Importance of competence development for putting the “from Road to Waterway“-idea into practice

How to ease the transport situation in Europe by improving the knowledge basis of employees working in the logistics sector

Technical Report

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**List of Abbreviations**

AG  Aktiengesellschaft; public limited company

Cp.  Compare

CRM  Customer Relationship Management

DVZ  Deutsche Verkehrs-Zeitung

dwt  deadweight ton

EC  European Commission

EDP  Electronic Data Processing

ed.  Editor

EMAS  Environmental Management and Audit Scheme

etc.  et cetera

EU  European Union

EU-15  Abbreviation for the 15 member states of the EU before enlargement in 2004 (Belgium, Denmark, Germany, Greece, Spain, France, Ireland, Italy, Luxembourg, the Netherlands, Austria, Portugal, Finland, Sweden, United Kingdom).

EU-25  Abbreviation for the 25 member states since May 2004 (EU-15 plus Cyprus, Czech Republic, Estland, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia).

€, EUR  Euro, currency unit in most member states of the EU

e.V.  eingetragener Verein; registered society, incorporated association

FI  Freight Integrator

GDP  Gross Domestic Product

HF  Higher Preparatory Examination

HHX  Higher Commercial Examination

HTX  Higher Technical Examination

IMO  International Maritime Organization

IQ  Intelligence Quotient
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
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<tr>
<td>IT</td>
<td>Information Technology</td>
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<tr>
<td>km</td>
<td>Kilometre</td>
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<td>MoS</td>
<td>Motorways of the Sea</td>
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<tr>
<td>NSR</td>
<td>North Sea Region</td>
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<tr>
<td>NVQ</td>
<td>National Vocational Qualification</td>
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<tr>
<td>3PL</td>
<td>Third Party Logistics Provider</td>
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<td>QCA</td>
<td>Qualifications and Curriculum Authority</td>
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<tr>
<td>REMARCC</td>
<td>Network of REgional MARitime Competence Centres</td>
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<td>SME</td>
<td>small and medium-sized enterprises</td>
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<td>SQA</td>
<td>Scottish Qualifications Authority</td>
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<td>SSS</td>
<td>Short Sea Shipping</td>
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<td>SUTRANET</td>
<td>Sustainable Transport Research &amp; Development Network in the North Sea Region</td>
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<td>SVQ</td>
<td>Scottish Vocational Qualification</td>
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<tr>
<td>TBT</td>
<td>Tributylzinn</td>
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<tr>
<td>TEN-T</td>
<td>Trans-European Network Transport (Guidelines)</td>
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<tr>
<td>TEU</td>
<td>Twenty Foot Equivalent Unit</td>
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<tr>
<td>tkm</td>
<td>tonne kilometres</td>
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<td>WP</td>
<td>Workpackage</td>
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1. Introduction

1.1. The transport situation in Europe 2005

More than ever, in the year 2005 the European Union is confronted with problems that disturb the quality of its citizens' life. These problems are on the one hand air pollution or climate change caused by emissions\(^1\) and on the other hand noise pollution.

About 2 to 8% of all illnesses in the EU-25 result from air and noise pollution\(^2\), the average life expectancy of the Europeans is reduced by nine months due to air pollution, more and more people are taken ill with respiratory diseases and 386,000 Europeans die early every year because of environmental factors.\(^3\)

According to the study “The attitudes of European citizens towards environment” 85% of the Europeans “agree that policy-makers should consider the environment to be just as important as economic and social policies”.\(^4\)

Since for policy-makers of the European Union the protection of the environment and the health of their citizens is of great significance, the European Commission signed the Kyoto-Protocol on the 29\(^{th}\) of April 1998.\(^5\)\(^6\)

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\(^1\) The main types of emissions in the traffic sector are carbon dioxide (CO\(_2\)), carbon monoxide (CO), nitrogen oxide (NO\(_x\)), sulphur dioxide (SO\(_2\)) and particle matter. But the CO\(_2\)-share takes the biggest part. Cp. Aberle (2003: 586).


\(^5\) “The Kyoto-Protocol is a framework agreement of the United Nations signed by 141 countries, that commits the signatories to cut down their emissions. On the 16\(^{th}\) of February 2005 the Kyoto-Protocol went into effect.” Umwelt für Europäer (2005b: 5). Translation Neumann.

By signing this framework agreement the EU-15 is obliged to cut down on their emissions by 8% compared to the emissions level of 1990 until 2012.  

The main sources of CO\textsubscript{2}-emissions are the energy sector, traffic sector, agriculture and industry sector. It is estimated by the European Commission that emissions in the energy sector will keep its status quo and emissions in the industry sector will even decrease by 15%, but emissions due to traffic will rise by 39% until 2010 if no steps will be taken to stop this development. The EC refers to the development in the traffic sector in the past, when emissions increased by 22% between 1990 and 2002.

Other external effects of traffic – the external cost components – next to air pollution are the pollution of the ground and water, noise, accidents, energy consumption and land utilization (the so called “ecological footprints”\textsuperscript{10}).

\textsuperscript{7} “Most of the new members of the EU set themselves the same goals with the exception of Poland and Hungary, who want to cut down on their emissions by 6% compared to the emissions level of 1990. Cyprus and Malta did not set any goals to reduce their emissions.” Umwelt für Europäer (2005c: 7). Translation Neumann.

\textsuperscript{8} At this point it is necessary to differentiate the terms ‘transport’ and ‘traffic’. For this it has to be mentioned that goods can be characterized by three features: physical, spatial and chronological features. Processes that change the spatial features are transports. Transports are technical-organisational processes that change the spatial features of goods and persons. Transports create traffic and traffic results from transports. Through the use of transport modes, their rides and their utilization, the need for movements of goods and persons are transferred. Consequently there is traffic without transport: empty runs. Of particular importance for the differentiation between transport and traffic is their time structure. The need for movement is a time-related phenomenon. Insufficient timing could cause idle times. Appendix 1 clarifies this coherence. Cp. Ihde (2001: 3-6). Additionally, the term ‘logistics’ needs further explanation: “Logistics is the process of planning, implementing and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods and related information from point of origin to point of consumption for the purpose of conforming to customer requirements. …Logistics can be understood as the production of availability.” Lohre (2005: 15). Translation Neumann.


\textsuperscript{10} “Ecological footprint” is an indicator for the use of ecosystems and describes different dimensions of the consumption of resources like energy consumption and land utilization due to population and traffic. First and foremost in this context the term means a transformation of landscape due to infrastructure extensions. The term has its origin in the social ecology and at this point the author wants to use it as a metaphor to make the fact clearer that human activities like traffic have consequences and leave traces on earth. Cp. Haberl, Adensam, Gaube and Erb (2004) and Simonis (2005: 8).

Appendix 2 provides an overview of the external effects of traffic and the areas where these effects are perceptible. Hence, the traffic sector is not only the one source that causes most CO$_2$-emissions, it is also considered as an essential threat of human health and the fulfilment of the Kyoto commitments.

Especially the dynamics of the growth of goods transport represent a big challenge for the EU.\textsuperscript{12} The following illustration shows the development of goods transport in the EU-15 from 1970 until 2002. The whole volume of goods transport of the year 1970 amounts to a total of 874 billion tkm (tonne kilometres\textsuperscript{13}) and 1.737 billion tkm in 2002.\textsuperscript{14, 15}


Source: Own figure based on data from Aberle (2005: 2).

The reduction of vertical integration, the shift to a stockless economy, the global division of labour and the increased demand of consumers for worldwide traded goods and economic growth as a whole are seen as reasons for the increasing demand for transportation.\textsuperscript{16}


\textsuperscript{13} “Tkm is the unit by which the movement of freight is measured (i.e. tonnes lifted multiplied by the distance it is carried).” Lowe (2005: 256).

\textsuperscript{14} Only the three inland transport means road, rail and inland waterway are included in the survey.

\textsuperscript{15} Cp. Aberle (2005: 2).

Apart from the increasing CO₂-emissions and noise pollution, the growing transportation of freight confronts the EU with other problems. Congestion of the Transeuropean Network (TEN-T), especially of the roads, causes costs of 0.5% of the European GDP. On European roads, there is a total of 7,500 km tailback every day and 16,000 km of European railways are regarded as a bottleneck. That leads to a decreasing competitiveness of the EU. However, until 2010 an increase of the volume of traffic up to 50% is expected and the transport intensity is even further growing. The attempt of the EU to decouple GDP growth from goods transport growth seems to be difficult on closer examination of the development of the transport intensity from 1980 to 2001.

Transport intensity:

- EU-15 1980: 230 thousand tkm/1 million GDP
- EU-15 2001: 265 thousand tkm/1 million GDP

These numbers illustrate the increasing relevance of goods transportation for the GDP. Accordingly an undisturbed traffic flow is a basic precondition for the European economy to flourish.

The allocation of the demand for transportation performance between the transport modes is strongly road oriented. Road transport accounts for the largest share of the modal split in Europe and lists steady growth as shown in appendix 3.

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17 Transport intensity describes the expenses in tkm per 1 million GDP. Cp. Aberle (2005: 2).
20 The whole goods traffic splits up into the different transport modes. Cp. Lohre (2005: 52).
21 Reasons for the increase of road transport are primarily seen in the character of the goods (increasing share of high quality goods while the share of bulk goods declines) and in the character of the road transport itself (very flexible and the shipper gets exactly the frequency he or she wants). Cp. Aberle (2005: 4).
Due to this development, the bottlenecks in the capacity of the TEN-T will grow as well.  
Therefore the extension of the TEN-T is necessary, but there are problems that make it very difficult to realise the Europe-wide infrastructure actions (e.g. the extension of the motorways).

It is necessary to take the high costs and the resistance of local residents, who are affected by the construction of a motorway, into consideration. About 600 billion € are needed to accomplish the extension of the TEN-T and even if the infrastructure actions are fundable and enforceable in terms of planning, it takes just a long time to complete them.

Furthermore the expansion of road networks supports the comfort of road transport and results in further growth which accounts for the major part (84%) of CO₂-emissions in the whole transport sector. Anyway, this is not what the EU strives for.

Thus total transports must be shifted from road to other more environmentally friendly transport modes.

This can be the rail for example. However, as mentioned above, 16.000 km of Europe’s railway system are bottlenecks and further efforts are needed to eliminate this bottleneck. For example, there is a lack of interoperability between the specific railroad networks of Europe’s countries as well as a lack of research in the field of innovative technologies and a common rail security model.

26 Next to the environmental friendliness there is another advantage of rail. With regard to transportation costs, the railway is favourable in cases of long-distance transports. Cp. Niederhausen (2005: 12).
However, there is still a transport mode with free transport capacities where the EU can add to what is already existing (inland waterways, seas, oceans): water transport.28

As it is shown in the following illustration, the vessel is the means of transport which pollutes the environment least of all with regard to tons per kilometre.29 Decisively for the environmental friendliness of the vessel is the huge transport capacity.30

The CO2-emissions of a 1.000-TEU31-vessel per km for instance are lower than the CO2-emissions of 1.000 trucks. Hence, maritime traffic bundles flows of freight on an efficient and environmentally friendly transport mode.32 33

30 In comparison to other transport modes, the vessel is the most environmentally friendly alternative. Accordingly maritime traffic offers the most favourable conditions in terms of energy consumption and pollution emissions as well as infrastructure costs and external costs. But it is to note that sulphur dioxide emissions and nitrogen oxide emissions of vessels have to be classified as relatively high and the global emissions of maritime traffic result in environmental impacts. Heavy fuel for vessels contains toxic chemicals and from every combustion exhaust fumes containing sulphur dioxide result. Sulphur dioxide combined with humidity in the air become sulphureous acid which comes down with rainfall (acid rain). That is the reason why fuel for vessels might not contain more than 4.5% sulphur due to international standards (for special regions like the Baltic Sea, the sulphur share is limited to no more than 1.5%). Maximum limitations are normally set by the IMO. Cp. Aberle (2003: 259), Braren (2005: 16 ff.), DVZ (2005a: 9) and Frerich and Müller (2004: 632, 650).
31 “Twenty Foot Equivalent Unit. Unit of measurement for the container transport capacity of vessels and port facilities.” Lowe (2005: 255).
33 These complex logistical processes (to bundle flows of freight in a way that minimizes damage to environment) are controlled by highly sophisticated IT-systems. Employees working in that field need to have special competences to handle these systems. Cp. Müller (2005: 13).
Illustration 2: Comparison of CO₂ emissions between different transport modes.

![CO₂ emissions chart]


However, the performance of ports depends very much on the hinterland\textsuperscript{34} connection (port access, road, rail and/or inland waterway connection\textsuperscript{35} to the traffic network\textsuperscript{36} – the goods have to be transported into and out of the ports), the port facilities and the maritime services itself.

Admittedly, there have to be some improvements in maritime traffic in order to make the vessel a good alternative to the truck. Thus some container ports are regarded as an “eye of a needle” because their capacities are nearly utilised and the big container vessels have to lie in the roads for some days until they can be disposed. The additional charge has to be put through to the shipper, which restricts the competitiveness in comparison with the truck. This and resulting delays in delivery have made shipper choose the truck for transportation. In


\textsuperscript{35}The decisive factor for choosing a transport mode for the pre- and on-carriage is the price for the services. Hence the truck does not carry the external costs it causes, the truck still (despite toll) is the cheapest alternative in short-distance transport. So in this area, there still is a need for action for policy makers. Cp. Kloss (2005: 3), Kudlicza (2005: 5) and DVZ (2005c: 3).

\textsuperscript{36}Bremen is a port with such trimodal hinterland connections for example. Cp. Kloss (2005: 3).
Europe, the Drewry Shipping Consultants identified Antwerpen and Rotterdam as the ports with the most serious bottlenecks.  
Possible solutions are for example the extension of trans-shipment facilities and rerouting of maritime services to smaller regional ports where construction work would be due as well (improvement of the infrastructure to and from the port site as well as the port facilities, extension of the depth etc.).

For all the problems mentioned above, the EU makes lots of effort to solve these problems.

In 2001 the EC developed a second “White Paper” that contains Europe’s transport policy for 2010. In this, the main objective “shifting the balance of the modal split in favour for more environmentally friendly means of transport” (the “from Road to Waterway”-idea) was formulated.

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38 In Rotterdam for instance inland navigation vessels sometimes have to wait 30 hours for trans-shipment. Cp. Zapp (2005: 390).


40 Related to the efforts of the EU, since 2001 the CAFE programme (Clean Air For Europe) has to be mentioned. Objective of this programme is to statistically record and evaluate data about the effects of air pollution in order to find out about the main polluting sectors and to develop a strategy for fighting air pollution. Cp. Europa.eu/CAFE and Umwelt für Europäer (2005a: 5).

41 “The first White Paper in 1992 put the main attention on opening up the traffic market and to develop a common traffic policy.” Europa.eu/White Paper.

42 Although these plans existed since the early 1990s. Cp. Klotz (2005: 3).
To reach this goal, the White Paper contains almost 60 separate measures (e.g. the extension of the port infrastructure).\textsuperscript{43} \textsuperscript{44}

The programme for the TEN-T\textsuperscript{45} includes in article 12a TEN-T\textsuperscript{46} of its guidelines the implementation of the Motorways of the Sea\textsuperscript{47} (high speed sea routes) for 2004.

Two main objectives of the MoS are to reduce the road congestion and to improve the access to peripheral and island regions and countries.\textsuperscript{48} To achieve this goal, maritime transport has to be just as attractive as road transport. Therefore, the existing maritime links need to be improved or new viable, regular and frequent maritime routes have to be established. This includes the improvement of the port infrastructure and the hinterland connections.\textsuperscript{49}

To help with financing the TEN-T measures and support intermodality, the EC established the PACT (Pilot Actions for Combined Transport) project in 1992.

\textsuperscript{43} Cp. Europa.eu/White Paper and EC (2005c: 16 ff.).

\textsuperscript{44} Repeatedly the intermodal and the combined transport were mentioned in the White Paper as possibilities to make the modal shift easier.

Intermodal transport means that goods stay in one transport unit (container, interchangeable container, truck or trailer etc.) during the whole transport chain (involved in this chain are at least two transport modes \textrightarrow multimodal transport). A trans-shipment of the goods does not happen.

Combined transport means intermodal transport by truck only for pre- and on-carriage (should be kept as short as possible), main haul (the longer distance) takes vessel or rail. Cp. Walter (2005: 457 ff.).

Regarding the efforts of the EU to promote intermodal transport, there are two EU-projects to mention as examples: SPIN (Scanning the Potential for Intermodal Transport) and Promit (Promoting Innovative Intermodal Freight Transport). Cp. Stifter (2005: 460).

\textsuperscript{45} Cp. EC (2005d: 11 ff.).

\textsuperscript{46} In appendix 4 the reader can find the whole Article 12a TEN-T.

\textsuperscript{47} Appendix 5 shows a map of the Motorways of the Sea.

\textsuperscript{48} In most cases the use of a Motorway of the Sea is not only favourable for the environment. The use of the MoS from Genua to Barcelona is about 33% less expensive than the road transport. Cp. DVZ (2005f: 7).

\textsuperscript{49} Cp. Article 12a TEN-T.
The succeeding Marco Polo project will be replaced in 2007 by the Marco Polo II project which has a total budget of 740 billion € to promote the “from Road to Waterway”-idea and to help financing the MoS.50

Among all of these attempts to shift the balance between the modes, there are two very important aspects the EU also takes into consideration:
Number one is the requirement of competences as employees in the logistics sector need to organise such a combined transport. Number two is being aware of environmental concerns. The best solution should be found by the employees regarding the costs for the transport and the environment.
Referring to common opinions, employees in the logistics sector (especially in small and medium-sized enterprises (SMEs) 51) are often specialised in only one field of the sector (an often-lacking awareness of different transportation modes) and curriculums for apprenticeships in Europe are not uniform.52

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51 Small and medium-sized enterprises are characterized by quantitative criteria like the number of employees and financial performance figures. Companies classified under this term have a number of employees of less than 250, an annual turnover of no more than 50 million € and a balance-sheet total of under 43 million €. Roughly 99% of all companies registered in the EU are SMEs. These companies provide about 67% of EU’s workplaces and represent an important part of the EU economy. In many SMEs there are ethically motivated policy makers who approve of environmentally friendliness, but due to larger personnel and financial resources, large-scale enterprises are dominating concerning sustainable behaviour. Therefore the EU considers supporting SMEs as an especially crucial task and established several EU-funded projects. Cp. Hauff, Kleine and Jörg (2005: 28 ff.) and EU (2003: 4).

It is to note that “85% of transport is provided by small and medium-sized enterprises.” Hence there is a need to attach importance to the training of employees working in SMEs to give them the sufficient competence to organize an intermodal transport chain. EC (2003: 10).

52 Cp. DVZ (2004: 8) and ZLU et al. (2003: 2 ff.).
The EU established the job description of the Freight Integrator\(^{53}\) that was first mentioned in its White Paper.\(^{54}\) In the following, the official definition for Freight Integrators is quoted:

“Freight Integrators are transport service providers who arrange full load, door-to-door transportation by selecting and combining without prejudice the most sustainable and efficient mode(s) of transportation.”\(^{55} 56\)

Illustration 3 shows problems of the Freight Integrator concept the EU tries to solve.

\(^{53}\) Integrator is derived from the term integration and „integration is when different activities are all concentrated in a single company. Specialization is the reverse process, where companies give up certain activities, on occasions by disposals. Integration may be horizontal or vertical [forwards and backwards integration].…Integration is horizontal if companies with similar business activities, such as several terminals join forces….A railway company that adopts a role of intermodal transport operator is integrating forward…An intermodal operator who starts his own rail activities is engaging in backwards integration.” Macharis, Vrenken and Wolters (2005: 25).

\(^{54}\) Cp. DVZ (2003: 4).

\(^{55}\) Cp. ZLU et al. (2003: 1).

\(^{56}\) “The best compliance with this definition is found in the freight forwarder without own assets.” ZLU et al. (2003: 4).

Full load describes that cargo exclusively is transported in one transport unit from door-to-door. Door-to-door transportation describes a transport service that encompasses the transportation from shipper to consignee. To combine transport modes without prejudice is seen as complicated because of a lacking neutrality of some potential Freight Integrators due to capacity utilization rate goals of own assets (trucks for instance). Cp. Seeck and Sinekal (2004: 483) and ZLU et al. (2003: 4).

Further explanations of the Freight Integrator concept by using an example will be provided in chapter 2.
Illustration 3: Problems of the Freight Integrator concept.

Source: Own figure according to ZLU et al. (2003: 2 ff.).

There are some EU-funded projects which are occupied with the task of improving the knowledge basis for employees working in the logistics sector (“Staff training” in illustration 3). The REMARCC II (Network of Regional Maritime Competence Centres) project for example has developed an e-learning platform57 as a possibility for further education.

57 Since the 27th of September, 2005, the platform is in its test stage. www.maritime-elearning.org. Appendix 6 provides an overview of the contents of REMARCC’s e-learning modules.
The platform contains the two modules “Transportation in the EU focussing on Short Sea Shipping\textsuperscript{58}” and “Maritime Transport” and will be complemented by the modules “Transport and Logistics Centres” and “Environmentally friendly Maritime Transport” supplied by the SUTRANET project in 2006.

The SUTRANET (Sustainable Transport Research & Development Network in the North Sea Region) project is also involved in the EU objective “from Road to Waterway”.

The Workpackage 4 of this project focuses on the problem of the “lack of a European-wide vocational training system, especially regarding any emphasis on intermodal transport…”\textsuperscript{59} and the development of a best practice catalogue on training and educational efforts in the NSR.

The SUTRANET project is occupied with the European Union’s medium-term objective to harmonise the training standards (a problem of the Freight Integrator concept). In the following the SUTRANET project and its fields of activities are explained.

\textsuperscript{58} “Short Sea Shipping means the movement of cargo and passengers by sea between ports situated in geographical Europe or between those ports and ports situated in non European countries having a coastline on the enclosed seas bordering Europe. SSS includes domestic and international maritime transport, including feeder services along the coast, to and from the islands, rivers and lakes.” Sutranet (2005: 7) and Shortsea.info.

SSS is part of the European transport concept to reduce road transport.

“SSS is understood to cover maritime transport services which do not involve an ocean crossing.” EC (1999: 2).

“SSS can be considered a most environmentally friendly mode of transport, in particular, because of its comparatively low external costs and high energy efficiency. Making more use of SSS could help the Community to reach its CO\textsubscript{2}-target under the Kyoto-Protocol.” EC (1999: iii).

In Stopford (2004: 8-9), the definition is a bit more extensive: “SSS provides transport within regions. It distributes cargo delivered to regional centres such as Hong Kong or Rotterdam by deep sea vessels, and provides a port-to-port service, often in direct competition with land based transport such as rail. This is a very different business from deep sea shipping. The ships are generally smaller than their counterparts in the deep sea trades…Designs place much emphasis on cargo flexibility…Because trips are so short and…visit many more ports in a year than deep sea vessels, trading in this market requires great organizational skills.”

\textsuperscript{59} ZLU et al. (2003: 2).
1.2. Link between sustainable transport and education – the task of SUTRANET Workpackage 4

SUTRANET is a project within the Interreg IIIB North Sea Programme. The Interreg IIIB Programmes are initiatives of the EC “to stimulate the transnational cooperation in the EU between 2000 and 2006. Interreg IIIB Programmes cover larger transnational areas and the North Sea Region comprises areas of Sweden, Denmark, Germany, the Netherlands, the Flemish Region of Belgium, United Kingdom and Norway.”

Since these areas of the region share often the same problems and challenges, best results can be attained by working together and sharing knowledge and experiences especially regarding the Interreg objective to secure a sustainable and balanced future.

Of the four North Sea Programme’s priorities, the SUTRANET project is connected with priority 2 “Efficient and sustainable transport and communications and improved access to the information society.” SUTRANET especially addresses measure 2.3 “which concerns the development of spatial integrated strategies on transportation networks and the promotion of intermodal transport systems in the NSR. This measure aims at improving transportation networks with an emphasis on intermodality.”

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60 Interregnorthsea.org.


63 ‘Sustainable transport’ can be understood as ‘environmental sustainability’. Basically, sustainability has three dimensions: Society, economy and environment. From this follows that sustainable transport has to be environmentally friendly, economically efficient and socially fair. Cp. Sutranet.org (2005). Sustainable development aims at the satisfaction of today’s generation’s demand without risking that future generations cannot satisfy their demands. Cp. Hauff, Kleine and Jörg (2005: 19). Appendix 9 provides an overview of transport and its linkages to the sustainability triangle.

64 Cp. Sutranet.org and Interregnorthsea.org.
Involved in the SUTRANET project are researchers from Denmark, Germany, Norway, Scotland, Sweden and the Netherlands.65

Illustration 4: Positions of the SUTRANET partners within the NSR.

Source: Interregnorthsea.org.

SUTRANET is divided in four Workpackages complementing each other to bring out the best solutions for a sustainable development in the NSR. Illustration 5 provides an overview of the Workpackages’ specific tasks and will be explained in the following.66

65 In appendix 7 there is a list of all ten SUTRANET partners.

66 There is only a brief description of the Workpackages 1-3 even though they deserve more precise explanations, the main focus of this survey is on Workpackage 4. WP0 is occupied with the project management and is not further mentioned.
Illustration 5: SUTRANET structure.

The first WP is engaged with the establishment of a sustainable research and development network. It is also – as a horizontal Workpackage – responsible for the specification of the framework conditions and strategies for policies and decisions regarding infrastructure investments. With the elaboration of the working papers “Regional Development Perspectives and Concepts in the NSR” and “Transport Systems Concepts and Definitions”, WP1 provided the partners as well as the Group of Users with clear definitions and the latest insights, as an example of this WP’s outputs.

The second WP is occupied with the analysis of the major seaports and maritime routes in the NSR. WP2 identifies the importance of the ports for the NSR and provides the logistics sector with an overview of new ferry and SSS concepts.

The third WP mainly focuses on the development of innovative transport systems and concepts. One activity of this WP is to elaborate case studies on
how NSR ports could be developed into integrated and intermodal logistics centres.

The aim of the last WP is to abolish the problem in staff training mentioned in illustration 3, that hinders the Freight Integrator concept of being well transferred. Hence the objective of WP4 is to improve the qualifications and skills/competences of SMEs and operational staff in intermodal transport. The elaboration of a training programme curricula and the development of a best practice catalogue are some of the activities of this WP. To generate valuable results, WP4 established a cooperation with the above mentioned REMARCC project at an early stage of the existence of the SUTRANET project so WP4 was able to benefit from the experiences of the longer-existing REMARCC project. From October to December 2005, WP4 is involved in the test stage of REMARCC’s e-learning platform and can gather own experiences for the development of own e-learning modules.
1.3. Objective and proceeding of the research

As the reader got an overview of the problems Europe’s environment is confronted with, the efforts of the EU to solve these problems are presented to the reader in chapter 1.1. In chapter 1.2 the workpackages of the SUTRANET project and their contribution to the EU target “from Road to Waterway” were explained. Especially the task of Workpackage 4 and the significance of educated staff for the EU target were mentioned. This chapter also serves the purpose of providing the reader with basic knowledge of the logistics sector, to make the reader aware of environmental matters and to explain the structure to him or her.

Illustration 6: Structure of the research.

Source: Own illustration according to Meifert (2004: 12).
Chapter 2 is preoccupied with the questions: “What is a Freight Integrator?” and “Which competences are needed to create an environmentally friendly intermodal transport chain?”. Derived from this, the author explains the research necessity.

The essential tools for the research – Utility Analysis and a comprehensible competence model – are presented in chapter 3.

In chapter 4 the general educational systems in the NSR are presented, occupations on the vocational education level in the logistics sector are identified and by the means of Utility Analysis, the quality of the education is examined. Thus it is identified where existing trainings methods have room for improvement.

In chapter 5 the results of the survey are looked upon and recommended action for the educational systems are deducted. Recommendations for a “best practice manual” are developed.

Chapter 6 contains conclusion of the author and a consideration of future prospects.
2. **Reflection on the skills needed to become a Freight Integrator**

2.1. **Explanation of the definition of a Freight Integrator in theory and by using a practical example**

The SUTRANET WP4 is involved with the improvement of skills and competences of SME and operational staff in the logistics business (especially in the field of intermodal transport). The ultimate goal is to help them gain the competences required to organize an intermodal transport chain and to act like a Freight Integrator (transport service providers).

At this point it is useful to explain what kinds of service a FI has to provide. Afterwards it will be discussed how a company can manage these services by offering consistently high quality (quality management system), how the entire company can act environmentally friendly (environmental management system) and which role the development of competences of employees plays in this context. These connections are explained on the basis of an example of the Hapag-Lloyd AG.

For considering what kinds of services a FI offers it is helpful to explain the term logistics services and what it encompasses. As stated in chapter one, “Logistics can be understood as the production of availability.”\(^67\) The task of logistics is to provide a company or a person with the right kind of goods in the right quantity and place and at the right time. Therefore logistics services encompass the following partial services.\(^68\)

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\(^{67}\) Lohre (2005: 15). Translation Neumann.

\(^{68}\) Logistics information services are necessary for planning, controlling and monitoring the logistics services. Additional logistics services are services like order picking or packing cargo for transport. Cp. Lohre (2005: 22 ff.).
According to the definition a FI has to arrange door-to-door transport in a way that the range of services has to encompass all partial services shown in illustration 8 – not only the transport itself but also transport related services. This is due to the fact that “customers often prefer one central commercial contact: a one stop shop. One stop shops have a full overview of the whole transport process and the skills and resources needed to obtain information and intervene in the process, at all stages including during the logistics service, should the need arise.”

The so-called Third Party Logistics Provider\(^6\) (3PL) in the form of a “solution provider” comes very close to the Freight Integrator concept.\(^7\)

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\(^7\) A 3PL is a player in the logistics industry who provides services that go beyond the classical core logistics services. These players focus on the strategic management along with information technology. The transport services can either be taken on with own assets or bought by the 3PL. Cp. Seeck and Smekal (2004: 484).

The next element of the Freight Integrator definition that has to be explained is the “combination of transport modes in the most sustainable and efficient way”.

One of the main objectives of a Freight Integrator is to combine possible environmental interests with economic necessities (efficiency; finding the best solution with regard to price, service and quality) as good as possible. Acting this way is of interest to the customer because of the best price, and of interest to the environment by means of including another transport mode next to road transportation. It is shown in the next paragraph that environmental issues (sustainability) are gaining more ground in companies throughout Europe.

Starting at the end of the 1990s, a special trend came across more and more European companies (not only in the logistics industry): The implementation of environmental management systems to support the idea of sustainability started to attract attention. In 1995 an environmental management system called EMAS (Environmental Management and Audit Scheme; a management tool for companies to “evaluate, report and improve their environmental performances”) was introduced. It was the first European standard to reliably measure the quality of environmental management activities. As a result, companies that implemented the system were able to effectively use it for publicity.

In general, management systems are supposed to contribute to a company’s management by structuring and systemizing business processes. There are three different management systems established: Quality management systems, occupational safety management systems and environmental management systems. Through implementing an environmentally friendly management

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72 The word ‘sustainability’ arose at the beginning of the 1990s, starting point was the conference of the United Nations for environment and development 1992 in Rio de Janeiro. Cp. Pichel (2002: 1).


74 ZLU et al. (2003: 66).

system voluntarily, a company can prove its willingness to assess, design and constantly improve their performance concerning their environmentally friendliness. In regular intervals independent auditors examine whether the commitments regarding these systems are being met by the certified company. Reasons for implementing such a system may be the opportunity of cost benefits, the need to catch up with competitors that already have an environmental management system, the desire to increase process efficiency as well as reacting to customers’ demand to implement the system.76 This is due to the fact that consumers are becoming more and more aware of environmental interests (they “take the environment into account.”77) and want companies to behave in a responsible manner.78 If a company with end-user contact promotes its own environmentally friendly behaviour (social responsibility), it is common that its service providers (transport service providers) are demanded to act similarly.

The objective of environmental management systems is to monitor and minimize the environmental damage the company causes. In order to successfully do this the most important components of environmental management systems are documentation, organization, monitoring systems, planning systems, information systems and employee training.79 80 Training of employees is a very crucial element in pursuing environmentally friendly (sustainable) behaviour of companies.

77 Dam (2004: 15).
79 Cp. EC (2004: 3) and Lohre (2005: 158 ff.).
It is regarded as recommendable that Freight Integrators should implement management systems proving their high standard of services.\textsuperscript{81} \textsuperscript{82} Therefore ISO 14000 and ISO 9000 as well as EMAS are recommended.\textsuperscript{83}

ISO 14000 supports the implementation “of an environmental management system, making a structured approach in setting environmental objectives and targets in achieving these and in demonstrating that they have been achieved.”\textsuperscript{84}

ISO 9000 is mainly concerned with quality management regarding the company’s efforts to make sure the products meet the customer’s requirements. The objective of ISO 9000 is “that processes within the company are defined by the company itself and then performed in this defined way to ensure uniform product quality.”\textsuperscript{85}

There are some decisive factors for a company to offer high quality standards, which are shown in illustration 8. One factor represents knowledge and makes clear that it is not possible to offer services of high quality that meet the customer’s needs with employees who are not able (due to insufficient training) to provide a customer with the optimal transport solution for his or her problem.

\textsuperscript{81} Cp. ZLU et al. (2003: 65).

\textsuperscript{82} “But it is not absolutely necessary for a Freight Integrator” ZLU et al. (2003: 65).

\textsuperscript{83} Cp. ZLU et al. (2003: 65 ff.).

\textsuperscript{84} ZLU et al. (2003: 65).

\textsuperscript{85} ZLU et al. (2003: 65).
Illustration 8: Determining factors of quality.

Concerning the Freight Integrator definition, the Hapag-Lloyd Container line is very close to meeting the standards because they provide lots of different services that enables a full load, door-to-door service for the customer, the combination of different transport modes in the most efficient way and often in the most sustainable way as well.86

Two visits to Hapag-Lloyd AG87 in Hamburg88 of SUTRANET WP4 provided information about the company’s behaviour regarding the environment and training/education concerning the environment.

86 Due to the cost-leadership Hapag-Lloyd strives for, the price is the decisive factor and therefore in some parts of the world, road transportation is the most reasonable alternative (for example in Russia). However, the decision depends on the client. Ermuth (2005), interview from 30th of August 2005.

87 Hapag-Lloyd belongs to the TUI AG. Since 2004 the Hapag-Lloyd group exclusively concentrates on shipping. The Hapag-Lloyd group consists of the "global container liner shipping” with a wide range of supplementary services and the “premium luxury cruises”. The Hapag-Lloyd Container Line provides worldwide container transport. Cp. Hapag-Lloyd.de.

These visits happened on the occasion of the expert interviews SUTRANET WP4 carried out.\textsuperscript{89} In both visits it became clear that Hapag-Lloyd allocates a certain importance to environmental interests. The company has implemented a quality management system (ISO 9001) and an environmental management system (ISO 14001). Its environmental activities encompass transport, hardware and facilities:

- Hapag Lloyd makes an effort to reduce the number of containers that are transported empty.
- Modal split with a relatively high share of rail and barge/feeder is aspired.
- The vessels’ crews are told not to throw any waste or garbage overboard.
- The entire Hapag Lloyd fleet manages to get by without TBT yet before it becomes legally binding. In order to reduce toxic emissions silicone painting is used instead of paintings containing TBT.

\textsuperscript{89} The expert interviews of the SUTRANET WP 4 are carried out from the end of 2005 until early spring 2006. The motivation for these interviews is to get an idea of the current in-house practice concerning employee training and to identify good and poor performance to be able to make further suggestions how staff could be trained regarding environmental consciousness and the idea of sustainability.
- Energy efficient reefer container are used for the carriage of perishable goods.
- Efforts to save electric energy and to reduce consumption of paper are made.

Although Hapag Lloyd teaches environmental consciousness to its trainees/apprentices, there is a lack of special further education for employees to keep them up-to-date with the latest developments concerning the environment.

In the training sessions, Hapag-Lloyd emphasizes the fact that education encompasses all transport modes.

To summarize it can be stated that there is a growing willingness of companies to develop environmentally friendly business practices and, as far as companies in the logistics sector are concerned, to become real Freight Integrators. The following survey presents opportunities how this could be done by developing the employee’s competences.
2.2. Necessary competences to become a Freight Integrator

In the “Study on Freight Integrators”\textsuperscript{90}, the authors identified several indicators that make out a Freight Integrator. The following illustration provides an overview of these indicators.

**Illustration 9:** Ten indicators for the identification of Freight Integrators.

To make a company act like a Freight Integrator, the employees must have – as mentioned above – some very special competences/skills.

But before these competences can be determined and undergo further contemplation, the terms competences/skills and qualifications have to be explained and distinguished from one another in order to give reasons why only competences/skills are examined in the further course of this project.

\textsuperscript{90} ZLU et al. (2003).
Traditionally, qualifications describe the amount of knowledge and talents a person has at his or her disposal to meet the professional requirements at the workplace for example. Exclusively, qualifications describe the ability of a person and ability refers to relevant knowledge, expertise and experience.

The term competence is more extensive. Additional to the ‘ability’, it includes the elements ‘desire’ and ‘permission’. Desire covers the personal willingness to carry out an act in a certain way to achieve a special goal. Permission opens a legitimate field of action.91

To give a complete definition of the term competence/skills, two more aspects have to be added: ‘Technology’ and ‘market’. Technologies are the relevant instruments for achieving an objective by combining desire, permission and ability. The other aspect – market – has to be mentioned because competent acting requires the existence of a demand for action. And finally, competences encompass self-organizing acting, the assessment of consequences of actions and the motivation for independent further development. From this, it follows that a person can be qualified without being competent but the other way round is not possible. In most cases qualifications alone do not meet the requirements to solve the complex problems most people face in their jobs. 92

Exactly this is what Freight Integrators are confronted with: Complex transport problems. Hence, important competences/skills and not simple qualifications need to be identified and further developed.

The overall objective of integrated professional training is imparting competence of acting responsibly on-the-job including elements of professional competence, methodological expertise and social competence also called soft skills. And these three different fields of competences encompass all of the skills needed for acting responsibly on-the-job. 93

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The following illustration explains the individual competence classes.

**Illustration 70: Fields of competences.**

<table>
<thead>
<tr>
<th>The competence of acting responsibly on-the-job as an aim of integral professional training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence of acting responsibly on-the-job</td>
</tr>
<tr>
<td>Social competence / soft skills</td>
</tr>
<tr>
<td>Professional competence</td>
</tr>
<tr>
<td>Methodological expertise</td>
</tr>
</tbody>
</table>

**What to understand by these fields of competences?**

**Professional competence**
- describes every necessary professional abilities, skills and knowledge for coping with specific on-the-job tasks.

**Methodological expertise**
- describes the ability to use acquired competences goal-oriented in complex working processes,
- the ability to obtain and process information and to use them in the working process
- and the ability to assess actions and results of actions and to derive consequences for future actions

**Social competence / soft skills**
- describes the ability to cooperate with supervisors, colleagues, clients and suppliers and to achieve and preserve a good working atmosphere

Examples for professional competences are basic knowledge in economic or the understanding of technical connections. Due to the rapid technological change, the period of use of professional competences is shorter than the one of methodological expertise or soft skills. Project management, analytical and integral thinking are examples for methodological expertise; holding of conflicts and the ability to present a topic in front of an audience are examples for social competences. 94 95

The division of the individual competences in one of these three classes is important for developing these competences because soft skills for instance have to be developed in a totally different way than professional competences. In the following, necessary competences for Freight Integrators are listed in alphabetical order and it is explained why these competences seem so important.96 Afterwards the competences are allocated to the different fields of competences to offer a clear view on all sides.97


95 Sometimes, the competence of acting responsibly on-the-job is divided into four fields of competences: Professional competences, methodological expertise, social competence and personal skills. The difference between social competences and personal skills is described as the following: social competences mean the ability to perceive thoughts, feelings and attitudes; personal skills mean the ability to act in accordance with ones own conviction. Cp. Baldin (1997: 28).

It sometimes is difficult to assign the competences to the classes because competence terms are scarcely selective and are overlapping. Cp. Erpenbeck and Heyse (2004: XIX). This especially is the case with social competences and personal skills, so the author decided to divide the different competences into only three classes.

According to literature, a special randomness due to the disassociation can be seen. Cp. Becker and Berthel (2003: 266).

96 Appendix 10 shows that there are many more competences which are necessary for professional tasks and that a division can be made in another way. Appendix 10 comes from an investigation by orders of the European Union. Cp. Diethelm (2001: 65 ff.). Not all of the quoted competences are closer examined because of the universal validity and less meaning for Freight Integrators. The ability to handle stress for example has universal validity for most occupations.

97 The following listed necessary competences for Freight Integrators (in alphabetical order) were selected by the author. The subjectivity of the selection has to be seen critical, but this effect was tried to be reduced by the consultation of relevant literature given in the footnotes.
Ability to work in a team/team-competence/collaborative ability98

In Europe, there is a trend towards being a knowledge society and knowledge-based work is carried out more and more in teams.99 The whole intelligence of a team can only be shown if the social component will not be neglected. Ideally there is a special harmony existing in the team that offers each team member the possibility to give constructive comments. Teamwork is the base for the exchange of ideas. The ability to work in a team is based on social and communicational skills and the personal willingness to work in a team and to accept and further develop in a cooperative manner the thoughts and opinions of other team members. Also essential for working in a team is reliability and confidence as well as the ability to be critical.100 While organizing a multimodal transport chain, a Freight Integrator will inevitably work together with others, so the ability to work in a team is a significant competence.

Advisory competence101/negotiation skills102

There are some decisive factors for a client to come to a modal split decision. Measurable criteria are for instance the frequency of vessel and truck services, the own amount of cargo, the kind of cargo and with that the suitability of the transport mode. Unmeasurable criteria – the subjective experienced criteria – are for example the reliability of the service provider, the punctuality, a

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98 The term ‘collaborative ability’ is used in Weinert (2004: 26 ff.) and encompasses a relationship management ability.

99 This can be one permanent team or changing teams which are established to solve a special problem. Not sufficiently inquired is the question how people can transform from a “single warrior” to a “collective warrior”. Cp. Weinert (2004: 20 ff.).


101 Gnaß (1997: 151 ff.).

102 The term “negotiation skills refers to the ability to confer with others in an effort to have them compromise on an issue.” Lucas (2005: 401).
matured trusting relationship and whether the client feels well-advised or ill-advised.\textsuperscript{103} Although, in general “shippers do not care how their goods are transported, however because of the current greater awareness of environmental issues, others can be convinced by the ‘eco-friendly behaviour’ arguments to favour intermodal transport.”\textsuperscript{104} So the ability to communicate well with clients and to discuss the different possibilities to transport the cargo and to make the client feel well-advised can be very important for the decision about the transport mode.

Friendliness, diplomacy and open-mindedness for instance belong to advisory competence because these competences round off the clients’ impression of being well-advised. But negotiation skills are also needed when negotiating with service providers in a multimodal transport chain.

So, the ability to communicate well with others is a precondition for negotiation skills/advisory competence. These so-called communication skills\textsuperscript{105} encompass amongst others persuasive power, a steady and friendly appearance as well as the ability to express oneself in writing or orally in a precise and eloquent way, information processing and the ability to listen carefully.\textsuperscript{106} It describes the ability to formulate own intentions and needs in a way the conversational partner can understand.\textsuperscript{107} Finally, it is necessary to mention that an employee must be able to deal with information and communication technologies because of the importance of logistical services.

\textsuperscript{103} Cp. Zachcial (2005: 133).

\textsuperscript{104} ZLU et al. (2003: 2).

\textsuperscript{105} Communication skills are “strategies used by people to communicate verbally and nonverbally in order to exchange messages and information.” Lucas (2005: 396).


\textsuperscript{107} Cp. Bontrup and Pulte (2001: 231 ff.).
So communication skills encompass also a certain kind of technical skills\textsuperscript{108} (although, these skills belong more to the basic skills noted below).\textsuperscript{109}

**Customer orientation**

A customer-oriented behaviour is the best way of encouraging customer loyalty, which almost every company seeks. One indicator for Freight Integrators in illustration 9 is customer relationships and one can build up durable relationships to customers when behaving customer-focused. For this, some issues are very important. For a service provider it is necessary to listen openly and carefully to the customer, to show empathy, to be patient, to show ethical behaviour (e.g. do not lie to a client about a warranty) and to show initiative etc. Showing enthusiasm (this means attaining and maintaining a level of excitement about the customer’s demands) is also a good step towards establishing a relationship.\textsuperscript{110} 111

It is important to view the customer from a relationship point of view, to treat them in a way that makes them believe the service provider cares for them and “have their best interests at heart.”\textsuperscript{112} Usually, customers tend to companies with whom they developed respect and trust.\textsuperscript{113}

\textsuperscript{108} Technical skills describe “aptitudes and knowledge that allows effective use of technology.” Lucas (2005: 404).

\textsuperscript{109} Cp. Lorenz (2004: 346 ff.).


\textsuperscript{111} For encouraging customer loyalty, the establishment of a Customer Relationship Management (CRM) seems to be useful. A CRM software helps in recording customers needs and the services already provided. Cp. Lucas (2005: 322).

\textsuperscript{112} Lucas (2005: 322).

Creativity/creative thinking skills

Under this competence, the willingness to leave old paths, the ability to perceive developments as a chance and not as a threat and the ability to judge chances and risks in a competent manner can be put together. This competence is important for Freight Integrators to eliminate the problem “Mentality/Attitude: Intermodal transport is regarded as complicated and not the normal mode of choice”. Therefore, employees should be supported in leaving old paths and developing their creativity.

Empathy

Empathy describes the ability to put oneself in another person’s situation and to recognize his or her expectations (important for Freight Integrators for identifying the customer’s needs and to communicate well with his colleagues) and the ability to manage conflicts (objective of every solution for conflicts should be the creation of a win-win-situation and for this empathy is essential) as well as the ability to develop networks and relationships. An empathetic person has to possess extremely high sensitiveness and with this the person is able to find a better base for cooperation. Empathy is one of the most important competences among soft skills and also encompasses the ability to motivate oneself and others.

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114 Creative thinking skills are regarded as “the ability to look at things in more abstract or global terms as opposed to a linear, step-by-step manner.” Lucas (2005: 396).
116 Empathy also belongs to the interpersonal skills. These are defined as “skills used by people to relate to and communicate effectively with others.” Lucas (2005: 400).
Environmental consciousness/environmental responsibility/environmental competence

Environmental responsibility means the recognizing and solving of environmental problems in a responsible and effective way and the participation in designing quality of life. Knowledge about environmental concerns serves as a basis for environmental consciousness. But the state of knowledge about the environment is subject to permanent change.  

Professionally and interdisciplinary knowledge have to be enhanced by up-to-date knowledge about the environment. Hence another competence is associated with environmental consciousness: Learning ability. Although, the prevailing conditions – of how this competence will be developed and will be kept up-to-date – depend very much on the company-specific evaluation in the tense atmosphere of economicalness, environmental protection and standards of education. This is due to the fact that every training causes expenses and companies have to weigh up the utility of these measures against the expenses. According to Karpe, this environmental competence is the ability to reflect upon own acting and requires three different assumptions: The first one is an own ethical based motivation to take part in the sustainability process. The second assumption is a certain understanding that the so-called environmental dilemma is mainly caused by the pursuit of own interests. The last one is the understanding that a change towards sustainability is valuable if it is created by morally justifiable incentives. 

One indicator for Freight Integrators is “supporting the idea of environmental sustainability” and for this environmental competence is needed.

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120 Cp. Steger (1993: 23 ff.).
‘Europe competence’

The so-called ‘Europe competence’ assumes a large degree of social competences like being able to communicate and cooperate well with other people. While doing so it is necessary to pay attention to the business habits of the European partner countries. A special openness for new ideas in the ever changing logistics sector is important, too.

Europe competence can be regarded as a special intercultural competence that encompasses knowledge of foreign law, insights in the lifestyle and behaviour of foreign partners, knowledge of economic trade relations, the willingness and ability to flexibly adjust to foreign sociocultural conditions\footnote{123} and a special knowledge of the economy, politics, society, mentality and education in other European countries. It is also necessary to speak foreign languages. Intercultural competence can only be acquired to a limited degree in the native country. To create an authentic learning environment for developing this European competence, a stay abroad for employees is the best method.\footnote{124} This is regarded as important because of the increasing internationalization and networking of the markets especially in the traffic industry.\footnote{125}

The European competence is necessary for Freight Integrators because of the identified indicators “cooperations and partners” (EU-wide), “customer relationships” (to foreign customers these can only be established by having mutual understanding) and “geographic-spread towards EU-wide business” (because “organizing intermodal transport often means organizing international transport”\footnote{126}).

\footnote{123} This especially is named “acculturation” what describes the “adjustment or adaptation to a new and different culture”. Lucas (2005: 395).


\footnote{126} ZLU et al. (2003: 29).
Functional competence/basic competence/basic skills\textsuperscript{127}

This competence includes task related functional knowledge, specialised (well founded) professional knowledge as well as interdisciplinary knowledge and basic knowledge in economic relationships. It also can be understood as a special conceptional competence which describes the ability to assess the use of suitable methods in specific situations.\textsuperscript{128} The methodological ability to arrange a transport chain with different transport modes belongs to this category. (This includes also a basic knowledge in electronic data processing. Precondition for arranging a multimodal transport chain is training that includes all transport modes (vessel, truck, train and aeroplane)). According to ZLU et al. a Freight Integrator \textbf{must} have detailed knowledge on the different modes and detailed knowledge on combining modes as well as knowledge on liability in (intermodal) transportation.\textsuperscript{129}

The functional competence in this meaning is the precondition of logistical services. Logistical service providers for instance must have product specific and industry specific knowledge and they must have knowledge of process chains in commerce and industry.\textsuperscript{130}

The basic skills also include the ability to deal with the area “liability and documentation” a Freight Integrator has to work on and which appears to be as “undoubtedly complicated”.\textsuperscript{131}

It is also important for Freight Integrators to be able to “carry out systematic comparisons of costs between intermodal and all-road options, between real

\textsuperscript{127} Basic skills encompass all the “skills needed to be successful in the workplace and in life. Examples are reading, writing, computation skills.” Lucas (2005: 395). With regard to the employees in logistics industry, they encompass all the basic skills needed to configure a transport chain.


\textsuperscript{129} Cp. ZLU et al. (2003: 67).

\textsuperscript{130} Cp. Lorenz (2004: 346 ff.).

\textsuperscript{131} ZLU et al. (2003: 54).
costs and prices paid, between external costs and taxes/charges.” So the main objective of this task is to identify as exactly as possible the various costs involved in the transport of cargo by intermodal and all-road solutions and to present these calculations to the clients.

Integral way of thinking

This competence describes the ability to realize that every action has an own consequence. Freight Integrators need the capability to assess the consequences of their work. Employees should be able to calculate the different environmental costs for road or water transport for example (this ability plays a role in the functional competence also).

In connection with this, another term makes clear what to understand by ‘integral way of thinking’. According to Weinert, the term ‘helicopter competence’ means the ability to not be restricted in one’s thinking. For supporting the idea of intermodality, an interdisciplinary way of looking at things is essential.

Learning ability/aptitude

For this ability, a lot of self-discipline and the willingness to adapt to ever changing job requirements is necessary. Learning ability assumes an open-mindedness towards dissidents and a curiosity about something strange as well as the perception that the own state of knowledge is only temporary. Learning ability is regarded as one of the most important factors for the success of a

134 Diethelm (2001: 64).
136 According to Arnst (1997: 206), the development of personal abilities base on a positive learn and work morale.
company.\textsuperscript{137} If a person wants to stay employable or fit for work and productive in the twenty-first century (especially for Freight Integrators working in the ever changing logistics industry), life-long learning is essential. Adults acquire about 80-90\% of their new knowledge self-organizedly. This comprises formal learning (organized by educational establishments; systematic, planned and structured learning) and informal learning (unplanned, unstructured and disordered learning; learning happens in life-context). It is important to gain explicit (this could cover data, facts, information, methods, texts and formulas; persons who possess this knowledge can document it and pass it on to others) as well as implicit (complex knowledge that is saturated by own experiences and interpretations; it is not possible to pass it on to others completely) knowledge.\textsuperscript{138,139}

**Organizational skills**

Due to the above demanded indicator “supporting the idea of environmental sustainability”, a Freight Integrator has to deal with issues like the choice of transport modes and the organization of intermodal transports. Short Sea Shipping, in most cases in direct competition to land based transport, is regarded as a more environmentally friendly way of transporting goods. So a Freight Integrator must be able to organize an intermodal transport chain by considering road alternatives like SSS.

And according to Stopford it requires great organizational skills to trade in this market: “It requires a knowledge of the precise capabilities of the ships involved, and a flexibility to arrange the disposition of vessels so that customers’ requirements are met in an efficient and economic way. Good

\textsuperscript{137} Knowledge is regarded as a competition-decisive resource in modern economies. Cp. Haasis (2005: 165 ff.).


\textsuperscript{139} According to Bontrup and Pulte (2001: 220), a pupil is only matured when he or she learned enough from others for being in the position to learn on his or her own.
positioning, minimization of ballast legs, avoiding being caught over weekends or holidays and accurate reading of the market are crucial…” So it is more demanding for employees to configure a transport chain with the involvement of more than one transport mode.

In contrast to the functional competence mentioned above, organizational skills assume a prior training in all transport modes to then organize the multimodal transport chain. So functional competence is a prerequisite. Organizational skills encompass the ability to identify what is relevant as well as planning and own commitment to change circumstances. Organizational skills are essential for tasks that cannot be carried out by working only schematic or as a matter of routine. Finally, organizational flexibility has to be mentioned because service providers often have to work with different logistical concepts of their clients and have to adapt the planning to the customer’s demand.

**Problem consciousness/Problem-solving competence/problem-solving skills**

This competence assumes the ability to grasp the core of a problem (this could be a transport problem a Freight Integrator has to solve), to think it over in a flexible and open-minded way, then to assess possible methods to solve the problem and to finally choose an appropriate method that is able to provide an extensive solution. Intelligence, measured by means of the Intelligence Quotient (IQ), is the most important factor for solving complex problems. A

140 Cp. Stopford (2004: 8 ff.).


142 Cp. Lorenz (2004: 346 ff.).

143 Problem-solving refers to the "system of identifying issues, determining alternatives for dealing with them, then selecting and monitoring a strategy for resolution." Lucas (2005: 402).

Problem-solving skills describe the “aptitude that a service provider has for determining the true case of an issue and finding appropriate resolution.” Lucas (2005: 402).
person needs cognitive abilities and the courage to face complex situations and problems.\textsuperscript{144} \textsuperscript{145}

The following table provides an overview of all the competences listed above, allocated to the special fields of competence.

**Table 1:** List of important competences for FIs.

<table>
<thead>
<tr>
<th>Field of competence</th>
<th>Name of competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soft skills:</td>
<td>Ability to work in a team</td>
</tr>
<tr>
<td></td>
<td>Advisory competence/negotiation skills</td>
</tr>
<tr>
<td></td>
<td>Customer orientation</td>
</tr>
<tr>
<td></td>
<td>Creativity</td>
</tr>
<tr>
<td></td>
<td>Empathy</td>
</tr>
<tr>
<td></td>
<td>Environmental responsibility</td>
</tr>
<tr>
<td></td>
<td>Europe competence</td>
</tr>
<tr>
<td></td>
<td>Problem-solving competence</td>
</tr>
<tr>
<td>Professional competence:</td>
<td>Functional competence</td>
</tr>
<tr>
<td>Methodological expertise:</td>
<td>Integral way of thinking</td>
</tr>
<tr>
<td></td>
<td>Learning ability</td>
</tr>
<tr>
<td></td>
<td>Organizational skills</td>
</tr>
</tbody>
</table>

Source: Own illustration (allocation to the fields of competences following Erpenbeck and Heyse (2004: XXVI-XXX)).\textsuperscript{146}

---


\textsuperscript{145} Diethelm and Bernard (2001: 43 ff.) indicate that first and foremost the IQ is decisive for recruiting employees, but the intellectual component has to be completed by emotional competence because about 90\% of in-company communication runs nonverbally and has to be interpreted.

Intelligence is described as a construct composed of different components depending on the research base. These components could be for example ability to think logically, speed of perception and language comprehension. Cp. Horsch (2000: 63).

\textsuperscript{146} An unambiguous assigning of the individual competences to the fields of competences is not possible according to Erpenbeck and Heyse (2004: XX), so the author made the final decision about the allocation.
In further course of this survey, these identified competences – the competences that no training should lack – will be weighted according to their different importance for acting as a Freight Integrator. Afterwards it has to be examined which training or education in the countries of the NSR provides the trainee with these competences. The training that develops the required competences best will serve as a model for the best practice training, the SUTRANET WP4 aims to develop.
3. Tools applied for the analysis of the educational situation in the logistics sector in the NSR

3.1. Explanation of the Utility Analysis

In order to compare the individual trainings offered in the NSR, a special tool is needed. This tool must provide the opportunity to distinguish between trainings regarding the benefits each education offers in order to form necessary competences for Freight Integrators.

The Utility Analysis\textsuperscript{147} is the most suitable method for supporting that decision, because the objective of this analysis is to sort out the best training in the NSR to serve as a basis for the development of a best practice education for Freight Integrators.

The Utility Analysis is a method to evaluate alternatives regarding their non-monetary/qualitative characteristics and to help policy makers come to the right decisions. The intention of this method is the utility maximization.\textsuperscript{148} \textsuperscript{149}

In general, the decision-making process includes seven steps as shown and explained together with a comprehensible example in appendices 11-13.\textsuperscript{150}

\textsuperscript{147} The Utility Analysis was developed in the USA due to the problem that the cost-benefit analysis evaluates only the economic efficiency and focuses only on monetary objectives. Since the beginning of the 1970s, the Utility Analysis has been applied in Germany. The Utility Analysis has been disseminated by Zangemeister. Cp. Uni-Hannover.de.

\textsuperscript{148} Utility is an abstract measure for satisfaction. Utility maximization describes the process of obtaining the highest level of utility from the use of services or goods. This is based on the assumption that people prefer more to less. Cp. Mankiw (2001: 490).


\textsuperscript{150} The number of steps varies depending on the author. Coulter and Robbins divide their decision-making process into eight steps, Boddy divides it into seven steps, Olfert and Rahn into five steps etc. But the activities this method requires are always the same.
3.2. **Application of the Utility Analysis to the necessary competences**  
(allocation of weights to criteria)

The first step of the Utility Analysis “identification of the problem – set objectives” has been carried out in chapter one when looking at the problematic transport situation in Europe 2005. Obviously skills and the attitude towards the environment of employees working in the logistics industry as well as organizing transport chains contribute a lot to this situation. Hence, the objective is to give employees the sufficient competence to organize a transport chain by combining the different transport modes in a way that the transport situation can be eased and environmental pollution can be reduced.

The identification of the different competences needed for acting in a Freight Integrator’s manner represents step two of the Utility Analysis: “identification of decision criteria”. Each competence represents one decision criterion.

Step three “allocation of weights to criteria” will be carried out in the following table.

Since the general importance of the above listed competences for Freight Integrators were explained in chapter 2.3., it is only necessary to justify the allocation of weights – the grading of importance of the individual competences – in brief words. Altogether, a special training can get 78 points when fulfilling all criteria/requirements for FIs. The most important competence is assessed with twelve points, the least important one with one point.

This step is based on subjective decisions of the author (as well as the selection of the criteria itself), therefore it was important to rely on the relevant literature about Freight Integrators to eliminate this effect.
Table 2: Allocation of weights to the different competences.

<table>
<thead>
<tr>
<th>Name of competence</th>
<th>Weights</th>
<th>Reasons for the allocation of weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental responsibility</td>
<td>12</td>
<td>Since the EC developed the FI concept due to the desire for a modal shift (44% of all goods being transported in Europe are carried by trucks) to more environmentally friendly transport modes (SSS, inland navigation, rail), environmental responsibility is regarded as the most important competence for FIs. The author considers the idea of sustainability as being the main cause of the development of the FI concept.</td>
</tr>
<tr>
<td>Problem-solving competence</td>
<td>11</td>
<td>Directly after the importance of environmental responsibility the author regards the significance of the problem-solving competence. This is due to the fact that employees according to the FI definition should offer their clients the best transport solution/service (by combining the different transport modes) referring to efficiency (price, delivery time etc.) and sustainability. To manage these sometimes very complex problems an employee must have this competence.</td>
</tr>
<tr>
<td>Advisory competence/ negotiation skills</td>
<td>10</td>
<td>After finding the best transport solution with regard to efficiency and sustainability, the client has to be convinced of this solution even if he or she does not have shipped the goods in another way than using trucks so far and if he or she is not very open-minded about anything new like intermodal transport. Especially this is important when intermodal transport costs nearly the same as road transport and a decision only based on the price is impossible. Therefore the author considers this competence as being the third important one.</td>
</tr>
<tr>
<td>Name of competence</td>
<td>Weights</td>
<td>Reasons for the allocation of weights</td>
</tr>
<tr>
<td>----------------------------</td>
<td>---------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Learning ability</td>
<td>8</td>
<td>If an employee has finished education and his or her skills encompass everything needed to organize intermodal transport in the most efficient and sustainable way, it is important to stay informed and learn about new developments in the logistics industry. Since the latter one is ever changing, the author regards this competence as the most important one after gaining functional competence because learning ability helps to keep functional competence up to date.</td>
</tr>
<tr>
<td>Europe competence</td>
<td>7</td>
<td>Since one of the indicators of a FI mentioned above is “geographic spread as an EU-wide business” and organizing intermodal transport often means organizing international transport, the Europe competence is important. A FI must be able to do business within Europe without obstacles (like ignorance of international/foreign law, foreign political circumstances or customs and traditions or even not having sufficient language skills). Therefore the author decides to give this competence a high number of points.</td>
</tr>
<tr>
<td>Organizational skills</td>
<td>6</td>
<td>Without organizational skills, a FI is not able to organize an intermodal transport chain even if the employee possesses the necessary knowledge about the different transport modes. So the author decides to give this competence still a relatively high number of points.</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>5</td>
<td>Customer-oriented behaviour is important for FIs like for all service providers so the author is of the opinion to pay attention to this competence but not as much as to other competences.</td>
</tr>
<tr>
<td>Integral way of thinking</td>
<td>4</td>
<td>Since it is important for FIs to take the external costs of their actions (the transports they organize) into account the author decides not to provide this competence with too few points.</td>
</tr>
<tr>
<td>Name of competence</td>
<td>Weights</td>
<td>Reasons for the allocation of weights</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Empathy</td>
<td>3</td>
<td>Empathy is a significant completion of the other competences because without the ability to really understand other people, all negotiations with clients, colleagues and partners are more difficult than they need to. As a complementary competence, empathy gets three points.</td>
</tr>
<tr>
<td>Creativity</td>
<td>2</td>
<td>Creativity is important to leave old paths and try something new. This attitude is important, but without the other skills, an implementation of new ideas is very difficult. Hence the author decides to provide this competence with only two points.</td>
</tr>
<tr>
<td>Ability to work in a team</td>
<td>1</td>
<td>Important, but not as much as all the other competences for a FI is the ability to work in a team because of the increasing significance to find (intermodal) solutions for complex transport problems that can only be solved by a competent team. Since this is a more general competence developed in almost every education, the author decided to weight this competence with the least of all points.</td>
</tr>
</tbody>
</table>


In chapter four common vocational trainings regarding the transport of goods in the NSR are being identified. The identification of the individual trainings – the alternatives – represents step four.

The fifth step ‘analysis of the alternatives’ is also carried out in chapter four when looking at the individual trainings to find out whether they provide the apprentice/trainee with the competences needed for combining the different transport modes in the most efficient and sustainable way. For each required competence covered by a training it gets the determined amount of points. These points are sumed up at the end of the table for each individual education. While assessing the competences developed by the individual trainings and educations, no partial points are given because the author cannot judge to which extent for example environmental consciousness or the ability to work in
a team is taught/developed. If a training does not offer a very important part of the required competence for FIs, no points will be given. This is the case for example when a training focuses only on one transport mode. Due to insufficient competence development, no points are given for “functional competence” for this special training because encompassing all transport modes is a prerequisite for getting points.

The sixth step encompasses the comparison and the selection of an alternative – an individual education. This is carried out in chapter five.

An implementation of the chosen alternative is not yet possible due to the fact that the author has no influence on the implementation of training methods in the NSR. However, recommendations for implementation are given in chapter 5.
3.3. Presentation of the necessary competences of a Freight Integrator in a comprehensible competence model

Competence models specifically applied to a job/task are called Skill Profiles. Objective of such Skill Profiles is to describe competences/skills needed for a special job in a way everybody can understand at first sight.\footnote{Cp. North (2003: 205-210).}

The competences identified in chapter 2.2. represent the requirements for the special job – the Freight Integrator. After allocating weights according to their individual importance to the different competences, the meaning of every competence for fulfilling the job requirements are fixed.

This should be considered in the Skill Profile so that the reader gets an impression of the significance of each competence. Since not every competence model makes that possible, the author decided to refuse some competence models.

The author refused taking the so-called Kienbaum Competence-Pyramid and the Competence Stairs due to the fact that it is not easy for the reader to recognize the different meanings for the job of a Freight Integrator.\footnote{A bit more precise descriptions of the refused competence models and further explanations for refusal are presented in appendix 14.}

The Competence Wheel seems to be the best model to the author because it makes clear the importance of each competence without giving the impression that the competences found on each other.

The procedure of building a Competence Wheel usually encompasses three steps.

The first step is to think about the competences/skills that are required or need to be developed for a special job and to assign the competences to the three fields of competences “social competence/soft skills”, “professional...
competence” and “methodological expertise” (has been carried out in chapter 2.2.). According to these competence classes the wheel will be subdivided.

The second step is to categorize the competences in three categories due to the degree of expertise from the outside to the inside of the wheel. Analogous to this, the reader should think of a dartboard where players with more practice hit the centre of the board. The author relinquished on this step due to the fact that gaining experience is a process that starts after the vocational training and would be more confusing than helpful in the course of this paper.

The third step encompasses assigning weights to the competences (has been carried out in chapter 3.2.). The wider a competence is in the Competence Wheel the more important it is for fulfilling the job.
**Illustration 8:** Job specification for Freight Integrators – requirements presented in the so-called Competence Wheel.

**Job specification for Freight Integrators**

Source: Own illustration according to North (2003: 209).
4. Presentation of the education systems and analysis of the vocational education in the logistics sector in the NSR on the basis of the Utility Analysis

In this chapter the various education systems – with main emphasis on the vocational education – are presented briefly to provide the reader with an overview of how people are educated and the topics of debate in vocational education in 2005 in the different countries of the NSR.\(^{153}\)

Afterwards the common trainings and educations in the logistics industry are presented and analyzed\(^{154}\) on the basis of the Utility Analysis to compare the different trainings and to identify the training which prepares best for being a good Freight Integrator.

It is one of the main challenges for recruitment specialists to assess the differences in the educational backgrounds of applicants from several European countries. The European Commission realized this problem and set up a special agency trying to keep policy-makers informed about the various vocational trainings and the current developments in the vocational education systems: CEDEFOP, the European Centre for the Development of Vocational training.\(^{155}\) Since this problem is very complex, the EC established additional research projects working in this field.

\(^{153}\) For most parts of the presentation of the different education systems, the author falls back on a special source: Eurydice (Education Information Network in Europe (Socrates Programme)). Eurydice was established in 1980 by the EC to “boost cooperation by improving understanding of systems and policies...Eurydice is an institutional network for gathering, monitoring, processing and circulating reliable and readily comparable information on education systems and policies (structures, reforms and trends) throughout Europe.” Eurydice.org.

Eurydice has cooperations with Eurostat, CEDEFOP, ETF (European Training Foundation) and others. Cp. Eurydice.org.

\(^{154}\) Out of all competences that are developed during the individual trainings in the NSR, only the ones that are relevant for the FI are mentioned in the following tables.

But not only staying informed about the differences of vocational educations is important. In the whole European Union, there is a need for uniform education. The SUTRANET WP4 is – as mentioned above – involved in developing a best practice manual as a proposal for uniform training\(^{156}\) of staff working in the logistics industry.

4.1. Denmark

4.1.1. Presentation of the education system\(^ {157}\)

Responsible for the pre-school areas in Denmark is the Ministry of Social Affairs, for primary and lower secondary education the Ministry of Education and for the artistic tertiary education the Ministry of Culture. The Ministry of Science, Technology and Innovation is the proper authority for long tertiary university educations as well as for research programmes; and the Ministry of Education, again, is responsible for short and medium tertiary educations. Together with the county councils and school or course boards, the Ministry of Education is in charge for the ‘gymnasium’ and the ‘Højere Forberedelseseksamen’. Also, the Ministry of Education controls vocational education and training together with the companies. The Ministry of Cultural Affairs, the Ministry of Education and the Ministry of Research share responsibility for higher education.\(^ {158}\)

The ‘Folkeskole’ is the responsible establishment for primary and lower secondary education, which is compulsory for pupils between seven and sixteen, a tenth grade is voluntary and is not offered by all ‘folkeskole’ institutions. There are two types of post-compulsory education: the general upper secondary education and the vocational upper secondary education.\(^ {159}\)

\(^{156}\) The training especially should provide the employees with skills and competences needed for acting like it is described in the Freight Integrator definition.

\(^{157}\) Appendix 15 provides an overview of the Danish education system.

\(^{158}\) Cp. Eurydice.org/Denmark.

\(^{159}\) Cp. Eurydice.org/Denmark.
The first type encompass the ‘Almengymnasiale uddannelser’ (Gymnasium and HF (higher preparatory examination)) and ‘Ehvervsgymnasiale uddannelser’ (HTX (higher technical examination) and HHX (higher commercial examination)). HTX and HHX are three-year courses chosen by pupils after the ninth or tenth school year and offer vocationally oriented courses. HTX and HHX prepare for both, the admission to higher education or finding professional employment. The second type – vocational education and training in Denmark – is a combination of general and vocational education at a vocational college together with on-the-job training (like the Dual System in Germany – further explained in chapter 4.2.1.). Additionally, specialised schools offer basic social and health training, agricultural, maritime and other forms of education. The political framework and the objectives (basic core subjects, optional subjects and specialization subjects) of the basic vocational education are determined by national committees of the trade associations and vocational schools. Responsible for planning and implementation of the vocational education are local educational committees.

For assessing the progress of a trainee, the vocational courses have a final examination (oral and written form). HTX and HHX students have to complete a major written assignment additionally to the written and oral assessment. At the non-university level there are some medium tertiary educations that last three to four years with the objective to develop specialised job-specific qualifications.160

During the period of time 2005-2006, there are planned some reforms in education. For example the HF programme “shall be based on proficiency and competence and enable the pupil to qualify for further study, and ensure a good basis for the choice of further education and of a profession. The qualifications and competences shall be strengthened through the creation of a greater coherence between the subjects.”161

161 Eurydice.org/Denmark.
Another focus point of the Danish educational policy is the innovation of the commercial vocational education and training programmes to meet the needs “of the business sector regarding a variety of competences. The programmes should be target-oriented so that it will be possible for the pupils to complete them more quickly and find a job….It is the aim to establish more flexible education courses in order to provide recognised vocational competence with the possibility of a later upgrading of the acquired competences.”

The overall plan is to innovate the vocational education and training programmes so that it provides more flexibility for pupils to plan their occupational career like the British education system.

\[162\] Cp. Eurydice.org/Denmark.
4.1.2. Analysis of the vocational education

Job title:
Vocational education and training programme: Mechanical engineering, transport and logistics\textsuperscript{163}

Job description (subject matter of education):
In order to simplify the education system, guidelines regarding vocational education and training were introduced in 2001. As mentioned above, the main principle of the Danish vocational education system is that of the Dual System “whereby training alternates between education and training in a vocational college and in-company training….There are two access routes to the vocational education and training programmes: the school pathway and the company pathway. Trainees can either enrol on a basic course, or start in an enterprise with which they have a training contract. In both cases, school periods (1/3 of the entire training programme) will alternate with periods of in-company training (2/3). The vocational education and training programmes are divided into two parts: a basic course, which is broad in its scope, and a main course in which the trainee specializes within a craft or trade”\textsuperscript{164} The basic course ‘mechanical engineering, transport and logistics’ is the one that provides trainees with necessary skills for logistics.

Duration of training:
1 ½ to 5 ½ years with a flexible basic course that may last from ten to sixty weeks depending on the “proficiency level, desires and needs of the individual trainee”\textsuperscript{165}

\textsuperscript{163} Cp. Workindenmark.dk/Vocational.
\textsuperscript{164} Workindenmark.dk/Vocational.
\textsuperscript{165} Workindenmark.dk/Vocational.
**Responsible institutions for education:**
Ministry of Education in cooperation with the social partners of the labour market and the trade committees
Basic in-school education: in commercial colleges, combined colleges and technical universities.\(^{166}\)

**Requirements of education:**
School leaving certificate after 9th grade or higher

**Particularities:**
-

**Table 3:** Analysis of the Vocational education and training programme:
Mechanical engineering, transport and logistics.

<table>
<thead>
<tr>
<th>Competences required for becoming a FI</th>
<th>Scores to allocate</th>
<th>Description of the trained competences in this occupation</th>
<th>Criteria fulfilled: Yes: X No: --</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental consciousness</td>
<td>12</td>
<td>Understanding of complex environmental issues</td>
<td>X</td>
</tr>
<tr>
<td>Problem-solving competence</td>
<td>11</td>
<td>Learn how to optimize transportation and business logistics</td>
<td>X</td>
</tr>
<tr>
<td>Advisory competence</td>
<td>10</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Functional competence</td>
<td>9</td>
<td>Main emphasis on ICT, data analysis as well as statistics, operations research, economics</td>
<td>X</td>
</tr>
<tr>
<td>Learning ability</td>
<td>8</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Europe competence</td>
<td>7</td>
<td>Foreign language skills</td>
<td>--</td>
</tr>
<tr>
<td>Organizational skills</td>
<td>6</td>
<td>Organization of supply chains at the factory level, public transport planning</td>
<td>X</td>
</tr>
</tbody>
</table>

\(^{166}\) Due to a lack of information, the author made the analysis on the basis of information provided by the Technical University of Denmark (homepage).
<table>
<thead>
<tr>
<th>Competences required for becoming a FI</th>
<th>Scores to allocate</th>
<th>Description of the trained competences in this occupation</th>
<th>Criteria fulfilled:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer orientation</td>
<td>5</td>
<td>-</td>
<td>Yes: X</td>
</tr>
<tr>
<td>Integral way of thinking</td>
<td>4</td>
<td>Integral way of viewing things</td>
<td>No: --</td>
</tr>
<tr>
<td>Empathy</td>
<td>3</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Creativity</td>
<td>2</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Ability to work in a team</td>
<td>1</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Total scores acquired: 42

Sources: TechnicalUniversityDenmark.dk.
Source: Own illustration (2005).
4.2. Germany

4.2.1. Presentation of the education system

In accordance with the Basic Law (Grundgesetz), responsible for the education system, the educational legislation and administration in Germany are the ‘Länder’ (federal states). For this, the Länder run a system comprising the Ministries of Education, Cultural Affairs and Science, the regional authorities called ‘Oberschulamt’ and the lower-level school supervisory authorities called ‘Schulamt’. These institutions are in charge for the school system, higher education and the adult education/continuing education sector. Responsible for the pre-school education are the social ministries in most Länder.

The vocational education takes place in the apprenticing company and in schools (‘Berufsschulen’) like in Denmark and is called ‘Dual System’. The in-company training is financed by the company itself and the school training by the Länder. The in-company vocational training has to follow special nationally coordinated rules established by the Länder and is supervised by public-law corporations like the Chamber of Industry and Commerce or the Chamber of Craftsmanship. The timetable for the in-school education is set up by the Länder, too. Concerning the admission criteria of the Dual System, there is a minimum requirement of having finished full-time compulsory education (between six and fifteen or sixteen; depending on the individual Land), other requirements depend on the apprenticing company. The Dual System is organised for 346 state-acknowledged professions.

167 Appendix 16 provides an overview of the German education system.

168 Cp. Eurydice.org/Germany.

At the end of their vocational education, participants of the Dual System have to pass a final examination. This examination is carried out by an examination board composed of the competent bodies like the Chambers of Industry and Commerce or Chambers of Liberal Professions. After passing this examination and a final examination of all relevant school subjects in the ‘Berufsschule’, the candidate receives two leaving certificates: one from the Berufsschule and one from the competent body.170

Next to the Dual System, there are several other offers of vocational education in Germany: ‘Berufsfachschule’, ‘Fachschule’, ‘Fachoberschule’ and ‘Berufsoberschule’ for example offer full-time vocational in-school education. The vocational programmes in these kinds of schools comprise subjects like German, social studies, mathematics, natural sciences, a foreign language, sport and several vocational subjects. At full-time vocational schools, pupils are prepared for a specific profession or for getting access to higher education.171

In 2005 there are numerous points being discussed in Germany concerning reforms in all areas of the education. Areas of reforms at the preparatory or planning stage are for example “distance learning and new media in higher-education teaching; continued strategic development of further education and life-long learning; and the development of open, flexible and company-oriented training regulations and of new occupations and professions.”172

When describing the reform of the vocational education, three important points have to be mentioned. First the ‘Nationaler Pakt für Ausbildung und Fachkräftennachwuchs in Deutschland’ (National Pact for Career Training and Skilled Manpower Development), agreed in summer 2004. The involved parties are the Federal Government and the major trade organizations. The overall objective is to increase training opportunities in companies and in

170 Cp. Eurydice.org/Germany.
171 Cp. Eurydice.org/Germany.
172 Cp. Eurydice.org/Germany.
Federal Administration with a first result by the end of 2004: 58,000 new places for apprenticeships have been created.\textsuperscript{173}

The second important point to mention is the reform of the Vocational Training Law (initiated in summer 2004) with the aim to “heighten permeability between the educational systems and to strengthen cooperation between companies actively involved in the training and the vocational schools.”\textsuperscript{174}

The last point to describe is the launch of the programme ‘Kompetenzen fördern – Berufliche Qualifizierung für Zielgruppen mit besonderem Förderbedarf – BQF-Programm’ (Promotion Skills – Vocational Qualification for Target Groups with Special Learning Problems and for the Socially Disadvantaged) which is co-financed by the European Social Fund (ESF) and will run through 2006. Objective of this programme is the support of youths who do not find a vocational training.\textsuperscript{175} 176

\textsuperscript{173} Cp. Eurydice.org/Germany.

\textsuperscript{174} Cp. Eurydice.org/Germany.

\textsuperscript{175} Cp. Eurydice.org/Germany.

\textsuperscript{176} Next to the below listed vocational educations, there are some more in the logistics industry in Germany: Merchant for courier, express and postal services (Kauffrau/-mann für Kurier-, Express- und Postdienstleistungen); Rail and road forwarding clerk (Kauffrau/-mann im Eisenbahn- und Straßenverkehr); Sea merchant – tramp shipping (Schifffahrtskauffrau/-mann with the subject area tramp shipping); Transport clerk – air traffic (Luftverkehrskaufmann/-frau). These educations are not analyzed because they are not important for the FI concept.
4.2.2. Analysis of the vocational education

**Job title:**
Freight forwarding and logistics services clerk\(^{177}\)
‘Kauffrau/-mann für Spedition und Logistikleistungen’

**Job description (subject matter of education):**
Freight forwarding and logistics services clerks plan and organize the shipments of goods, the trans-shipment and warehousing of these goods as well as additional logistics services. The trainee learns for instance how to handle the different documents needed to send cargo, get knowledge about all transport modes and the characteristics of goods. Depending on the size, specialization and kind of the apprenticing company, the education of the trainee may have an emphasis on some special services or transport modes, but in general the training covers all tasks concerning the organization of a multimodal transport chain.

**Duration of training:**
3 years

**Responsible institutions for education:**
Apprenticing company and vocational school (‘Berufsschule’)

**Requirements of education:**
School leaving certificate after 10\(^{th}\) grade or higher

**Particularities:**
Since August 2004, this education replaces the training as a forwarding clerk. The new training has a main emphasis on modern logistics services. This

\(^{177}\) Berufenet.arbeitsamt.de/Freight and Agentur für Arbeit (2005: 1-28).
encompass a more detailed training in ICT (satellite navigation etc), foreign languages (English) and customer-orientation. Since the beginning of 2005, the vocational training act (‘Berufsbildungsgesetz’) offers the possibility to serve up to one third of the training period in a foreign country. The Chamber of Commerce Aachen helps trainees to find a company for doing a period of practical training in Ireland or for attending a two-week seminar (Name of the seminar: ‘Doing Business in the English-Speaking World’) in Great Britan. Thus trainees are able to gain intercultural competence („Europe competence“). They also get better knowledge in foreign economy and culture as well as insights into work routine abroad.

**Table 4**: Analysis of the Freight forwarding and logistics services clerk.

<table>
<thead>
<tr>
<th>Competences required for becoming a FI</th>
<th>Scores to allocate</th>
<th>Description of the trained competences in this occupation</th>
<th>Criteria fulfilled: Yes: X No: --</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental consciousness</td>
<td>12</td>
<td>Environmental protection; environmental protection measures</td>
<td>X</td>
</tr>
<tr>
<td>Problem-solving competence</td>
<td>11</td>
<td>Choosing the most suitable transport technology and mode and organize the transport chain to solve a client’s transport problem</td>
<td>X</td>
</tr>
<tr>
<td>Advisory competence</td>
<td>10</td>
<td>How to carefully treat and advise a (foreign) customer; purchase of external services and negotiation about these services</td>
<td>X</td>
</tr>
<tr>
<td>Functional competence</td>
<td>9</td>
<td>Comparison of the different transport modes regarding the best solution for the customer’s goods and the environment; knowledge about dangerous&amp;normal goods, legal regulations, customs, ICT; consolidated cargo transports; calculation of costs; general administration; knowledge about important logistics services; quality management</td>
<td>X</td>
</tr>
<tr>
<td>Competences required for becoming a FI</td>
<td>Scores to allocate</td>
<td>Description of the trained competences in this occupation</td>
<td>Criteria fulfilled:</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>--------------------</td>
<td>-----------------------------------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Learning ability</td>
<td>8</td>
<td>Knowledge about study techniques (important for life-long learning)</td>
<td>X</td>
</tr>
<tr>
<td>Europe competence</td>
<td>7</td>
<td>Foreign language skills (English); knowledge about international customs regulations; parts of the education could be served in foreign countries</td>
<td>X</td>
</tr>
<tr>
<td>Organizational skills</td>
<td>6</td>
<td>Organize a transport chain and combine the different transport modes</td>
<td>X</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>5</td>
<td>How to take care of customers</td>
<td>X</td>
</tr>
<tr>
<td>Integral way of thinking</td>
<td>4</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Empathy</td>
<td>3</td>
<td>With regard to communicate well with others</td>
<td>X</td>
</tr>
<tr>
<td>Creativity</td>
<td>2</td>
<td>Not restricted in planning a transport chain; react flexibly on problems and customer’s wishes</td>
<td>X</td>
</tr>
<tr>
<td>Ability to work in a team</td>
<td>1</td>
<td>Team-work is practiced</td>
<td>X</td>
</tr>
</tbody>
</table>

**Total scores acquired:** 74

**Sources:** Berufenet.arbeitsamt.de/Freight and Agentur für Arbeit (2005: 1-28).

Source: Own illustration (2005).
Job title:
Sea merchant – liner shipping \(^{178}\)
‘Schiffsfahrtskauffrau/-mann with the subject area liner shipping’

Job description (subject matter of education):
Sea merchants plan, organize, monitor and control the transport of goods by vessels and take care for trouble-free trans-shipment. In the area of liner shipping, sea merchants deal with vessels driving regularly on routes between ports with fixed schedules. Sea merchants are responsible for advising their customers regarding the different freight rates and the alternatives to transport their goods (multimodal/intermodal transport). Their task is also to negotiate with the vessel’s crew, the vessel’s suppliers and service providers in the ports as well as transport service providers for the pre- and on-carriage. They have to calculate freight rates, deal with all documents concerning the transport and control all activities associated with equipping a vessel (supply of fuel, food and other things).

Duration of training:
3 years

Responsible institutions for education:
Apprenticing company \(^{179}\) and vocational school (‘Berufsschule’)

Requirements of education:
School leaving certificate after 10\(^{th}\) grade or higher

Particularities:
-

\(^{178}\) Cp. Berufenet.arbeitsamt.de/Ship and Kmk.org/Rahmenlehrplan.

\(^{179}\) For the subject area liner shipping: liner shipping companies and liner agents. For the subject area tramp shipping: tramp shipping companies and ship brokers. Although this division is not binding. Cp. Bundesinstitut für Ausbildung (2004: 108).
### Table 5: Analysis of the Sea merchant – liner shipping.

<table>
<thead>
<tr>
<th>Competences required for becoming a FI</th>
<th>Scores to allocate</th>
<th>Description of the trained competences in this occupation</th>
<th>Criteria fulfilled:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental consciousness</td>
<td>12</td>
<td>Environmental protection (environmentally suitable waste disposal, consequences of transport for environment etc.)</td>
<td>X</td>
</tr>
<tr>
<td>Problem-solving competence</td>
<td>11</td>
<td>How to develop services that are in line with market conditions; planning of logistical processes</td>
<td>X</td>
</tr>
<tr>
<td>Advisory competence</td>
<td>10</td>
<td>How to plan, perform and go over again conversations with customers; How to advise (foreign) customers and sell him or her the right service</td>
<td>X</td>
</tr>
<tr>
<td>Functional competence</td>
<td>9</td>
<td>Knowledge about different types of transport modes and all logistics services concerning maritime transport; how to insure liability risks, vessels and how to handle claims; profound knowledge about intermodal transport; ICT; calculation of costs; general administration; quality management; customs and transport documentation; how to perform a market analysis and to monitor the transport market</td>
<td>X</td>
</tr>
<tr>
<td>Learning ability</td>
<td>8</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Europe competence</td>
<td>7</td>
<td>Foreign language skills; the apprentice learns how to find and make use of information about ports and shipping routes with regard to their geographical and current political conditions; knowledge about international law</td>
<td>X</td>
</tr>
<tr>
<td>Competences required for becoming a FI</td>
<td>Scores to allocate</td>
<td>Description of the trained competences in this occupation</td>
<td>Criteria fulfilled:</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-------------------</td>
<td>----------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Organizational skills</td>
<td>6</td>
<td><em>How to organize workload; organizing the carriage of goods by vessel (planning of liner services and transshipment, concluding contracts for time charter); how to organize an intermodal transport chain</em></td>
<td>Yes: X No: --</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>5</td>
<td><em>How to care for clients</em></td>
<td>X</td>
</tr>
<tr>
<td>Integral way of thinking</td>
<td>4</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Empathy</td>
<td>3</td>
<td><em>With regard to communicate well with others</em></td>
<td>X</td>
</tr>
<tr>
<td>Creativity</td>
<td>2</td>
<td><em>Leave old paths (intermodal transport)</em></td>
<td>X</td>
</tr>
<tr>
<td>Ability to work in a team</td>
<td>1</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Total scores acquired: **65**

Sources: [Berufenet.arbeitsamt.de/Ship and Kmk.org/Rahmenlehrplan](https://www.berufenet.arbeitsamt.de/Ship and Kmk.org/Rahmenlehrplan).

Source: Own illustration (2005).
4.3. The Netherlands

4.3.1. Presentation of the education system

In the Netherlands, the Constitution authorizes people to found schools and provide teaching based on religious, ideological or educational convictions. That is the reason why there are many private schools attended by 70% of the pupils. This freedom of organizing teaching – determining what to teach and the teaching methods – is limited by the qualitative standards for education set by the Ministry of Education, Culture and Science. According to the law, privately run schools are equal to publicly run schools, what means that the government is obliged to spend money on both kinds of schools. The quality of education is supervised by the Education Inspectorate, for which the Minister of Education, Culture and Science is responsible. Responsible for all schools (publicly and privately run schools) in one area are the municipal authorities. Regarding vocational education policy, on national level the Government together with the umbrella organizations of employees and employers are the responsible parties. Regional employment committees are in charge of the implementation of the vocational education policy and the vocational education regulations. The Regional Opleiding Centres (VTL for ‘Transport and Logistiek’\(^\text{181}\)) are the responsible institutions for the individual contents of the education and have a close cooperation with the apprenticing companies.\(^\text{182}\) Dutch children attend primary schools from the age of five to twelve. Afterwards they have to decide on one possible secondary education (compulsory full-time education until the age of sixteen).

\(^{180}\) Appendix 19 provides an overview of the Dutch education system.


This could be the pre-university education (‘Voorbereidend wetenschappelijk onderwijs’ VWO: six years of education) from the age of twelve to eighteen. Or the senior general secondary education (‘Hoger algemeen voortgezet onderwijs’ HAVO: five years of education) from the age of twelve to seventeen. Another possibility is the pre-vocational secondary education (‘Voorbereidend middelbaar beroeps onderwijs’ VMBO: four years of education) from the age of twelve to sixteen. A last possibility offers the ‘speciaal voortgezet onderwijs’, the special secondary education for pupils from twelve to eighteen or twenty. The MBO (‘Middelbaar beroeps onderwijs’), the secondary vocational education is a post-secondary education offered for pupils of the age of sixteen to twenty.\(^{183}\) Introduced in 1999/2000, the VMBO is a type of secondary education offering four learning pathways: A basic vocational programme, a middle-management vocational programme, a combined programme and a theoretical programme.

After finishing the VMBO, students have the opportunity to go to MBO or to HAVO (admission to the fourth year of HAVO). After completing HAVO, students can go to VWO (admission to the fifth year of VWO) or to MBO. The VWO certificate-holders are entitled to apply to university.\(^{184}\)

The MBO-courses represent the national qualification structure for vocational education. These courses are divided into four levels and students can take them one after another; admission criterion for the succeeding course is the diploma of the previous course. Each MBO-course encompass two learning pathways: Vocational training, called BOL (practical training amount between 20% and 60% of the course) and block or day release, called BBL (practical training amount more than 60% of the course). In 2004 there were 700 qualifications trained like this registered. This combination of school and periods of practical trainings is similar to the German Dual System.\(^{185}\)


4.3.2. Analysis of the vocational education

Job title:
Technical administrative employee\textsuperscript{186}
‘Technisch-Administrief Medewerker’

Job description (subject matter of education):
Technical administrative employees are responsible for advising customers regarding their transport problems. Mainly, they are concerned with dealing all necessary transport documents and customs.

Duration of training:
2 years, MBO level two

Responsible institutions for education:
Apprenticing company and the Regional Opleiding Centre (VTL)

Requirements of education:
School leaving certificate after 10\textsuperscript{th} grade and minimum age of sixteen

Particularities:
Table 6: Analysis of the Technical administrative employee.

<table>
<thead>
<tr>
<th>Competences required for becoming a FI</th>
<th>Scores to allocate</th>
<th>Description of the trained competences in this occupation</th>
<th>Criteria fulfilled:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental consciousness</td>
<td>12</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Problem-solving competence</td>
<td>11</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Advisory competence</td>
<td>10</td>
<td>How to advise a customer and sell him or her the right service</td>
<td>X</td>
</tr>
<tr>
<td>Functional competence</td>
<td>9</td>
<td>Knowledge about different types of cargo; calculation of costs; general administration; customs and transport documentation; knowledge about legal aspects of transport</td>
<td>X</td>
</tr>
<tr>
<td>Learning ability</td>
<td>8</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Europe competence</td>
<td>7</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Organizational skills</td>
<td>6</td>
<td>Planning and scheduling skills; organization regarding the workload</td>
<td>X</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>5</td>
<td>Answer to customers demands</td>
<td>X</td>
</tr>
<tr>
<td>Integral way of thinking</td>
<td>4</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Empathy</td>
<td>3</td>
<td>With regard to communicate well with others</td>
<td>X</td>
</tr>
<tr>
<td>Creativity</td>
<td>2</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Ability to work in a team</td>
<td>1</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td><strong>Total scores acquired:</strong></td>
<td></td>
<td></td>
<td><strong>33</strong></td>
</tr>
</tbody>
</table>


Source: Own illustration (2005).
Job title:
Forwarding planner\textsuperscript{187}
‘Expeditie planner’

Job description (subject matter of education):
The expeditie planner is responsible for the planning of the transport of goods itself and all services regarding the transport.

Duration of training:
4 years, MBO level three

Responsible institutions for education:
Apprenticing company and the Regional Opleiding Centre (VTL)

Requirements of education:
Diploma in a lower secondary professional education or comparable/higher

Particularities:
-

Table 7: Analysis of the Forwarding planner.

<table>
<thead>
<tr>
<th>Competences required for becoming a FI</th>
<th>Scores to allocate</th>
<th>Description of the trained competences in this occupation</th>
<th>Criteria fulfilled:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental consciousness</td>
<td>12</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Problem-solving competence</td>
<td>11</td>
<td><em>How to solve transport problems by combining various transport modes</em></td>
<td>X</td>
</tr>
<tr>
<td>Advisory competence</td>
<td>10</td>
<td><em>How to advise a customer and sell him or her the right service</em></td>
<td>X</td>
</tr>
<tr>
<td>Functional competence</td>
<td>9</td>
<td><em>Knowledge about different types of cargo and means of transport; calculation of costs; knowledge about legal aspects of transport</em></td>
<td>X</td>
</tr>
<tr>
<td>Learning ability</td>
<td>8</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Europe competence</td>
<td>7</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Organizational skills</td>
<td>6</td>
<td><em>Planning and scheduling skills; organization regarding the workload</em></td>
<td>X</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>5</td>
<td><em>Answer to customers demands</em></td>
<td>X</td>
</tr>
<tr>
<td>Integral way of thinking</td>
<td>4</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Empathy</td>
<td>3</td>
<td><em>How to communicate well with others</em></td>
<td>X</td>
</tr>
<tr>
<td>Creativity</td>
<td>2</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Ability to work in a team</td>
<td>1</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td><strong>Total scores acquired:</strong></td>
<td><strong>44</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Source: Own illustration (2005).
Job title:
Manager for port, transport and logistics\textsuperscript{188}
‘Manager haven, vervoer en logistiek’

Job description (subject matter of education):  
The manager haven, vervoer en logistiek is responsible for a trouble-free transport of goods. Therefore he or she must possess special organizational skills. Employment is possible in companies with an export-, import-, transport- or sale department.

Duration of training:  
4 years, MBO level four

Responsible institutions for education: 
Apprenticing company and the Regional Opleiding Centre (VTL)

Requirements of education:  
Diploma of a lower secondary professional education or comparable/higher

Particularities: 
- 

Table 8: Analysis of the Manager for port, transport and logistics.

<table>
<thead>
<tr>
<th>Competences required for becoming a FI</th>
<th>Scores to allocate</th>
<th>Description of the trained competences in this occupation</th>
<th>Criteria fulfilled:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental consciousness</td>
<td>12</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Problem-solving competence</td>
<td>11</td>
<td>How to solve transport problems by combining various transport modes</td>
<td>X</td>
</tr>
<tr>
<td>Advisory competence</td>
<td>10</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Functional competence</td>
<td>9</td>
<td>Knowledge about different types of cargo and means of transport; cargo treatment; calculation of costs; knowledge about legal aspects of transport</td>
<td>X</td>
</tr>
<tr>
<td>Learning ability</td>
<td>8</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Europe competence</td>
<td>7</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Organizational skills</td>
<td>6</td>
<td>Planning and scheduling skills; organization regarding the workload</td>
<td>X</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>5</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Integral way of thinking</td>
<td>4</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Empathy</td>
<td>3</td>
<td>How to communicate well with others</td>
<td>X</td>
</tr>
<tr>
<td>Creativity</td>
<td>2</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Ability to work in a team</td>
<td>1</td>
<td>-</td>
<td>--</td>
</tr>
</tbody>
</table>

Total scores acquired: 29


Source: Own illustration (2005).
Job title:
Shipping agent\textsuperscript{189}
‘Expéditeur’

Job description (subject matter of education):
Shipping agents are responsible for the organization of transports in the most efficient way. Therefore they also have to prepare all necessary documents.

Duration of training:
1 year, MBO level four

Responsible institutions for education:
Apprenticing company and the Regional Opleiding Centre (VTL)

Requirements of education:
Diploma in higher secondary education with practical experience or
Diploma in lower secondary education specialized in economy/technique or
MBO level three (assistant shipping agent)

Particularities:
-

### Table 9: Analysis of the Shipping agent.

<table>
<thead>
<tr>
<th>Competences required for becoming a FI</th>
<th>Scores to allocate</th>
<th>Description of the trained competences in this occupation</th>
<th>Criteria fulfilled:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>No:    --</td>
</tr>
<tr>
<td>Environmental consciousness</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem-solving competence</td>
<td>11</td>
<td><em>How to solve transport problems by combining various transport modes (in an efficient way)</em></td>
<td>X</td>
</tr>
<tr>
<td>Advisory competence</td>
<td>10</td>
<td><em>How to advise a customer and sell him or her the right service</em></td>
<td>X</td>
</tr>
<tr>
<td>Functional competence</td>
<td>9</td>
<td><em>Knowledge about different types of cargo and means of transport; cargo treatment; calculation of costs; knowledge about legal aspects of transport, documents referring the transport; ICT; administration; knowledge about economy; how to insure goods</em></td>
<td>X</td>
</tr>
<tr>
<td>Learning ability</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe competence</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizational skills</td>
<td>6</td>
<td><em>Planning and scheduling skills; organization regarding the workload</em></td>
<td>X</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>5</td>
<td><em>Answer to customers demands in a friendly way.</em></td>
<td>X</td>
</tr>
<tr>
<td>Integral way of thinking</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Empathy</td>
<td>3</td>
<td><em>How to communicate well with others</em></td>
<td>X</td>
</tr>
<tr>
<td>Creativity</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to work in a team</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total scores acquired:</strong></td>
<td><strong>44</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: Studie Gids (2005: 300).

Source: Own illustration (2005).
**Job title:**
Transport manager\(^{190}\)
‘Transportmanager’

**Job description (subject matter of education):**
Transport managers are responsible for the planning and monitoring of transport processes. Therefore he or she must have knowledge in different transport systems, modes and ways. It is also necessary to gain profound knowledge about logistical processes during the education.

**Duration of training:**
4 years, MBO level four

**Responsible institutions for education:**
Apprenticing company and the Regional Opleiding Centre (VTL)

**Requirements of education:**
School-leaving certificate VMBO or higher or completion of an apprenticeship (canvanasser or forwarding agent)

**Particularities:**
- 

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Table 10: Analysis of the Transport manager.

<table>
<thead>
<tr>
<th>Competences required for becoming a FI</th>
<th>Scores to allocate</th>
<th>Description of the trained competences in this occupation</th>
<th>Criteria fulfilled:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yes: X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No: --</td>
</tr>
<tr>
<td>Environmental consciousness</td>
<td>12</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Problem-solving competence</td>
<td>11</td>
<td>How to solve transport problems (transport management)</td>
<td>X</td>
</tr>
<tr>
<td>Advisory competence</td>
<td>10</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Functional competence</td>
<td>9</td>
<td>Calculation of costs, technical skills for transport-managing</td>
<td>X</td>
</tr>
<tr>
<td>Learning ability</td>
<td>8</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Europe competence</td>
<td>7</td>
<td>Foreign language skills</td>
<td></td>
</tr>
<tr>
<td>Organizational skills</td>
<td>6</td>
<td>Planning and scheduling skills, management skills</td>
<td>X</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>5</td>
<td>Answer to customers demands in a friendly way.</td>
<td>X</td>
</tr>
<tr>
<td>Integral way of thinking</td>
<td>4</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Empathy</td>
<td>3</td>
<td>How to communicate well with others (customers, suppliers and employees); how to behave sympathetic</td>
<td>X</td>
</tr>
<tr>
<td>Creativity</td>
<td>2</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Ability to work in a team</td>
<td>1</td>
<td>Ability to work in a team</td>
<td>X</td>
</tr>
<tr>
<td><strong>Total scores acquired:</strong></td>
<td><strong>35</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.4. Norway

4.4.1. Presentation of the education system

In Norway, the supervision of the education system is performed at three different levels. The overall responsibility for all educational fields (except the pre-schools) lies at the Ministry of Education and Research supported by advisory bodies including the County Governors of the individual county. In charge of the pre-schools is the Ministry of Children and Family Affairs. Responsible for all affairs concerning compulsory education are the municipality authorities; for affairs concerning upper secondary education the county authorities and for managing the tertiary education institutions the Ministry of Education and Research. The ultimate responsibility for monitoring the education has the Ministry of Education. The Ministry of Education and Research is assisted by the individual County Governors. Since June 2004, there is a new Directorate for Primary and Secondary Education that is responsible for creating national curricula, supervising and developing primary and secondary education.

The compulsory full-time education is held in the so-called ‘grunnskole’ from age six to sixteen. Afterwards, pupils can decide to go to the ‘videregaende skole’, the upper secondary school from age sixteen to nineteen. The upper secondary school encompass a general education and a vocational education. The general education consists of a foundation course and two advanced courses. The vocational training consists of a foundation course an advanced course I, an advanced course II or two years of apprenticeship or one year of general studies.

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191 Appendix 20 provides an overview of the Norwegian education system.


Since the reform of the curricula guidelines in 1994 by the Ministry of Education, upper secondary education curricula encompass fifteen programmes\textsuperscript{194} of general or vocational study. Each of these programmes comprise a foundation year and two years of specialisation. In most vocational training programmes, the student can take two years of apprenticeship in a company instead of the last specialisation year. According to the needs of the labour market, the contents of the upper secondary courses are determined. Responsible for the accreditation of the vocational qualifications is the County Examination Board. The County Vocational Training Board is among others responsible for approving apprenticeship establishments, administration of the apprenticeship contracts and the inspection of the apprenticeship establishments. The County Vocational Training Board is also responsible for the communication between county education authorities, training establishments and representatives of industry.\textsuperscript{195}

The tertiary education is presented by six universities, twenty-five university colleges and thirty-two private higher education institutions. Students who successfully completed three years upper secondary education or five years work experience or a combination of education and work experience are allowed to enter the tertiary education sector.\textsuperscript{196}

\textsuperscript{194} Before the educational reform in 1994, there were more than one hundred different branches of study. This action was taken to avoid specialization and impart a broader knowledge. Cp. Eurydice.org/Norway.

\textsuperscript{195} Cp. Eurydice.org/Norway.

\textsuperscript{196} Cp. Eurydice.org/Norway.
4.4.2. Analysis of the vocational education

Job title:
Upper Secondary School: General and business studies

Job description (subject matter of education):
At the Upper Secondary School in Norway pupils may choose from 15 branches of study. Each of them comprises a foundation course and the advanced course I, which both last one year. Pupils then may either attend the advanced course II to qualify for higher education or two years of apprenticeship training. The core subjects comprise Norwegian, English, social sciences, mathematics, science and physical education. “General and business studies” is one of the programmes that do not lead to a formal qualification. Thus the most common way is to continue with higher education afterwards. However, completing with vocational education is possible as well. ¹⁹⁷ ¹⁹⁸

Duration of training:
Three years of academic education to prepare for higher education or four years (including two years of apprenticeship training) for the vocational strand

Responsible institutions for education:
Upper Secondary Schools supervised by county authorities

Requirements of education:
School leaving certificate after 10th grade

Particularities:

¹⁹⁸ Cp. Trainingvillage.gr.
Table 11: Analysis of the Upper Secondary School: General and business studies.

<table>
<thead>
<tr>
<th>Competences required for becoming a FI</th>
<th>Scores to allocate</th>
<th>Description of the trained competences in this occupation</th>
<th>Criteria fulfilled:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental consciousness</td>
<td>12</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Problem-solving competence</td>
<td>11</td>
<td>- (insufficient information)</td>
<td></td>
</tr>
<tr>
<td>Advisory competence</td>
<td>10</td>
<td>- (insufficient information)</td>
<td></td>
</tr>
<tr>
<td>Functional competence</td>
<td>9</td>
<td>- (insufficient information)</td>
<td></td>
</tr>
<tr>
<td>Learning ability</td>
<td>8</td>
<td>High proportion of theoretical training</td>
<td>X</td>
</tr>
<tr>
<td>Europe competence</td>
<td>7</td>
<td>Compulsory foreign language course, English as a core subject</td>
<td>X</td>
</tr>
<tr>
<td>Organizational skills</td>
<td>6</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>5</td>
<td>Advertising and marketing included</td>
<td>X</td>
</tr>
<tr>
<td>Integral way of thinking</td>
<td>4</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Empathy</td>
<td>3</td>
<td>Social competence, entrepreneurial skills and communicative skills are trained</td>
<td>X</td>
</tr>
<tr>
<td>Creativity</td>
<td>2</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Ability to work in a team</td>
<td>1</td>
<td>Two years of apprenticeship</td>
<td>X</td>
</tr>
<tr>
<td>Total scores acquired:</td>
<td>24</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: Eurydice.org/Norway and Trainingvillage.gr.

Source: Own illustration (2005).

199 This result may be due to the insufficient information about the contents of the training.
4.5. **Scotland (Great Britain)**

4.5.1. **Presentation of the education system**

Responsible for the supervision and development of the education service is the First Minister of Scotland; responsible for the translation into practice is the Minister for Education & Young People together with the Minister for Enterprise and Lifelong Learning. The Scottish Executive Education Department and the Scottish Executive Enterprise, Transport and Lifelong Learning Department support the Ministers in the implementation. Besides a wide network of state-run and -financed educational establishments and further educational establishments there are many private institutions. The Scottish Local Authorities – 32 unitary councils – are responsible for the provision of publicly funded education. Compulsory full-time education is required between the ages of five and sixteen. At the age of fifteen, a special guidance is offered to pupils to help them selecting subjects for study in Upper Secondary or Further Education colleges, or choosing an appropriate training course or even finding the right kind of job.

Great Britain’s Government requested employers for its whole sphere of influence to take on the responsibility for the training/education and

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200 Appendix 18 provides an overview of the Scottish education system and appendix 17 shows the British education system in general.

201 Primary schools: between the ages five and 12; Secondary schools: between the ages twelve and sixteen. Cp. Eurydice.org/Scotland.

202 The Further Education colleges offer advanced or non-advanced courses. The non-advanced courses comprise vocational and general studies, pre-employment courses, link courses for school pupils and off-the-job training for employees. Advanced courses comprise for example higher National Certificate courses. “The National Certificate is a non-advanced vocational certificate awarded by the Scottish Qualifications Authority (SQA) on the basis of a course comprising a number of learning modules.” Eurydice.org/Scotland.

203 “Further education is the vocational education which is offered mainly through 46 Further Education colleges which are grant-aided directly or indirectly, by the Scottish Executive. The funding agency set up by the Executive for this purpose is known as the Scottish Further Education Funding Council.” Eurydice.org/Scotland.

204 Cp. Eurydice.org/Scotland.
development of their employees. Vocational training is offered by independent providers or in Further Education colleges. 205

The vocational education scheme is called ‘Scottish Vocational Qualification/Education’ (SVQ)206; the specific SVQ preparing for the target occupations (forwarding merchant, freight forwarder, logistician) is called Traffic Office NVQ/SVQ and is assessed at two different levels without an exact occupational title resulting from achieving this qualification. The SVQs are assessed through the demonstration of competences in specified tasks by the candidates and not through examinations.207

The British/Scottish education system stands out for being very output-oriented (acquisition of qualifications and competences). Great Britain’s/Scotland’s modular education concept is very flexible. Necessary professional skills can be acquired by stringing together single skills or qualifications. Duration, method and location of training can be chosen freely due to the educational goal. The modular education provides the candidate with the exactly needed application-oriented skills or qualifications which can be designed cost-efficient and precisely tailored. But the extreme specialization and the one-sidedness is seen very critically.208 For this reason, the Scottish Education Minister unveiled twelve key actions to improve Scotland’s education system in November 2004. One key action for example is to make more international comparisons between “Scotland’s education performance and that of other countries to ensure Scotland continues to compete internationally.”209

207 Cp. Eurydice.org/Scotland.
209 Eurydice.org/Scotland.
4.5.1. Analysis of the vocational education

**Job title:**
The Traffic Office NVQ/SVQ prepares the trainee for a variety of jobs at different possible skill levels without an exact occupational title.\(^{210}\)

**Job description (subject matter of education):**
Skills for Logistics, the organisation that is mainly responsible for developing skills, states that the lower level NVQ/SVQ fits employees working in roles such as a traffic clerk and the higher level NVQ/SVQ is suitable for employees who have the position of a transport manager. The objective of all NVQs/SVQs modules is that the candidate acquires the needed job-skills at the workplace. NVQs/SVQs are regarded as work-related, competence-based qualifications making sure that the achiever possesses the skills and knowledge required for working effectively and competently in the field of work the specific NVQ/SVQ framework represents. The so-called Traffic Office NVQ/SVQ is the framework for people who plan and organize transports.

**Duration of training:**
No maximum time schedule for achieving a NVQ/SVQ is determined. Participants can take as much time as they need to fulfil all the requirements.

**Responsible institutions for education:**
For England, Northern Ireland and Wales, the Qualifications and Curriculum Authority (QCA) is responsible for the National Vocational Qualifications (NVQs). The QCA cooperates with the Scottish Qualifications Authority (SQA), which is responsible for the Scottish Vocational Qualifications (SVQs). In charge of the Traffic Office NVQ/SVQ is the Sector Skills Council (this specific institution is called ’Skills for Logistics’).

\(^{210}\) Cp. Skillsforlogistics.org and QCA.org.
Requirements of education:
No entry requirements. Full-time employees or school and college students with a work placement or part-time job that enables them to develop the required skills can take part (hence, a workplace is the prerequisite).

Particularities:
The Sector Skills Council for the freight logistics industry was established in 2004 introducing logistics as one of the first nine UK industry sectors to be served by a Sector Skills Council. Therefore the Traffic Office NVQ/SVQ is considerably well adapted to modern requirements of a vocational education in the field of logistics. It has to be mentioned that Skills for Logistics only sets a framework for the content of teaching, consequently the trained competences may slightly diversify.

Table 12: Analysis of the Traffic Office NVQ/SVQ.

<table>
<thead>
<tr>
<th>Competences required for becoming a FI</th>
<th>Scores to allocate</th>
<th>Description of the trained competences in this occupation</th>
<th>Criteria fulfilled:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental consciousness</td>
<td>12</td>
<td>Environmental aspects are mentioned in various units throughout the entire training; the trainee gains awareness about environmental rules and regulations</td>
<td>X</td>
</tr>
<tr>
<td>Problem-solving competence</td>
<td>11</td>
<td>Solve the transport problems of clients in a flexible way</td>
<td>X</td>
</tr>
<tr>
<td>Advisory competence</td>
<td>10</td>
<td>Gaining ability to provide information about the available services to customers</td>
<td>X</td>
</tr>
<tr>
<td>Competences required for becoming a FI</td>
<td>Scores to allocate</td>
<td>Description of the trained competences in this occupation</td>
<td>Criteria fulfilled:</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>--------------------</td>
<td>-------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Functional competence</td>
<td>9</td>
<td>Detailed knowledge of the different types of transport modes and goods and how to handle them; relevant legislation; regulations and codes of practice; how to handle customer complaints; knowledge in ICT</td>
<td>X</td>
</tr>
<tr>
<td>Learning ability</td>
<td>8</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Europe competence</td>
<td>7</td>
<td>“International transport operation” only as additional unit</td>
<td>-- (insufficient)</td>
</tr>
<tr>
<td>Organizational skills</td>
<td>6</td>
<td>Skills for planning, organizing and executing a transport chain considering cost implications of the transport (fuel, labour, insurance, etc.) to prepare a quotation for the customer</td>
<td>X</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>5</td>
<td>Apprentice learns how to promote goodwill, trust and confidence; responding to customer expectations</td>
<td>X</td>
</tr>
<tr>
<td>Integral way of thinking</td>
<td>4</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Empathy</td>
<td>3</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Creativity</td>
<td>2</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Ability to work in a team</td>
<td>1</td>
<td>sensitized for the importance of teamwork</td>
<td>X</td>
</tr>
<tr>
<td><strong>Total scores acquired:</strong></td>
<td></td>
<td></td>
<td><strong>54</strong></td>
</tr>
</tbody>
</table>

**Sources:** *Skills for Logistics (2003: no page numbers)*

Source: Own illustration (2005).
4.6. Sweden

4.6.1. Presentation of the education system

In Sweden, the main responsibility for education has the Government and the parliament whose task is setting an all-level-comprehensive (basic, secondary and adult education level) framework for education. The individual municipalities then are responsible for providing and running the schools and the implementation of the framework. Responsible for providing and operating tertiary education are the several universities, called ‘universitet’ and university colleges, called ‘högskola’. The Swedish universities and university colleges have an extensive autonomy. Prerequisites for access to the tertiary education are either a school-leaving certificate from an upper secondary national programme or work experience (at least four years). The National Agency for Education is in charge of monitoring, evaluating and supervising the preschools, schools and adult education. The National Agency for Higher Education does the same in tertiary sector and additionally is in charge for the provision of information to students and for international contacts.

Compulsory full-time education (primary and lower secondary education) takes place in the so-called ‘grundskola’ (from the age of six or seven to the age of fifteen or sixteen). A school-leaving certificate of the ‘grundskola’ authorizes students to apply for upper secondary education (‘gymnasieskola’, from the age of sixteen to nineteen). The ‘gymnasieskola’ offer seventeen study programmes and fourteen of them are vocationally oriented. Like in Denmark and Germany, Sweden has a vocational education with a dual structure (three-year apprenticeship) only for some educations where companies work together with municipal schools to provide an apprenticeship. A number of

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211 Appendix 21 provides an overview of the Swedish education system.


213 Although the author did not find any vocational training in the logistics industry.
universities offer a combination of academic studies and practical training in companies.\textsuperscript{214}

In Sweden there are no special institutions for guidance what occupation to choose. The responsibility for all educational and vocational guidance before choosing from the numerous options how to continue the educational route have the Swedish schools. Concerning vocational training, the governmental bill ‘Knowledge and quality – eleven steps for improving upper secondary school’ direct amongst others at the quality of upper secondary vocational programmes and basic vocational programmes. The quality should be improved by providing a better link to working life for instance. Overall objective is the improvement of upper secondary school so that more pupils acquire the knowledge and skills they need for working life. An institution called Labour Market Board takes care of unemployed adults who need retraining or further vocational training and education for the labour market.\textsuperscript{215}


\textsuperscript{215} Eurydice.org/Sweden.
4.6.2. Analysis of the vocational education

Job title:
Upper Secondary School: Business and Administration Programme

Job description (subject matter of education):
The Business and Administration Programme is one of 17 programmes that can be chosen for Upper Secondary School. Each programme is diversified by several branches of study during the second and the third year. Eight core subjects (Swedish, English, civics, religious studies, mathematics, natural science, physical education and health, artistic activities) are identical in every programme and comprise 750 credits. On this basis, programme-specific subjects make up additional 1450 credits and individual options 300 credits.216

The Business and Administration programme prepares pupils for working in the service sector. Knowledge of economics, administration and service enables them to plan, analyze and perform working tasks related to commerce and production of services. Marketing, communication with customers, law and environmental aspects are part of the syllabus as well as using information technology. The Programme has two national branches of study: “Commerce and service” and “Tourism and travel services”.217

Duration of training:
3 years

Responsible institutions for education:
Upper Secondary Schools monitored by the National Agency for Education (Skolverket)

216 Cp. Skolverket.se.

Requirements of education:
School leaving certificate after 9th grade

Particularities:
Until 1991, the Upper Secondary School in Sweden comprised over 500 specialised programmes to choose from. The school reform reduced the number to 17, hence they provide a form of education which is rather generalised than specialised. Students must be younger than 20 to take part in one of these programmes. 15 weeks of workplace training are included in the programme.218

Table 13: Analysis of the Business and Administration Programme.

<table>
<thead>
<tr>
<th>Competences required for becoming a FI</th>
<th>Scores to allocate</th>
<th>Description of the trained competences in this occupation</th>
<th>Criteria fulfilled: Yes: X No: --</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental consciousness</td>
<td>12</td>
<td>Sustainable ecological development, efficient use of resources and energy</td>
<td>X</td>
</tr>
<tr>
<td>Problem-solving competence</td>
<td>11</td>
<td>Problem-solving competence in the field of business administration</td>
<td>-- (insufficient training about logistics)</td>
</tr>
<tr>
<td>Advisory competence</td>
<td>10</td>
<td>Personal sales, marketing</td>
<td>X</td>
</tr>
<tr>
<td>Functional competence</td>
<td>9</td>
<td>General administration</td>
<td>-- (insufficient training about logistics)</td>
</tr>
<tr>
<td>Learning ability</td>
<td>8</td>
<td>Learning ability is trained by high theoretical parts of education</td>
<td>X</td>
</tr>
<tr>
<td>Europe competence</td>
<td>7</td>
<td>Speak fluent English; knowledge of different cultural patterns</td>
<td>X</td>
</tr>
<tr>
<td>Organizational skills</td>
<td>6</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>5</td>
<td>Service-oriented way of thinking, marketing</td>
<td>X</td>
</tr>
</tbody>
</table>

218 Cp. Skolverket.se.
| Competences required for becoming a FI | Scores to allocate | Description of the trained competences in this occupation | Criteria fulfilled:  
| Yes:     X   | No:      -- |
| Integral way of thinking | 4 | Understanding of running a company; administrative routines | -- (insufficient) |
| Empathy | 3 | Communicate well with others | X |
| Creativity | 2 | - | -- |
| Ability to work in a team | 1 | Programme includes 15 weeks of workplace training | X |
| Total scores acquired: | 46 |

Sources: National Agency for Education (2001: 18) and Senrp.se.
Source: Own illustration (2005).
**Job title:**
Upper Secondary School: Vehicle Programme

**Job description (subject matter of education):**
The Vehicle Programme is one of 17 programmes that can be chosen for Upper Secondary School.
It deals with service and maintenance of vehicles and aircraft as well as transport by vehicles, providing basic knowledge to carry out tasks in this area, including design, safety, electronics and computer technology, recycling, sustainability and language skills. The programme offers five national branches of study: aircraft, coach work, machines and lorries, cars and transport. Pupils deciding for the latter are trained in logistics, distribution, air freight, harbour and terminal work, international freight transportation, vehicle combinations and environmental transport.²¹⁹

**Duration of training:**
3 years

**Responsible institutions for education:**
Upper Secondary Schools monitored by the National Agency for Education (Skolverket)

**Requirements of education:**
School leaving certificate after 9th grade

**Particularities:**
15 weeks of workplace training are included in the programme.

Table 14: Analysis of the Vehicle Programme.

<table>
<thead>
<tr>
<th>Competences required for becoming a FI</th>
<th>Scores to allocate</th>
<th>Description of the trained competences in this occupation</th>
<th>Criteria fulfilled:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yes: X No: --</td>
</tr>
<tr>
<td>Environmental consciousness</td>
<td>12</td>
<td>Sustainable ecological development; efficient use of resources and energy</td>
<td>X</td>
</tr>
<tr>
<td>Problem-solving competence</td>
<td>11</td>
<td>Planning of logistical processes, adapting techniques and working methods in the vocational area</td>
<td>X</td>
</tr>
<tr>
<td>Advisory competence</td>
<td>10</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Functional competence</td>
<td>9</td>
<td>For example knowledge of logistics, distribution, freight transportation, harbour work(^{220})</td>
<td>X</td>
</tr>
<tr>
<td>Learning ability</td>
<td>8</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Europe competence</td>
<td>7</td>
<td>Speak fluent English; knowledge of different cultural patterns</td>
<td>X</td>
</tr>
<tr>
<td>Organizational skills</td>
<td>6</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>5</td>
<td>Service-oriented attitude and approach to customers</td>
<td>X</td>
</tr>
<tr>
<td>Integral way of thinking</td>
<td>4</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Empathy</td>
<td>3</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Creativity</td>
<td>2</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Ability to work in a team</td>
<td>1</td>
<td>Programme includes 15 weeks of workplace training</td>
<td>X</td>
</tr>
<tr>
<td><strong>Total scores acquired:</strong></td>
<td></td>
<td><strong>45</strong></td>
<td></td>
</tr>
</tbody>
</table>

Sources: National Agency for Education (2001: 16) and Senrp.se.

Source: Own illustration (2005).

\(^{220}\) By choosing the transport branch.
5. Summary of the research results and deduction of recommended action for decision makers for competence development

5.1. Summary of the research results of the Utility Analysis and comments on the education systems

During the researches in the fields of the different education systems in general, the author was confronted with a flood of more or less relevant information and the author regards it critical that much information about the education systems is only available in the respective national language. The homepage of the Eurydice project, providing the reader with an overview of the various education systems and news about current developments regarding these, turned out to be a positive example.\(^{221}\) Nevertheless, the author confirms the statement of Rauner that the establishment of an international (EU-founded) project concerned with comparison studies of the strengths and weaknesses of the education systems would be very sensible.\(^{222}\) Regarding the search for vocational trainings in the logistics industry, it was difficult to get sufficient information about contents/the curricula of training due to a lack of sources of information in some countries. Thus, it is crucial to mention that the allocation of points in chapter 4 highly depends on the interpretation of the author. Therefore, the attempt to compare the different vocational trainings in the logistics industry regarding their contents is a bold venture and cannot be carried out in a satisfactory way as long as there are so many differences between the individual countries. The author fully appreciates the wish for uniform vocational training systems and sees the necessity to enable apprentices to serve parts of their education abroad due to

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\(^{221}\) The homepage of the Danish Ministry of Science, Technology and Innovation (Workindenmark.dk) providing the reader with information about the Danish education system in general has to be praised for clarity and availability in English, too.

\(^{222}\) Rauner (2005: 86).
the grown together Europe and the increasing meaning of the so-called Europe competence (not only for Freight Integrators). Since the reform in 2004 the German education freight forwarding and logistics services clerk is a good example for developing this competence. According to the results of the Utility Analysis, this education can be regarded as best one for providing apprentices with necessary competences for Freight Integrators.

So at this point of the paper, the sixth step of the Utility Analysis will be carried out: Selection of an alternative. The following table shows the results of the Utility Analysis and the vocational education with the highest score is the Freight forwarding and logistics services clerk. Providing the apprentice with the “integral way of thinking”-competence is the only missing subject in this education.223

Table 15: Overview of the results of the Utility Analysis.

<table>
<thead>
<tr>
<th>Country</th>
<th>Vocational education</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>Mechanical engineering, transport and logistics</td>
<td>42</td>
</tr>
<tr>
<td>Germany</td>
<td>Freight forwarding and logistics services clerk</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>Sea merchant – liner shipping</td>
<td>65</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Technical administrative employee</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Forwarding planner</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Manager for port, transport and logistics</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Shipping agent</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Transport manager</td>
<td>35</td>
</tr>
<tr>
<td>Norway</td>
<td>General and business studies</td>
<td>24</td>
</tr>
<tr>
<td>Scotland/Great Britain</td>
<td>Traffic Office NVQ/SVQ</td>
<td>54</td>
</tr>
<tr>
<td>Sweden</td>
<td>Business and Administration Programme</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Vehicle Programme</td>
<td>45</td>
</tr>
</tbody>
</table>

Source: Own illustration (2005).

223 This competence can be trained by helping the trainee to develop powers of imagination for the complexity of a problem. Cp. Heyse and Erpenbeck (2004: 96).
The results of the Utility Analysis unveil a very interesting fact: German trainings attained very high scores. Hence, it may be valuable to take a closer look at the vocational education system – the Dual System (also existing in Denmark and the Netherlands) that was explained briefly in chapter 4 in comparison to the other systems.

Summarizing the information gathered during the research process, it can be noticed that the vocational education in the NSR happens either in form of the Dual System or in form of full-time school education with more or less big parts of practical training.\textsuperscript{224} \textsuperscript{225}

The insight of the results led the author to a discussion that stirs the emotions of the Europeans in 2005: the ongoing reforms of the education systems in Europe and the agreement of the European Ministers of Education in 2002. This agreement means that the British modular vocational education system should serve as a model for reforms of the vocational education systems all over the European Union.

The objective of this agreement (in 2006 the modular system is planned to be implemented European-wide) is to make competences internationally comparable due to the assumption that narrow modules providing only few skills (skills are developed directly on-the-job without in-school parts) are easier to compare and regarded as more flexible than a three-year-education providing many skills. The advantages and disadvantages of the British system are described in chapter 4. The disadvantage of a too intense specialization is regarded as very critical as it might lead to a narrow competence to act

\textsuperscript{224} Bontrup and Pulte (2001: 72) arrive at the same conclusion.
\textsuperscript{225} According to research results of the European Commission there are about 25 different education systems and there is an urgent need for developing a European-wide uniform education system: “The largest single market in the world will never become the basis for the most competitive knowledge-based society if serious further efforts are not made to remove incompatibilities and incoherence between what, following enlargement, are 25 different education and training systems, where qualifications and skills are not recognised across borders and where methodological excellence in one country remains unknown in others. The necessary complement to the single market and the common currency is a workforce empowered to make use of professional and geographical mobility. What is needed is a coherent strategy, whereby Member States learn from each other.” EC (2004b: 8).
responsibly on-the-job. However, it is considered that a three-year-education has some decisive advantages compared to the eight steps encompassing British modular system. For example, one advantage is that new developments and innovations could be implemented during the in-company training periods.226

But there are also some critical voices arguing that the Dual System produces only semi-skilled workers. An education system must provide incentives for lifelong learning. Hence the Dual System is a good base but must undergo further reforms.227 228

Due to this, the German Government amended the Vocational Training Act on the 27th of January 2005. The main objectives of this reform are for example securing international competitiveness as well as enhancing and intensifying the cooperation between companies and vocational schools. “To achieve these objectives organizational benchmarks are bound to undergo fundamental…changes as it is intended in the new Vocational Training Act (Berufsbildungsreformgesetz)…”229 One issue for example is the “internationalization of the vocational education and training by providing opportunities for apprentices to undergo part of their vocational training abroad…”230


228 „One of the most interesting issues, in the national German context is the challenge to redefine the borders between initial training and further training (or lifelong learning respectively)…” Emeraldinsight.com.

229 Emeraldinsight.com.

230 Emeraldinsight.com.
5.2. Deduction of recommended action

As mentioned in chapter 5.1, the freight forwarding and logistics services clerk is the education that provides an apprentice best with the competences needed to organize intermodal transport. Though the discussion of each single education systems showed that also a good training in the Dual System can just be conditionally denoted as best practice training. Sure, it offers a good base, but if the developed competences won’t be updated during the training in the manner of lifelong learning, the co-workers will quickly lose the connection of the actual happening. This applies for almost every occupation, but especially for a Freight Integrator, who has to affirm himself in the ever-changing logistics industry.231

The author suggests for a best practice manual for Freight Integrators, that the basic training should always be implemented based on the model of the Dual System of the freight forwarding and the logistics services clerk including advanced education for the co-workers in regular distances so that they can update their skills. Implementing this best practice manual, each single company would have to develop incentives which would facilitate and encourage the employees to take part in European-wide standard and government organised courses.

As the employees are hardly to spare, especially in the SMEs, the duration of the training shouldn’t be too long and the effort not to strengthened. It is important to mention that the employees can be easily deterred if they have to spare some free time and are not really released by the company. Theoretically the advanced training should be offered as e-learning. In this area, the above

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231 “Globalisation and the new knowledge-driven economy have brought about dramatic and rapid changes in the European labour market. European programmes can significantly contribute to this process, both by providing citizens with an opportunity to upgrade and acquire new skills through periods of study and training abroad, and by promoting quality and adaptation to the new requirements of education and training systems through a process of cooperation and exchange of good practice.” EC (2004a: 10).
mentioned REMARCC project rendered outstanding services and has developed an e-learning platform which is used by the students of the University of Applied Sciences Oldenburg Ostfriesland Wilhelmshaven. Though, the tested students of the University of Applied Sciences in Kiel wished that they would like to have a supervisor. So the author suggests Blended Learning (Blended Learning is a combination of e-learning and presence seminary), as it saves time and financial resources and updates the most important competences which were developed over several years during a training in the Dual System.

In the end it is to mention that the competence which is esteemed as the most important by the author – is environmental consciousness. Which kind of issues can be influenced by the environmental aware at the workplace, represents the following illustration.
**Illustration 9:** Conditions for environmentally friendly on-the-job behaviour.

- Personal attitude towards the job / motivation for the job
- Communication, information and feedback about the environmental management system in the company
- Possibility to take part in the environmental protection measures
- Controlling of meeting the commitments of the environmental management system in the company
- Education / Knowledge about the environment
- Guidelines / work orders
- Exemplary manner of superiors
- Incentives / reward
- Education / Knowledge about the environment
- Perceived environmental damage / Problem consciousness
- Environmental morals / Personal sense of duty
- Willingness to act responsibly
- Personal attitude towards the environment

6. Conclusion and future prospects

One objective of this paper was to explain the urgency for developing a uniform training for Freight Integrators. The future of the environment very much depends on the individual decisions of the relevant players, which in turn depend on their competences and environmental consciousness. A situation where only some countries provide their trainees with necessary competences for Freight Integrators is not satisfactory. A uniform training would have a substantial effect in favour of the environment and an exchange of trainees during their training supporting the sense of community in Europe would be easier.

The author also hopes that the reader gains a small insight into the different (vocational) education systems and is enabled to form his own opinion. Since European countries are “more or less willing to learn from each other in the context of contemporary vocational reform”\textsuperscript{232} it remains to be seen which direction a uniform vocational training system will head for – whether towards a Dual System or a modular system similar to Great Britain – but there is no doubt that there is a need for uniformity.

\textsuperscript{232} Emeraldinsight.com.
Appendices
Appendix 1: Differentiation between Transport, Traffic and Logistics.

Source: Ihde (2001: 3).
Appendix 2: External effects of traffic.

Appendix 3: Development of the modal split in the Scandinavian countries

the SUTRANET project.

Development of the modal split in goods traffic...

...in Denmark

...in Norway

...in Sweden

1995 2005

Appendix 4: Article 12a TEN-T.

Article 12a: Motorways of the Sea

1. The Transeuropean Network of Motorways of the Sea shall aim to concentrate flows of freight on sea-based logistical routes in such a way as to improve existing maritime links or to establish new viable, regular and frequent maritime links for the transport of goods between Member States so as to reduce road congestion and/or improve access to peripheral and island regions and States. Motorways of the sea should not exclude the combined transport of persons and goods, when freight is predominant.

2. The Transeuropean Network of Motorways of the Sea shall consist of facilities and infrastructure concerning at least two ports in two different Member States. These facilities and infrastructure shall include elements, in at least one Member State, such as the port facilities, electronic logistics management systems, safety and security and administrative and customs procedures, as well as infrastructure for direct land and sea access, including ways of ensuring year-round navigability, in particular the availability of facilities for dredging and icebreakers for winter access.

3. Waterways or canals, as identified in Annex I, which link two European Motorways of the Sea, or two sections thereof, and make a substantial contribution to shortening sea routes, increasing efficiency and saving shipping time shall form part of the Transeuropean Network of Motorways of the Sea.

4. The projects of common interest of the Transeuropean Network of Motorways of the Sea shall be proposed by at least two Member States
and shall be geared to actual needs. The projects proposed shall in
general involve both the public and private sectors in accordance with
procedures which, before aid granted from the national budgets can be
supplemented, if necessary, by aid from the Community, provide for a
tendering process in one of the following forms:

a) A public call for tenders organized jointly by the Member States
concerned, intended to establish new links from the category A
port, as defined in Article 12(2), which they select in advance
within each sea area, as referred to in project No. 21 in Annex
III;

b) In so far as the location of the ports is comparable, a public call
for tenders organized jointly by the Member States concerned
and targeting consortia bringing together at least shipping
companies and ports located in one of the sea areas, as referred
to in project No. 21 in Annex III.
Appendix 5: Map of the Motorways of the Sea.

Source: Europa.eu/MOS.
Appendix 6: Contents of REMARCC’s e-learning modules.

Source: REMARCC (2005: 3).
Appendix 7: The SUTRANET partners.

Aalborg University (AAU)
Department of Development and Planning
Fibigerstraede 11
DK – 9220 Aalborg
Denmark

FDT – Association of Danish Transport and Logistics Centres
Roerdalsvej 201
DK – 9220 Aalborg
Denmark

Institute of Shipping Economics and Logistics (ISL)
Universitätsallee GW I Block A
DE – 28359 Bremen
Germany

Institute of Transport Economics TOI
Postboks 6110 Etterstad,
Grensvingen 7
N – 6110 Oslo
Norway

SINTEF Civil and Environmental Engineering
Department of Roads and Transport
Klaebuveien 153
NO – 7465 Trondheim
Norway

Moreforskning Molde
Britveien 4
NO – 6411 Molde
Norway

IVL Swedish Environmental Research Institute Ltd.
Aschebergsgatan 44
PO Box 5302
SE – 40014 Gothenburg
Sweden

Napier University
Transport Research Institute
Redwood House, 66 Spylaw Road
EH10 5BR – Edinburgh
Scotland, UK

Erasmus University Rotterdam
Postbox 1738
2000 DR Rotterdam
The Netherlands

University of Applied Sciences Kiel
(Fachhochschule Kiel)
Faculty of Business Management
Sokratesplatz 2
24149 Kiel
Germany
Appendix 8: Map of the Motorways of the North Sea.

Source: Sutranet.org.
**Appendix 9:** Transport and its linkages to the sustainability triangle.

Appendix 10: Key competences.

**Self-confidence**
- Self-confidence
- Self-criticism
- Self-motivation
- Dynamics
- Independence

**Intellectual and cognitive skills**
- Integral thinking
- Analytic thinking
- Crosslinked thinking

**Creativity**
- Ideas
- Fantasy
- Enthusiasm

**Ability to handle stress**
- Perseverance
- Stamina
- Frustration tolerance
- Act in exceptional circumstances
- Willingness to work

**Intention to succeed**
- Persistence
- Working manner

**Sense of responsibility**
- Sensitivity
- Tolerance

**Ability to motivate oneself**
- Willingness to take risks
- Willingness to react
- Willingness to learn

**Intrapersonnel factors**

**Own responsibility**
- Integral personality development
- Emotional stability
- Common sense

**Flexibility**
- Initiative

**Interrpersonnel factors**

**Ability to lead**
- Integrating ability
- Implementation

**Communication**
- Ability to communicate
- Open communication
- Persuasive power
- Negotiating skills
- Presentation & speech technique

**Social interaction**
- Treat clients with kindness
- Self-confident appearance

**Conflict management**
- Ability to be critical
- Role-competence

**Sociability**
- Cooperativeness
- Openness

**Empathy**
- Generosity
- Humane oriented

**Intercultural competences**
- Foreign languages
- Interfunctional competences

**Ability to work in teams**
- Co-operation teams
- Social interaction with colleagues
- Co-operation
- Co-operative management style

**Job specific factors**

**Behaviour**
- Outcome orientated
- Goal orientated
- Entrepreneurial behaviour

**Performance orientated**
- Effectiveness

**Specialized knowledge**
- Management
- Business Management
- Administration

**Thinking**
- Entrepreneurial thinking
- Systematic thinking
- Competence to solve problems

**Commitment**
- Professional attitude
- Identification

**Innovative capability**

Appendix 11: Utility Analysis.

1. Identification of the problem or opportunity – set objectives

2. Identification of decision criteria

3. Allocation of weights to criteria

4. Development / identification of alternatives

5. Analysis of the alternatives

6. Comparison and selection of an alternative

7. Implementation of the chosen alternative
   Evaluation of decision effectiveness

Source: Own illustration according to Coulter and Robbins (2002: 151).
Appendix 12: Explanation of the decision-making process.

Step 1: Identification of the problem or opportunity – set objectives
The starting point of decision-making is a problem. The first step for the decision maker is to become aware of it: The current situation has to be compared with the desired state of affairs, a discrepancy between the two indicates the existence of a problem. If the different alternative solutions include non-monetary or qualitative characteristics, the Utility Analysis can be used. It is recommendable to define the problem including the problem-describing data and to distinguish relevant aspects from irrelevant information.

Step 2: Identification of decision criteria
In this step it is necessary to identify and define the factors – decision criteria – that are relevant to the problem. Until these criteria are not set, a well-founded decision between two or more options is not possible.

Step 3: Allocation of weights to the criteria
The significance of the decision criteria in relation to each other has to be determined. Since not all of the criteria identified in step two are equally significant the decision-making process has to represent it in some way. This is done by assigning weights to the items according to their relative importance.

233 A problem is defined as a “gap between an existing and desired state of affairs”. Coulter and Robbins (2002: 150 ff.).


235 Due to the KISS principle (keep it short/small and sweet/simple), the “Institut für Landesplanung und Raumforschung” at the University of Hanover recommends not to examine too much criteria. Cp. Uni-Hannover.de and Lucas (2005: 400).

For instance, the most important criterion gets a weight of ten and the other factors are assigned suitably less.237

Step 4: Development/identification of alternatives
Precondition for using this analysis is the availability of alternatives. The task in this step is to identify these alternative solutions to the problem defined. A development of alternatives themselves may be needed if the problem is very complex. Objective of the Utility Analysis is the relative assessment of these alternatives.238

Step 5: Analysis of the alternatives
In this step the degree of performance of any alternative has to be determined. Accordingly the decision maker must critically analyse each alternative. This is usually done by evaluating to which degree each alternative serves each decision criterion. For example, if an alternative measures up to a decision criterion completely, on a scale from one to five, it gets five points.239 If an alternative serves a criterion insufficiently, the alternative may receive a score of only three points. Differences in the degree of performance are measurable. This is called cardinal scaling. Ordinal scaling puts the decision criteria into a ranking. If ordinal scaling is used differences in the degree of performance are not measurable. The decision criterion of the alternative with the highest degree of performance would get maximum points and the criterion with the next highest degree of performance would get one point less and so on.
Another possible procedure is nominal scaling. Using this procedure the decision maker has to make a yes-or-no decision. If an alternative measures up the decision criterion it is a yes-decision (degree of performance = 1), if not it

is a no-decision (degree of performance = 0). This is seen as the most suitable method if the decision maker is not really sure about the degree of performance of the decision criterion, but only if an alternative contains the criterion or not.\textsuperscript{240} \textsuperscript{241} Afterwards the degrees of performance must be multiplied by the weights assigned to each criterion in step four. The sum total of these scores represents the total utility\textsuperscript{242} of an alternative solution.

For determining the total utility, the following formula\textsuperscript{243} has to be used:

\[
U = \sum_{k=1}^{K} w_k \cdot p_k
\]

U: total utility  
K: number of criteria  
w: weight  
p: degree of performance

Step 6: Comparison and selection of an alternative

After calculating the total utility the decision maker has to compare the alternatives. The result represents the relative utility of the ratio from one another. To choose the best alternative, the one with the highest total utility has to be selected. Because the higher the total utility the better the effectiveness of the solution.\textsuperscript{244}

\textsuperscript{240} The author considers the nominal scaling as the best proceeding for the following investigation because the intensity of each competence developed in a training programme in the NSR cannot be defined clearly.


\textsuperscript{242} The total utility is explained as the numerical expression of a subjective value of an alternative considering the attainment of preset objectives. Offert and Rahn (2001: 671).


Step 7: Implementation of the chosen alternative

(evaluation of decision effectiveness)

After the selection process is completed in the previous step the result has to be interpreted, unreliabilities of assessment and margins of error need to be considered. Then the chosen alternative must be implemented. Due to the fact that in most cases implementation depends on wide acceptance of persons affected, suitable measures should be taken to get this acceptance. It is considered as valuable to involve these persons in the decision-making process and the implementation of the solution or reform. Afterwards, a retrospective view enables the decision maker to see whether the chosen alternative resolved the problem in the expected way. During this evaluation process deviations must be recorded and sometimes the decision needs to be reconsidered.

Criticism of the Utility Analysis

In many cases the Utility Analysis does not provide the decision maker with objective results but it helps systemize the dimensions of a problem. That is because most procedures in this method involve personal judgements – the selection of criteria in step two for instance. People tend to vary in the criteria they wish to include. And the assigned weights for each criterion reflect personal preferences. Also assessments of the degree of performance can only be done objectively in few cases. They often depend on personal judgement. This subjective way of proceeding explains why two or more decision makers may consider totally different decision criteria and/or alternatives. The result reflects the system of values of the decision maker.\(^{245}\)

In order to put more objectiveness to the solution, different views of different persons, expert’s or research reports should be taken into consideration.

## Appendix 13: Decision-making process for buying a notebook.

<table>
<thead>
<tr>
<th>1</th>
<th>Identification of the problem or opportunity – set objectives</th>
<th>Sales representatives need new computers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Identification of decision criteria</td>
<td>- Price</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Weight</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Warranties</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Reliability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Screen size</td>
</tr>
<tr>
<td>3</td>
<td>Allocation of weights to criteria</td>
<td>Reliability 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weight 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Screen size 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Price 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Warranties 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Screen type 3</td>
</tr>
<tr>
<td>4</td>
<td>Development / identification of alternatives</td>
<td>Acer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Compaq</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gateway</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Micromedia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NEC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sony</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Toshiba</td>
</tr>
<tr>
<td>5</td>
<td>Analysis of the alternatives</td>
<td>Model</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reliability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Screen size</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Warranty</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weight</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Price</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Screen type</td>
</tr>
<tr>
<td></td>
<td>(Assessed values of notebook computer alternatives against decision criteria – to which degree fulfils an alternative a decision criterion)</td>
<td>Acer 80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Comp. 80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gateway 100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H-P 80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Micromedia 60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NEC 100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sony 20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Toshiba 40</td>
</tr>
<tr>
<td></td>
<td>(Assessed values multiplied by the weight of each criterion)</td>
<td>Model</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reliability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Screen size</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Warranty</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weight</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Screen type</td>
</tr>
<tr>
<td>6</td>
<td>Comparison and selection of an alternative</td>
<td>Selection of the alternative that reached the highest total score: Gateway</td>
</tr>
<tr>
<td>7</td>
<td>Implementation of the chosen alternative</td>
<td>&quot;Gateway!&quot;</td>
</tr>
<tr>
<td></td>
<td>(afterwards: Evaluation of decision effectiveness)</td>
<td>Appraising of the decision to check if the problem has been solved</td>
</tr>
</tbody>
</table>

Source: Own illustration according to Robbins an Coulter (2002: 150 ff.).
Appendix 14: Refused competence models.

### Competence Stairs

#### Presentation of the model:

![Competence Stairs Diagram]

Brief explanation of the model:

If a person learns something about symbols and adds syntax then this could be seen as data, if a meaning is added, this data present information and so on. The further a person climbs the steps the more competent a person is. At the highest level of the stairs “normative management competence”, a person has next to the knowledge how to do something and the intention to do it, the ability to judge the own acting and has a feeling for ethics and might even set standards for others. The higher a person climbs on the competence stairs, the more strategic management competence he or she gains.

#### Reason for refusal:

The author refused this competence model because the division of knowledge, abilities, skills and qualifications is too narrow for the general FI competences.

**Source:**

### Kienbaum Competence-Pyramid

#### Presentation of the model:

![Kienbaum Competence-Pyramid Diagram](image)

<table>
<thead>
<tr>
<th>Competence of acting responsibly on-the-job</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methodological expertise</td>
</tr>
<tr>
<td>Social competence/soft skills</td>
</tr>
<tr>
<td>Personal competence</td>
</tr>
<tr>
<td>Professional competence</td>
</tr>
</tbody>
</table>

#### Brief explanation of the model:

According to the Kienbaum Competence-Pyramid, competences are split up into five competence areas that found on each other. By this division of competences the definitions of the different classes are as follows:

- **Competence of acting responsibly on-the-job**: Describes the skills needed to convert knowledge to practical work (like the ability to transfer theoretical knowledge).
- **Personal competence**: Personal characteristics like moral concepts and ability to motivate oneself.
- **Methodological expertise**: Describes specialist knowledge, work methodologies etc.
- **Social competence**: Ability to work in a team, intercultural competence etc.
- **Professional competence**: Theoretical knowledge and experiences.

#### Reason for refusal:

The author refused this competence model because the division of the broad FI competences into five fields of competences is difficult and overlappings at social and personal competences may cause confusion.

#### Sources:

Appendix 15: Overview of the education system in Denmark.

Source: Eurydice.org/Denmark.
Organisation of the education system in Germany, 2002/03

Source: Eurydice.org/Germany.
Appendix 17: Overview of the education system in Great Britain.

Organisation of the education system in England, Wales, Northern Ireland 2003/04

Source: Eurydice.org/GreatBritain.
Appendix 18: Overview of the education system in Scotland.

Organisation of the education system in Scotland, 2002/03

Source: Eurydice.org/Scotland.
Appendix 19: Overview of the education system in the Netherlands.
Appendix 20: Overview of the education system in Norway.

Source: Eurydice.org/Norway.
Appendix 21: Overview of the education system in Sweden.

Organisation of the education system in Sweden, 2003/04

Source: Eurydice.org/Sweden.
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