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The Effect of technological and organizational Innovation in the European Logistics Sector on Port Economic Areas - Recommendations for spatial and regional Planning

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Introduction

The industrial development of the 1980s and 1990s led to a drastic increase in the revenue generated by transportation in general and, especially, from road freight, through new forms of goods procurement within the context of a “paradigmatic change in the organisation of production and enterprise“ (Läpple 1993: 22). These forms of production, synchronised with delivery, are expressed in current catch-phrases such as “just in time”, “lean production” and “systemic rationalisation” (see Läpple 1993, Altmann et. al. 1986). They are related to an increasing interregional and international division of labour, which has led to the volume of world-wide transported goods, and therefore transport derived profits, are rising much faster than world-wide production.

From this increase, maritime transportation and logistic service providers profited most of all, at least from the quantitative point of view. Seabourne world trade has risen continuously since the 1980s, only registering an approximately 0.7% decrease from the previous year in 1998, the first in 16 years. However in 1997 it had grown by about 5,1%. In 1998, the world-wide volume of goods delivered by means of maritime transportation amounted to 5.1 billion tons. Despite the slightly decreased demand for transport, the load-carrying capacity of the world trade fleet also continued to rise by about 1% in 1998 and amounted thereby to 750.8 million tons. Even though this increase slackens in 1999, the larger ship capacities lead, along with decreased volumes of trade, to sinking freight rates. "Freight rates are not sufficient to cover operating costs, interests and repayments." (Torsten Wagner, executive board member of the Schiffshypothekenbank zu Lübeck AG in: DIE WELT, 17.06.99)
1 From the Transport Company to the Lead Logistics Provider

These developments lead to all the maritime trade participants strongly increasing the necessary rationalisation measures, in order to advance themselves compared to their direct competitors, as well as against other transportation companies. Information technologies (IT) play a key role here, since their implementation leads to accelerated and simplified processes. The use of IT frequently yields a reduction in the number of workplaces, while at the same time modifying employee qualifications, resulting in a lowering of the connected operating costs. In addition, other optimisation potentials can be achieved with IT (e.g. improved utilisation of resources) and also lead to sinking costs. The increasing globalisation of the world economy and the international competition of enterprises within the area of port economies, lead to enterprises being forced by competition to be open to all rationalisation potentials and to thus advance the use of IT.

1.1 Information Technologies

An exceptional importance has been attached to IT during the economic development of the world economy. Several authors see in this technology the basic innovation of the currently starting fifth Kondratief-cycle. IT for ports represents an important part of this carrier renewal, so it may be assumed that the introduction of these technologies in ports which up to now have been running rather sluggishly, will increases in the future and will have an important influence on the evolution of port markets. The importance of these technologies to the world-wide logistic chains, and therefore to the regional and local markets of ports, is extremely large. Which actors (Shipping firms, forwarding agents, local authorities etc.) control the innovation processes and determine their future development - in the form of Hardware and software investment - was examined within the frame of BALTICOM, along with the question of which general conditions control the decisions of these actors. Of special interest in this connection are the middle- and long-term strategies of large-scale enterprises (global players) that, unlike public planning bodies, are less obvious and far less accessible.
1.2 Actors

The actors are those close to the producers who, as shippers or receivers, commission the bearer service; and furthermore the forwarding agents, who in the past normally functioned as contractors and carried out the material land transportation by road freight or via railroad. Through this subordinate position in the organisation of the transportation chain, the forwarding agents determined the process of this chain. Other enterprises involved in transportation, like ship owners - who cover the field of the maritime traffic - and the port enterprises - who actually receive their orders from them and act as possible mediating actors - in the past held the position of subordinate service providers, normally receiving their tasks from the forwarding agents.

These structures, which had grown over decades, have been increasingly eroded in the last years. Classical port enterprises are not by any means limited anymore to transhipments and storage at individual port locations, and "surrender to" the dependence of a derived demand, where they have only little influence over the quality and rates of their service in comparison to rival businesses and competing port markets. Rather, port enterprises acquire tasks from large shippers through the marketing departments and distinguish themselves from the competition by providing additional services, for example block trains or through the construction of networks.

Large shipping companies, because of the constant growth of the world trade fleet, sinking freight charges and increasing competition, have to deal with negative margins and maintain their welfare by building ever larger trade vessels (McLellan et. al. 2000), enjoying the comparative cost advantages which can thereby be obtained (economies of scale). These attempts at bundling transport in volume are in conflict with the post-fordian production systems used by the large shippers, which today often produce small series for selected target groups (economies of scope) in differentiated partial markets, and are dependent on flexible systems for their distribution (cf. Bachmeier 1999).

1.2.1 Concentration Processes

As in all other fields of the economy, concentration processes also occur in the transportation sector, which express themselves in a true "fever of mergers". Shipping companies¹ merge with and/or take over terminal operators and other enterprises from

¹ For example, P&O/Nedloyd
the area of port transportation. Terminal operators\(^2\), in their turn, join in order to be in a strong position to face the size and market power of the shipping companies and to avoid becoming dependent on individual enterprises. Large-scale mergers are currently making headlines also within the forwarding business\(^3\).

However, company alliances don’t only involve the transportation companies. In the same way, different forwarding agents and big ship owners attempt, with the aid of strategic alliances or company incorporations, to acquire the necessary know how in the field of IT. This in order to develop, as quickly as possible, information systems with which the logistical steps can be controlled and checked, and which the individual company data processing departments are no longer able to manage by themselves. All actors participating in the transportation chain are convinced that the future information system leader will also lead the physical chain, therefore gaining the largest part of the incremented value created by transportation (cf. Frenzel 2000, Liesenfeld 2000, Adrion 2000).

1.2.2 Of Actors and Co-Operations - "Player Alternation"

The European economic integration in the context of world-wide globalisation processes, which dramatically accelerated during the 1990s, is characterised by KLÄUS (1999: 3) as being a "late revolution ... under the strict market-economic game rules of the Roman Contracts of 1957" whose tardiness had been forgotten by many actors and depreciated by others already before they began. The comprehensive disassembly of restrictions on trade in the middle of the 1990s, along with the consequent end of political limitations on site choices for enterprises, led to new possibilities for entrepreneurial co-operation and alliances, including fusion and hostile incorporation. Especially the “used-to-stability” entrepreneurs in Germany feel the dramatic consequences of this integration process.

One of the most impressive examples of this tendency was the hostile take-over of a traditional German company, Mannesmann, by its British competitor Vodafone. Mannesmann had, through early positioning and concentration in the growing telecommunications sector, successfully competed to become the second most important provider in Germany, surpassed only by Deutsche Telekom. The purchasing

\(^2\) For example, Eurogate (formerly Eurokai Hamburg und Bremer Lagerhaus Gesellschaft)
\(^3\) For example, German Post (Deutsche Post)/DANZAS
negotiations were portrayed by the media as an incorporation battle; at first broken off without a result and then continued through two gigantic advertising campaigns which only the print media could be pleased with, since the continuously changed full-page ads of the competitors resulted in unexpected gigantic returns for them. Many entrepreneurs, but also politicians, trade unions and the population in general were shocked by this bitterly conducted incorporation battle, and calls were made for government intervention and for new rules to be set for the "hostile" incorporation of one enterprise by another. The politicians did not react; in contrast to the "Holzmann case\(^4\), they followed their liberal pattern and left the market to itself and to its strengths, which in the EU - at least by the 1990s – are trusted even by socialist and social-democratic governments.

The competitors finally ran out of the financial means to keep up the media campaign, and after the egoistic motives of Mannesmann’s former chairperson were satisfied (see figure 3) with a compensation of approximately 60 Million DM, the incorporation took place. Vodafone, being a telecommunication conglomerate, was of course interested only in Mannesmann’s main market area. The traditional divisions belonging to the heavy industry divisions were sold off, thereby making it possible to concentrate in the future on the key competencies and simultaneously to get back a part of the financial means which had been used for the (expensive) incorporation. This method of refinancing an incorporated enterprise, through its "splitting up", is a frequent tool used, particularly in the USA, by neoliberal turbocapitalism as practised by global investment bankers.

Also in the transport and logistics sector (T&L) the major players are changing. Former State Enterprises such as Deutsche Post (German Mail) are privatised and must prepare themselves for the sudden competition. Just as the governmental telecommunications monopoly was eliminated in previous years, the state monopoly on the transportation of letters and parcels will now be eliminated too. These modifications of the general conditions lead to hectic activities within the sector. Many re-evaluate their middle- and long-term strategies, reposition themselves, co-operate and merge, withdraw from some markets and set themselves up in others. Co-operation with, or the incorporation of, other companies is the most usual reaction to the new conditions, in the T&L sector as well. As in almost all the other branches of the "Old Economy" (for example

\(^4\) The long-established German construction company Philip Holzmann had to apply for bankruptcy in 1999. This endangered 20,000 workplaces. The current governing coalition – under chancellor Gerhard Schröder – promised financial help, which the trusting banks used as a basis for further help to the highly indebted company.
automobile manufacture, mineral oil extraction and processing, chemicals, pharmaceuticals and energy supply), size seems to be the most secure guarantor for future success. The main driving forces for this evolution, next to the search for "Economies of scale" and "Economies of scope", are particularly the urge to enlarge one’s own market power and to optimally position oneself in the international competition fight, in order to safeguard the long-term survival of the enterprise.

But according to opinion of the actors involved, not only quantitative growth is important; qualitative growth is equally so. The new demands of the information society and the "New Economy" on the T&L-sector, make it necessary to increase the “know how” as quickly as possible in the field of IT, and develop information systems with which the logistics chain can be controlled and checked. IT departments of individual companies are no longer able manage such a task, so that big actors (for example the experienced and traditional Swiss forwarding agent Kühne & Nagel) buy up software enterprises throughout the world that develop information systems for the T&L sector, or will be able to do so in the future. All actors participating in the transportation chain are convinced that the future leader of the information system will also dominate the material transportation chain and thereby gain the largest part of the increased value created by transportation (see. Frenzel 2000, Liesenfeld 2000, Adrion 2000). Furthermore, the evolution of such technologies is extremely capital-intensive: Markets, which are becoming more and more transparent, involve ever-increasing costs for marketing and distribution. Smaller enterprises, endowed with a more limited capital, are no longer able to make the investments necessary to remain competitive.

Current examples of such co-operation is the collaboration between i2 and Kühne & Nagel, or the incorporation of BILOG AG by Bertelsmann Distribution. The growing importance of information and communication processes, as well as their increasingly close intermeshing with traditional economic sectors, result in T&L service providers not only having to increasingly control the information processes in logistics management and checking, but also having to develop the necessary tools to do so. Also other services are outsourced by the producers and taken over by enterprises in the T&L sector. Those can be, for example, activities from ordering (for example billing) or customer service (for example call centre, service, installation). These activities go far beyond the classical warehouse, commissioning and transportation activities which the conveyors formerly undertook, and which were often carried out in direct proximity of, or within, the ports themselves.
**Service Provider contract Logistics**

Strong increases in this regard, especially in the field of service-provider-contract logistics, lead to the intertwining between the T&L providers and those in the added value chain (producers and traders), which is destined to further increase since the "outsourcing" of the described activity automatically presupposes a closer co-operation of the different enterprises. In this context, the term “lead logistics provider” was coined. The large industrial and commercial enterprises rely on stable and dependable partners that take over these activities. This not only lowers costs, but allows them the freedom to concentrate on their main competencies in the spirit of “lean management”. A basic assumption for such a concept is the reliability of the partner in the T&L branch, which must guarantee a smooth co-operation. If this is the case, both involved actors can enjoy the positive effects and thus have the possibility to optimise their added value chain and outperform competing ones.

Such positive results have the consequence that big producers and traders, who act as forwarders in the added value chain, have to restrict these positive effects to their own chain. While the possibilities of positioning oneself in the market through product quality are decreasing, the optimisations within the added value chain (for example delivery times, services) offer considerable possibilities for distinction. In order to keep this advantage over the competition, T&L service providers are ideally supposed to be obliged to exclusively serve one company but, due to the dependence this implies, it is not in the interest of the T&L enterprises to do so.

**1.2.3 New Formations - Co-Operations and Alliances**

The ongoing concentration processes in the European T&L sector can be illustrated by considering the annual revenue "moved" through fusions and alliances. In the period from 1997 to 1999 it amounts to about DM 50 billion, which is equal to more than 10% of all logistics service sales in Europe. Thus, the total turnover volume of the 10 European T&L market leaders in 1999 was DM 93 billion, almost twice as much as two years before (1997: DM 53 billion) (Klaus 1999: 11). The most prominent actor in this period was the German Mail, which, through renewal, investments and incorporation, developed from a government parcel and letter carrier with high labour costs to Europe's largest (by sales) forwarding and logistics corporation and is one of the most diversified world-wide. But also the Dutch, the French and the English mail bought into other enterprises in the field. In the shipping sector, the mammoth fusion of P&O with
Nedlloyd Containers was followed by the merger of Maersk-Moeller with Sea-Land. The European railroad conveyers also formed new corporations, and corporations which were previously foreign to the sector such as VEBA-Stinnes, RWE and VIAG from Germany, or GE Capital from the USA, evidently see promising potential in the logistics line and invest heavily in the market.

But not only do the supplied T&L-services change, the demanded ones also change. For example company shuttles, which are run by the enterprises themselves and constitute an estimated 50% of all T&L services in Germany, will gradually be outsourced, resulting in a development from “insourced to outsourced”. (Klaus 1999: 5f). Klaus (ibid.) assumes that of these "insourced" activities, which Europe-wide amounted to about 200 billion EURO in 1999, 20% to 30% will be transferred into the T&L sector, especially to the profit of the “service provider contract logistics” enterprises. Table 1, below, shows the most important fusions, alliances and incorporations in the European T&L sector from 1997 to 1999. Only enterprises with an annual revenue of more than a billion DM are considered here.
Table 1: Co-Operations, Incorporation and Alliances 1997 to 1999 in the European T&L Sector

<table>
<thead>
<tr>
<th>Actor (Country)</th>
<th>1997 Sales in Mil. DM</th>
<th>Fusion/Co-operation Partner</th>
<th>1999 Sales (net change) in Mil. DM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deutsche Post AG (D)</td>
<td>3.400</td>
<td>Danzas, Nedloyd ETD, ASG, Securio Ex., DHL, Ducros, Trans-o-Flex a.o.</td>
<td>27.500 (12.100)</td>
</tr>
<tr>
<td>Maersk-Moeller (DK)</td>
<td>5.140</td>
<td>Sea-Land</td>
<td>11.740 (6.600)</td>
</tr>
<tr>
<td>SNCF/Sernam (F)</td>
<td>6.300</td>
<td>GEODIS</td>
<td>10.500 (4.200)</td>
</tr>
<tr>
<td>Preussag (D)</td>
<td></td>
<td>Fusion VTG, Lehnkering in Hapag Lloyd</td>
<td>3.800 (3.800)</td>
</tr>
<tr>
<td>Stinnes/Schenker (D)</td>
<td>6.500</td>
<td>BTL</td>
<td>10.100 (3.600)</td>
</tr>
<tr>
<td>SNCCB-ABX (B)</td>
<td>2.500</td>
<td>THL with Bahntrans a.o.</td>
<td>5.000 (2.500)</td>
</tr>
<tr>
<td>P&amp;O Steam Navig. (GB)</td>
<td>4.000</td>
<td>Nedlloyd Container</td>
<td>6.000 (2.000)</td>
</tr>
<tr>
<td>Geo-Logistics (US)</td>
<td>1.700</td>
<td>Lep/Lassen, Nortrans</td>
<td>3.580 (1.880)</td>
</tr>
<tr>
<td>DFDS (DK)</td>
<td>2.400</td>
<td>Dantrans</td>
<td>4.000 (1.600)</td>
</tr>
<tr>
<td>Wallenius (S)</td>
<td>1.300</td>
<td>Wilhelmsen</td>
<td>2.600 (1.300)</td>
</tr>
<tr>
<td>Hays (GB)</td>
<td>2.200</td>
<td>FDS, van der Heijden, Daufenbach</td>
<td>3.000 (970)</td>
</tr>
<tr>
<td>Capital Securities/ Prologis (US)</td>
<td>550</td>
<td>Frigoscandia</td>
<td>1.280 (730)</td>
</tr>
<tr>
<td>Royal Mail/ Parcelforce (GB)</td>
<td>1.300</td>
<td>German Parcel</td>
<td>2.000 (700)</td>
</tr>
<tr>
<td>TNT Post Group (NL)</td>
<td>5.500</td>
<td>JET-NVS</td>
<td>6.100 (600)</td>
</tr>
<tr>
<td>La Poste (F)</td>
<td>2.800</td>
<td>DPD</td>
<td>3.340 (540)</td>
</tr>
<tr>
<td>GE Capital/Penske (US)</td>
<td>3.500</td>
<td>Van der Graaf, Serra Merz</td>
<td>4.000 (540)</td>
</tr>
<tr>
<td>Tibbet&amp;Britten (GB)</td>
<td>2.600</td>
<td>Walon, Applied Distrib a.o.</td>
<td>3.100 (500)</td>
</tr>
<tr>
<td>Deutsche Bahn (D)</td>
<td>7.200</td>
<td>Niederl. Eisenbahn</td>
<td>7.500 (320)</td>
</tr>
<tr>
<td>ÖBB/RAIL Cargo (A)</td>
<td>1.800</td>
<td>Express Sped., Interfracht</td>
<td>2.100 (300)</td>
</tr>
<tr>
<td>Fiege (D)</td>
<td>1.200</td>
<td>Aser Span. a.o.</td>
<td>1.500 (300)</td>
</tr>
<tr>
<td>Dachser (D)</td>
<td>1.750</td>
<td>Graveleau</td>
<td>2.050 (300)</td>
</tr>
<tr>
<td>Kühne und Nagel (CH)</td>
<td>5.900</td>
<td>Elan</td>
<td>6.040 (140)</td>
</tr>
<tr>
<td>GEFCO (F)</td>
<td>2.900</td>
<td>K&amp;N-Elan</td>
<td>3.000 (85)</td>
</tr>
<tr>
<td><strong>Summe</strong></td>
<td><strong>129.830</strong></td>
<td></td>
<td><strong>129.830 (45.605)</strong></td>
</tr>
</tbody>
</table>

Source: Klaus 1999: 12f
As the table shows, not only traditional enterprises in the T&L sector are the driving forces in the field of company mergers. Former public mail and railroad services appear no less than eight times among the primary actors. These enterprises, which today are the biggest logistics service providers in Europe, wouldn’t have appeared in such a ranking a few years previously. Additionally one finds enterprises that deal with raw materials, energy and others which have not had any connection with the T&L sector until now. An example of such a company is Penske, which is part of General Electric corporation. Similarly to other capital joint venture companies, these enterprises are not actively involved in the business process, but invest only in sectors that give reason to expect high net yields.

### 1.2.4 Medium sized Company Co-Operation and other Relationships

Along with the big actors that operate globally, or at least within Europe, the T&L sector consists largely of middle and small firms, even today. Just in the forwarding field, there are innumerable "dog and pony shows". These are the result of the dissolution of truck vehicle fleets and the migration of formerly dependent drivers into new forms of entrepreneurial self-sufficiency, often designated as "apparent independence" in political discussions. These small and very small firms suffer the most from the ongoing concentration processes, since they must yield to the rationalisation pressures of the big enterprises without having a corresponding lobby. They are as a rule dependent on one main client and are not at all capable, due to lack of capacity and training, to acquire business from other sources. They must conform to the default rates and can not pass increasing costs on to the market, such as the increases in mineral oil prices. While the commissioners (senders, forwarding agencies) are managing to reduce the costs for road transport and keep it at a low level, the new "entrepreneurs" work far outside legal limits and norms (for example in loading and in driving and rest times) without being correspondingly paid. They live on the edge of a bare subsistence level, without the social safeguards of having a dependent occupation and without the financial possibilities to implement this safeguard themselves. This evolution has led to road transportation today being cheap, as never before, compared to alternative carriers (railroad, inland waterways). This trend towards the "outsourcing" of vehicle fleets continues, and will increase through the described additional relocation of the currently "insourced" T&L activities.
1.2.5 Horizontal, vertical and diagonal Co-Operation

Whereas these very small firms don’t take advantage of the possibility to co-operate, the “bigger small firms”, the medium-sized companies and the large-scale enterprises do get involved in co-operation and concentration processes. For the big actors it is often a question of vertical alliances. These enterprises are active in different fields of the T&L sector and are often ordered in respect to one another (for example ship owners/transhipment firms/land transportation firms) in the added value chain. The enterprises arising from these vertical alliances succeed in controlling large parts of the added value chain. Next there is diagonal co-operation, involving enterprises which were until now acting in different added value concatenations, an example of which is the incorporation of IT and telecommunications companies by forwarding agents or ship owners. Horizontal co-operation tends to be the exception among the Global Players in the T&L sector, though not rare. Among the small and middle sized companies on the other hand, these horizontal co-operations are the rule. Enterprises that have the same functions in the added value chain, and were often competitors in the past, increasingly co-operate in order not to succumb to the market power of the large-scale enterprises and also to enjoy the various advantages that such co-operations bring. The great number of co-operation declarations, including those actually leading up to incorporation, in this market segment of the T&L branch makes a comprehensive view impossible. Also, reliable dates for the sales of these enterprises are not available in many cases. Klaus gives several examples of these middle scale co-operative formations from 1997 to 1999 (2000: 15).

1.2.6 The “Logic” of Mergers

The question is; what is it, that is driving enterprises of the T&L branch, like companies in other sectors of the economy, to join horizontally, vertically and also diagonally and to take those great risks that such concentration processes with immense investment volumes and comprehensive new positioning in the business fields bring about? In the preceding sections this question was dealt with again and again, but was not systematically and comprehensively answered. A comprehensive analysis and evaluation of these factors is, in the scope of this work, vital for evaluating the future actions and strategies of the individual actors and their capacity to compete, within the context of the future of the European T&L branch.
The following explanations and the driving forces behind them are not only relevant for the T&L sector, but they keep their validity in all economic branches of the globalised world economy. The international concentration processes at work in the automotive industry in recent years (for example VW/Audi/Skoda/Seat, Daimler Chrysler/Mitsubishi, GM/Opel/Fiat, Ford/Volvo/Range Rover, BMW/Rolls Royce and others) were, on the whole, triggered by the same factors as the concentration processes in the pharmaceutical and chemical industries (for example Novartis and Aventis). These factors control concentration processes in the European T&L sector in the same way. The time during which this sector was shaped by middle-class enterprises, that limited their activities to single sectors of the world economy (except for international shipping), now seem to have passed. In this respect, the question must be asked whether it is still permissible to speak of a "European T&L-sector", if the large and determining actors are globally active in the same fashion as international market leaders belonging to other sectors. Nevertheless, the T&L sector still counts innumerable medium scale enterprises, and small, very small and specialised providers are present as in few other sectors in the world. These enterprises do not determine the evolution of the sector to any great extent and often only react to the processes controlled by the large-scale ones. Their economic activity is limited to circumscribed areas, countries or to Europe itself. In this respect it seems possible to speak of a European T&L-sector, which is dependent on the evolution of the global T&L-sector.

A comprehensive, systematic analysis of the driving forces behind these fusions must encompass the companies’ economic motivations (those stated and mathematically expressed in the form of cost-benefits analyses by the enterprises themselves). Like Klaus (2000: 16ff), these driving forces behind fusions will be referred to as economic motives. Next to that there are several other motives, which enterprises normally do not mention and even often deny. Their importance is underlined, however, in economic, social science and economic geography literature. These driving forces will be referred to as “non economic” reasons in this text. Illustration 1 summarises the economic and non-economic driving forces for fusions.
1.2.7 Economic Driving Forces

The most important and frequently mentioned basis for fusions and co-operations are the intended rationalisation effects. The joining together of economic activities increases the ability to innovate.

1.2.7.1 Ability to Innovate

A high capacity to invest is an absolute necessity: Particularly during the current development towards a society permeated by information technology and an economy which, for the evolution and application of new technologies which are absolutely necessary for future achievement, demands high investment volumes from enterprises.
However, not only in the fields of information and communication technologies must huge investments be made. Competition in the globalised world economy continuously increases the cost pressure to the competitors in the added value chain. However, they can distinguish themselves less and less from competitors through the uniqueness of their own products, as these are becoming ever more similar world-wide in many fields. Also, the technological advantage of enterprises in traditionally high technology countries is rapidly fading. For example, in the sixties the automotive industry of Japan began to conquer the international market, this development has its parallel in the nineties; particularly in the case of providers from newly industrialised countries in East and Southeast Asia, which successfully took up positions in the international market. On the Asiatic, North American and even on the highly competitive German market, enterprises like Hyundai, KIA and Daewoo succeeded in slowly increasing their market coverage. While in the sixties, a leading German automotive industry entrepreneur was convinced that Japanese car manufacturers would “hardly ever be able to build a car that could succeed in the international market” (Reinheimer 1982: 7), Frenzel (2000: 2), who manages vehicle transport logistics for the Daimler Chrysler corporation, sees the situation differently. He believes that the product quality of the different world-wide providers is becoming increasingly more similar which – according to Frenzel – results in a decreasing importance of brand names. Therefore the providers must use factors other than product quality to distinguish themselves from their competition.

1.2.7.2 Economies of Scale

These additional optimisation potentials can be the various consequences of fusions, or co-operation. Next to the previously mentioned stronger innovation capacities, material flows can be bundled, which leads to a better utilisation of the existing resources (Economies of Scale). However, not only in the fields of procurement and production can positive scale effects be achieved. Especially in the fields of marketing and distribution, increasingly larger sums must be spent in order to market the products, thus increasing or maintaining sales revenue. Here, fusions can result in a geographic broadening of the market. It is like this, for example, that VW Corporation managed to become the market leader through the incorporation of SEAT in Spain and Skoda in the Czech Republic.
1.2.7.3 Economies of Scope

Along with the actual product, however, today customers expect the enterprise to provide a comprehensive customer service. These companies do not simply attempt to sell a product, but to tie the customer to the enterprise, for example when additional services are offered from the service branch. Previously one-time customer contacts (contract signing) are developed into long-term customer relationships (Customer Relationship Management). Information on the customers are stored in databases and used for enhancing customer loyalty. This is the same approach used by the hairdresser who sends his or her customer a card for their birthday or to remind them that their last permanent wave was already more than eight weeks ago. Similarly, the investment goods producer does not only sell his plant, but simultaneously completes long-term maintenance agreements and offers all the necessary service to the customer, requiring only a single provider. In these cases the competence of the provider is enhanced in the eyes of the customer; the provider can thus gain additional possibilities for revenue through the broader palette of offered goods and services from the added value chain (Economies of Scope).

This addition of additional effects results in the fused enterprise showing a higher enterprise value in comparison with individual enterprises, which in turn leads to rising share values. The share price and the "Shareholder Value" resulting from that is the most important measurable variable for entrepreneurial success, not only in the USA, but increasingly in Europe as well due to rising stock market euphoria and the possibilities of free capital flow. If it is more profitable to invest in North American companies than in German or European ones, the money will consequently go to the US instead. Thus European enterprises must join the competition over the most profitable shareholder value, in order to have sufficient financial means at their disposal in the future. Besides, the danger of being taken over by a competitor increases with sinking share values, since the enterprise is commonly perceived as being below its real worth and therefore being a “bargain”. With new management and a new strategy that is more strongly oriented towards enhancing shareholder value (for example rationalisation measures), the enterprise value can be increased rapidly, though often also with scarce social compatibility.
1.2.7.4 Diversity - "Portfolio Logic"

The main goal of every merger is the long-term protection of the implicit base of contracts, as well as the survivability of the enterprise itself. Such a goal can entail putting into effect the described scale effects, or the efforts to create other “feet” to stand on, thus eliminating or at least reducing seasonal and random risks as well as the dependence on particular clients or restricted fields of action caused by an existing monolithic structure. It is particularly in the information age, with its unprecedented dynamic development of technologies and markets, that a diversified procedure is of great importance. Nobody can predict, in fact, whether their own business activity will still have a chance in the market in 10 years time.

A very good example of this is Dakosy, a company active in the Hamburg port economy: It is owned by a financial group composed of different port actors. As "port socket" for the Hamburg port, Dakosy has since the eighties connected the actors with itself by means of dedicated data transfer lines, thus forming the junction for data exchange throughout the port. In 1998, about 500 enterprises, from the loaders, through the forwarding agencies, the line agencies, the quay operators up to the administrations were cross-linked via the Dakosy network (Woywood 1998: 3). Mainly EDI messages are exchanged via the Dakosy system. Other supporting programs were developed in the course of the years, for example the customs program ZAPP, which made electronic customs declarations or GEGIS, a program to supervise the transportation and storage of dangerous goods. For almost 20 years Dakosy has been guaranteeing data exchange in the port of Hamburg. Through the increasing importance of Internet, however, the service provided by Dakosy is increasing being questioned. In the age of Internet, a dedicated line to Dakosy is superfluous since all actors are connected to each other through Internet anyhow. This modern service provided by Dakosy, which at the beginning of the nineties was still being highly praised by politicians, scientists and private actors, was seen as a distinctive site advantage of the Hamburg port and left others with their systems in secondary positions (Bukold/Deecke/Laeppele 1991: 22). Today Dakosy’s service is superfluous, at least concerning the core business, even if does still offer advantages compared to Internet, for example in data security. But it is only a matter of the time until the security standards of Internet data exchange satisfies the demands. This argument used by Erdelbrock (in 2000) must be regarded as a pseudo-argument probably already today, since in the meantime much more sensitive data than the documents accompanying shipments (for example from banks and authorities) is currently being exchanged via Internet.
Today and for the future Dakosy sees itself mainly as a software developer (Erdelbrock 2000) and attempts to market its products outside of the port of Hamburg as well, for example in Sweden or the Baltic states. At the same time, feverish work is carried out on adapting the systems for data exchange to Internet. It can be doubted whether Dakosy is a large enough player to be able to develop such systems for the future and market them, considering the immense competition in this field. As previously mentioned, all actors see the greatest possible future gain in having the leading position in the management system of the added value chain and are developing the corresponding software through co-operation. Some big actors also expressed an interest in incorporating Dakosy, but this has so far been successfully prevented by the partners. Dakosy is an impressive example of how inflated confidence in one’s main capacity can result in a lack of necessary diversification measures. If the main business unforeseeably collapses, it is then difficult to search for other "feet" to stand on in order to safeguard long-term business success.

The German Mail company (Deutsche Post AG) is another current example. As previously described, this enterprise developed in a few years into the biggest T&L service provider world-wide through incorporations. With the knowledge, that the letter monopoly was to be abolished in Germany, in order to create further "feet" to stand on, the comprehensive diversification process was initiated at an early stage. Even if today post still accounts for about 90% of its sales, Deutsche Post AG was so diverse before its introduction in the stock market in November 2000, that all analysts admitted that it had good chances in the international marketplace.

The example which DAKOSY offers is an outstanding example of the life-cycle of an entrepreneurial activity, in the sense of a portfolio analysis. This strategic analysis - and planning instrument – was developed the 1970s by the Boston Consulting Group (BCG). It allows an appraisal of the diversity efforts of an enterprise. An enterprise or a commercial activity begins, as in the case of DAKOSY, with an idea and a small turnover with high growth expectations and high risks involved in the expectations of future profits. The risk consists of the necessity to invest heavily in an unsure future. The enterprises are at this point labelled as "question marks". With commercial success, the business increases quickly and the enterprise develops into a "star". Since competition works and the environment of the "star" changes dynamically through changing customer needs or the development of new technologies, the growth rates decrease. At this stage profits can be made by the still good competitive position while cost are sinking. The profits are not invested in the business field so that net liquidity is released. Enterprises that are at this stage are designated as "cash cows". This is where
Dakosy finds themselves in the year 2000; if the enterprise does not manage to engage in new and increased business fields, there will be problems. The "dogs", which are companies at the end of their life cycle, consume financial means without offering a future perspective. Thus, enterprises or business divisions that are recognised as being "Dogs", must sooner or later be sold or shut down. A balanced portfolio should include "cash cows", the profits from which should be invested into promising "question marks" in order to develop future "stars". This kind of the portfolio analysis has become the most important instrument for judging an enterprise on the international stock market: Thus, since the eighties, portfolio logic has permeated many enterprises. With this logic, essential parts of the international concentration- and disinvesting process can be explained, including the European T&L sector (Klaus 2000: 18).

**Figure 2: The classical BCG Portfolio**

![Figure 2: The classical BCG Portfolio](image)

Source: from KLAUS 2000: 18
Figure 3: The Determinants of Relocation of port-related Activities

Source: van Klink 1995: 10
2 From Transportation to Logistics

The term “transportation” describes the removal of that inter-company distance which is considered to be an obstacle and which must be effected in the shortest possible time and with the least possible costs to the enterprises. The internal organisation of the enterprise and the covering of internal distances are not designated as transportation. Thus the term “transportation” is clearly separated from the in-house processes (cf. Laepple 1993, Predoehl 1961, Exler 1996). Transportation is the physical movement of a transported object\(^5\) in a direction with the aid of a means of transport (cf. Hettner 1952, Obenaus/Zaleski 1979), and serves the purpose, in an organised and work sharing economy, of bridging the distance between the places of production (appropriation) and consumption (destination). The functioning of a market economy is made possible by the transportation service, since that guarantees the bridging of the distance between supply and demand. The demand and supply of transportation services must exactly correspond in both time and space since - being immaterial goods – transportation services can neither be stored nor moved and thus must be used immediately.

2.1 The Implications of Transportation Costs

Transportation costs are “an expression of the expenditure for the bridging or the ‘annihilation’ of the spatial-geographic barriers of the economic process. They add to the production costs, which the respective entrepreneurs want to keep as low as possible.” (Laepple 1993: 26)

Next to these costs, which can be directly connected to individual products, further, indirect transportation costs arise that entrepreneurs have to take into account when setting their prices. For example, administrative costs that arise from the purchase of the carrier service, but also costs due to the capital tied up in goods during the time needed for their transportation. The relative importance of the direct haulage costs therefore decrease. They constitute, on average, three to five percent of the value of the final product (Laepple 1993: 25). Also, from the point of view of the national economies, the importance of the transportation sector decreases. Indeed the world-wide investment into the production and transportation of goods rose from 1970 to 1995 by about 38%.

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\(^5\) The term transported object only indicates goods according to Obenaus/Zaleski (1979). Transported persons are designated as driven objects.
(Exler 1996: 20). Nevertheless, this rise is not high when considered in proportion to the economic growth of developed countries during that period (Schroeder 1989: 30).

On the one hand, these developments can be attributed to technological innovations in the transportation sector, on the other to the decreasing importance of transportation intensive industries such as coal and steel in industrially highly developed countries. The currently expanding economic fields (Electronics, telecommunications, IT, etc.) produce goods that are both smaller and lighter, as well as more expensive, so that the importance of transportation costs is reduced for the producers. Thus, transportation costs can no longer be seen as the main variable involved in the spatial differentiation processes of the economy (Laepple 1993: 24ff), as it was considered in many traditional economic geography works (cf. Alonso 1964, Thuenen 1842, Weber 1922).

The situation when considering the costs of the capital tied up in transported products is different. Their importance increases despite the shorter transportation times, since the value of the products themselves increases. For example, the costs from the tied up capital in a Mercedes-Benz car during the approximately 33 day journey from Germany to Japan are as high as the ocean freight costs themselves. Since a main characteristic of profitability at Daimler Chrysler is the "return on net assets", an important instrument is the reduction of goods in the distribution channel through increased departure frequencies or shorter travelling times (Frenzel 2000: 3). In this example the increasing importance of the time factor becomes clear. Increasingly shorter innovation and production times, as well as product life-cycles, require ever shorter transportation times. Speed, and thus the thinking in terms of concatenations becomes the central measurement variable and the determining competition advantage of enterprises. Thus the emphasis has been further shifted from transportation to logistics. "In the future the time factor will become and important 'weapon', along with logistics service and/or logistics quality in the international competition" (Kajueter et. al. 1996: VI).

2.2 Logistics – The Necessity to optimise

Within the framework integrated planning, logistics combine all transportation and storage processes, necessary for the procurement, production and distribution, and "thus embraces all spatial, chronological, climatic and quantity based bridging factors (Laepple 1993: 28) with the aid of information and communication technologies for operation and control. The production process is integrated into the logistic chain by means of the information and communication network and is facilitated by a planning...
concept that involves several enterprises. The entire logistics of a company can be subdivided into the procurement, production and distribution fields.

2.2.1 Procurement Logistics

Procurement Logistics optimise the transportation and storage processes which follow the purchase of raw materials and unfinished parts. Procurement Logistics also solve the pending problems with the aid of an integrated strategy. Thus, they guarantee the supply of materials to the enterprise. Their smooth functioning is the prerequisite for trouble free production. Through their requests, procurement logistics have a strong influence on the entire logistic system, largely determining the cost and time frames of the entire added value chain. They must also safeguard product quality and consistency as well as handling the purely logistic tasks (Bauer 1997: 22, Kuhn 2000: 46).

2.2.2 Distribution Logistics

Distribution Logistics deal with the same problems that occur during the marketing of the products. Since again, it might involve unfinished parts destined for another enterprise, the part of the logistic system defined as distribution logistics by the sender can be interpreted by the receiver as being procurement logistics. The optimisation of the in-house material flows is task of production logistics. It is, however, the "optimisation of the entire logistic chain, from the subcontractor through procurement, production, warehousing up to distribution on to the customers" (Laeppele 1993: 29) that determines the quality of an integrated logistics concept and which opens comprehensive potentials for optimisation and rationalisation (cf. Bauer 1999: 22, Weber 1996a: 5). The innovations in logistics are thus, on the one hand, new developments in information and communications technology - with parallel advances in transportation technology - and on the other hand the reorganisation of internal company processes on the basis of thinking in terms of process concatenations (Kajueter et. al. 1996: VI). Weber (1996a: 15) sees in the increasing globalisation of markets the basis for the need of organisational innovations inside the enterprises, if they still want to keep up with the competition in the future. He describes these modifications as a movement away from a functional organisation, which is inward-

6 Kajüter et. al. (1996) add waste disposal logistics to these three sections.
looking and budget-oriented, towards an outward-looking organisation which is principally customer-oriented.

### 2.3 Different Levels of Innovation

These two levels innovation (technological and organisational) cannot be considered separately, since they both define and depend on each other. Technological innovations in the storage, loading/unloading and transportation of goods are expressions of the changing entrepreneurial demands on the logistics chain. At the same time, however, they are also the driving forces for organisational modifications of business practices, as well making new organisational forms within individual and between different enterprises possible. Thus, next to the technologies, also the new forms of logistic organisation must be considered and evaluated. These in turn are expressions of entrepreneurial aims and strategic planning by the actors participating in the management of logistics. It is those who plan and organise that ultimately make things happen, with the aid of technology. These actors are increasingly also the developers of the information and communication technologies and thus determine the technological evolution, along with the classical infrastructure and vehicle producers in the transportation sector (shipyards, vehicle construction, port building, etc.). The actors therefore move into the heart of the consideration, as they determine the process concatenation along with the evolution of the port economic areas, while the technologies used are mere tools. The initial question must therefore be modified: What future conditions will the actors require from port economic areas, so that they function as junctions in the logistic networks and how do the technologies used in such networks affect the port economic areas?

In a globalised world economy, the driving force behind organisational and, therefore, technological innovations is competition between enterprises; hence the necessity to become ever more efficient. The costs arising from the logistic chain comprise those due to transportation as well as the other previously mentioned costs (warehousing, tied up capital, administrative and order processing costs). The "increasing complexity when dealing with internal company information and material flows, results in a disproportionate rise of the logistic costs aspect of the already strongly increased overhead costs" (Hausotter 1994: VII). The opinions on which percentage logistic costs have in overall revenues vary considerably between different authors. Depending on the line of business, logistic costs in Germany account for 10% to 25% of the sales price according to Kajüter (1996: V). With these figures, Germany occupies a top position in
Europe. On the other hand, according to Klaus (2000: 5), logistic costs are 4% to 6% of the sales, depending on how “logistic” is defined.

Several other industrialised countries (for example France, Great Britain, USA) have already managed to constrain these percentages to levels below the German ones. Therefore – according to inter-sector surveys carried out in Germany – cost cutting and increasing productivity are “among the most important motivations for applying new improvement schemes to logistics” (Kajueter et. al. 1996: V). Furthermore, great importance is attached to maximising customer contentment by increasing the quality of logistics (delivery times, adherence to schedules, customer information, etc.). Klaus’ study (2000: 5) places Germany’s relative logistic costs in Europe’s centre field, behind the previously mentioned countries, though still before countries such as Luxembourg and Norway. The relative logistic expenditures depend on the stage of development and the industrial structure of the respective national economy.

2.4 Sales Trends in the T&L Sector

Klaus (2000: 5 F) estimates the total turnover of European T&L services in 1999 at DM 615 billion, of which DM 184 billion can be ascribed to Germany. The very small quantitative growth over the last few years was more than compensated through rationalisation measures and a noticeable price collapse. This evolution results in the total turnover of this sector not increasing in its traditional fields of business. In order nevertheless to increase sales, the big actors of the T&L line leave their traditional markets and broaden their portfolio of services. They increasingly they accept co-ordination tasks in the management of the added value chains as well as logistic and non-logistic tasks from the fields of procurement, warehousing, production and after sales services. The total turnover that has thus been outsourced to the logistics service sector by industry and trade amounts to over DM 400 billion, by Klaus’ estimation (2000: 5 F). In the next 5 years, 20% to 30% will be implemented. It will mainly be the lead logistics provider’s market niche which will profit from that.

Illustration 4 shows the development from transportation to an integrated logistics chain. The information system in distribution logistics ties the actors in the conveyor chain (loaders, forwarding agents, port enterprises - loading, unloading, warehousing, ship owners, customers) to other actors who are not involved in the material transportation of goods (public authorities, sales agents, IT service providers).
Figure 4: The evolution of the logistics chain

The Transport Chain

Logistics of Distribution

The Logistic Process Chain

INFORMATION SYSTEM

LOGISTIC MANAGEMENT SYSTEM

Procurement Logistics

Distribution Logistics
Figure 5: The Way to an integrated Added Value Chain

Table 2: The “Top 10” of the European T&L Sector

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Enterprise</td>
<td>Yearly sales. (in Mil. DM)</td>
</tr>
<tr>
<td>1</td>
<td>Deutsche Bahn (D)</td>
</tr>
<tr>
<td>2</td>
<td>NFC/Exel (UK)</td>
</tr>
<tr>
<td>3</td>
<td>Schenker (D)</td>
</tr>
<tr>
<td>4</td>
<td>SCETA with Geodis (F)</td>
</tr>
<tr>
<td>5</td>
<td>Kühne &amp; Nagel (CH)</td>
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<tr>
<td>6</td>
<td>Danzas (CH)</td>
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<tr>
<td>7</td>
<td>Maersk-Moeller (DK)</td>
</tr>
<tr>
<td>8</td>
<td>TNT Post Group (NL)</td>
</tr>
<tr>
<td>9</td>
<td>Panalpina (CH)</td>
</tr>
<tr>
<td>10</td>
<td>DHL Worldwide (B)</td>
</tr>
</tbody>
</table>

Source: from Klaus 2000: 22
2.5 Ports - Fractures in the Logistic Process Chain

Maritime traffic forms a possible link in logistic process chain, in which ports are the interface between land and sea transportation and function as intermodal junctions (Laepple 1994: 1) in the interregional and international logistic networks (cf. D 9.1). The further function of ports, which is a result of the nature of their interface, consists in bridging and equalising the spatial, chronological and quantitative differences between the different traffic carriers. Overcoming these differences, which can take the form of capacity differences or different arrival and departure frequencies, through the storage and transposition of goods represents a break in the logistic chain. This break forms the premise for the functioning of ports and is the economic basis of port economies.

The innovations in the field of logistics, as well as the increasing importance of the time element in the added value chain, has allowed private enterprises to reduce the work and turnover times required for port activities in the last few decades. The waiting times of the increasingly larger ships, thanks to the also increasing turnover rates, are decreasing thus allowing bound capital to be uselessly “parked” for shorter periods. As already described, individual added value chains can compete against other "supply chains" using speed as a distinguishing factor. These evolutions find their material expression in modern, technically advanced sector plants for containers, but also in non containerised goods as well as in optimised intermodal traffic carrier concepts. They result in the break in the logistic process becoming increasingly smaller, although it can still be considered as being a major problem by the actors. The loaders and especially the ship owners - which are put under pressure by the loaders - would insist on even higher turnover rates, achievable through improved techniques and a high quality service, so that the costs arising from time delays do not compromise the net profits (Adrion 2000:2). This allows the following assertion: One can "through the increasing development of port and transportation technology ... remove those functions immediately bound to ports, such as the added value possibilities and place of work effects" (Laepple 1994: 1).

3 Summary

The work done in the context of BALTICOM and the difficulties thereby encountered, have made clear that the initial question formulated for the project - the meaning information and communication technologies have for ports and their effects on port
markets – can not at all, or only unsatisfactorily, be answered. The reasons for this can be summarised as follows.

- At the centre of BALTICOM’s consideration are the individual port economic areas and the technologies used in these spaces. These technologies, however, can not be considered spatially limited way. Rather, the focus must be on the actors (enterprises) who use and develop the technologies. These actors can not, however, be assigned to spatial categories. In a globalised world economy, in which the logistics sector is shaped by a continuous concentration process, actors that are active only at a port site are no longer available. They are vertically and horizontally interconnected by their information and communication technologies, on a planetary scale.

- Furthermore, the effects of these technologies at the regional scale do not lend themselves to measurement. The technologies are used in order to speed up or to simplify processes. The actual effects of these technologies, for example on the workplace, are minimal. Ports themselves can not create the conditions for the application of modern communication technologies within them. These technologies follow the actors into the ports, those same actors which run the logistics chain.

In port and regional planning, the question is which demands the actors make on port markets, which determine the course of the world-wide logistics chain. It is about globally acting players, that increasingly transact not only in a part, but in the entire world-wide logistics chain and control it with the aid of management systems.

The demands that are made by these actors on port areas are sufficiently known and are thoroughly considered by regional planners. The best and most current example of this is the planning of the deep-sea port off the German North Sea coast. Nevertheless, further investigation can be of interest in how the middle and long-term strategic planning of these global players could be described. These strategies will determine the future of the logistics sector and with that also of the ports themselves. A topic to be especially considered here are the ideas concerning information and communication technologies. We have here described the rough direction in which this "trip" is going. From that we can assume that the power of the enterprises will become increasingly larger and the possibilities for action of political and planning actors increasingly smaller. The remaining task for politicians is to create and maximise optimal infrastructural conditions, in order to continue existing in the international site competition. Whether the costs of that are justified by the benefits is doubtful, because the future profit possibilities arising from that are rather small.
4 Literature


4.1 Newsprint and Magazines


4.2 Various Publications


4.3 Interviews, Lectures, Conversations


4.4 Internet

