw lessons for the situation in the Netherlands.

The following ports were selected for this study: Antwerp, Hamburg, Le Havre, Hong Kong, Shanghai, New York/New Jersey and New Orleans. This selection is based primarily on the volume of inland shipping containers processed in the port. The two American ports have been included because of the ambitious plans that they have (or have had) regarding inland shipping.

Table S.1

Container transshipment per port in 2007 (* = 2006; ** = 2003)
The abbreviation TEU stands for Twenty feet Equivalent Unit (a container which is 20 foot long, 8 foot wide and 8 foot high).
The figures in italics are estimates.

	Total container transshipment (in 1,000 TEU)	Hinterland transport transshipment volume (in 1,000 TEU)	Inland shipping transshipment (in 1,000 TEU)	Modal Split		
				Inland shipping	Rail	Road
Rotterdam	10,790	8,200	2,500	30%	11%	59%
Antwerp*	8,176	7,824	2,618	33%	10%	57%
Hamburg	9,890	5,390	92	2%	34%	64%
Le Havre	2,638	1,880	159	9%	5%	86%
Shanghai	26,150	Unknown	2,500	10%	1%	89%
Hong Kong	23,900	Unknown	2,700	Unknown	Unknown	Unknown
New Jersey	5,300	Unknown	Unknown	< 1%	12%	87%
New Orleans	250	Unknown	41**	Unknown	Unknown	Unknown

The situation in Rotterdam is relatively unusual due to several factors: a large volume of inland shipping containers, a large market share for inland shipping in hinterland transport, a large number of inland shipping operators and a large number of potential access points (terminals and depots) in the port area. Antwerp is the only port in the world where a similar combination of factors exists.

A number of lessons can be drawn from the examples of foreign ports to improve container handling in inland shipping in the Netherlands. The main lessons – the importance of support, collaboration and flexibility – are briefly discussed below.

Support is important

The working method in Antwerp is to first create support for solutions by means of a declaration of intent. This approach avoids the danger of

first choosing a solution and investing in that solution (in the form of studies or pilots) and looking for support for that solution afterwards. If there is no support, for example due to a lack of trust, there is a chance that a promising solution will die an early death and that any investments in the form of time and money in the preliminary phase will have been in vain.

Collaboration

The problems in Antwerp are very similar to the problems in Rotterdam. The same kinds of solutions are also envisaged for both ports. It is worth exploring the possibility of working together to develop concepts such as corridor-based inland hubs and extended gateways. At corridor-based inland hubs, goods flows destined for a specific hinterland region are transported in clusters between the seaport and the inland terminal. The cluster is then split at the inland terminal and the goods are sent on to specific destinations in the region. Goods from different locations can also be clustered at the inland terminal for transportation to the seaport. In the case of an extended gateway, customs checks do not take place until somewhere inland, rather than at the seaport. As there is a lot of inland shipping traffic between Antwerp and Rotterdam, the two ports could also work together on planning systems, for example.

Do not make solutions too static

Concepts which involve additional handling costs can be interesting if there is a considerable lack of quay capacity. The River Trade Terminal in Hong Kong (a sort of container 'transferium' near the port) and inland container transferiums are examples of such solutions. However, as soon as (economic) circumstances change at the port or outside, these kinds of concepts can lose their appeal due to the additional costs involved.

Possible solutions based on other modes of transport

The study showed that the number of foreign ports with similar problems is limited. Rail and road solutions to the problems of coordination between seaside and landside were therefore briefly explored. As there are technical differences between the modes of transport, this exploration focuses on organisational and ICT-based solutions, rather than on purely technical solutions. Both domestic and foreign initiatives are considered, from which a number of possible solutions can be identified. These examples are discussed briefly below.

Road transport: 'De Verkeersonderneming'

The Rotterdam transport organisation called *De Verkeersonderneming* is a covenant-based project organisation that is an interesting form of cooperation between road managers, the port authority, the municipal authority and the Rotterdam Metropolitan Regional Authority. The aim of the organisation is to reduce traffic congestion on the A15 motorway to and from the port. There are relatively few inland container shipping initiatives in which the waterway manager is actively involved.

Road transport: charging for terminal slots

Experience at the port of Felixstowe shows that charging for terminal slots for road transport could be effective, but it also has too many negative features for those involved. Charging can create a situation where the road haulier holds the terminal operator financially liable for delays, or where the terminal operator holds the road haulier liable if the vehicle arrives too late or fails to arrive at all. This can result in high transaction costs. A booking which is not regarded as a contract, but which offers advantages for compliance and disadvantages for non-compliance, seems to work well in Felixstowe.

Rail transport: clustering of goods flows

Goods flows can be clustered for rail transport in the port area as well as in the hinterland. This is demonstrated by the collaboration between the Tilburg and Eindhoven rail terminals and by the example of the National Rail Container Network in Antwerp. The port authority can play an active role as clustering facilitator but must ensure that clustering does not impose entry thresholds on new market players.

Ocean-going transport: Terminal Operator Haulage

The Terminal Operator Haulage project in Antwerp demonstrates that it is advantageous for the deep-sea terminal operator to have a directing role. The deep-sea terminal operator's direct involvement in hinterland transport facilitates better coordination with the inland terminal operators regarding the availability of handling capacity.

The role of the government

The problem of inland container vessel congestion in seaports primarily involves market parties. These parties could reduce and possibly completely eliminate the problem by using hardware, orgware and software solutions. This could contribute to several of the policy aims of local and national government, such as the promotion of the inland shipping sector, the reduction of congestion on the road network and the reduction of pollutant emissions into the air.

The possible contribution to government policy aims does not automatically mean that there is a role for the government in stimulating the search for and the implementation of solutions. Economic theory states that a major pre-condition for government intervention is the presence of one or more public interests. According to economists public interests arise if markets do not work properly (market failure), if the effects of market forces lead to politically or socially unacceptable distribution of prosperity, or if certain markets cannot be established because of high transaction costs.

In this specific situation, public interests provide two reasons for a potential government role. These reasons are additional external effects of inland shipping and possible misuse of market power on the part of terminal operators. The additional external effects will primarily consist of pollutant emissions (CO₂, NO_x, particulates, etc.) as a result of additional shipping movements in the harbour (and possibly also in the direction of the hinterland) and as a result of ship engines being run for longer because inland vessels are waiting for quay space. The extent of

the additional external effects will probably be limited in comparison to the external effects which already exist without inland vessel congestion in seaports.

A specific government policy is not necessary to combat the additional external effects. It will be sufficient if there is a generic government policy that aims to internalise the external costs for all modes of transport. Levies are ideal for achieving this aim, but the trading of emissions rights can also be efficient and effective.

In inland container shipping, misuse of market power by terminal operators could contribute to the maintenance of the information problems between terminals and inland shipping companies. This is because there is a risk of monopolistic behaviour due to two factors. Firstly, there are only a limited number of terminal providers in the Port of Rotterdam. Secondly, the inland shipping companies are 'tied-in consumers' in the sense that they are not able to choose the terminals where they load or unload. This means that terminal operators have no incentive to share with inland shipping companies the information that is necessary for efficient collaboration in the supply chain, or to cooperate in establishing and maintaining information systems.

However, this study does not conclude that there is suspected monopolistic behaviour by terminal operators. There have been no studies carried out on this subject and there have been no interviews with inland shipping operators or other involved parties that suggest that monopolistic behaviour occurs. However, the risk does exist based on economic theory. The transport section of the NMa (Netherlands Competition Authority) could be called in to investigate whether monopolistic behaviour does in fact occur. A major precondition for such a study is that it should be demonstrated that the costs of poor coordination between terminal and inland shipping company form a substantial proportion of the total costs of the inland shipping company.

The economic perspective is limited in a sense: it focuses in particular on maximising prosperity, but this means that other aspects are not taken into consideration. For example, pre-conditions of a more political/administrative nature – such as jointly formulating policy with all stakeholders to ensure support – are not taken into account.

The internalisation of external costs is a measure that economists often advocate, but it is often difficult to find support for such a measure in practice. The promotion of inland shipping could therefore be an effective means of achieving the desired policy aims if aspects such as support and feasibility are also taken into consideration. The investigation of foreign ports and of other modes of transport reveals a number of starting points for suitable policy instruments. These starting points fall into the categories of providing information and communication, creating support, financial instruments (subsidies), co-regulation and legislation.