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Investments in Container Terminals:
Public Private Partnerships

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Abstract

The desire to create a more competitive, market based transport system has led to the involvement of the private sector in infrastructure investments. A private financing of transport infrastructure is one of the fields where this trend can be recognised. However, there are also distinct aspects, which make it unattractive to invest in transport infrastructure for private parties. This paper will elucidate the characteristics of investments in infrastructure in general, with the aim to clarify the hesitation under private investors. In addition, one specific category of infrastructure investments, viz. container terminals, will be discussed here as an exception. Container terminals are mostly financed with involvement of private parties. From a comparative study between 'normal' investments in infrastructure and investments in container terminal infrastructure, we will argue that terminals have several features, which lead to a lower risk for private parties, in particular restricted competition in the terminal market and protected monopoly profits, labour productivity gains and fall in unit costs, and a light regulatory framework. Because of these characteristics public private partnerships occur rather often and seem to be attractive. However, without government support it is still not realistic to attract private investment in the terminal market.

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1. Introduction

Transportation lies at the heart of the spatial-economic evolution of our **economies** (Nijkamp et al., 1995). A well-functioning transport network is an important **condition** for the competitive position of regions and cities. Today, the most prosperous locations occur **where** transport nodes coincide with skilled labour locations and a high quality environment. This has encouraged some countries to take a more pro-active approach towards transport planning, with investment preceding **rather** than following **demand**. Seen from this perspective, **infrastructure** plays a **fundamental** role in the development of various regions. Investments in **infrastructure** are for **many** (local) governments a critical element of their policy. In a European context, investments in transport **infrastructure** are usually regarded as a major incentive for **economic** development, especially **when** one looks at the Trans European Network (TEN) plans.

The traditional approach in Europe to transport **infrastructure** has been based on detailed government intervention in the sector, ostensibly to **protect** the public interest (see **also section 2**). In the case of **infrastructure** direct **state** provision has been the norm (including **financing**). **However**, in recent years profound **changes** in **economic** and spatial policy have brought about a re-orientation so that the dominant role of the public sector is increasingly questioned. The trend towards market **principles** and liberalist views **sketched** by Fukuyama (1992), and mirrored amongst others in devolution **principles** such as deregulation, decentralisation and privatisation, has **far** reaching implications for public sector involvement in physical planning including **infrastructure** planning. An important background factor is the liberalisation of the transport market in the EU, not only for road but **also** for air, rail and waterway transport. These policy **changes** will have profound implications for **financing** European **infrastructure** (Henry, 1993). This trend is reinforced by developments **such** as public budget deficits in **many** countries and the need for more competitiveness in (semi) public goods delivery in order to enhance efficiency.

These developments have led to the **desire** to **create** a more competitive, market based transport sector in which the government does not need to finance **all** investments in **infrastructure**. The **debate** has started to give the private sector a larger role, so that a more **efficient** operation of transport **infrastructure** is realised. But this **process** is not without problems and therefore not yet generally used throughout Europe. Especially in Western and Northern Europe experiences with privately **financed infrastructure** are limited. Private financing of transport **infrastructure** has been most significant in **Latin America** and the Caribbean region and in East **Asia** (World Bank, 1996). The present paper pays particular attention to the problems and possibilities in private financing. **After** outlining some of the characteristics and risks of private investment in **infrastructure** the focus **will** be on a particular kind of infrastructure; namely container terminals at **(sea-)ports**. A container terminal is a **place where** containers are transferred between **any** two or more **freight** transport modes. In this interface unit loads are **collected, exchanged, stored and/or** distributed. Private involvement in **financing** and operating container terminals in harbours is stated to be high compared with other investments in **European** transport **infrastructure** such as roads and railways (see e.g. Farrell, 1999). The aim of the present paper is to elucidate on this theme and to **identify** particular issues why terminals are to be **attractive** for private **investors**, based on a **comparative** study.

This paper is organised as follows. **Section 2** will start with a general description of the characteristics and risks of investments in transport **infrastructure** in **general**. This **will** reveal some of the unattractivities for private parties to **invest** in this type of **infrastructure**. **Section 3** will elucidate on the **state** of the art in **financing** of terminals in Europe. **Section 4** will focus this discussion on **financing** of terminals by describing a **frequently** observed type of cooperation via public private partnerships. In the **final section** some considerations and lessons regarding private financing and operation of **infrastructure** following **from** the terminal studies **will** be **discussed**.

2. The Nature of Investments in Infrastructure

Infrastructure is a broad concept. Several definitions and descriptions have been used in the literature. Recently, a study on the meaning and content of this term has been **carried out** by Nijkamp et al., 2000. Following this study infrastructure includes those **real** estate provisions, which increase the efficiency of the use of production **factors** and meet the following requirements: infrastructure is directly **productive**, is characterised by stock features (capital good) and it has the character of a (semi-) public good (non-excludability and non-rivalness). Three categories of infrastructure **can** be distinguished. Physical network infrastructure includes elements **such** as transport infrastructure and public utilities, water management and industrial sites and is relevant in our context. Immaterial knowledge **infrastructure** and **environmental** infrastructure are the two other categories. **When** we refer to **infrastructure** in this paper, we **mean the first** category and more in particular transport infrastructure. Transport infrastructure consists of several **aspects** that are necessary to facilitate the movements of goods and passengers. Well-known examples include waterways, railways and road infrastructure, but **also** seaports, **airports** and telecommunication.

Traditional welfare theory argues that **social** welfare **can** be maximised through market transactions based on **free** exchange in perfectly operating **markets**. In this ideal **economy** **government** intervention would negatively affect the Pareto-optimal outcome. **However**, following **the** above-mentioned description, the market for **infrastructure** is not perfectly operating. There are market imperfections (e.g. imperfect competition, the **existence** of externalities) which make governmental intervention necessary in this sector. The aim of the government is then to remedy this sub-optimal allocation and in this way to move towards **the** theoretically pure situation of perfect competition.

In recent years **however**, it has become understood that mainly due to government **failures** financing of **all** types of infrastructure by governments is not an appropriate solution, and certainly not in a situation of high public sector deficits. **Mistakes** in **this** respect might **result from** imperfect insight into the **real demand** for public services and **insufficient recognition** of both positive and negative **effects** of **policies**. These **failures** of government agencies lead **often** to problematic **cost** estimates and in several cases to inefficient spending of public money. Clearly, it is overly optimistic to think that these **failures will** completely vanish with private financing of infrastructure investments. **However, from** a financial point of view private involvement is **attractive**, as attention is focused on **economic** and commercial value. The basis for increasing **economic** sustainability in the transport sector is to **create** a **competitive**, market based transport system and thus to include the private sector. But the private sector is generally not highly interested in financing and operating transport infrastructure. In most cases this is **caused** by **the** characteristics and risks involved in **infrastructure** investments. In the sequel private involvement in infrastructure investments **will** briefly be **discussed**. Knowing this, the characteristics and risks for these types of investments **will** be investigated.

2.1 Options for private finance in transport

Private financing of construction is usually associated with continuing public sector responsibility for **strategic** network and locational planning. In the case of **toll** roads and urban mass transit **infrastructure**, private **firms** are normally given a concession to manage and **operate** the facility for a certain period, with ownership of the **asset** returning at some point to the public sector. The same **holds** true for investments in container terminals (see **section 3** and **4**). There are several ways in which the private sector **can contribute** to **the** transport system (ITS, 1999). Several examples of private contributions to financing, and of more far reaching private sector involvement are given below. In **section 4.1** we apply these types of public private partnerships to the container terminal market with the help of the theoretical background of Dietrich (1994).

- A tax **can** be imposed on **firms** in a region; reflecting the broad transport **benefits** obtained by these **firms** or **firms** in a region; the French Versement is an example.

- A more focused charge **can** be levied reflecting the **specific** transport benefits obtained by a particular property; the US concept of value Capture is based on this **principle**.
- The private sector **can** be involved directly in financing new investment, as **happens** with **many** rail projects, with the operator of the infrastructure repaying the loan.
- The private sector **can** be involved in the operation, with the private sector operator obtaining its revenue directly **from** the user.

The **first** two of these have no direct effect on the specification of a transport strategy; besides, **firms** are only indirectly involved in financing (and not investing). But it **may well** help to make the strategy **financially** feasible for the public sector. The third introduces the impact of private sector objectives, which **will** emphasise a financial return on investment in the **specific** measures **covered**. The private sector **may** be more willing to **invest** in particular projects than others, and this could influence the formulation of the strategy. The last example introduces the implementation of charges on users, through fares, parking charges or road use charges. These charges **will** be determined in order to **maximise** revenue, and this **can** significantly affect the performance of the overall strategy. For example, **higher fares** designed to **produce** a return on investment in a new urban rail system **may reduce** patronage and hence the contribution to congestion **relief** and **environmental** protection **will** decrease. The private sector usually seeks for commercial **profit** to be gained either as returns **from** investment interests, or as value Capture through improvements in the transport system. Despite the **higher costs** of capital raised **from** commercial sources and the need to cover the risks and gaining commercial **profit**, it has been argued that the overall **cost** for the community could be lower with private financing, than if the government would **provide** the facilities **from** taxation funds. The following objectives for private financing **can** be **identified** (ITS, 1999):

- Minimisation of the impact of additional taxation, debt burden or **financial** guarantees on the **finances** of the government
- Introduction of the benefits of private sector management and **control** techniques in the construction and operational phases of the projects (**possibly** leading to lower **costs**)
- Promotion of private entrepreneurial initiative and innovation in infrastructure projects
- Increase in the **financial** resources that might be available for the projects.

In container terminal investments especially the **second** and fourth **objective** for involvement of private container terminal operators do apply. Private finance **can** be said to be only purely private if (ITS, 1999):

- The private party runs **all** risks, and
- The investment is paid directly by its users, and
- The operation is based **upon** user charges

In **practice**, transport infrastructure is rarely **fulfilling** these requirements. **Almost all** European transport infrastructure (**except toll** roads in **France, Italy** and **Spain**) has been **financed** and operated by governments or by public organisations tied to the government. The **backgrounds** related to this high public involvement **will** be **discussed** in the next subsection.

2.2 Characteristics of investments in infrastructure

Investments in infrastructure have some special features. Broadly speaking one **can identify** seven characteristics of investments in **infrastructure** (ECMT, 1990 and Nijkamp et al., 1997). Firstly, the expectation of the **economic life of infrastructure** is **very** long. This **may** range **from** 20 years to more than a century. The **pay-back** period of **infrastructure** investments is **also** long; usually around 15 to 30 years. The **pay-back** period for **normal** capital goods is generally **much** shorter; the **average** is 8 to 9 years.

A **second** characteristic in **many** cases is the relatively **low level of the operational (variable) costs**, especially on **longer** distance infrastructure. There are some overhead, maintenance and labour **costs**, but compared to the construction **costs** of infrastructure or the exploitation **costs** of other investments, these **costs** are relatively low.

Thirdly, during the construction **time**, a **large amount of capital** is required. **Often** high loans have to be acquired, which **makes** the interest costs relatively high. The costs are **also** influenced by the project financier; the government is usually able to attract loans which are cheaper (i.e., lower interest **rates**) than the private sector.

Another feature of infrastructure investments is that the **waiting period prior to actual infrastructure construction can** be **very** long. This has to do with the **many legal decision-making** procedures, resistance by society and interest groups, and other **time** consuming formalities. These formalities **often** lead to project changes that have a major influence on the costs of projects. During this planning **process** different unforeseen **facts may** thus happen which are of critical influence on the **whole** project and **may** even lead to planning disasters (see Hall, 1990). In **fact**, this situation **makes** it **very difficult** to make a reliable and good **cost** estimation at the beginning of a project. Ideally, everything should be **clear when** the construction of the project starts, so that then a good estimation should be possible.

A **fifth** characteristic is the **irreversibility of the investment once** the project has started. If the construction is **discontinued**, this would lead to a significant capital loss, because it is not possible to use the investment in another way. In **fact, once** started, the project **will** be built if it is within the budget of the government. It is **clear that** the agency responsible for **the** project wants to **finance** it as soon as possible. One **may** safely assume that the costs of the project at that stage are as low as possible to ensure that the project **will** be executed. This suggests that the costs **may** be somewhat underestimated at the beginning of a project.

The next feature of **infrastructural** investments is the **Zong construction period**. This period **may** take two to seven years depending on the **scale** of the project. During this period there are no revenues, but **there** are of course **already** interest and other costs. This long construction period **also makes** it more **difficult** to offer a good **cost** estimate, as several external **factors may** influence the project during this period, one example being the rise in the **price** level.

The final characteristic is the **uniqueness** of **each infrastructure** project. **Each** infrastructure project is different **from** another. This **fact will** likely have an influence on the **cost** estimations, because of missing experience, low learning possibilities and **lack** of comparability.

The above mentioned characteristics show that at the outset of a project high **financial** capital outlays are needed. This **makes** private investors more reluctant, because their flexibility **tends** to decline. The high costs at the beginning of a project are not immediately compensated for by high cash-flows. There are apparently **many** risks involved in infrastructure projects; these **will** be **discussed** in the next **section**.

2.3 Risks in infrastructure investments

The major issue in involving private **finance** for transport infrastructure investments concerns the sharing of risk. In **infrastructure** investments the flow of **revenues often** begins **many** years **after** the initial investment; this increases uncertainty and risk compared to alternative investment options. Investments in infrastructure **incorporate** various risks; the following classes **may** be distinguished (Nijkamp et al., 1995):

- political risks; for example, changes in transport policy or regulations by the government;
- financial risks; for example, fluctuations in interest **rates** and exchange **rates**, and false expectations about inflation;
- construction risks; for example, delays, unexpected and **higher** or lower costs;
- operational risks; for example, damage by **accidents** and vandalism;
- commercial risks; for example, wrong **cost** estimates or wrong estimates of the traffic volume.

All these risks make it **difficult** to **draw** up a reliable **cost** and **demand** estimation, because **each** risk **has** its distinct influence on these variables; for example, a new **law** supporting

environmental protection. A policy shift may lead to the construction of a road tunnel to protect a natural area, whereas at the outset of the project, the road was scheduled to cross the area. This leads, of course, to higher costs that could never have been estimated at the start of the project. A clear example of commercial risks is formed by the Scandinavian bridge crossing the Sont where traffic was highly overestimated leading to disappointing toll revenues. In a later part of our paper we will come back to the risk problem and apply the different risk categories to container terminal investment projects (see section 4.1 and 4.3). The construction costs (including interest costs) of infrastructure are, up to a certain level of demand, fixed; the other costs are partly fixed and partly variable. The fixed costs are very high for an investor when compared with competing investments, while variable and marginal costs are normally relatively low. When the price is set according to marginal costs (which is economically optimal), it is often not possible to make a satisfactory return on investment. The variable costs per volume of transport are for reasons of simplicity assumed to be constant, which is a rather plausible assumption as long as the capacity of infrastructure is sufficient. As a consequence also the marginal costs are constant until there is a lack of capacity. From Figure 2.1 it becomes clear that price p_1 is economically optimal for an investor (this corresponds with the point where marginal revenues are equal to marginal costs). The total number of transported volume equals q , while total revenues correspond to the area $0qAp_1$. The total costs are equal to the area $0qBp_2$, leading to a loss of this project of area p_1p_2BA . In this case it is not possible to find a price at which the project is profitable, because fixed costs could not be covered from the revenues. It is now only possible to operate the infrastructure project at a profit, when external financing is obtained (from the government or other interested parties). The average total cost curve is then lower. When it is located below A, a profit will be made.

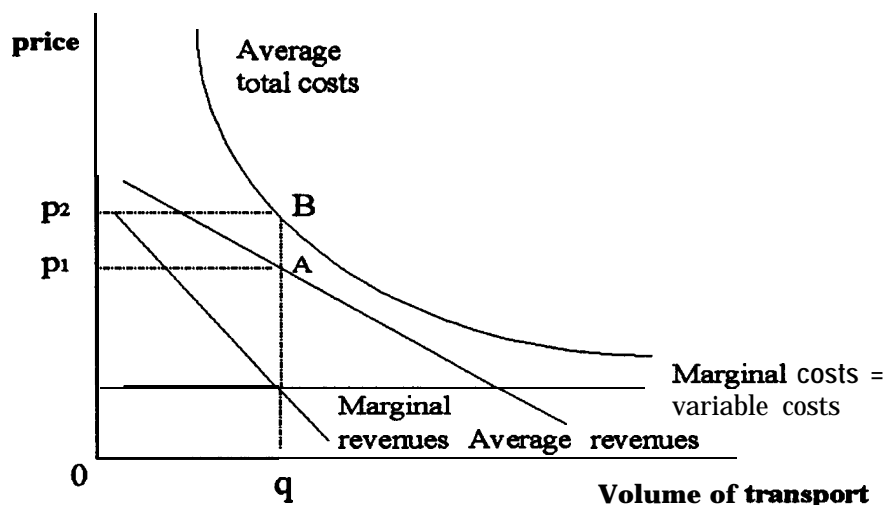


Figure 2.1: Market situation for an investor in infrastructure (Nijkamp et al., 1995)

From the aforementioned risks, the political risks are the most pressing compared to other investments. The government has many reasons to interfere in the transport market. As mentioned earlier, there is on the long run always a danger of changes in laws or regulations, or there may even be a change of government and thus a change of transport policy.

In conclusion, because of the high risks of investments in infrastructure compared to other investment opportunities, these investments are often unattractive for private investors. There must be a high-risk compensation for these private investors if they are to participate into these types of investments. This compensation may stem from high profit expectations, as is

shown by some road **tunnel** projects in the Netherlands. Another option is that governments make these investments more **attractive**, if they do not want to **finance** these projects directly. They could do so by **means** of joint-risk constructions (guaranteeing a public subsidy if the use of **infrastructure** is below the expectations), or by guaranteeing a minimum **profit** ratio. From the foregone the **backgrounds** of difficulties to attract private interest in the **financing** and investment of infrastructure projects have been clarified. **However**, there are some forms of infrastructure **where** private involvement seems to occur more **often**. The telecommunication sector **may** be one example, another is related to **infrastructure** in (**sea-**)ports. The next **section** will analyse investments in a **specific** segment of ports, namely container terminals. It is interesting to analyse why **such** terminals are more interesting investment **objects** compared to other transport infrastructure.

3 Container terminal investment: European state of the art

3.1 Investments in ports in general

Containerisation has led to the development of increasingly bigger and bigger vessels, while maritime competition has resulted in **the** formation of alliances of container carriers. This development has **forced** port authorities and container terminal operators to increase their **scale** as well. The location of individual ports is rapidly becoming less important in favour of the extent to which its services and hinterland connections **fit** into the alliance networks (See **also** van Klink, 1995). In the past decades, reputations and businesses of European ports were primarily built on their locations in protected harbours, near major rivers or with **access** to industrial **centres**. **However**, networking **-rather** than location- seems the key to future growth of ports. Furthermore, the volumes per alliance are **enormous** and **will** probably **result** in single user container terminals and in the medium term maybe even in single-user container networks.

Ports are rapidly becoming a **normal** industry **through** the injection of private money that ensures greater competition, **higher** productivity and probably lower **costs**. The transformation **process** of the last two decades, which few other industries **can** match, has been one of the **main** drivers of this development. In Europe, the UK is at the **forefront** of these developments. Recently, mainland Europe is catching up as governments **loosen** their grip on ports and container terminals. Ports are becoming landlords and lease container facilities to private **companies**. Even port authorities are linking up. More consolidation is to follow with the UK and Germany leading the way. The most notable exception in this **process** is **France**. So **far**, the **benefits** of private involvement in ports are strictly limited to container terminals. **Ports** - and especially container terminals - have become a **real** business and money from **conglomerates** and aggressive equity funds is flowing in. Until **very** recently, political interference and the **structure** of port management has not **changed** to meet the new circumstances, but **markets** are changing. Ports are still political business, **except** for the UK **where** the industry is **almost** completely privatised.

In Figure 3.1 we have depicted the actors and their relations with respect to investment in container terminals in **general**. In Northern European **landlord** ports the most common **financial structure** is one in which the government pays for **access** to the port by land and sea, an (autonomous) port authority funds infrastructure **such** as land reclamation and **quay** walls, and private container terminal operators fund the superstructure: **paving**, buildings and mechanical equipment. **Infrastructure costs** are recovered to a greater or lesser extent through charges on ships and cargo, and **rental** and leasing payments **from** the container-handling **companies**. **However**, there remain large differences in the level of public sector **financial** support, which are passed on into port tariffs. In southern Europe, port authorities **and/or** the **state** were until recently responsible for **almost all** port investment, including mechanical equipment and superstructure as **well** as infrastructure. This was the **result** of **vertical** integration (Greece), the strength of the **unions** (Italy), the weak **financial** position of the private stevedores (**Spain**) or the treatment of ports as a public service (**France**). **However**, the

reforms of the early 1990s and the move towards **landlord** ports have resulted in a gradual **convergence** of financial **structures** in northern and southern Europe.

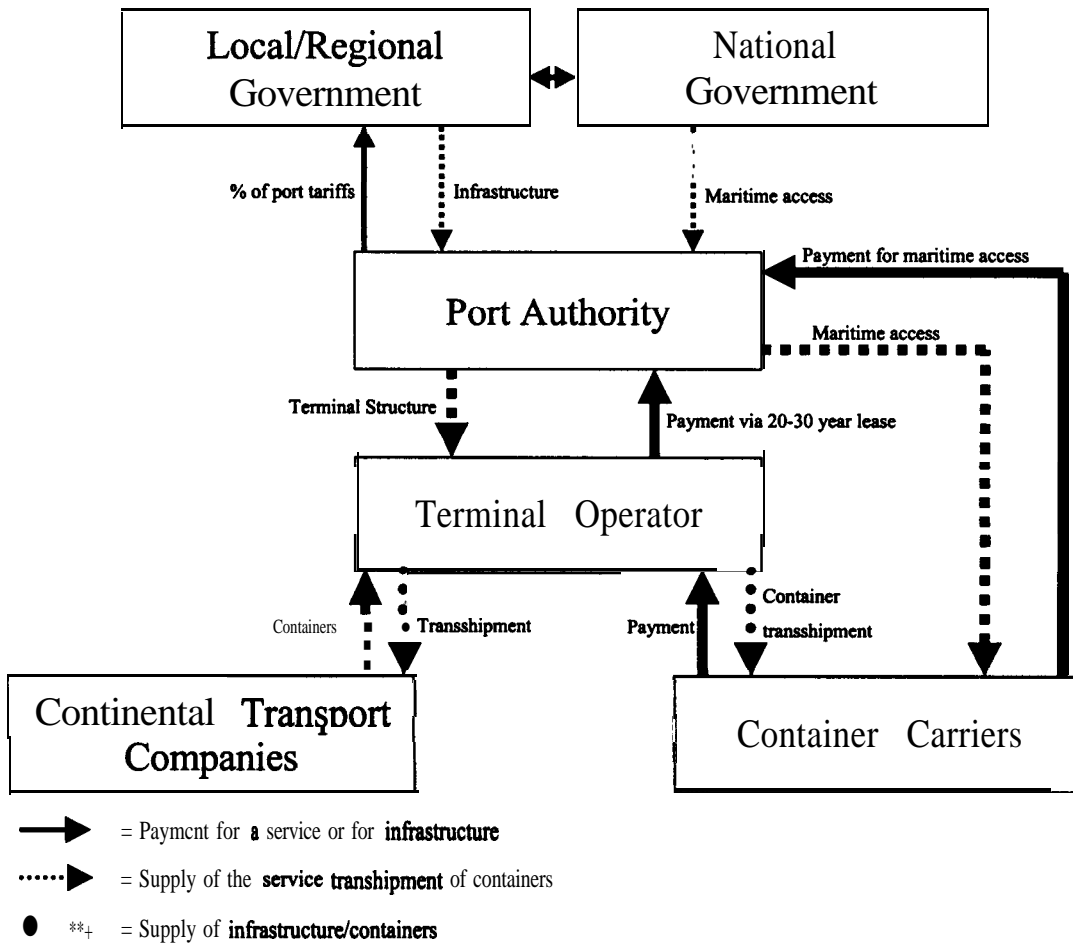


Figure 3.1: An overview of actors and relations in container terminal investment
Source: based on Wiegman et al., 1999

It appears that private involvement in financing container terminals in **harbours** is high compared to other investments in transport infrastructure **such** as roads and railways. A possible explanation is that container terminal operations are too complex for cities and regions; another explanation for private involvement **may** be found in the increasing efficiency of privately run terminals. A third explanation **may come from** the increasing **scale** of container terminals and another part of the picture **may** be found in the **fact** that operating a container terminal is **no longer** considered as a **core** business of governments. Reasons for **governments** to be still involved in container terminal investing are to be found in the creation of employment and **also** the **fact** that ensuring **sufficient** provision of infrastructure is sometimes still considered as government **core** business.

3.2 Container Terminal Infrastructure Investments

Container terminals form a central part of the transport **infrastructure** for **freight** transport. A terminal is a **place where** goods are transferred between **any** two or more **freight** transport modes and is **often** located at modal transfer points (**such** as harbours) (see **also** Wiegman et al., 1999). In the terminal market we have two important groups: owners and operators:

1. terminal **owners** who are **not** providing the terminal services by themselves (investors). Basically, there are three forms of terminal ownership; privately owned, publicly owned, or a public/private partnership. Especially the third form of ownership **can further complicate** daily operations, because the actors **often** have conflicting interests;

- terminal operators **who provide** the terminal service assortment. The terminal operation **can** be accomplished by a railway company, seaport company, shipping line, private company, consortium, independent regional operator, multimodal shipping companies/forwarders, road haulage industry, **and/or** even cities.

The aim of the terminal operator is to **provide** the customer with terminal services for the best possible **price**. Terminal service quality **may** be looked **upon** from three perspectives (Hilferink, 1994); i) customer-oriented; ii) **network-oriented**; iii) production-oriented. In this paper we **concentrate** on the production-oriented approach in order to **find out** the **cost** elements of a container terminal and to **identify** the **difference** between the financing of terminal **infrastructure** and infrastructure in **general**. It is **often claimed** that **costs** per container handling generated by terminals are high. **However**, several general indicators suggest that terminal service charges are not exceptionally expensive (**Societa per Azioni**, 1991, CBS, 1998):

- The **average financial** results of terminal operators in general (in the Netherlands) are not extremely high (**average 5,1%** of terminal sales)
- The terminal handling **may** be expensive, but the total **cost figure** of the **combined** transport Channel as a **whole** is far more important. Therefore, it is more important to look at terminal service charges **from** a marketing **channel** perspective
- The **price/quality** ratio per transshipment is not **well** balanced. Terminals **may provide** their customers with pre-defined quality levels and **clear cost figures** to **justify** their terminal handling **prices**.

As a starting point we use the table below in order to distinguish between the **various cost** elements of maritime container terminals. A container terminal **can** basically be developed in three ways: a new container terminal **can** be developed on a **greenfield site**, an existing container terminal **can** be extended, and an industrial **site can** be redeveloped into a container terminal. Furthermore, we distinguish between four different **categories** of terminal investments:

- Infrastructure** investments consist of investments in rail, road, **barge** and sea facilities to the terminal (terminal external).
- Terminal **structure** investments consist of **specific** investments (e.g. quays, **cranes**, and **crane rails**) in terminal infrastructure (terminal internal).
- Investments in the terminal suprastructure are investments on the terminal **site** that are not **specific** for a container terminal (e.g. terminal buildings, pavements, lighting, etc.).
- ITstructure** investments are **all** information technology investments needed for the container terminal.

Table 3.1: Ways to develop a container terminal and investment **categories**

	New CT	Extesion of CT	Redevelopment
Infrastructure	X	x	x
Terminal structure	X	x	X
Suprastructure	X	x	X
ITstructure	X	x	x

X = high **importance** in financial **terms**, x = **average importance** in financial **terms**

Source: **Wiegmans** et al., 1999

Due to **lack** of data it is not possible to **provide** exact insight into **cost components** of container terminals in general (**both** continental and maritime). **However**, there is a study **from TU Delft** (1995) which **provides** some insight into the **cost** elements of **very small** container terminals (mostly continental terminals).

3.3 Investments in container terminals: characteristics and risks

In this subsection we combine the theory about investments in infrastructure (section 2) and the **specific** case of investments in container terminals. We **pay** particular attention to the rationale for public sector activity in container terminal investments in combination with interaction with private **firms**. According to Dietrich (1994) two important **principles** have had an important influence on **economic** perspectives on the public sector and its relationships with private sector activities. **First**, the two sectors are involved in separate activities with different responsibilities. Secondly, the public sector must restrict itself to developing a **legal** and **economic infrastructure**. As government activity is based on the power of the **state**, contacts **can** be either based on governments determining infra-structural conditions within which private actors **operate** autonomously, or contacts **can** be direct and **interactive**.

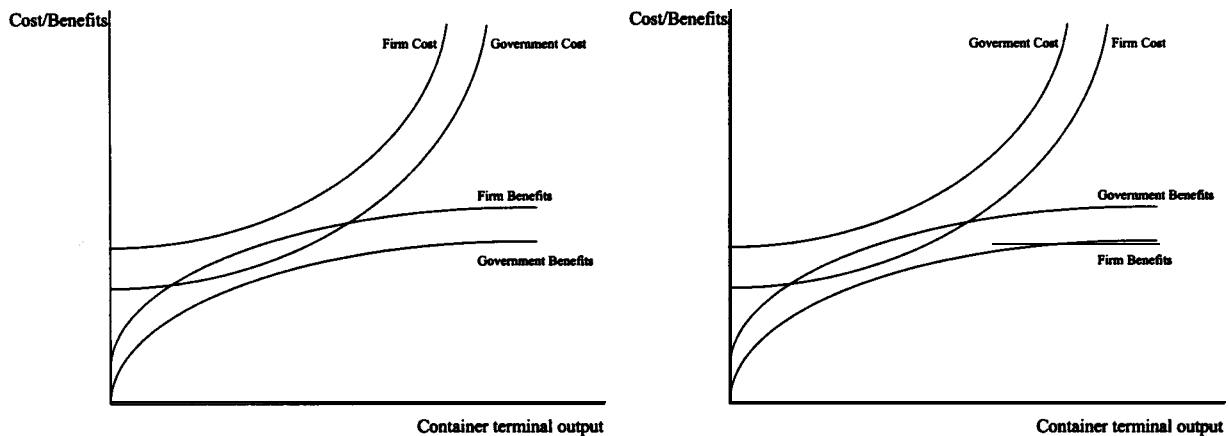


Figure 3.2: Cost and **benefit** relationships between governments and **firms**
Source: Dietrich, 1994, adapted

In the **left** part of Figure 3.2 we observe that the government is more **efficient** in **cost** terms but the **reverse holds** for **benefits**. On the **cost side** private sector **failures** exist, perhaps because of the public good characteristics of the activity in question with resulting **free-rider** problems. This is the case in container terminal investment **where** especially **access** to terminals via road, rail and water carry public good characteristics. **Also** the **fixed** lease term **means** that container terminal operators are not willing to **invest huge** amounts in a container terminal **that after** the lease period **can** be **contracted** to another operator. In the right-hand part of Figure 3.2 we observe that from a **cost** perspective **firms** are more **efficient** indicating that the activity in question is readily marketable. Resource **benefits however, indicate** advantages of government activity. This might **indicate** the **existence** of private sector **failures** (i.e., relative inability to change the characteristics of activities).

In the container terminal market it seems that the **left** part of Figure 3.2 **holds** true. **Risks** for private **companies** to **invest huge** amounts of money in container terminals are high, due to the long expected **economic** life of **infrastructure**. This **may** range **from** 20 years to more than a century. The **pay-back** period of infrastructure investments is **also** long; usually around 15 to 30 years. Private investments usually must **generate profits** in a **far** more restricted **time** period (e.g. 5-10 years). Secondly, the relatively low level of the operational (variable) **costs**, imposes a **further** risk increase for **the** private container terminal investor. Thirdly, during the construction **time**, a large amount of capital is required. **Often** high loans have to be acquired and the government is usually better able to attract cheaper loans (i.e., lower interest **rates**). Fourthly, the waiting period prior to actual infrastructure construction **can** be **very** long due to political decision **making**. These formalities **often** lead to project **changes** that have a major influence on the **costs** of **projects**. In **general**, private **companies** are not willing to run these

political risks, which forms another reason for government intervention. **Fifthly**, the irreversibility of the investment **once** the project has started **causes** another risk for private parties. If the construction is **discontinued**, this would lead to a significant capital loss, and this is another reason for government intervention to **reduce** the initial risks. Sixthly, the long construction period during which there are no revenues, imposes a further risk increase for private terminal operators. In the **beginning** there are **already** interest and other costs which calls for a governmental role. Finally, **each** container terminal investment is more or less **unique**. This **makes** it **difficult** to learn from **mistakes** made in the past. Overall, governments probably step into container terminal investment to decrease the risks for the private terminal operator. Without government intervention the risks of container terminal investments are relatively high compared with the low expected **rates** of return on investments.

Despite these risks, private involvement in **financing** and operating container terminals in harbours appears strong compared to other investments in transport **infrastructure such** as roads and railways. Public Private Partnerships (PPP) is a well-known term in this respect. Compared with investments in road and rail **projects**, Public Private Partnerships are **often** used for container terminals. In **general**, the (public) port authority is the provider of the suprastructure, whereas the private company operates the container terminal service portfolio. The construction of the terminal **also** involves **financial** aid of port authorities (e.g. through leasing constructions). The construction of a bulk terminal in the port of Amsterdam (starting in 1997) is a good example of this. The private company "Waterland Terminal" operates a terminal in Amsterdam, which is pre-financed by the Gemeentelijk Havenbedrijf Amsterdam (GHA, port authority of Amsterdam). Banks were not interested, as it would be too **risky** for them. The terminal is paid back via a rent-buy construction (not a subsidy). Besides this, GHA **also** provided quays and land, which are rented by Waterland terminal. It seems that the same problem **holds** true for investments in container terminals. Banks are not interested or only **when** the **pay-back** period is less than ten years. Involvement of governmental bodies enables a reduction of the **pay-back** period to **15-20** years which **makes** the project **financially** feasible. According to Farrell (1999) there are several reasons why ports have been more **successful** than other modes of transport in attracting private **capital**:

- There was an earlier **recognition** of the distinction between **infrastructure** and services. Port **infrastructure** is subsidised in most European **countries**, allowing service **providers** to make healthy **profits** at **prices** that are perceived as reasonable by their customers. The assignment of **infrastructure** to terminal operators in large blocks – which is **quite** unlike the 'open **access**' stevedoring arrangements found in some other **parts** of the world – has restricted competition **from** new entrants and protected monopoly **profits** (an opposite position is **faced** by the railways).
- The **second** reason for private sector interest in container terminals is the labour productivity gains in recent years, and the steady **fall** in unit costs due to **economies** of **scale**, which have not always been passed on to container terminal (port) users through lower tariffs. Private operators taking over the management of a public facility have usually been able to improve on past **profit** levels through the introduction of more flexible labour **practices**. The limited supply of terminals suitable for leasing and the high costs of **building** new **infrastructure** allow these **profit** levels to be maintained. Moreover, inside most container ports there is only one container terminal operator, which suggests the **existence** of regional monopolies.
- Furthermore, most container terminals involve relatively low risks **after** government intervention. The amounts of private investment required are **still** relatively small in comparison with other transport modes – the suprastructure for a two berth container terminal costs around ECU 50-100 million, which is equivalent to only 10-20 km of motorway. Most of the **assets** are mobile, with **well** developed **second hand** **markets**. Private investment in container terminals is therefore not **such** a leap in the dark as it is in other transport modes.

- The **final** factor encouraging private investment is the relatively light regulatory framework. Container ports are perceived to **operate** in a highly **competitive** market, and do not offer a standard product. There has **also** been a **convergence** of interest between the private container terminal operators and their **respective** port authorities, united by their efforts to compete against other container ports.

The **main** issues in involving private **finance** for transport infrastructure investments, concerns the sharing of risk and ensuring **higher** efficiency. These are the **main** reasons that governments are interested in attracting private parties towards public infrastructure investment **projects** through long leasing **contracts** and operational involvement. In **general**, in **infrastructure** investments the flow of **revenues** often begins **many** years **after** the initial investment; **this** increases uncertainty and risk for a private party or consortium compared to alternative investment options. In **general**, investments in infrastructure **incorporate** various risks for private parties. Currently, in the **specific** case of investments in container terminals these risks seem to be effectively shared between governmental bodies and private parties. The exact risk sharing depends on the lease contract both parties have agreed on. **However**, some general statements on the various risk **components** can be given (see Table 4.1).

Table 3.2: Container terminal investment **categories** and investment risks

	Pay-back	Operational costs	Capital	Waiting	Irreversible	Construction	uniqueness
Political risk	G	G	G	G	G	G	G
Financial risk	G/P	G/P	G/P	G	G/P	G	G/P
Construction risk	G/P	G/P	G/P	G	G/P	G/P	G
Operational risk	P	G/P	P	G	P	G/P	P
Commercial risk	P	P	P	G	P	G/P	P

G = government, P = private party; in this case **the** terminal operator
Source: **Wiegmans** et al., 1999

In Table 3.2 we connected the general characteristics of investments in **infrastructure** with the risk **factors** associated with investing in **infrastructure**. In **general**, the government runs the political risk of **all** characteristics of the investment in a container terminal. The terminal operator is 'safeguarded' **from** this risk by the government. The **financial** risks are shared between the government and the private terminal operator through lease constructions. The governmental body mainly **carries** the construction risks of the container terminal. The private terminal operator nms both the operational risk and the commercial risk. Besides reducing the risks mentioned above for private container terminal operators, the governmental body (port authority) **can** realise public benefits as well:

- With the construction of a new container terminal a city **will receive** more seaport tariffs and an increase in employment. These (financial) **benefits** are **extra benefits** above the amount resulting **from** the lease of the terminal facilities. In case of a road or railway there are in general no extra long-term benefits for the government;
- In a port it is possible to **create** more terminal facilities and thus to favour **competition** in that particular harbour. In case of a road or railway this is not possible;
- In **general**, a container terminal has to compete with container terminals in other harbours for transshipment volume (**inter-port competition**). In the case of a road or railway there is **often** no serious alternative (regional monopoly);
- Both the Port Authority and the terminal operator have the **same** interest (creating or maintaining an excellent port). In case of a road or railway the **main** interest of a government seems to get part of the project **financed** by private parties, whereas private parties are interested in **making profits out** of that particular project.

In **general**, container terminal investment and PPP **carries** extra **benefits** compared with road and rail investment for both private **terminal** operators and governmental bodies.

4. The relation between risks, profits, and Public Private Partnerships

Public Private Partnerships in container terminal investments (**both** maritime and continental terminals) are operational and successful because it is possible to share risks and because the projects **provide** profits for both the government (through extra port tariffs) and for the terminal operator (through regular container transshipment). Currently, container terminals are normally operated on a common-user basis, and have different characteristics (Farrell, 1999):

- Terminals have been transferred to the private sector as leasehold concessions **rather** than privately built installations;
- Because container terminals have high capital costs, most ports **can** support only one operator – even **where** traffic is sufficient to support 2-3 competing operators, there **may** be collusion in **the** way the market is shared;
- Customers are shipping lines **rather** than tramp services **making** them more responsive to quality of service than to **price**;
- Container lines have a greater choice of ports than bulk shippers and are more mobile, leading to **fierce inter-port** competition.

Lately, we have seen the development of the **first** single-user container terminals in Europe (e.g. P&O, Antwerp, Euromax, Rotterdam). Due to the increasing **scale** of container carriers and the continuing development of the conferences (cooperation between a number of carriers), volume seems sufficient to **justify** single-user terminals providing just the services as they are needed (See **also** Benacchio et al., 2000).

A distinction has to be made between different **cost** elements of container terminals to be able to **provide** insight into the sharing of risks and profits. We investigated **each cost** component in order to be able to **provide** insight into the costs per container and the costs per Twenty-foot Equivalent Unit (TEU) for small continental container terminals (see Appendix). These **cost figures** give some insight into the **cost structure** of an investor in container terminals. Based on this information we tried to **compose** a **figure** similar to Figure 1. Figure 3.4 presents a short term investment situation **where** it is **profitable** for a private company to **invest** in a terminal. It should be noted that this **figure** is only valid under certain assumptions. We assume a public private partnership between **the** private party and the port authority. As a **consequence** investment costs are reduced via lease **contracts** (although the amounts of required private investments are **already** relatively small). From the above this appears to be a valid assumption. This results in a lower **average** total costs curve, which is below the **average revenues** curve. The variable costs per unit are not constant anymore. **Price will** be set at p_1 and the terminal operator **will** make a **profit** of π_{AB} . For this to be true we assume that the container terminal operator **fixes** a **price** at level p_1 and that no **price** discrimination takes **place**. In this case it is interesting for private **companies** to **invest** in a terminal under these circumstances. **However**, in **practice** **prices** are subject to **competitive** powers of container carriers and **will** be lower than level p_1 .

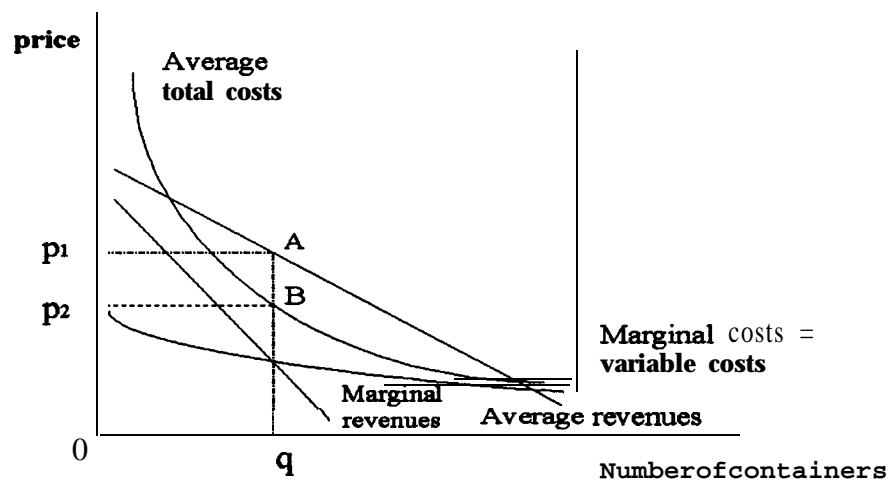


Figure 4.1: Market situation for an investor in terminals
Source: Nijkamp et al., 1995, adapted

Some remarks are in order concerning this analysis. The variable **cost** curve is **almost vertical when** the capacity of the terminal is not sufficient anymore to handle **all** containers. More containers **can** only be transhipped **when** capacity is enlarged and **all** other measures to enlarge current capacity have been used (e.g. **longer** terminal operating hours, increase the number of **cranes**, employ more people, **longer** port operating hours, etc.). Besides, the situation above **indicates** that it is interesting for other **companies** to enter this container terminal market. New entrants lead to new **cost structures** and other equilibria. **However**, we **focused** on the short run situation for only one terminal operator in a certain port. The situation **will** be **affected** by new entrants within the same port or by new strategies of other competing ports. As a **consequence** this **will** affect pricing **policies** of the investor. But there has been a **convergence** of interest between the private operators and their port authorities, united by their efforts to **compete** against other ports (Farrell, 1999). This weakens the possible threat of competition. In addition, the **economies of scale** available to established operators puts them in a strong **competitive** position.

It **may** be **clear** that operating a terminal **can** be **profitable** and **from** this perspective interesting to private parties for investment. But it still is without doubt that the role of port authorities should not be neglected. Differences in **financial** performance are not simply a question of some operators being more **efficient** than others, but are strongly influenced by government policy towards container terminal investment **funding**. For example, a contract to **operate** the terminal for 15 years results in a completely different **financial figure** compared to a lease period of 30 years. The **cost structures** of private terminals are **also affected** by the way port authorities **attempt** to **recover infrastructure** costs **from** port users, as they have a **considerable** amount of discretion in **how** they do this.

4. 1 Current practise in terminals investment in Europe

From a theoretical point of view, a container terminal **can** be developed in three ways: a new container terminal **can** be developed on a greenfield **site**, an existing container terminal **can** be extended, and an industrial **site** **can** be redeveloped into a container terminal. In container terminal investment **projects** we distinguish between four different **categories** of terminal investments:

1. **Infrastructure** investments consist of investments in rail, road, **barge**, and sea facilities to the terminal (terminal external and usually provided by the port authority). **Usage** is paid for through port tariffs;
2. Terminal **structure** investments consist of **specific** investments (e.g. quays, **cranes**, and **crane rails**) in terminal **infrastructure** (terminal internal and usually partly provided by the port authority). **Usage** is paid for by the terminal operator through long term lease contracts;
3. Investments in the terminal **suprastructure** are investments on the terminal **site** that are not specific for a container terminal (e.g. terminal buildings, pavements, lightning, etc. and paid for by the terminal operator). **Usage** is paid for by the container terminal users through transshipment tariffs;
4. **ITstructure** investments are **all** information technology investments needed for the container terminal and are paid by the terminal operator. **Usage** is paid for by the container terminal users through transshipment tariffs.

In Table 4.2 we then turn to a number of cases in the Netherlands extended with some information of container terminals in other European countries in order to analyse Public Private Partnerships in **practice**. An overview is presented of some **core** variables of investments in container terminals.

Table 4.1 Investments in terminals in the Netherlands

Terminal Name	Location	Investment (€)	Capacity (TEU/year)	Main customers	Transport mode	Investment TEU (€)
Ceres Paragon Marine Terminal (NT)	Amsterdam	172 mln	950.000		Deepsea	180
Oosterhout (NT)	Oosterhout		25.000		Barge	
Alphen aan de Rijn (NT)	Alphen	22,5 mln		Ikea Heineken	Barge	
IMCA (R)	Amsterdam	22,5 mln	150.000		Deepsea	150
WCT (NT)	Vlissingen	550 mln	2.500.000	-	Deepsea	220
Valburg (NT)	Nijmegen	550 mln.	1.400.000		Barge/rail	415
Zeeland Container Terminal (NT)	Terneuzen	31 mln	100.000	Dow	Deepsea	310
Beverwijk (NT)	Beverwijk	6mln	40.000	Corus, Cargill	Barge	150
Container Terminal regio Twente (NT)	Hengelo	4,6 mln	22.500	Grosch Vredestein	Barge	205
Wanssum (NT)	Wanssum	10 mln	-		Barge	
Container terminal Zutphen (NT)	Zutphen	7 mln.	15.000	Addink/ Opijnen	Barge	465
Moerdijk Container Terminal (E)	Moerdijk	20 mln	150.000		Deepsea	135
Euromax Container Terminal (NT)	Rotterdam	525 mln.	1.700.000	P&O Nedlloyd	Deepsea	310
Shell Haven (R)	London	835 mln.	3.500.000	-	Deepsea	240
Trinity Container Terminal (E)	Felixstowe	114 mln.	500.000		Deepsea	230
Container Terminal Deurne (NT)	Deurne	4.9 mln	-	Gosselin Moving	Barge	
CTIV (NT)	Bremen	260 mln.	-		Deepsea	-
Containerterminal Duinkerken (E)	Duinkerken	15 mln.	-		Deepsea	-
Harwich Container Terminal (E)	Harwich	160 mln.	1.700.000		Deepsea	95
Southampton CT (NT)	Southampton	860 mln.	-		Deepsea	
Riva Terminal Wielsbeke (NT)	Wielsbeke	5 mln.	75.000		Barge	70
Average		208	912.000	.	.	225

Container development plan: NT = New Terminal, E = Extension, R = Redevelopment

Source: Journal of Commerce, Cargoweb Newsletter, annual report of ECT and HHLG, and Nieuwsblad Transport, 1999 and 2000

We observe that the total investment amount varies between 860 mln. and 4,6 mln. Euro. It is important to note the **difference** between continental terminals (capacity usually under 100.000 TEU) and maritime container terminals (capacity mainly over 100.000 TEU). Terminal capacities are varying between 15.000 and 3.500.000 TEU a year in these cases. **Almost all** terminals are either **barge** oriented or **deepsea** oriented. Initial investment **costs** vary between 135-465 Euro per TEU. Unfortunately, it is for most terminals impossible to **provide** detailed information on **cost categories**, lease contracts, capacity **usage**, and **cost/TEU**.

Table 4.2 Investments in terminals in Europe and public-private partnerships

Terminal Name	Investment amount (€)	Public Investment	Private Investment	Capacity (TEU)	Public-Private Partnership ratio (%)
Ceres Paragon Marine Terminal Oosterhout	172 mln	128,5 mln.	43,5 mln.	950.000 25.000	75-25
Alphen aan de Rijn	22,5 mln				
IMCA	22.5 mln			150.000	
WCT	550 mln.			2.500.000	
Valburg	550 mln.			1.400.000	
Zeeland Container Terminal Beverwijk	31 mln	17 mln.	14 mln.	75.000	55-45
Container Terminal regio Twente	6 mln	1,4 mln.	4,6 mln.		23-77
Wanssum	4,6 mln	2,8 mln.	1,8 mln	22.500	60-40
Container terminal Zutphen	10 mln				
Moerdijk Container Terminal	7 mln.			15.000	
Euromax Container Terminal	20 mln			150.000	
Shell Haven	525 mln.	300 mln.	225 mln.	1.700.000	57-43
Trinity Container Terminal	835 mln.			3.500.000	
Container Terminal Deurne	114 mln.			500.000	
CTIV	4,9 mln				
Containerterminal Duinkerken	260 mln.				
River Terminal Wielsheke (NT)	15 mln.	9 mln	6 mln		60-40
Harwich Container Terminal	5 mln.	2.4	2.6	75.000	48-52
Southampton CT	860 mln.			1.700.000	
Average	208 mln.	66 mln.	43 mln.	912.000	55-45

NT = New Terminal, E = Extension, R = Redevelopment

Source: Journal of Commerce, Cargoweb Newsletter, annual report ECT and HHLG, and Nieuwsblad Transport, 1999 and 2000

We observe that the Public-Private ratio varies between 23-77 for the container terminal in Beverwijk and 75-25 for the Ceres Paragon Marine Terminal in Amsterdam. Almost all container terminals are Public Private Partnerships in which the government contributes considerable amounts to the financing of container terminals. Due to a lack of data only a general overview can be presented here. In the next section we will look in more detail to three of the container terminal investment projects and special attention is paid to the investment components concerning a new container terminal, an extension of an existing terminal, and the redevelopment of an existing site.

4.2 Three terminal case studies and Public Private Partnership

We selected three cases to be better able to look into detail into investment components and the differences between the development of a new container terminal (Ceres, Amsterdam), the redevelopment of an existing site (Shell Haven, London), and the extension of an existing container terminal (Port of Felixstowe, Felixstowe).

Ceres Paragon Marine Terminal Amsterdam

The terminal in Amsterdam is a joint project of Ceres Terminals Inc. and the Port Management of Amsterdam. Total investment is estimated at 172 million Euro and the terminal will be fully operational by mid 2001. Total extra employment is estimated around 600. Ceres Terminals Inc. will invest 43.5 million Euro (terminal buildings) and the Amsterdam Port Authority invests 128.5 million Euro in infrastructure and part of the cranes. Recently, the contract for all construction activities (such as berth dock, quay walls, paving, lightning, fencing, drainage, electrical systems, and other subsoil infrastructure; rail terminal and crane rails) has been awarded for 4 1 million Euro.

Port of Felixstowe (United Kingdom)

The container terminal in Felixstowe is a joint project of Hutchison Whampoa and the Port Management of Felixstowe. The current terminal consists of 540 acres and an additional 250 acres for which a long term lease is granted. The expansion plan has a two year time path and

will add about 500.00 TEU in extra transshipment capacity. Total investment is estimated at 114 million Euro. The expansion plan includes a quay extension of 270 meter and an additional 125 acres. The extra quay will be capable of serving two extra container ships. The three extra cranes are capable of serving ships up to 20 containers -and maybe even 22- wide on deck. Included in the investment amount is the transshipment equipment. The current terminal is studying on adding transshipment equipment worth 34 million Euro's as well. This amount will probably be paid for two quay cranes and ten rubber-tyred gantry cranes. The 26-km long channel has just been dredged to a depth of handling ships with a draught up to 15 meters (high tide). The dredging has last 70 weeks and has cost around 46 million Euro.

P&O Shell Haven Container Terminal (Turrock, Essex)

P&O and Shell will redevelop this former refinery site into a container port of 3.5 million TEU when fully developed. The site will consist of 1,500 acres of land, 3,000m of quays providing berths for up to ten vessels. The surrounding area will be developed to provide services like transport and logistics. P&O will purchase the land required and the site will be jointly developed with Shell. The Port of London Authority and Thurrock Council form part of the proposed deal to develop the site. Currently, the site is well connected by road and rail to the UK national network, but the capacity of these connections will be increased. The total investment is thought to exceed over 835 million Euro over the next 10-15 years. The terminal will be built in stages and the first phase -ready in 2003 or 2004- will cost around 167 million Euro.

If we take a closer look at the different container terminal development models we come to the following Table 4.3. This Table shows the relation between container terminal development types and risks of investments in infrastructure.

Table 4.3: Container terminal types and characteristics of investments in infrastructure

	Amsterdam	Felixstowe	London
Political risk	G	G/P	None
Financial risk	G/P	G/P	G/P
Construction risk	G/P	G/P	G/P
Operational risk	P	P	P
Commercial risk	P	P	P

G = government, P = private party; in this case the terminal operator
Source: Wiegmans et al., 1999

Considering the three case studies and the risks involved in investments in container terminals we constructed Table 4.3. In all three cases we observe that the private terminal operator runs the commercial and the operational risk. Financial and construction risks are shared in all three cases. The degree of risk sharing depends on the lease contract conditions. In the case of a completely new terminal we see that the government runs most of the political risk, whereas in the case of an extension of a container terminal (e.g. Felixstowe) the political risk is shared. Both the government and the terminal operator support the extra investment and try to secure the political support. In the case of the redevelopment of an existing site (a former oil refinery in the case of London), the political risk is of far less importance, since all parties are eager to transform such a site into a more productive area (e.g., a container terminal).

5. Conclusion

In general, it is still not attractive to invest in transport infrastructure for private investors. This is mainly due to some specific risks and costs caused by several characteristics (public good) of transport infrastructure. Private involvement in financing and operating container terminals in harbours is high compared to other investments in transport infrastructure such as

roads and railways. Both the literature and **also practice** (number of PPP in container terminal investing) show that this statement **holds** largely **true**. In analysing investment projects of container terminals we **find** that in **all** projects both the government and private parties play a role. In **general**, container terminals are an example of a successful cooperation between government and business. It **needs** to be stressed **however**, that without governmental help risks are still too high in relation to the expected returns on investment for private parties. This has to do with the **fact** that costs of infrastructure are **rather** large for private **companies**. It appears that public funding via lease **structures** is necessary to **reduce** investment costs and to make the operation of a terminal a more attractive (**profitable**) activity.

Besides, the confirmation of the high involvement of private parties in container terminal investment projects, we have **also** identified the particular issue why terminals are more attractive to private investors than other infrastructure investment projects. Firstly, there was an earlier **recognition** of the distinction between container infrastructure and container services. Port infrastructure is subsidised in most European countries, allowing container terminal service providers to make (healthy) **profits** at **prices**, which are perceived as reasonable by their customers. Usually rail and road service providers do not make healthy **profits** and their users perceive **prices** as too high. It **can** even be stated that **profits** of container terminals are paid for by the tax-payer. Secondly, the assignment of infrastructure to terminal operators in large blocks – which is **quite** unlike the ‘open **access**’ stevedoring arrangements found in some other parts of the world – has restricted competition from new entrants and protected monopoly **profits** (a position that is a contrast with the railways).

The third reason for private sector interest in ports is the productivity gain in recent years, and the steady **fall** in unit costs due to **economies of scale**, which have not always been passed on to port users through lower tariffs. Private operators taking over a public facility have usually been able to improve on past **profit** levels through the introduction of more flexible labour **practices**, while the limited supply of terminals suitable for leasing and the high costs of **building** new infrastructure allow these **profit** levels to be maintained.

Furthermore, most port terminals involve relatively low risks **after** government intervention. The amounts of private investment required are **still relatively** small in comparison with other modes – the suprastructure for a two berth container terminal costs around ECU 50-100 m, which is equivalent to only 10-20 km of motorway. Most of the **assets** are mobile, with **well** developed **second hand markets**. Private investment is not **such** a leap in the dark as it is in other transport modes. Or to put it another way, the **chance** for **profits** is **higher** to investments in container terminals than to conventional investments in infrastructure.

A **fifth** reason **can** be found in container terminal operations. These are becoming too complicated for cities and regions to perform as a governmental task. Moreover, operation of a container terminal is **definitely** no **core** business of governments.

The **final** factor encouraging private investment is the relatively light regulatory **framework**. Ports are perceived to **operate** in a highly **competitive** market, and do not offer a standard product. There has **also** been a **convergence** of interest between the private operators and their port authorities, united by their efforts to **compete** against other ports.

Rationality (extra employment, seaport tariffs, involvement in networks, etc.) for local governments to **invest** in container terminals has vanished in recent years. Governments should be **much** more careful in these **bidding processes** for transshipment capacity. Competition between (in **general**) public port authorities for container terminal transshipment capacity leads to high risk situations for local governmental bodies.

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