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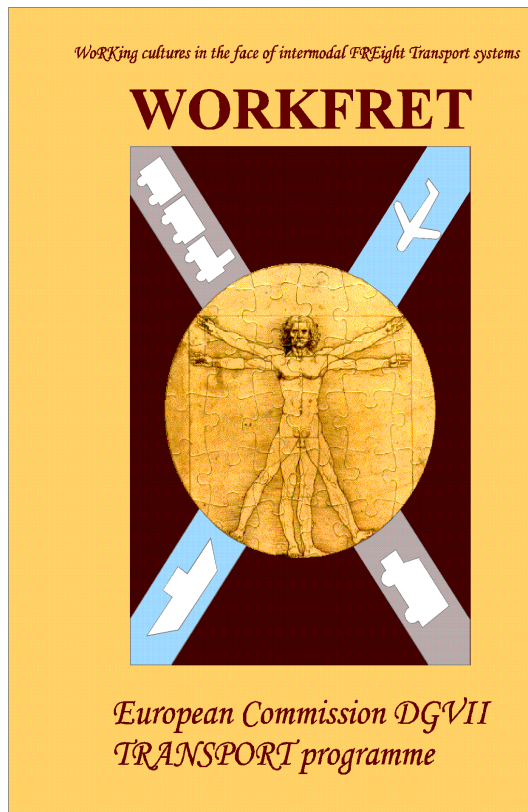
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Working cultures in the face of
intermodal freight transport systems

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Preface

Work organisation in intermodal freight transport systems realises a fast transition process influenced by the introduction of new technologies in the whole transport sector, as well as by new developments in Logistics and production systems.

The identification of changes and their impacts on the “working cultures” and organisational structures, together with a definition of a set of policy suggestions in order to utilise resulting strengths and avoid threats, constitute the main aim of the WORKFRET project.

The WORKFRET project was financed 100% by the European Commission as part of the Fourth Framework programme, EU – DG VII Transport RTD Programme, Strategic Sector. This project was an idea first resulted during a seminar organised by Hans Boeckler Stiftung in Brussels in 1996 aiming to bring together Research Institutes and Trade Unions to co-operate, in view of the 4th Framework Programme.

Selecting “the essential information” and “main conclusions” from a work presented in 16 volumes (deliverables) is not an easy task. Moreover will unavoidably have sort of personal bias towards what the editor considers as important. This bias has been reduced by the active participation of all the WORKFRET Consortium members with whom we enjoyed a two years work, exchange of ideas, discussions, with sometimes harsh arguments, which though brought us closer, not necessarily always sharing the same opinion, but for sure with a better understanding of each other, sharing finally a wider “common view”.

The knowledge base created constitutes a wealth of ideas, which can be utilised in many ways. We do not see the stated conclusions and suggestions as an only one – dimension way to interpret results. On the contrary, we would like to see also other interpretations and suggestions on our results and observations.

For further information the interested reader can refer to the WORKFRET WWW site: <http://hermes.civil.auth.gr/wf/wf.html> where all public deliverables can be downloaded as PDF files.

This project would not have been realised without the encouragement and assistance of numerous people from Trade Unions and employers’ organisations who participated in various events, interviews, discussion forums. We are grateful to all of them and also we are grateful for the assistance and co-operation of the DG VII staff, especially our project officers Mr Keith Keen and Mrs Maria Alfayate for their active participation in this effort.

Thessaloniki, May 2000

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Abstract

The main objectives of the WORKFRET project were to analyse existing working cultures and organisational/ managerial structures characteristics in European freight transport systems, examine implications of the integration of new technologies, new logistics and production systems, apply technology assessment tools and suggest policy measures to establish desirable, effective and efficient anthropocentric systems in the freight transport sector.

The term “*working cultures*” (as defined by the WORKFRET Consortium) refers to employee level and includes five main elements with further subdivisions: *Labour force, Work organisation, Working environment, Employment conditions, Labour relations*. A review of published data as well as questionnaire surveys have been performed to identify state-of-the-art knowledge about working cultures in freight transport systems.

An identification of new technologies and new logistics and production systems under introduction in freight transport systems as well as an overview of their impacts on working cultures has taken place by means of a literature review and expert consultation via appropriate Delphi studies. Results have shown that the attitudes, concerning future developments, differ in certain cases considerably between the different groups of actors, which results in a conflict potential especially between social partners who took the extreme positions for many of the issues presented to them in the Delphi questionnaire. *This suggests the necessity of an intensive social dialogue at a European level as the points of view differed clearly between the groups of actors.*

WORKFRET considered at case study level (in six countries), a number of specific developments (technological innovations or organisational restructuring) in order for the adaptation process to be analysed and for the implications on the working cultures to be identified. The case studies analysed were : *three intermodal facilities in the UK (Leeds, Wakefield, Doncaster), rail/road intermodal freight center of Bahntrans in Regensburg, Germany; the port of Rotterdam (two Multimodal transport centers and use of EDI in a cross-port logistics chain), the AGA case study in Finland, the port of Thessaloniki and the intermodal axis Thessaloniki-Sofia.*

A hierarchy of key issues has been derived applying a Delphi study among experts. Results derived from the hierarchy of key issues’ work and the individual case studies were utilised to synthesize *scenarios of future working cultures*.

The review of the impacts on the working cultures in freight transport, in combination with the hierarchy of the key issues as perceived by the various actors that have contributed to the WORKFRET project research activities, has led to the identification of twelve policy areas of particular importance: *Size of the labour force in freight transport, Working time, Payment, fringe benefits and social security, Education and training, Health and safety, Recruitment procedures, Organisational principles, Behavioural codes, Bargaining structures, Employee involvement and consultation, Labour regulations, Promotion of intermodal transport.*

Ten specific policy suggestions were also formulated that should be combined in order for solutions for each policy area to be promoted: *Mutually accepted dismissal policies, Reform of freight transport education and training systems, Establishment of a service to monitor shifts in labour force size, Working time directives, Payment systems, Collective bargaining, Incentive schemes, Local action networks, Human resources management, Job rotation schemes.* An appropriate strategy for intervention in each policy area should consist of a combination of a number of policy suggestions.

In any case, one of the main conclusions of this research effort is the identification of the need to conduct a social impact analysis whenever a major change in the operational or organisational framework of the freight transport industry takes place.

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1. Partnership

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2. Executive summary

The main objectives of the WORKFRET project were to analyse existing working cultures and organisational/ managerial structures characteristics in European freight transport systems, examine implications of the integration of new technologies, new logistics and production systems, apply technology assessment tools and suggest policy measures to establish desirable effective and efficient anthropocentric systems in the freight transport sector.

Working cultures and organisational / managerial structures in European freight transport

The term “*working cultures*” (as defined by the WORKFRET Consortium) refers to employee level and includes five main elements with further subdivisions: Labour force, work organisation, working environment, Employment conditions, Labour relations.

The term “*organisational / managerial structures*” refers to the employer level where the introduction of new technology may demand for appropriate adaptations of traditional structures to meet new requirements and exploit them in an efficient and effective way.

Intermodal transport is defined here as the movement of goods whereby at least two different modes are used in a door-to-door transport chain.

Main issues resulted from the WORKFRET review of published data and the questionnaire surveys performed are:

- The most important technological intermodal developments have been identified as vehicle and ship improvements, loading and unloading technology, information technology, logistics and the provision interchange facilities. All the interviewees agreed that these developments would improve efficiency and should increase the importance of rail, sea, inland waterways and intermodal transport.
- The other intermodal developments that were mentioned are related to policy changes. While deregulation and organisational changes, that promote free competition and efficiency, are not challenged, policy changes such as privatisation and changing the current pricing structure do meet resistance. Some interviewees, particularly trade unions, are not convinced that organisational improvements can be, or should be, attempted with a policy of privatisation. On altering the pricing structure, the current thinking is that road transport is too cheap, and by increasing the cost of this mode, intermodal transport will be promoted. Not surprisingly, the road transport sector takes a defensive position, while the other sectors support this change.
- The predominant view of employers in European freight transport from the Level A survey (but caution is needed because of the low response rate of the relevant WORKFRET survey) is that intermodal developments will have little or no social impact
- The main concerns of both employers and trade unions were about patterns of employment, training requirements, worker flexibility and working time. There were always more employers who said intermodal developments would have no impact on these issues than those that said they would have minor or major

impacts. In the Level B interviews, a number of issues were raised which have the potential for conflict between employers and employees.

- A central issue resulting also, is how much flexibility will be required of employees; an issue that can create conflict between employers and trade unions. Increases in flexibility can have negative effects for employees (e.g. create more temporary positions with low job security) or have positive ones (e.g. making jobs more interesting and giving workers more control over their working life).

New technologies under introduction in freight transport and their impacts

As new technologies, for the WORKFRET purposes are defined the ones that *have been recently implemented and / or are expected to be implemented to a larger extent in the near future and are also expected to have an impact in freight transport system.*

It should be stated that differences exist per mode of transport and per country in the introduction rate of both ICT and physical technologies. Also, not every country has adopted new technologies at the same rate. The new technologies, however, have a fairly homogeneous impact on the human factor. Not every “new technology-human factor relation” is identical in the various countries and modes of transport, but the following more or less general effects can be recapitulated.

- The size of the labour force is influenced by two opposite effects. First the introduction of new technologies, replacing existing labour, reduces the size of the labour force. As a result the efficiency of the sector is improving, which leads to an increased demand for transport services and an increase in the size of the labour force. The net effect is expected to be a decrease in the size of the labour force.
- A common development in transport organisations is a stronger monitoring of the people involved in transport. Improved communications and tracking & tracing technologies have enabled this. More integrated decisions are made at a central point (planning department), while the autonomy and the freedom of the driver, shipper and pilot decreases.
- The introduction of ICT is expected to result into a shift from low skill jobs towards high skill jobs. This can be achieved by upgrading the existing personnel (retraining) or by hiring new personnel, which is expected to be higher educated and computer literate.
- The traditional physical problems in the transport sector, caused by heavy physical work, have been reduced, as a result of the introduction of automated processes and the shift from outdoor work to indoor work. However, time-pressure and a constant strive for efficiency improvement, have created stress and other social or psychological problems. In conclusion it can be stated that a shift has taken place, from physical, to social or psychological problems.
- The above-mentioned time-pressure and efficiency improvement within the transport sector, have resulted in the need for a very flexible workforce. This means temporary jobs and flexible working hours.
- Union membership differs per mode of transport and per country. With the shift from low skill to higher skill jobs and with the shift from outdoor to indoor work (both as a result of new technologies), a general tendency is expected towards a diminishing share of union membership.

New logistics and production systems and their impacts.

An identification of new logistics and production systems as well as an overview of their impacts on working cultures has taken place by means of a literature review and expert consultation, and also a Delphi study. Main conclusions derived from this part of work are:

- The working culture will be significantly influenced by the new logistics and production systems. Changes will be seen for each of the five human factor elements: labour force, work organisation, working environment, employment conditions and labour relations.
- Most of the trends in logistics and production systems are found to be important to the companies represented among the interviewees. The development in the companies must be seen as a mix of activities, where no company is following or reacting to only one trend. The companies must act dynamically, and respond to the development. This is what can give them competitive advantage.
- It is also important to remember that it is not only the companies that must respond to the new trends and market requirements. It is equally important that the trade unions to respond to the new trends in order to look after the employees' interest.
- The support of four key factors must be a common objective to each employer and employee, in order to ensure a sustainable business. The key factors are : *reliability, integration, flexibility, cost reduction.*
- To create a sustainable and good working culture is a demanding challenge to all parties involved in the process. It is necessary to keep the most creative dialogue between employers, employees, their organisations and authorities, focusing on how to achieve reliability, integration, flexibility and cost reduction, and at the same time sustain a positive working culture, giving the best working conditions for the employees.

Hierarchy of key issues

Utilising the results of the previously mentioned activities the question of deriving key issues and also a *hierarchy of key issues* has been faced next. A Delphi study has been performed for this purpose, via an appropriately structured questionnaire (based on results of previous stages of this project), which has been mailed to experts. After processing the results, a workshop was organised to discuss them and conclude on hierarchies, potential conflicts, problems, impact on human work etc. Results have shown that the attitudes, concerning future developments, differ in certain cases considerably between the different groups of actors, which results in a conflict potential especially between social partners who took the extreme positions for many of the issues presented to them in the Delphi questionnaire. *This suggests the necessity of an intensive social dialogue at a European level as the points of view differed clearly between the groups of actors.*

The "top ten" key issues, which displayed both, a high conflict and a high problem potential, ranked in the sequence of decreasing problem potential are:

1. high time pressure in many enterprises in freight transport,
2. the necessity of more flexibility in working time and contractual status,
3. decrease of number of jobs per ton of transported goods, and increase of employment through growth of the freight transport sector,

4. a shift from collective bargaining on regional level to enterprise level,
5. a negative impact on employment by containerisation through rationalisation,
6. a negative impact of privatisation on contractual conditions,
7. the necessity of new qualifications and vocational training in the transport sector,
8. the risk of social isolation through IC technologies and computer work,
9. the change of professional profiles in the transport sector,
10. the necessity of more temporary work/contracts through flexibility requirements.

The WORKFRET case studies

WORKFRET considered at case study level, a number of specific developments (technological innovations or organisational restructuring), in order for the adaptation process to be analysed and for the implications on the working cultures to be identified. The following case studies have been analysed in WORKFRET:

Case study of three intermodal facilities in the UK (Leeds, Wakefield, Doncaster)

The rail / road intermodal case of freight center of Bahntrans in Regensburg study in Germany

The port of Rotterdam case study (two Multimodal transport Centers and use of EDI in a cross-port logistical chain).

The AGA case study in Finland

The port of Thessaloniki and the intermodal axis Thessaloniki – Sofia case study

Scenarios for future developments

Results derived from the hierarchy of key issues' work and the individual case studies were utilised to synthesize *scenarios of future working cultures*.

Two types of scenarios have been synthesised: "Vertical scenarios", based on the case studies and produced by Delphi methods, "Horizontal scenarios" formulated with a European view covering the European level at a more broad and general scope.

Besides the expert's input, a system model of a generic nodal point was formulated and analysed in order to obtain some recommendations on active parameters, which influence working cultures.

The following are some main conclusions resulted from the system analysis:

The system model further shows that especially the introduction of new technology and automation will have a big influence on working culture as well as new contractual and working time models. It has to be made sure by all actors that the impacts of such measures are assessed carefully in the individual case. That should be within the interest of a European policy, which is aware of the obligation to protect European citizens at European work sites. It should also be to the interest of the employees and their representatives and it should be to the interest of the employers as well. The management of change in those cases should include a "management of working culture".

It is remarkable that, at an enterprise or facility level, organisational factors seem to have lower impact than technological ones. This is apparently in contradiction to findings reported in earlier survey on working cultures, that organisational factors have a dominant impact. The difference can be explained by the

scope. Organisational changes at a facility level have lower impacts than structural organisational changes in an entire economic sector. The fact that the dominant impact of new technologies is observed at facility level suggests to perform technology assessment at that level. The level of autonomy of work and the degree of centralisation are the most influencing organisational factors at an enterprise level and should be therefore carefully considered by the management.

Main conclusions

- Even if the effect of the higher labour demand due to future traffic volume increases is taken into account, it is expected that developments in the freight transport sector will result in net losses considering the number of jobs in the industry. Regardless of the mode concerned, the impacts on the labour force are expected to be immense, limited number of opportunities are offset by a large number of threats.
- According to the various actors that have contributed to the WORKFRET research, the available EU legislation doesn't allow the support of intermodal developments and economic activity, while also ensuring acceptable employment conditions and safety. It is believed that the dual goal of keeping European transport companies competitive and protecting employees in the freight transport industry cannot be currently achieved.
- The role of employees in freight transport changes radically, especially due to the introduction of new technologies and, in most cases, personnel needs to be retrained, or new personnel, with relevant knowledge and skills, needs to be hired. New training programmes should be designed, preferably tailor made, on a company level.
- Regardless of transport mode, payment and benefits are seen as a key factor for the attraction of high quality employees to the freight transport sector. However, fair employment practices and equal opportunities are still necessary and the demand for linking rewards to quality improvements is becoming more intense.
- Due to the introduction of new systems in the organisation, the employee might find himself/ herself in more demanding situations, especially when there is a combination of increased productivity objectives and new required employee knowledge and skills. Excessive stress can lead to errors and accidents and, most importantly, will have a negative long-term effect on the employee's health
- The transitional phase in European freight transport has to be met by suitable recruitment procedures in order for the European integration to increase economic efficiency and create new opportunities. However, there are currently strong obstacles to recruitment (such as monopoly on recruitment services etc.), and national educational/ vocational systems are rather not prepared for such social changes.
- A more skilled and flexible workforce is essential to intermodal developments, which require both organisational and technological change. The management of this change process needs a positive attitude from all those involved and a team working culture. This can only be achieved if the workforce feels valued, has interesting work and is participating in the process.
- The expansion and restructuring of freight transport has been accompanied by the decline of national systems of collective bargaining. There is a need to review the current provisions for normal employment relations at different levels and consider how some degree of harmonisation between collective agreements can be achieved. Collective bargaining procedures at a European level should be harmonised, while the decentralisation of the relevant processes should be also achieved.

- By involving employees in the design & implementation phase and by periodically reviewing the results of the introduction of a new technology, an organisation might gain the user's acceptance and valuable input for further optimisation of the new technology.
- An overall improvement is needed in employment conditions if the changes in work organisation and working culture identified elsewhere are to be achieved. The current emphasis on long, unsocial hours and uncertain prospects in the industry is not conducive to attracting the best labour force. The non-homogeneity of the legal situations makes it difficult for the social partners to act legally correct in the still "grey" and uncertain zone of international activities in social partnership.
- The development of an intermodal transport system, with the emphasis on a modal shift to rail transport (and waterborne transport), is hindered by several problems. Rail transport is lagging the other modes of transport in terms of improvement of technology and logistical concepts; It is necessary to promote intermodality and sustainable transport in general and remove any barriers to change caused by impacts on working cultures.
- In general, freight transport has not shown signs of important differences with other industrial sectors in relation to impacts on the human element due to the introduction of new technologies. Apart from the issue of working time, which is a unique characteristic of freight transport's nature, all other issues of importance are also met in other sectors.

Policy suggestions

The review of the impacts on the working cultures in freight transport, in combination with the hierarchy of the key issues as perceived by the various actors that have contributed to the WORKFRET project research activities, has led to the identification of twelve policy areas of particular importance:

Size of the labour force in freight transport, Working time, Payment, fringe benefits and social security, Education and training, Health and safety, Recruitment procedures, Organisational principles, Behavioural codes, Bargaining structures, Employee involvement and consultation, Labour regulations, Promotion of intermodal transport

The twelve main policy recommendation areas coincide with the main problem areas that were identified as resulting from intermodal developments. Intervention in order to decrease the negative impacts of new technologies (or promote their positive impacts) in most cases requires an array of policy measures. As a result, research during the WORKFRET project concluded in the formulation of ten specific policy suggestions that should be combined in order for solutions for each policy area to be promoted:

Mutually accepted dismissal policies, Reform of freight transport education and training systems, Establishment of a service to monitor shifts in labour force size, Working time directives, Payment systems, Collective bargaining, Incentive schemes, Local action networks, Human resources management, Job rotation schemes

An appropriate strategy for intervention in each policy area should consist of a combination of a number of policy suggestions.

In any case, one of the main conclusions of this research effort is the identification of the need to conduct a social impact analysis whenever a major change in the operational or organisational framework of the freight transport industry takes place.

3. Project Objectives

The following were the main objectives of the WORKFRET project:

- To contribute to the development of efficient freight transport systems in Europe, taking into account the interests and requirements of the people who actually operate them.
- To identify the characteristics of existing working cultures in relation to the intermodal transport systems, interfaces between the various transport systems, potential problems and conflict areas, barriers of any kind.
- To identify organisational changes and barriers to change.
- To define systems' strengths and weaknesses, propose and evaluate alternative strategies for the exploitation of new opportunities, such as creation of new jobs and better working conditions.
- To propose measures for higher efficiency and enhanced safety in transport.
- To propose strategies and methodologies for the appropriate control and monitoring of the organisational and socio-economic changes under consideration.
- To propose policies at European Union, National, Trade Union level which will contribute to the creation of "desired structures" such as Anthropocentric systems.
- To disseminate the concepts developed and the results to all actors involved.

4. Means used to achieve the objectives and structure of this report

4.1. Means and techniques used

The project has followed a clearly specified workprogram, where ten partners from five EU and one PHARE country participated. The partnership included four consultancy companies, two Trade Union institutes and one Trade Union organisation.

In order to achieve the stated objectives the WORKFRET Consortium has used the following means and techniques : Literature Reviews and Questionnaire surveys for obtaining a state-of-the-art view whereas the Delphi technique and statistical analyses were used extensively to gain a further insight on issues identified. Scenarios were also formulated and evaluated during horizontal and vertical Delphi studies. In addition, a generic system model of an intermodal platform was elaborated, representing a generic freight center in combined transportation and was used to perform an impact analysis.

In the Scientific and Technical Description of the project part of this report, the general methodology followed in the project is described and next for each chapter the specific approach followed and techniques used are also explained.

4.2. Structure of this report

The aim of this report is to provide a comprehensive view of the process followed in the WORKFRET project, also main conclusions and suggestions resulted.

Since this report is addressed to the general public it should be written in an appropriate style and select certain parts of the work, presented in detail in the 16 deliverables, which should be of interest and provide essential information and stimuli to the reader.

This is not an easy task and one has to make certain choices and sometimes omissions that are essential to somebody else's view.

Most of the project deliverables are public, distributed for free and thus the interested reader can refer to them for further reading if we prove ourselves successful to attract his/her interest.

In the first chapter of the scientific and technical description of the project part, of this report, a description of the methodology followed and its main stages is presented.

In the second chapter an overview of existing working cultures and organisational managerial structures is provided. Basic definitions are given and statistical data from readily available sources such as Eurostat are utilised to create an overview picture of the existing situation allowing also some conclusions on macro-scale.

Also in the aforementioned chapter the main findings of a survey initiated by WORKFRET on European scale, on existing working cultures and organisational / managerial structures are presented. These results allow for a closer view of the situation than the one resulted from the processing of readily available statistical data.

In chapter 3 findings of a survey of new technologies under introduction in freight transport systems, in relation to the working cultures and organisational / managerial structures is presented.

Similarly in chapter 4, findings of a survey of new logistics and production systems in relation to the working cultures and organisational / managerial structures are presented.

The previous chapters provide an overview of the main issues, which concern WORKFRET on a European scale.

In chapter 5 a hierarchy of the key issues resulted in WORKFRET is presented following the application of appropriate techniques.

In chapter 6 the scenarios for future development in freight transport systems and their expected results on working cultures, are stated and commented.

In chapter 7 an overview of the case studies conducted is presented and also relevant summery descriptions are included in the Annexes of this report. Additionally, in the same chapter, the main conclusions resulted from WORKFRET are presented.

Finally in chapter 8, policy recommendations stemming from the overall work in WORKFRET and particularly from the case studies are presented.

In Annexes 1-5 the following case studies are presented in brief.

- The U.K case study of Freight terminals in Yorkshire
- The Bahntrans case study in Germany
- The port of Rotterdam case study
- The AGA case study
- The port of Thessaloniki and the intermodal axis Thessaloniki – Sofia case study

5. Scientific and technical Description of the Project

1. Description of methodology

The WORKFRET consortium has followed a clearly specified methodology in the project's technical Annex with a few modifications, which are rather common in a two-year project where some changes during the course of the work are necessary. The project's work content is explicitly described in relation to 11 main workpackages that are further split into 32 activities. Each workpackage has a workpackage leader and each activity an activity leader.

In what follows, three diagrams, explaining the content, relations and sequence of the main activities, present an outline of the methodology and the main stages followed. In principle, the methodology applied in WORKFRET follows two streams:

- From the “general” to the “specific(s)” i.e. from overviews and surveys to identify the specific issues of interest (from surveys to the case studies). During the initial stages of the project, extensive surveys explored the issues of working cultures, organisational/managerial structures, new technologies, new logistics and production systems, in freight transport, aiming to describe the situation and identify main issues at European and national level.
- From the “specific” to the “general” i.e. from observations and results derived from specific cases to generalisations, where appropriate (from case studies' results to generalisations).

In both streams expert consultation was extensively utilised by means of Delphi studies and workshops in order to analyse and refine the results.

In Figure 1.1 the process to derive *a description of working cultures and organisational/managerial structures* is described.

Initially a definition of working cultures and the main components constituting them (5 main, 20 partial) has been agreed upon, by the WORKFRET participants, and a questionnaire has been synthesised as a result of a workshop held for this purpose.

In parallel, a network of key users was identified and established. These users were informed about the project's progress and also provided their advice-input where necessary.

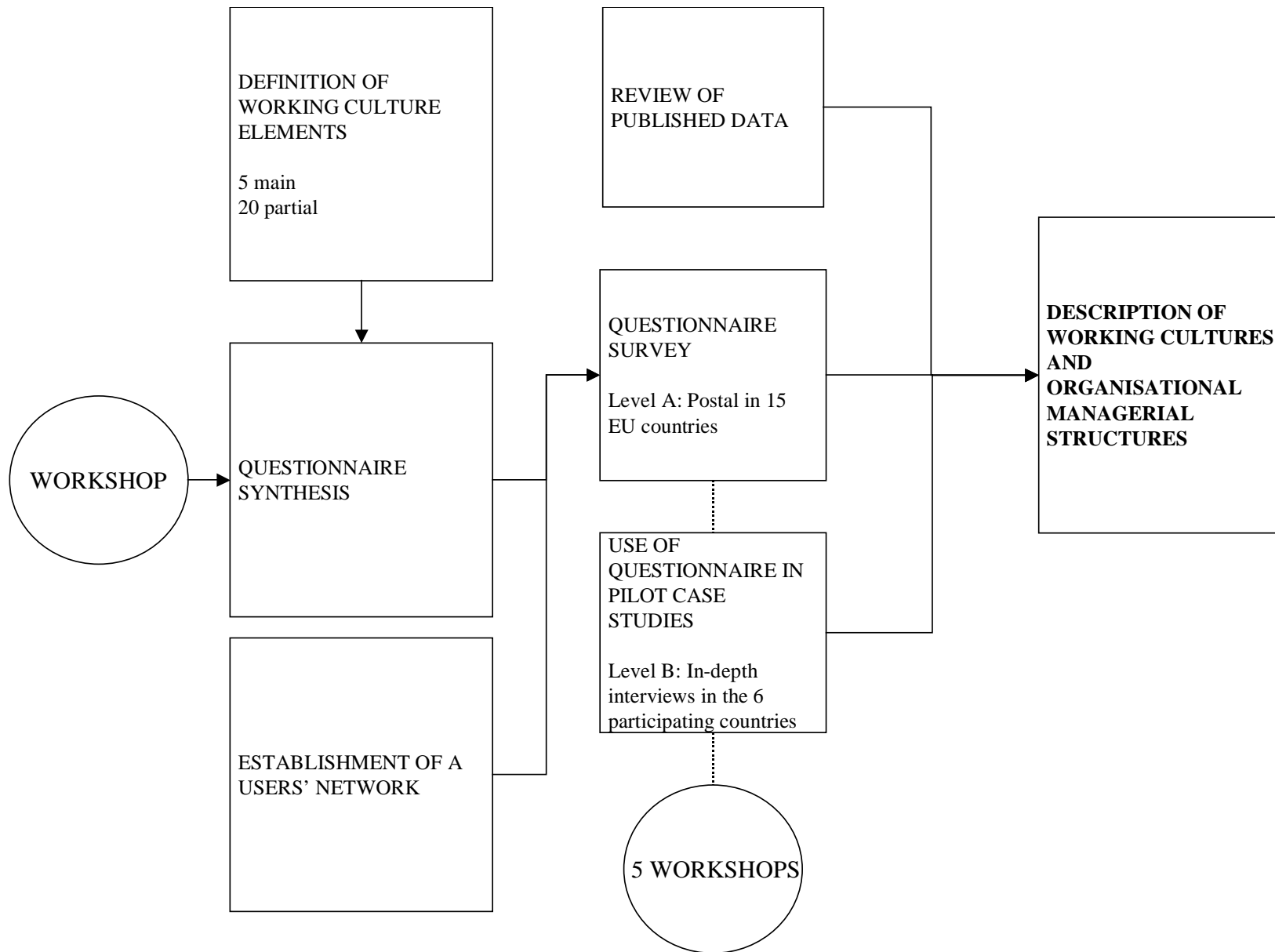
A review of published data has been performed to identify relevant information and state of the art knowledge about working cultures in freight transport, relevant organisational and managerial structures.

The questionnaire synthesised earlier was used as a basis in a postal questionnaire survey (level A) that took place in 15 EU countries.

In addition, the same questionnaire was used as a basis in further in-depth interviews in the 6 participating countries (level B), where in addition 5 related workshops were organised on local level.

The results of the above course of work are summarised in chapter 2.

Figure 1.1 Diagrammatic Outline of the WORKFRET Project



In Figure 1.2 another stream of actions is described. Part of these actions proceeded in parallel with those of Figure 1.1.

Initially an identification of *new technologies under introduction in freight transport systems* as well as an *overview of their impacts on working cultures* has taken place by means of a literature review and expert consultation, via an appropriate Delphi study. The results derived are presented here, in chapter 3.

In parallel an identification of *New Logistics and Production systems* as well as an *overview of their impacts on working cultures* has taken place by means of a literature review, expert consultation and a Delphi study. The results derived are presented here in chapter 4.

Utilising the results of the previously mentioned activities the question of deriving key issues and also a *hierarchy of key issues* has been faced next. A Delphi study has been performed for this purpose, where an appropriately structured questionnaire (based on previous results) has been mailed to experts. After processing the results, a workshop was organised to discuss them and conclude on hierarchies, potential conflict problems, impact on human work etc.

Next, the key issues selected have been further examined in case study areas involving 7 countries.

In the United Kingdom the *Intermodal facilities* of:

- The Freight Liner Terminal in Leeds
- The Europort in Wakefield
- The Railport in Doncaster

The last two being new developments

In Germany the *Freight Center* of Bahntrans in Regensburg has been considered.

In the Netherlands in the area of Rotterdam port

- The Multimodal transport Center (MTC) in Maasvlakte
- The MTC in Waal-Eemhaven
- EDI in a cross-port logistical chain

have been examined.

In Finland the case of *Company Logistics* of the Swedish company AGA has been considered.

Finally, in Greece, the *port of Thessaloniki* has been examined and its connection with the *intermodal axis* with Sofia, Bulgaria. This also gave the opportunity to consider relevant issues in the Bulgarian transport system and mainly its working culture in itself.

Figure 1.2 diagrammatic Outline of the WORKFRET project

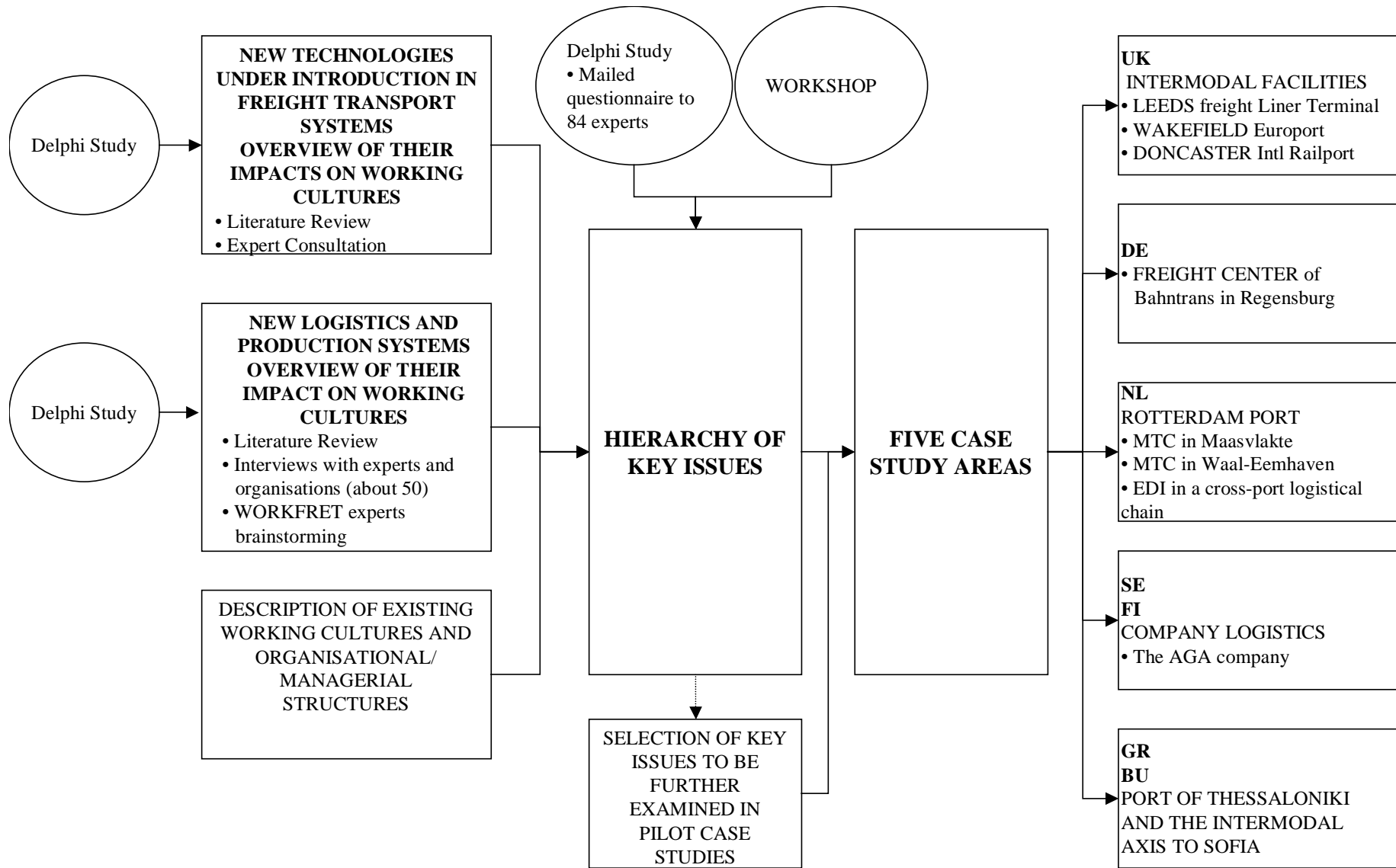


Figure 1.3 presents the concluding stream of actions in the WORKFRET project.

Results derived from the hierarchy of key issues' work and the individual case studies were utilised to synthesize *scenarios of future working cultures*. Two basic approaches were used here to obtain scenarios for working cultures: Firstly Delphi studies were carried out to obtain scenarios based on the consensus of the experts. Secondly, expert workshops were organised in the context of the WORKFRET case studies to formulate scenarios.

Two types of scenarios have been formulated: "Vertical scenarios", which are based on the case studies conducted within the project's framework and "Horizontal scenarios" including higher levels i.e. regional, national or international. Supplementing the two Delphi studies, a generic system model of an international platform was elaborated that, in total, involves 80 parameters and 458 relations. The model was used to perform an impact analysis to identify parameters, which can influence working cultures positively or negatively.

The results of the three main surveys i.e.:

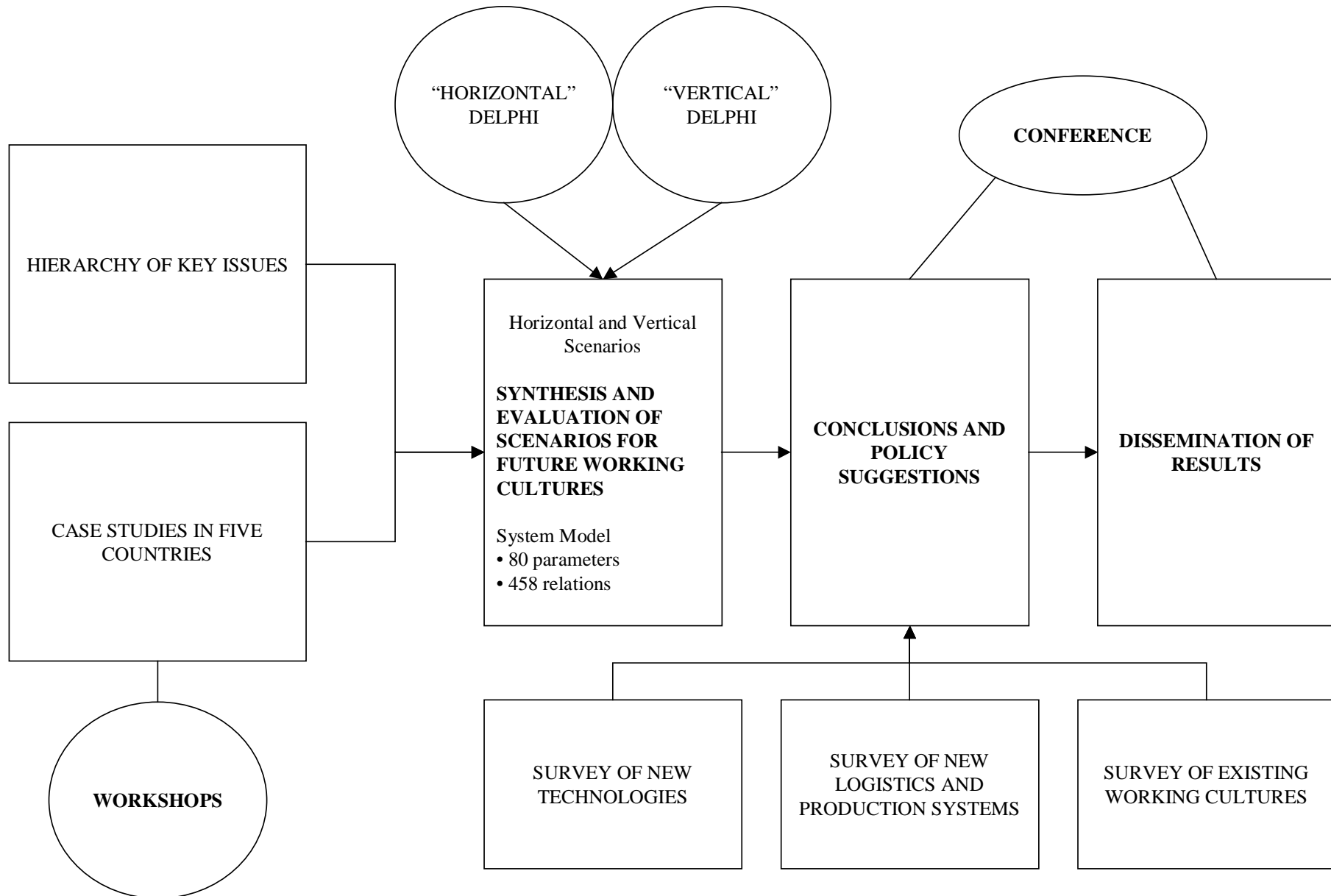
- of new technologies
- of new logistics and production systems
- of existing working cultures

as well as the results of the work concerning the hierarchy of key issues, the case studies in five countries as well as the synthesis and evaluation of scenarios of future working cultures have all contributed to draw the main conclusions and policy suggestions.

The aforementioned results have been discussed in a Conference in Brussels, where external experts and other interested actors have been invited to participate and relevant proceedings have been produced.

What has been described previously is a brief outline of the methodology and the main project's stages followed. In the specific WORKFRET deliverables the reader can find an explicit description of the methodology followed for that part of the work. Also in this report, such a description of methodology is provided in brief for each respective chapter.

Figure 1.3 Diagrammatic outline of the WORKFRET project



2. An overview of existing working cultures and organisational /managerial structures

Here, a description of the intermodal freight transport system in Europe in terms of «working cultures¹ and organisational/managerial structures²» is presented. It is based on published data from EU sources and a national sample consisting of Germany, Greece, the Netherlands, Sweden and the UK.

Considering the primary objectives of WORKFRET the work described in this chapter provides a starting basis in terms of definitions, examination of basic statistics and trends, in all intermodal freight transport systems in Europe, with focus on the human element. This basis is essential as a departure point allowing next to go deeper with country surveys and specific case studies, to examine issues of particular interest to this project.

2.1. Intermodal Freight Transport

According to the Communication from the Commission to the European Parliament and the Council “Intermodality and Intermodal Freight Transport in the European Union” (COM(97)243).

Intermodality is a quality indicator of the level of Integration between the different modes: more intermodality means more integration and complementarity between modes, which provides scope for more efficient use of the transport system. Intermodal transport can then be understood as the movement of goods whereby at least two different modes are used in a door-to-door transport chain.

The previous definition of intermodality and intermodal transport, which is also adopted by the WORKFRET Consortium, goes beyond earlier ones that have been put forward by several institutions and particularly ECMT.

In freight transport there are distinct modes: road, rail, air and water transport. Water transport can be divided into inland waterways and maritime transport. The

¹ The term «**working cultures**» refers to employee level. It was first used (by A. Naniopoulos) in the intermodal transport systems area with the following thinking: The philosopher Plato in «Symposium», 205B, writes «... **thus works under any craftsmanship are poetry and their creators poets**»

Similarly the great modern German artist Joseph Beuys was supporting the idea that «**Everything is Art**».

Thus work, any work, is poetry, art, and culture. Our concern should be how to identify sustain and enrich the elements of work that make people feel evolving and integrated as human beings.

The operationalisation of the term «working cultures» for the purpose of this project has been made by the WORKFRET Consortium in WP2 (leader: Sheffield Hallam University) where the following elements were included: **Labour force** (number employed, social characteristics, contractual status, recruitment sources), **work organisation** (work systems, functional flexibility, organisation structures, organisational cultures), **working environment** (technological characteristics, human factors at work, occupational health and safety, physical conditions), **Employment conditions** (working time, payment systems, employment procedures, welfare provisions), **Labour relations** (trade union membership, collective bargaining structure, employee consultation, labour conflicts).

² The term «**organisational / managerial structures**» refers to the employer level where the introduction of new technology may demand for appropriate adaptations of traditional structures to meet new requirements and exploit them in an efficient and effective way

transport market can be divided into maritime (30%) and inland (70%) with road transport the major mode (74% of inland). In intermodal systems, road is the most flexible and usually performs the pre- and end-haulage to and from terminals. Rail, inland waterways and short sea transport are less flexible and economically viable on longer distance (>300 km) or for low value (bulk) goods. Air transport is primarily used for the transport of high value, low volume and/or time-sensitive products (not included here).

Table 2-1 Transport services - Main indicators of the EU transport sector - 1988-1992

Gross value added at market prices (billion ECU) (1)	163,8	178,7	190,3	201,2	211,7
Persons employed (millions) (2)	5,6	5,8	5,9	5,9	6,0
Road transport (billion tkm) (3)	496,5	519,1	525,8	547,3	(4) 534,2
Rail transport (billion tkm)	173,7	176,5	174,6	176,4	165,4
Inland waterways (5) (billion tkm)	101,6	102,0	103,8	(6) 48,6	(6) 47,5

(1) Estimate, (2) Italy including communication 1988-1991, (3) Only B, DK, D, GR, F, IRL, NL and UK, (4) Excluding B and IRL,

(5) Including countries with international or transit traffic of more than million tonnes in 1992, i.e. B, D, F, L and NL, (6) Excluding D.

Source: Panorama, 1995

2.1.1. Demand and Supply

Demand for transport is strongly related to growth in GDP, market liberalisation and structural changes in manufacturing and distribution. Since 1970 growth in freight transport has been slightly slower than growth in GDP, with an annual average of 2.0%. The development and increasing complexity of transport and logistic operations has led to outsourcing of these activities to specialist transport operators. Supply of transport is influenced by changes in infrastructure (removal of serious bottlenecks); changes in equipment technology (mainly air, road and rail); policy measures including removal of price controls and entry restrictions. Other trends in the transport and logistics sector are: more and more shippers are contracting out transport and logistic services; companies are concentrating and centralising their production and distribution; and fewer but larger warehouses and production units are established/used.

2.1.2. Employment

The transport sector (passenger and freight) accounted in 1992 for 4.3% of the EU labour force, which is about 6 million jobs. Inland transport, which is the total of rail, road and inland waterways, accounts for 65% of total employment in transport, while sea and air transport accounts for 9%. Indirect transport services, supporting services and auxiliary services take a share of 26%.

Approximately one million are self-employed and only 19% of the workforce are women, compared to the EU average of 39%. Job creation prospects in the industry are likely to be offset by restructuring and privatisation. Working hours are longer than the EU average and working conditions are characterised by exposure to weather conditions; low levels of autonomy; discomfort; and time pressures.

2.1.3. Social partners

Social dialogue is organised through the EU transport committee covering both passenger and freight transport. An informal intermodal group was established in 1988.

Table 2-2 Social partners in the EU transport committee (June 1998)

Mode	Union	Employer
Road	FST	IRU
Rail	FST	CCFE
Maritime	FST	ECSA
Inland Navigation	FST	IUIN, ESO
Civil Aviation	FST	AEA, ERA, ACE, ACCA, ACI

2.2. Road Transport

2.2.1. The Road sector

Road freight transport divides into two: professional, contract or independent hauliers; and own account haulage whereby larger production or retail companies own a distribution fleet and are able to meet their logistical and distribution needs in-house. The professional sector is growing in countries where deregulation is the norm: in Portugal 59% of national and international haulage is carried out by contractors whilst in The Netherlands the figure is 84%. The EU average is 74%.

Table 2-3 Size of road haulage firms in European countries 1985-1990

Country	Total 1985	Total 1990	Number and size of undertakings					
			of which					
			1-5 vehicles		6-10 vehicles		11+ vehicles	
		1985	1990	1985	1990	1985	1990	
Austria	6970		67.6	60.1	23.3	25.8	9.1	14.1
Belgium	7812	8172	73.5	68.3	10.9	11.6	15.4	20.1
Bulgaria	...	7067	...	43.8	...	22.8	...	33.4
Denmark	6975	7045	(13) 89.4	83.7	(13/14) 6.1	(14) 9.3	(13/15) 4.5	(15) 5.3
Finland	(10) 13639	14339	(10) 94.7	95.8	(10) 2.4	2.1	(9) 0.9	1.1
France	28895	37037	(9) 80.0	(9) 81.6	(9) 7.5	(9) 5.6	(9) 12.5	(9) 12.8
Germany	(2) 44572	(3) 41325	(4) 88.7	(4) 83.1	(5) 7.7	(5) 9.7	3.6	7.2
Italy	204119	...	95.0	...	3.1	...	1.8	...
Latvia	21	26	...	...	...	...	...	...
Luxembourg	260	(10) 289	...	...	...	...	...	...
Netherlands	7390	7173	64.5	56.8	19.8	20.9	15.6	21.7
Spain	164976	...	98.4	...	(6) 1.4	...	(7) 0.2	...
Sweden	17767	19371	92.7	91.0	4.3	6.0	3.0	3.0
UK	96000	86300	87.0	83.0	7.0	8.0	6.0	9.0
3. Professional road transport only			7. 21 vehicles and over		13. 1984			
4. 1-6 vehicles			9. Estimate		14. 6-9 vehicles			
5. 7-10 vehicles			10. 1987		15. 10 vehicles and over			
6. 6-20 vehicles			11. 1989					

IRU based on statistics from AEBTRI, AISO, BAG, BDF, Camion Magazine, CBS 1991, Eurostat, FBAA, FNTR, FAT,

2.2.2. Employment

The characteristics of road transport employment are strongly linked to the pattern of many small businesses and a diversity of large operators. Occupational identity is high and exists in both small business and large company contexts. Variations in labour costs range from 50% of operating cost in the Netherlands to 17% on Portugal. Wage levels and subsistence varies by up to 35%, excluding the Nordic countries, Greece and Portugal.

Table 2-4 Numbers employed in road transport in sample countries

Country	Number of companies	Number of firms by number of employees	
		Number of employees	Less than 10 More than 100
Germany	43821 (7)	381000 (6)	34228 (7) ...
Greece	6738 (3)	105000 (4/5)	... ...
The Netherlands	7449	67730 (8)	5190 140
Sweden (9)	16624	54000	8000 (2)
UK (1)		478000	167 248
1. 1996		4. Estimate	7. 1994
2. One person operations		5. 1993	8. Truck drivers only
3. 1991		6. 1995	9. Year???

Sources: BAG, NSSG, RTS, TFK, VW

IRU based on statistics from AEBTRI, AISO, BAG, BDF, Camion Magazine, CBS 1991, Eurostat, FBAA, FNTR, FAT

INS, ITR, LAL, NIWO, OPV, Spanish and Italian ministries of Transport, SA, SBF, SKAL, SNCB, Freight Transport Magazine

2.2.3. Working Conditions

All countries in the sample reported problems such as exposure to weather; stress related illness; irregular working hours; long working periods; time pressure on deliveries; poor cabin quality and lack of space; poor sleeping conditions; heavy physical lifting; high noise level; high exposure to fuel emissions and particulates in cabins; repetitive work; lack of appropriate machinery to aid task completion; vibration strain; long periods of absence from family; and a number of related issues.

2.2.4. Labour Relations

In Germany and Sweden, a single trade union represents road transport workers while employers are organised into three and four federations. In Greece there is a multiple three-tier system of representation but unionisation is very low. In the Netherlands there are two unions and four employers associations whereas in the UK there is only one main employers group and a number of general unions.

2.3. Rail transport

2.3.1. The Rail Sector

Until recently, rail companies in the EU were controlled by single national operators in the state sector. Under Directive 91/440/EEC it is now possible for the private sector to participate in the rail industry and many member states are in the process or have completed a process of privatisation that separates the industry into companies controlling the rail infrastructure and those controlling rolling stock.

2.3.2. Employers

In Germany the Western Deutsche Bundesbahn and Eastern Deutsche Reichsbahn have combined to form Deutsche Bahn AG (DB), the national rail network company which controls the majority of track, with a small amount of track owned by 100 local railway operators. Here DB occupies 85% of market share in the rail freight sector. Meanwhile, the rail system in Greece remains state owned. The Hellenic Railway Organisation (OSE) remains a monopoly responsible for infrastructure, equipment and

rail movement. OSE is involved in a massive improvement programme as the Greek system is generally considered inadequate from both a design and gauge width, perspective. Since it's privatisation NS, the Dutch rail company, has begun to show profit. Its freight arm NS Cargo, started life in 1995, aims to become fully independent of NS. Sweden has 25 rail companies with tracking owned by Banverket and stations owned by Swedish State Railways.

In the UK the 1994 rail privatisation resulted in a similar system: Railtrack owns tracking and stations and a plethora of companies own regional or inter-city routes. Initially, three companies were involved in rail freight movement, this has now reduced to two: English, Scottish, Welsh Ltd (EWS) and FreightLiner.

Table 2-5 Rail Employers in Sample Countries

Country	Privatized	Track or main operator	Other operators
Germany	yes	Deutsche Bahn AG	100 smaller companies
Greece	no	Hellenic Railway Organization	none
The Netherlands	yes	NS	NS Cargo and daughter organizations
Sweden	yes	Banverket	24 rail companies
UK	yes	Railtrack	2 freight companies

2.3.3. Employment

At EU level, employment in the rail sector has been in decline since 1985 employing around 900,000 people in 1991. This has been mainly due to the decline of traditional rail freight users such as the coal and steel industries. Privatisation and the break up of national systems, which begun in 1992, have also had a dramatic impact. The Joint Committee on Railways has set up working parties on social aspects of a common railways policy (joint opinion 19.11.86), new technologies and working time. Other joint opinions have been issued on faster freight traffic and combined transport.

In our sample, the trend has been for numbers employed in rail to fall dramatically: in German rail (passenger and freight) numbers were 337,340 in 1994 (down 23% from 1992); Dutch rail freight (NS cargo) employment was 1,600 in 1997 (down 54% from 1990); the largest rail employer in Sweden (SJ) reduced employment to 16,000 (down 59% from 1980); in the UK rail employment decreased by 6.5% in 1996. However, Greek rail employed 12,155 in 1993, the same as in 1980.

2.3.4. Working Conditions

Commonly, external workers are subject to climate and physical workload demands whilst drivers face ergonomic problems and irregular and long working hours. In the Netherlands an increase in night work was reported; Sweden cited problems with electromagnetic fields for drivers; the UK has high levels of overtime and there are concerns about accident rates.

2.3.5. Labour Relations

In Germany two trade unions represent rail workers and employers also have two associations that engage in collective bargaining. Sweden has one main rail union and two large rail employers. The Netherlands has four rail unions and one employers association. The UK has two main rail unions and two main employers in freight transport. There are eighteen first tier rail unions in Greece and a second tier federation. Union density is high in all countries in the sample.

2.4. Inland Waterways

2.4.1. The Inland Waterways Sector

Inland navigation is used for significant freight movement in five members states: Germany, France, and the Benelux states. Here it represents 36% of freight transportation. Organisationally, a classic division exists between shipping companies, carriers dealing directly with dispatches, and owner operators. Of the five countries with significant inland waterway freight movements, Germany and The Netherlands carry between 72-80% of traffic divided roughly equally. Dry bulk carriage is stagnating or decreasing slightly, liquid bulk remains stable, whilst container transport is increasing rapidly.

2.4.2. Employers

The German system comprises a diverse range of organisational and managerial structures. In 1995 1160 traditional small enterprises run by “Partikuliers” - co-operatives with less than 10 members, and small, medium and large shipping companies all operate within the inland navigation system. 1% of these enterprises had 41% of available ships in 1995. The market is heavily competitive and this is likely to increase, particularly following the 1998 deregulation when inland transport markets become more open to EU competitors. The 1995 figure of 1446 active German enterprises included a fall of 7.2% of freight companies.

In The Netherlands inland waterways organisational structures are at least as fragmented as road transport. There is a steadily growing number of small enterprises and a declining number of medium and large operators. In 1995 there were 4,575 inland shipping companies in The Netherlands, 4,100 of which owned only one vessel and five of which owned twenty or more vessels. Very often these small businesses are run on a family basis.

2.4.3. Employment

In The Netherlands, nearly 50% of inland waterway employees are under 30 yet more than 50% of employees leaving the sector are also under 30. Above the age of 19 the number of employees is declining within the sector. Family operations comprise almost 95% of the sector.

Table 2-6 Number of enterprises, vessels and jobs - The Netherlands

	1988	1991	1993	1994
Number of enterprises	4,767	5,473	5,900	5,340
Number of vessels	6,213	5,681	5,792	5,780
All working people	13,900	14,710	14,300	13,565
Employees	6,570	6,710	6,360	6,122

Source: Piers Group/CBS 1996

2.4.4. Working Conditions

The working culture of inland waterways in the EU is characterised by a small business tradition where businesses own between one and three vessels, except on the Rhine where larger firms are more common. The Joint Committee on Inland Navigation has expressed concern about health & safety, vocational training, and non-Rhine living

and working conditions. There has also been a joint opinion on harmonisation of qualifications. Health & safety concerns include long and irregular working times, small crew size, dangerous cargo, noise and exposure to weather.

In Germany, couples often live and work together onboard ship. Recently a trend of using part-time seasonal staff from Eastern European nations on low wages had begun. Social mobility and family absence are typical concerns. There is a high risk of accidental injury and exposure to weather. Incomes have decreased considerably in recent years and collective agreements are often undermined because of low inclusion rates. Moves by larger companies to sell or lease vessels to small single operators or co-operatives are resulting in a diversity of contractual arrangements ranging from the fair to poor.

2.4.5. Labour Relations

In Germany, trade union strength is rather low, ÖTV is the bargaining union negotiating with the ADB - the employers association for inland navigation - on behalf of on-board personnel. Neither contractors nor larger companies are substantially organised into federations. In The Netherlands, the sector is fragmented and labour relations unstable with 30% union density. Shippers are organised in several competing employers' organisations.

2.5. Short sea and off-shore shipping

2.5.1. The Maritime Sector

Across the EU the maritime transport sector comprises a growing concentration of major players and a number of smaller businesses in specialised fields. This change is characterised by the increase in specialised ships (chemical, gas, container, reefer, ro-ro) and a decline in dry bulk and general cargo carriers. The EEA registered trading fleet shows a total of 6,902 (5468 EU only) vessels with Greece and Norway around 1,500; Denmark, Germany and Italy with between 500 and 1000; and the remainder with less than 500. If controlling interests in fleets registered under third party flags is taken into account, the number of vessels rise to 10,459 representing approximately 31.2% of world tonnage. Ports are organised in a diverse number of ways throughout the EU.

Governments invariably have some involvement, more in some states than in others with even autonomous ports having some form of statutory constraint. Within member states there are also differences between individual port organisation. Generally, the larger the port the more critical its role in the country's economy and the greater the Government interest in its structure.

2.5.2. Employers

Although there are no official statistics available for the number of shipping companies in Germany, the Hoppenstedt directory of German enterprises lists 71 medium sized companies and 91 large enterprises. The main employers association has about 300 members which indicates that there is a considerable number of small businesses. Short sea shipping is highly significant to the Greek economy. The fleet is gigantic and the geography requires a large fleet carrying goods to and from the islands. The Greek fleet - carrying the Greek flag - represents 6.82% of the total world tonnage, the Greek owned fleet, which includes vessels under other flags, represents 17.41%. Although well developed, the number of companies was, until recently, decreasing in the Netherlands.

There is now a slight increase in the number of companies. In 1992 there were 486 companies operating with 1,109 vessels - although only 545 were operating under the Dutch flag. In the UK Ro-Ro is highly significant for both off-shore and short-sea activity. It is second only to road transport with the vast majority of carriage within the EU. In 1994 439 companies were listed with FAME. Official statistics record vessels of 500 gross tons and over, and in 1995 there were 540 of these operating under UK flags.

Table 2-7 Greek owned fleet in 1995

Vessel type	Number of vessels	GRT
Freight	837	14.666.566
Tankers	426	14.104.653
Passenger	519	988.091
Other	346	103.618
Total	2128	29.862.928

Source: Panhellenic Seafarers Federation

2.5.3. Employment

In 1991 there were 212,600 employees in this sector across the EU, 120,000 of these were EU nationals - a decline from 250,000 in 1980. This is largely due to ship owners and operators increasingly moving to flags of convenience in order to exploit less rigorous working conditions and lower pay levels. EU nationals employed in each state range from 27,000 in Italy to 825 in Ireland. Non EU nationals account for between 9123 in Greece to none at all in Sweden. A detailed study of maritime professions in the EU shows an ageing and declining workforce in the EU shipping industry with a growing proportion of non EU nationals (now 20%). The report highlights the need for new initiatives in recruitment and training to match the new shipboard technologies and forms of work organisation. This is supported by the European harbourmaster's Association who have reported a shortfall in supply of suitable qualified personnel.

2.5.4. Working Conditions

The main concern of the Joint Committee on Maritime Transport has been the organisation of working time. A Working Party set up in response to the EU directive on working time reported in 1993 giving a comprehensive overview of time regulation under national law, collective agreements and national practice. There has also been a joint opinion on health & safety on board ships. The impact of technological change on work organisation and the working environment is already subject of EU projects sponsored by DG VII. For example, there have been recent reports on human factors and automation (MASIS 1996); manpower utilisation and advanced technology (ATOMOS 1996); and human aspects of efficiency and safety (THAMES 1996).

2.6. The Establishment of a User's Network

The success of the WORKFRET project is heavily dependent on the interest and involvement of the key actors in European freight transport. Thus, in early stages of the project, relevant data have been collected and contacts have been made, aiming to establish a Users' Network.

The main aims of the network establishment were:

1. consult on and test the survey concerning working cultures and prioritise themes and concerns;
2. be a source for gathering documentary material for a source library/WWW database and literature review;
3. widen participation in the design of implementation strategies;
4. recognise the need for an inclusive approach to policy development; and
5. be an outlet for dissemination.

The WORKFRET network enabled a wide arena in which a level of creativity in problem solving and policy development could take place, an arena, which previously was not available

Action taken to set up the WORKFRET network was therefore an exploratory process, which involved discussion about the relevance of the project and the actor's perception of the research objectives.

The WORKFRET users' network included relevant organisations at European level i.e. Trade Unions, Employers' associations and research networks, altogether approximately 20 "actors".

At national and regional level the networks established refer to the participating partners' countries and are (numbers in parenthesis is the number of "actors" defined):

- United Kingdom (45)
- Germany (23)
- Greece (7)
- The Netherlands (39)
- Sweden (16)
- Finland (20)
- Norway (16)
- Denmark (3)

It has to be noted though that response and participation did not always meet the Consortium's expectations.

Additional information on the established users' network can be found in Annex 6.

2.7. Main findings of a survey on existing working cultures and organisational/ managerial structures

Here the main findings of a survey by the WORKFRET Consortium on existing working cultures and organisational / managerial structures are presented. The impact of intermodal developments on the Freight Industry as well as the social impacts are discussed and presented in terms of appropriate tables.

The survey conducted in two levels, using appropriately designed questionnaires, attempts to go deeper in examining issues resulted in the first stage review of available data and statistics.

2.7.1. The surveys

Two main objectives are stated in this part of the WORKFRET work.

- To gain a better insight of the existing working cultures and organisational/managerial structures, that are related to intermodal developments, in the various transport systems in Europe, and;
- To gain a more detailed knowledge of the working cultures and organisational/managerial structures that apply to the intermodal locations chosen for case study research.

This involved discovering existing trends and options, but also identifying where there were constraints on developments and conflicting opinions between different groups.

To achieve the stated objectives it was decided to carry out two complementary surveys. The first, called Level A, was a postal questionnaire survey of employers and trade unions throughout the 15 member states of the European Union. Amongst employers, the response rate was 26%, spread relatively evenly amongst the European countries and different transport sectors. The trade union response rate was 18% and limited to the UK, France, Germany, Sweden, Norway, Luxembourg, Greece and The Netherlands. Great caution must therefore be taken in using the statistical data. The data analysis in the Level A survey can only be regarded as a broad indication of European trends and not as reliable statistical evidence.

The second survey, called Level B, comprised a series of in-depth interviews with key actors, carried out in countries where the case-studies are being conducted (Germany, Greece, the Netherlands, Sweden and the United Kingdom). Interviews were also carried out in Bulgaria to highlight the different context of freight transport developments in the emerging economy of Eastern Europe. The sample chosen by each partner from those who have an overview of intermodal developments and a personal interest in social issues, not because they represent institutional views.

The main parameters of working cultures and organisational/managerial structures that the surveys aimed to get information about were: labour force, work organisation, working environment, employment conditions and labour relations.

2.7.2. The Analysis

The analysis recognises the need to identify options for developments and the problems that different groups may have with them, and arrange them in a way that can help develop consensus between different groups on what the best option will be. The objectives of the analysis are to record existing intermodal developments and 'working culture and organisational/managerial structure changes, uncover the arguments for these developments and changes, gauge the impact of intermodal developments on 'working cultures and organisational/managerial structures', and identify conflicts between different groups.

2.7.3. The nature of intermodal developments

The survey results gave more information about the nature of intermodal developments and also revealed some of the main economic and environmental justification for them. This is important in assessing the reasons behind the social impacts and possible areas of conflict. Intermodal developments were put in the following categories:

- competition policy
- logistics and information technology
- infrastructure
- loading and unloading technologies
- vehicle and ship improvements

Aggregated data from the Level B interviews show in which transport modes and in which countries these developments are happening. The number of respondents, grouped according to nationality, that mentioned the different types of developments are shown in Table 2.8. The number of respondents, grouped according to the mode they represent, that mentioned the different types of developments are shown in Table 2.9. Also in the final column of Table 2.9 the total number of respondents, representative of all countries and modes, that mentioned the developments is shown.

Table 2-8 Intermodal Developments (by country)

Intermodal Developments	Country					
	Bulgaria	Germany	Greece	Holland	Sweden	UK
<i>Policy:</i>						
Deregulation				4	2	
Streamlining	1	1		4		1
Privatisation						1
Pricing		1		2		2
Marketing				4		
<i>Operation:</i>						
Logistics	3	6	3	6	3	1
Information tech.	3	5	1	5	4	1
<i>Infrastructure:</i>						
Interchanges		2	3	8		8
Network Improvements				5		3
<i>Loading/Unloading:</i>						
Containers etc.	4	3	2	5	3	8
<i>Transporters:</i>						
Piggybacking						3
Ro-Ro ferries				1		2
General design	8		2	7	2	

Table 2-9 Intermodal Developments (by mode)

Intermodal Developments	Mode					
	Rail	Road	Sea	Inland	Comb.	Total
<i>Policy:</i>						
Deregulation	3	1		2	2	7
Streamlining	2	2	1		2	7
Privatisation	17					1
Pricing	1	1			3	5
Marketing			1	2	1	4
<i>Operation:</i>						
Logistics	5	5	2	2	8	22
Information tech.	3	4	4	3	5	19
<i>Infrastructure:</i>						
Interchanges	3	5	1	3	9	21
Network Improvements	1	1		2	4	8
<i>Loading/Unloading:</i>						
Containers etc.	3	8	3	5	6	25
<i>Transporters:</i>						
Piggybacking	1				2	3
Ro-Ro ferries					3	3
General design	2	6	4	3	2	18

2.7.4. The Impact of Intermodal Developments on the Freight Industry

The most important intermodal developments have been identified as vehicle and ship improvements, loading and unloading technology, information technology, logistics and the provision interchange facilities. All the interviewees agreed that these developments would improve efficiency and should increase the importance of rail, sea, inland waterways and intermodal transport. There was some concern that new patterns of transport could have environmental impacts, but this was countered by a belief that the total impact on the environment of a more intermodal freight transport system would be better than the current situation.

The other intermodal developments that were mentioned are policy changes. While deregulation and organisational changes, that promote free competition and efficiency, are not challenged, policy changes such as privatisation and changing the current pricing structure do meet resistance. Some interviewees, particularly trade unions, are not convinced that organisational improvements can be, or should be, attempted with a policy of privatisation. On altering the pricing structure, the current thinking is that road

transport is too cheap, and by increasing the cost of this mode intermodal transport will be promoted. Not surprisingly, the road transport sector takes a defensive position, while the other sectors support this change.

When businesses are deciding on a transport option they compare the generalised costs of the different modes. This includes the money cost, the time of the journey and the quality of service. If the goods are delicate and perishable, businesses will weight the time and quality elements highly, whereas if the goods to be transported are unbreakable and long-lasting the time and quality dimensions of the generalised cost are not so important. The impacts on the different modes were reported as:

- **rail transport** - renewed emphasis on quality and service through privatisation.
- **road transport** - new short distance opportunities and collaboration with rail/sea.
- **short sea transport** - will benefit from deregulation and new technologies.
- **inland waterways** - positive impact but potential still lacks proper recognition.

In order to be able to discover connections between intermodal developments and «working and organisational structures» one needs to know what are the broader objectives of intermodal developments, this summarised in the following Table 2-10.

Table 2-10 Intermodal developments and their economic and environmental impacts

Options (Appreciative Planning)	Arguments (Dialogue)	Conflicts (Dialogue)	Evidence
<i>Policy:</i>			
Deregulation	Increase competition	No	Sweden and Holland, all modes
Streamlining	Improve efficiency	No	Bulgaria, Germany, Holland and the UK, all modes
Privatisation	Increase competition and improve efficiency	Yes (Trade Union v Employers)	In the UK, in the rail sector
Pricing	Provide for fair competition	Yes (Road v Other sectors)	Germany, Holland and UK
<i>Operation:</i>			
Logistics	Co-ordinate intermodal transport	No	All countries, all modes
Information technology	Tool for logistics	No	All countries, all modes
<i>Infrastructure:</i>			
Interchanges	Needed for intermodal transport	Environmental	Germany, Greece, Holland, UK. Environmental concerns in UK
Network improvements	Limited need	No	Holland and UK
<i>Loading and unloading:</i>			
Containers/swap-bodies etc.	Improves speed of transshipment	No	All countries, all modes
<i>Transporters:</i>			
Vehicle and ship improvements	Often needed in conjunction with new loading technologies	No	All countries, all modes

2.7.5. The Social Impacts of Intermodal Developments

The predominant view of employers in European freight transport from the Level A survey (but caution is needed because of the low response rate) is that intermodal developments will have little or no social impact.

The main concerns of both employers and trade unions were about patterns of employment, training requirements, worker flexibility and working time. There were

always more employers who said intermodal developments would have no impact on these issues than those that said they would have minor or major impacts. In the Level B interviews, a number of issues were raised which have the potential for conflict between employers and employees. For example:

- **Labour Force**

The main issues reported here are about how many people will be needed to work, and if their contracts will be temporary. While the amount of freight to be carried is expected to increase, the methods of transportation are becoming more efficient, and therefore this increase in volume does not necessarily mean an increase in employment. These new methods of transportation may require a higher skilled work-force, and if this is the case it may conflict with the trend to employ people on a temporary basis, because a more skilled work-force may be able to demand more job security.

- **Work Organisation**

The important issues here were team-working, functional flexibility and streamlining. Some respondents thought that autonomous teams, with a wider job-description, may stifle creativity. Meanwhile on functional flexibility the trade unions and employers could conflict on the amount of flexibility required by an employee. On stream-lining some trade unions were worried that in flat organisational structures it is more difficult to apportion blame when something goes wrong.

- **Working Environment**

The use of new technologies has the potential to make jobs more interesting, in which case there would be no conflict, but if there has not been the correct training there might be safety implications, and conflict between employers and employees. Also there is a general concern that functional flexibility may increase stress levels.

- **Employment Conditions**

The main issues reported were about working time and payment methods. Flexibility may mean some workers are over-worked and others are under-employed. These changes may adversely affect the pay workers receive. This raises potential for conflict between trade unions and employers. However, increased flexibility may actually give workers more control over their working life.

Few respondents throughout Europe felt qualified to comment on how intermodal developments may affect labour relations but it was possible to aggregate some observations. Trade union membership may need to be rationalised; more joint consultation is expected but collective bargaining structures are unlikely to change.

In WORKFRET the connection between intermodal developments and 'working cultures and organisational structures' was explored, the different 'working culture and organisational structure' changes were identified and the arguments for them given. Then during the analysis any conflicts were noted and the evidence for them recorded. This is shown, in summary, in the following Table 2-11.

Table 2-11 The social impacts of intermodal developments

Social Parameters of Working Culture	Opinion	Potential Conflict	Evidence
<i>Labour Force:</i>			
Employment	Intermodal developments can create new jobs in combined transport	Can increase in freight carried overcome job losses due to increased efficiency?	All countries
Status of contract	There is demand for temporary work	Is it possible to have a skilled workforce that is temporary?	All countries
<i>Work Organisation:</i>			
Teamwork	There is trend for autonomous teams	This may stifle creativity	Noted in Sweden
Functional flexibility	The tasks workers are expected to do are increasing	The intensification of work	Noted in UK
Flat organisational structures	Trend is for less hierarchical structures	More difficult to apportion blame if mistakes are made	All countries
<i>Working Environment:</i>			
Technology increases	Amount of technology expected to increase. Need to be flexible.	Will this require a more skilled or a re-trained workforce?	All countries
More interesting jobs	Functional flexibility may make jobs more interesting	No conflict	
Health and safety	Physical conditions may improve.	Increases in re-loading of cargo may increase danger. Greater responsibility on workers may increase stress.	All countries
<i>Employment Conditions:</i>			
Flexible working time	Need to be more flexible about when to work	Conflict between needs of employer and employee	All countries
Payment	More incentive payments	Changes in payment systems may leave some workers worse off.	All countries

The previous Tables have been used next in the research that has taken place in the case studies in Germany, Greece, Bulgaria, The Netherlands, Sweden and the UK, and aided the formulation of policy recommendations.

The central issue resulting here, is how much flexibility will be required of employees; an issue that can create conflict between employers and trade unions. Increases in flexibility can:

- create more temporary positions with low job security;
- widen job descriptions and decrease creativity;
- place more demands on workers and increase stress levels, and;
- change the hours employees work, causing some people to have to work too many hours and some people not enough.

However, increases in flexibility can also be very positive, making jobs more interesting and giving workers more control over their working life. These are issues explored in the case studies and solutions are suggested in subsequent parts of the work, to ensure that intermodal developments contribute to the positive aspects of flexibility.

3. New technologies under introduction in freight transport systems in relation to the working cultures and organisational/managerial structures.

New technologies under introduction in freight transport systems and their expected impacts in relation to the working cultures and organisational / managerial structures is the subject of this chapter.

New technologies are defined as *the ones that have been recently implemented and/or are expected to be implemented, to a larger extent, in the near future*. The WORKFRET project concentrates on *the new technologies that are expected to have an impact on the working cultures in freight transport systems*.

The overview produced, aims at creating a picture of main evolutions and their possible impacts, thus providing the opportunity for further selections and deeper examinations on promising areas, in subsequent stages of WORKFRET (particularly in the various case studies), but also in other research initiatives.

3.1. Main objectives and approach followed

The main objectives of this part of the work were:

- To present an overview of the main technologies under introduction in freight transport systems.
- To present an overview of the impact of the most important new technologies on the working cultures and organisational structures.

The approach towards determining the impact of new technologies on human factor elements, consisted of the following steps:

- per mode of transport (road, waterborne, rail and air transport) and for the nodal points a survey has been made of new intermodal transport related technologies;
- literature review has been conducted on the impact of new technologies on human factor elements;
- a wide range of experts in six countries has been consulted in order to gain information on the relationship between new technologies and human factor elements;
- in addition a Delphi study has been organised to further gain information on the relationship between new technologies and human factor elements;
- Synthesis of expert consultation and Delphi study.

3.2. Overview of new technologies in freight transport

Overviewing the technologies under introduction, it should be noted that a large part of the new technologies are information related. New Information and Communication Technologies (ICT) in the fields of communication, route planning, tracking & tracing and identification play a dominant role within the transport sector. This tendency applies to all the modes of transport (road, waterborne, rail and air transport) and is especially true for the nodes between modes of transport, in which transshipment is being automated to a large extent.

The introduction of new physical technologies is limited compared to the widespread introduction of new ICT. This phenomenon can be partly explained by the fact that a large number of physical technologies in the transport sector have already been implemented in the past. In this respect one can think of the mechanisation and automation processes in transshipment and the introduction of the container.

It should be stated that differences exist per mode of transport and per country in the introduction rate of both ICT and physical technologies. For example, the land-side operations in air transport are automated to a much lower extent than the land-side operations in ports (with systems such as Automatic Guided Vehicles-AGV's). Also, not every country has adopted new technologies at the same rate.

In the tables that follow, an overview of main new technologies per transport mode is presented together with the underlying trends.

Table 3-1 Road transport

Trends	<i>Integrated transport chains, IT-maturity, Customer information, Environmental issues, Ergonomics, Retraining, Learning Organisations.</i>
Technologies	
Information and communication	<i>RDS/TMC, Radio Data System - Traffic Message Channel Electronic Data Interchange Bar Codes Radio Frequency Identification Technology Integrated Circuit Card - Smart Card Route planning systems GIS - Geographic Information System GPS - Global Positioning System On Board Computer</i>
Technical equipment	<i>New types of road vehicles New technical equipment - others</i>

Table 3-2 Air transport

Trends	
<p>Aircraft</p> <p>Airport</p> <p>Transport management</p>	<p><i>Aircraft noise reduction</i></p> <p><i>Pollution control</i></p> <p><i>Increase in aircraft speed</i></p> <p><i>Increase in aircraft size and transport capacity</i></p> <p><i>Maximisation of air transport share and/or total volume</i></p> <p><i>Minimisation of operation costs</i></p> <p><i>Improvement of airport infrastructure</i></p> <p><i>Minimisation of access time to airport</i></p> <p><i>Improvement of air traffic control</i></p> <p><i>New navigation systems</i></p> <p><i>New surveillance systems</i></p> <p><i>Improvement of aircraft maintenance systems</i></p> <p><i>New training methods for aircraft and ground crew</i></p> <p><i>Minimisation of waiting time in airport</i></p> <p><i>Focus on safety issues</i></p> <p><i>Increase in number of regional flights</i></p>
Technologies	
<p>Information and communication</p>	<p><i>Airborne Air Traffic Management Systems (AATMS)</i></p> <p><i>Advanced Surface Movement Guidance and Control Systems (A-SMGCS)</i></p> <p><i>Controller assistance tools</i></p> <p><i>Global Navigation Satellite Systems (GNSS) and Satellite Assisted Navigation (R/Nav, GPS)</i></p>
<p>Aircraft</p>	<p><i>Short Take-off and Landing aircrafts (STOL) and Vertical Take-off and Landing aircrafts (VTOL)</i></p> <p><i>Aerodynamic design and ultrasonic aircraft</i></p> <p><i>Fly-by-wire and fly-by-light control systems</i></p> <p><i>Aircraft size, speed and capacity</i></p>

Table 3-3 Waterborne transport

Trends	<i>Intermodal transport, pollution control, increase in safety, minimisation of crew aboard, increase in vessel speed, increase in vessel size and capacity, minimisation of waiting in port and minimisation of access time in port.</i>	
Technologies	Shipping	Port
Information and communication	<i>Electronic Data Interchange (EDI)</i> <i>Integrated Bridge System</i> <i>Global Maritime Distress and Safety System (GMDSS)</i> <i>Global Positioning System (GPS)</i> <i>Mobile Communications</i> <i>Electronic Chart Display and Information System (ECDIS)</i>	<i>Vessel Traffic Services (VTS)</i> <i>Tracking and Tracing Systems (T&T)</i>
Ship	<i>Inland Containerships</i> <i>Sea-river Vessels</i> <i>High Speed Vessels</i> <i>Self (un)loading Ships</i> <i>6th generation containerships</i> <i>FastShip concept</i> <i>Open Hatch Vessels</i> <i>Reefer Containers</i>	
Transshipment	<i>Barge Express (BEX)</i> <i>Sailing Container Terminal</i> <i>Rollerbarge</i> <i>Multiple Box Units (MBU)</i> <i>Air-Lift Container System (Alicon)</i>	<i>Automated Guided Vehicles (AGV)</i> <i>Automated Stacking Cranes (ASC)</i> <i>Robotic Container Handling (RCH)</i>

Table 3-4 Rail transport

Trends	<i>Privatisation, Containerisation, Transfer technology, Freight handling, Conveyance Systems, Transport Management and Global Production Systems.</i>
Technologies	
Container and transfer	<i>New container technologies Double floor containers Railway car with container lift Pivot systems for containers High performance terminal for HGV and trains Computer navigated loading machines Rolling train transfer installation for containers</i>
Warehouse	<i>Warehouse management Navigation assistant Automated Guided Vehicles</i>
Railway freight car	<i>Inland Speed Technologies Trailer-Train</i>
Transport management	<i>Cargo Identification Cargo tracking Intermodal management systems Fleet management Flexible railway management</i>
Combined transport systems	<i>Rolling shelf The Bahntrans concept</i>

3.3. Impacts of new technologies on working cultures.

Below main findings concerning impacts of new technologies on each of the five main elements of working cultures as defined in WORKFRET are discussed.

The labour force

In estimating the impact of new technologies on the size of the labour force, a differentiation should be made between two types of effects. First the new technologies tend to lead to a reduction of people involved by, for example, using identification technologies. The second effect is that, as a result of improved efficiency caused by the introduction of the new technologies, the demand for transport services increases, resulting in an increase in number of people involved in transport activities. The net effect of these two opposite effects is expected to be a loss of jobs in the transport sector.

The aforementioned (opposite) effects differ per mode of transport. In rail transport, for example, a relatively larger improvement in efficiency is expected to be

possible, than in road transport. As a result, the rail sector may gain relatively more market share.

With the introduction of new (information) technologies the social characteristics of the labour force is expected to change. There will be less demand for low skilled labour. The new technologies ask for more educated, computer literate labour. Partly, this higher skilled labour will be attracted from the market, especially the younger segment of the market. In addition, low skill labour will be upgraded by training programmes.

Work organisation

New ICT give companies the opportunity to restructure the organisation. A choice can be made for a centralised or decentralised structure. In practice the structure tends towards a more centralised approach. In road transport, for example, the planning department, with the use of planning, communication and tracking & tracing systems, can organise much of the road haulage activities. In aviation most activities are arranged from traffic control. The role of the truck driver and the pilot of the plane are reduced to executing functions, where in the past more tasks and responsibilities were involved in these functions.

As a result of the widespread introduction of information technology, a shift is expected from less low skill jobs towards more high skill jobs. New information systems will replace some of the existing functions or will lead to an integration of current functions. This phenomenon is taking place in every mode of transport, for example in shipping, where the function of navigator and engine-room worker is to a large extent replaced by automated systems. Another example can be found in rail where tasks of the traditional engine driver, the shunter, the radio-loc driver and the maintenance worker are integrated into a new upgraded function of the new engine driver. Besides the disappearance of functions, new functions are created. These functions can be found in the fields of system administration, operation and maintenance of high tech systems.

The introduction of systems such as tracking & tracing, advanced route planning, on board computers and mobile communications allow a strong monitoring of the people involved in the physical transport, such as the truck-driver, resulting in a decrease of autonomy. In shipping, for example, fewer decisions are made onboard the ship and more issues are determined from the shore. However, it can be argued that through the new technologies, there are opportunities to increase the variety of work and the involvement towards the direct contribution to the end result.

Working environment

Health and safety, especially in the field of transshipment, are expected to improve by a shift from outdoor to indoor work. Outdoor work is replaced by automated systems and more emphasis is placed on indoor work, such as functions in controlling and monitoring the automated systems. However, time-pressure, customer power and the transparency of the transport process are causes for increased stress. This is strengthened by the immobility of the “indoor” worker. In conclusion it can be stated that a shift has taken place from physical problems towards more social problems.

Physical conditions have improved. New vehicles and equipment are less noisy and in general the ergonomics of the vehicles and working places have improved. An example is the improved design of new truck-cabins. However, the pressure on the transport system is growing. Vehicles are getting bigger and faster. Hereby the impact of accidents is getting bigger as well.

Employment conditions

The transport sector has changed into a very fast moving sector, in which time-pressure and the strive for efficiency improvement is an almost constant factor. The workforce in transport is expected to adapt to the demands of the sector, which means that the workforce has to be very flexible. This means that there is a demand for temporary work, for example in the transshipment of very large ships, which has to take place at a very fast rate. Besides the temporary work, personnel will have to work flexible hours.

Training programmes are a necessity to adapt to new technologies. As noted earlier, there is a tendency towards upgrading low skill jobs into high skill jobs and training programmes are a vital instrument in realising this. Although the training programmes are triggered by new technologies, the training programmes do not always have a technical approach. Some new technologies are so complex that only a limited number of technical experts can cope with the techniques itself. The training programmes for the non-technicians are aimed at achieving operational goals.

Labour relations

Union membership among outdoor workers is traditionally higher than among indoor workers. A shift towards more indoor workers is expected to lead to a decline in union membership. However, trade unions can play an important role, for example in putting pressure on employers to limit the number of redundancies caused by the introduction of new technologies or in other relevant matters, such as the upgrading of the labour force, sufficient training and the quality of the working environment.

3.4. Main conclusions and findings

The introduction rate of new technologies differs per country and per mode of transport. The new technologies, however, have a fairly homogeneous impact on the human factor. Not every “new technology-human factor relation” is identical in the various countries and modes of transport, but the following more or less general effects can be recapitulated.

- The size of the labour force is influenced by two opposite effects. First the introduction of new technologies, replacing existing labour, reduces the size of the labour force. As a result the efficiency of the sector is improving, which leads to an increased demand for transport services and an increase in the size of the labour force. The net effect is expected to be a decrease in the size of the labour force.
- A common development in transport organisations is a stronger monitoring of the people involved in transport. Improved communications and tracking & tracing technologies have enabled this. More integrated decisions are made at a central point (planning department), while the autonomy and the freedom of the driver, shipper and pilot decreases.
- The introduction of ICT is expected to result into a shift from low skill jobs towards high skill jobs. This can be achieved by upgrading the existing personnel (retraining) or by hiring new personnel, which is expected to be higher educated and computer literate.
- The traditional physical problems in the transport sector, caused by heavy physical work, have been reduced, as a result of the introduction of automated processes and

the shift from outdoor work to indoor work. However, time-pressure and a constant strive for efficiency improvement have created stress and other social or psychological problems. In conclusion it can be stated that a shift has taken place from physical to social or psychological problems.

- The above-mentioned time-pressure and efficiency improvement within the transport sector have resulted in the need for a very flexible workforce. This means temporary jobs and flexible working hours.
- Union membership differs per mode of transport and per country. With the shift from low skill to higher skill jobs and with the shift from outdoor to indoor work (both as a result of new technologies), a general tendency is expected towards a diminishing share of union membership.

4. Main trends in new logistics and production systems, in relation to the working cultures and organisational/managerial structures

Various types of logistics and production systems (management concepts rather than e.g. ICT systems) can be distinguished, for example, Just-in-Time (JIT), Daily Direct Deliveries (DDD), Efficient Consumer Response (ECR). As new logistics and production systems are considered here those which are not (yet) generally applied, but applied by some companies in a limited rather extent (in relation to different industry sectors, various company sizes and various countries).

The overview produced aims at creating a picture of main evolutions and their possible impacts, thus providing the opportunity for further selections and deeper examinations on promising areas at subsequent stages of WORKFRET but also in other research initiatives.

4.1. Main objectives and approach followed

The main objectives of this part of the work are:

- To give an overview of the main new Logistics and production systems under application
- To identify and indicate the most important ones which may significantly affect working cultures and organisational / managerial structures.

The work carried out is mainly based on interviews with external organisations and also in house expertise of the WORKFRET participants and it was divided in three main activities.

The first one aimed at giving an overview of the main new Logistics and production systems under application. A gross list of new Logistics and production systems under application has been created through local brainstorming sessions and collection of actual in house knowledge in combination with interviews and a literature review. The second activity aimed at identifying and indicating the most important ones, which may significantly affect working cultures and organisational/managerial structures. Deep interviews and group discussions were held, with managers and specialists. The third activity, the Delphi study, gave a possibility to penetrate deeper into the effects caused by some of the more important trends

Working cultures and organisational/managerial structures will be heavily affected by new and future logistics and production systems. Changes are seen for each of the five human factor elements: labour force, work organisation, working environment, employment conditions and labour relations.

Most of the trends in logistics and production systems are found to be important to the companies represented among the interviewees. The development in the companies must be seen as a mix of activities, where no company is following or reacting to only one trend, the companies must act dynamically, and respond to the development, this is what gives them a competitive advantage.

It is also important to remember that it is not only the companies that must respond to the new trends and market requirements. It is equally important that the trade unions respond to the new trends in order to look after the employees' interest.

4.2. Main trends in logistics and production systems.

Main trends in the areas of new logistics and production systems are divided in three main groups: trends in the supply chain, trends in trade patterns and trends in management. The overview produced aims to provide a broad (rather than deep or exact) background to the areas of new logistics and production systems.

4.2.1. Trends in supply chain

Several trends in the area of new logistics and production systems are related to the supply chain. They are divided here into four groups. Firstly, the *new products and services*, where a continuous development increased the requirement on the logistics system. Secondly, *Electronic Commerce* is a very important area, where we only have seen the first implications on the transport system, but where much is expected to happen probably within the next ten-year period or even earlier. Additionally, the broader logistic trends have been grouped into *logistics systems*, including among others important concepts such as outsourcing and reverse logistics. Finally the trends of *delivery* cover concepts more related to the direct delivery-process.

The major supply chain trend is integration. Integration is often seen as a management issue, where management must have the ability to create efficient and reliable supply chains. However, attendance to integration is equally essential on all company levels.

Each employee must have a good understanding of cause and effect throughout the supply chain. An interesting example is the Port of Gothenburg, which has seven workers, dedicated to Avesta-Sheffield. The workers have visited their customer in order to understand their specific requirements. This example is important to supply chain integration, but is still very unusual.

The distribution drivers have a special role as ambassadors for the transport company, but also for the supplier of the transported product. This requires a feeling for the image of the distributed product. There is an increasing emphasis on the drivers' social competence.

Adaptability to new technological and conceptual change is equally important on all levels of the company. New products and services, electronic commerce, and new logistics and delivery concepts will all affect the working culture in the supply chain.

New Products and Services

Traditionally, there is a conflict between the marketing people, who want a broad product range and *customer-tailored products*, and on the other hand the production people who generally prefer *standardised products* in long series. In some cases, *modularised products* can combine the best of the two. Additional services such as *after sales services* are important competitive weapons, which sometimes results in a demand for complex logistics solutions.

The development of a *24-hour economy* is one of the most important trends, affecting the logistics systems. Also important is the increasing power of the consumer resulting in a *buyer's market*, and new concepts such as *one-stop-shopping*.

New products require new logistic systems, and the shorter product life cycles require frequent change in logistic systems. Better services require more service-minded front-line personnel (drivers, support and salesmen). Together they form an important competitive advantage, where the drivers of distribution vehicles probably have the most important role. New commerce in general increases the requirement on 24-hours transport service, flexible transport operations with flexible working hours and a concentration to night shifts.

Electronic Commerce (EC)

Electronic Commerce as a general concept covers any form of business transaction that is conducted electronically, using telecommunications networks. Such transactions occur between companies, between companies and their customers or between companies and public administration. EC uses an integrated set of electronic tools to streamline business processes and reduce cycle time. These tools include EDI, imaging, bar coding, e-mail, work-flow management systems and any other tools that may be appropriate.

Several commercial initiatives have evolved that employ EDI transactions and other related technologies in a strategic way. These include (see D5 for detailed descriptions):

Efficient Consumer Response (ECR) in the grocery industry, Quick Response (QR) in Retail, Just-In-Time (JIT) delivery, Vendor Managed Inventory (VMI), Evaluated Receipts Settlement (ERS), Paid on Production (POP), Various versions of Automated Procurement / Order Management, Electronic Settlement

The coming trend of electronic commerce will result in new business concepts and new supply networks. It is clear that electronic commerce will dramatically change the patterns of commerce, but rather nobody can exactly foresee how. As a consequence, new requirements on transport operations will appear where dynamic distribution systems are critical. Therefore, outsourcing will increase. New business concepts are expected to lead to reduced safety stock and shorter lead times throughout the supply chain, responding to real-time market demand. This requires very flexible distribution systems.

As electronic commerce will affect the whole supply chain, the effects will be important to all transport modes. The requirements on flexibility might have a slightly negative impact on rail and sea transport, in relation to the generally more flexible road and air transports. However, there is not a general consensus on this, and the use of electronic commerce in the transport business might also make the rail and sea transports more flexible. Whatsoever, there is a general agreement that electronic commerce will be used in, and will change each of the transport modes.

Logistics systems

The performance and efficiency of the logistics system is one of the most important factors for the capability of the companies represented in the supply chain. Interesting is that the capability is dependent on what is happening in a network of organisations, not just within the own organisation. Therefore it is crucial to be able to manage the supply chain and build the most competitive logistics systems.

One of the key-questions is whether you shall outsource or do everything yourself. Also questions like warehousing vs. extreme JIT-concepts are important. Other concepts concern the organisation of the transport operation, but also the avoiding of transportation itself, the avoiding of packing and the efficient use of logistics resources. Main concepts identified include:

Outsourcing, External warehousing, Centralisation, Neighbourhood Concepts, Combined production, Mainport and feeder concept, Hub-and-spoke, Green Logistics, Reverse logistics

For transportation/logistics providers in this field, logistic management skills are required and the ability to offer system solutions. This will lead to new/higher qualification and education requirements for their personnel.

For personnel moving from the commerce or manufacturing company to the new logistics service provider, an important change in working culture might occur. Values in the logistics company might differ substantially between the two companies. The employees normally stay on with their old trade union, meanwhile personnel in the logistics service company normally belongs to the transport trade union. This might result in conflicts between the trade unions, and problems for the employer to deal with different trade unions.

In combined traffic, employees must have knowledge of both railway transport and road transport, or at least knowledge of the interfaces between both. Driven by outsourcing and third party trends, logistics suppliers are forced to offer system solutions to manufacturers, which require a corresponding know-how in logistic systems. This leads to a shift in tasks and new professional profiles in the transport sector.

Transport companies are developing into logistic service centres. This leads to a broadening of the activities, for example in assembly and storage. The result is more jobs³ (in transport), new type of jobs and new working conditions. In these new fields of work a large amount of information and communication technology is implemented, for example in barcodes and automated warehouse systems, resulting in a reduction of labour required.

Besides this move towards "new industries", there is also a tendency towards outsourcing of activities resulting in less staff and fewer overhead within the transport companies. This might have a negative effect on the size of the workforce.

Through new logistic systems, such as J.I.T., the transport system becomes faster and more precise. Margins become smaller and flexibility of the system decreases. Effect on the human factor is more stress, requirement of more flexible work and less freedom (person is dictated/has to adjust to the changing transport system).

Intermodal transport has become a topic for several reasons. The strive for cost reduction is one of them. This can lead to the integration of train, ship or plane in the logistic chain. However, there are other (political) aspects, which play an important role as well. European laws or measures, for example, have a strong impact on the way a transport organisation has to operate. The restriction of driving in the weekends and the limitation of the driving hours of the truck driver are examples.

³ This is not a truly new type of jobs, but more a shift in industries.

Delivery systems

Increased demands for more frequent deliveries and reduced lead-times have forced companies to invent new delivery systems. Most of these are based on EDI to simplify the communication and avoid time-consuming paperwork. The delivery system has basic bi-polar characteristics; cost-efficiency vs. time-efficiency. To reduce costs and environmental effects, there should be few but large deliveries. The problem is that the customers often require frequent and small deliveries. Main systems identified include:

Breakpoint distribution, DDD - Daily Direct Delivery, JIT – deliveries, Increased parcel and express deliveries, City Logistics, Total fleet management, Intermodal transport, Co-ordinated distribution, Packing-free deliveries.

The application of delivery systems can lead to more efficient operations but requires close co-operation and communication with suppliers/clients, automatic tracing of consignments, the development of freight centres that facilitate the transshipment process. Their application might bring a slight reduction in the number of employees by adopting a more efficient scheduling of tasks and reducing the waste of resources. Normally, such systems would work under decentralised organisational structures in order to enhance the flexibility of operations. The employees must again be trained to adapt to the new working practices and although they will enjoy a higher level of autonomy in taking decisions, this will be accompanied with the required degree of supervision over their actions. A high level of automation and greater use of computers is anticipated with working hours following the expected delivery times of the system selected.

4.2.2. Trends in Trade Patterns

The **globalisation** and the **European integration** are the two most important trends in trade patterns that will dramatically affect the transport business. The total transport work is expected to increase at the same time, as a lot of effort is spent on reducing demand and especially reduce the environmental effects of transport.

The globalisation and European integration result in longer transport. The increasing lead-times for transport, increase the need for transport services 24 hours a day. New service requirements, increased competitiveness and a need for better use of the assets also demand 24 hour service - 7 days a week. This is one of the most important changes to the transport operation. A continuous demand for increased productivity and reduced cost remains, despite the increased requirement for flexibility and high quality and reliability.

Globalisation on one hand, leads in a shift of work from countries with high level work costs to those with low level wages, which may result in downsizing in the more 'expensive' countries. On the other hand globalisation leads to higher goods flows due to higher transport requirements. The same effects can be assumed for East-West Integration. Globalisation requires additional social, cultural and lingual qualifications and other employee skills in the transport sector.

Another effect caused by globalisation is the development of large transport operators (mega carriers) by means of taking over or by collaborating (joint ventures, strategic alliances etc.) with operations in numerous countries around the world. The focus will be placed upon the global market/demand rather than confining activities in one specific market. However, globalisation will require the standardisation of information systems across borders, as well as the removal of free-trade restrictions e.g. cabotage. The staff requirements for managerial positions are likely to also include the knowledge of foreign languages, as international departments may also be created within organisations.

One of the effects is that a demand for language training (Spanish, French, English) has occurred in a number of transport companies.

In common for all modes, globalisation has changed the outlook of the entire transport sector. An international dynamic network has been established. This leads to more dynamic work. To mention one of several similar examples, globalisation has an effect on the operations of an airport. In the current discussion in the Netherlands regarding the national airport Schiphol, airport noise is trying to be reduced by closing the airport at night. This however, leads to logistic problems in the "global market". Flights from Israel and connecting flights cannot wait for Schiphol to open up only during the days; it asks for a 24-hour economy.

European integration will require the standardisation of transport policies and information systems across Europe e.g. vehicle axle loading weight, emission levels, EDI standards etc. and also the representation of companies in other European countries either by direct expansion or by means of partners. Again, it is likely that the knowledge of other European languages by certain members of the personnel will be required. Generally, European integration will lead to similar effects as the globalisation.

The rail transport sector is one of the sectors that will be most affected by the European integration.

4.2.3. Trends in Management

There are several management trends, which directly or indirectly affect the transport business in general and the working culture in particular. The IT-development enables new organisational structures, which are necessary for the companies to stay competitive in a dynamic environment.

A dynamic environment also requires flexible organisations and continuous change and responding to that, a broad range of concepts have been developed.

4.2.4. New Organisational Structures

New conditions and demands require new organisations acting either as a complement or a substitute to the existing organisations. Main trends identified include:

Network organizations, Virtual organizations, Integrated organizations, Process oriented organisations

New organisational structures will require a change of management in transport operations to increase efficiency as well as integration in chains. This will lead to a decentralised organisational structure with high automation in terms of communication technology as to allow close co-operation between these new structures.

4.2.5. New Systems for Change Management

The topic of *change management* has currently become very fashionable. One reason lies in the massive impact brought about by social, technological and economic factors. The implementation of changes is not always easy, nor does it always result in the expected benefits of increased quality and reduced costs. Main systems identified include:

BPR - Business Process Re-engineering, TQM - Total Quality Management, TBM - Time Based Management, JIT- Just in Time Management, Supply Chain Management, ISO 9000 / ISO 14 000

New systems for change management are likely to impose the need for tighter and more efficient transport operations. In some cases, it might involve breaking down transport operations into subsequent tasks and processes and then examining ways in which they could be altered to improve efficiency and reduce waste. The staff would normally be of higher education and training will be needed to introduce them to the philosophy and concepts of change management. This will probably be done by organising seminars and workshops, incorporated within special training programmes. The focus will be placed on closer teamwork and working towards zero defects, a goal which will be facilitated by the increase in automation for more efficient control.

4.3. Main trends identified and their impacts on working culture elements

The support of four key factors must be a common objective to each employer and employee, in order to ensure a sustainable business. The key factors are:

- reliability
- integration
- flexibility
- cost reduction

The most creative dialogue between employers, employees, their organisations and the authorities must focus on how these four key factors can be achieved, sustaining a positive working culture, giving the best working conditions for the employees.

The results presented here, will point out some of the expected effects on the working culture, forming a base for the future dialogue. Some main implications of the main trends identified are described for the five human factor elements: labour force, work organisation, working environment, employment conditions and labour relations. In Table 4-1, below, the human factor elements and the requirements for a sustainable business are summarised. The effects on the five main working culture elements are discussed further in the text that follows the table.

Table 4-1 Human factor elements and their respective requirements for a sustainable transport business

Human Factor Element	Requirements for a sustainable business
Labour force	<ul style="list-style-type: none"> • Computer and integrated transport solution skills • Understanding of cause and effects • Reduction of administrative staff • Multi-skilled personnel
Work organisation	<ul style="list-style-type: none"> • Creative and decentralised organisation • Coaching role of supervisor important • Self-controlling, flat and creative organisation • Standardised transport system for major goods flow
Working environment	<ul style="list-style-type: none"> • Broader responsibility and varying work tasks • Job rotation against monotonous work tasks • Solution to conflict working environment vs. Cost reductions
Employment conditions	<ul style="list-style-type: none"> • Incentive based salary • Training and work exchange programs
Labour relations	<ul style="list-style-type: none"> • Competitive company through good labour relations • Trade union structure to meet new organisational structures • More flexible work force • Co-operative environment between trade unions and employers regarding cost reductions

4.3.1. Labour Force

Modern Information and Communication Technologies enable new logistic solutions that are necessary in order to improve the four key factors mentioned above. The reliability and flexibility will be increased if administrative tasks are performed close to operations. Many administrative tasks are also eliminated. The number of white-collar workers will consequently be reduced; a process that already has started in many companies. This increases the requirements on the blue-collar workers. They must be able to handle a PC and understand the administrative routines. The differences between white- and blue-collar workers will at several workplaces be eliminated. This raises questions like, what kind of personnel is needed tomorrow, is a person with a background as blue- or white-collar worker needed? What trade union should organise them, the transport union or the administrative union?

Maybe even more demanding is the requirement on the drivers and other front line personnel. There is a strong need for people with a positive and service-minded mentality. Young creative people are generally preferred to older and more experienced people.

A fast-growing business is the many new personnel-for-hire agencies. More people are temporarily hired, in order to give the organisation a high degree of flexibility. This is true for both white- and blue-collar workers.

The labour force of tomorrow is probably flexible in size, and the employees are skilled to do both administrative and physical tasks. The ICT-system will probably support a higher degree of reliability for standard flows. The employees have to concentrate on the small amount of non-standard goods, requiring more high-skilled people.

Summary of expected effects

- Reliability requires computer-based and integrated transport solutions. This will result in that new skills will be required.
- Integration requires a good understanding for the cause and effects in the entire supply chain. The borders between blue- and white-collar workers will erase and the number of pure administrative staff will be reduced.
- Flexibility requires employees who are skilled in several tasks (both administrative and physical) and the market for personnel for hire will continue to grow in importance.
- Cost reductions require a continuous reduction in the number of employees. This will especially be true on the administrative side, where computer-based solutions will make old jobs redundant.

4.3.2. Work Organisation

Despite the fact that, the work organisation differs between different companies and different transport modes, most interviewees agree that change is necessary. Their organisations are not dynamic enough, and maybe most important, there is a need for more integrated supply chains.

A general problem is that most things happen quickly and actions must be taken immediately. This does not allow for a bureaucratic and hierarchical organisation, but requires a flat and creative one. The new technology creates possibilities for a centralised control and co-ordination, using decentralised systems, where each individual has a comprehensive responsibility. Consequently, most job categories will cover larger areas than before.

A change from today's functional organisations is foreseen. The organisation must instead be efficiently organised around the freight flow. 80% of the goods will be handled in an efficient, standardised and static system. Individual efforts must be taken on the 20% of the goods that do not fit into the basic flow. This requires a creative and decentralised organisation. The employees must be more highly skilled and more oriented towards solving problems.

The new systems enable increased reliability and productivity without the supervisors' control. This means that the employee might feel more controlled by the system, but that s/he on the other hand has a larger degree of freedom.

The role of the supervisor has changed from control to motivation of the employees. S/he must also guide, create awareness and understanding; and help and support the employee to take a comprehensive responsibility. The requirements on the supervisors are expected to increase even more in the future.

One manager argues that the requirements on the supervisors result in that it is almost impossible to hire somebody from outside the organisation. The supervisors and other managers have to know the company culture very well. In order to avoid the high risk of a mismatch, these people are only recruited internally.

Change is another essential parameter. It is argued that there is an optimal range of change. Too much will create complete chaos, where people cannot work efficiently. Too little change will on the other hand demoralise the individuals and create a non-dynamic organisation. The computer system is argued to be a limiting factor to a large degree of change, since organisational changes often require expensive system development.

The office work of tomorrow

The office work in an economy in general and thus also the office work in the freight transport sector will be highly influenced by globalisation, ICT technology including e. g. electronic commerce, and the corresponding organisational approaches, such as virtual or network enterprises. The remaining part of this section will describe what possibilities new technology offers. What part will, in reality, be used in the transport sector cannot be accurately estimated.

In a networked enterprise and a networked market the location of the workplace will not play such an important role anymore. 'Work where you want' will (at least technically) be possible. The individual office worker will become more or less an entrepreneur, selling his own labour on the market.

International networks will allow the individual entrepreneur to act globally. Highly autonomous and individual types of work and self-organisation will be possible. This might result in higher mobility requirements. Travelling will be of even more increasing importance. On the other hand office work will be offered and can be delivered 24 hours a day around the globe via the electronic market.

The risk of social isolation on the job will exist (due to extensive computer use and high mobility). Other social structures at work, like network communities or more local social structures (related to work at home) will gain importance.

Summary of expected effects

- Reliability requires an organisation that is focused on solving emerging problems. Individual efforts must be taken on the "20%" of goods, which do not fit into the basic flow, requiring a creative and decentralised organisation, with high skilled people.
- Integration requires a good understanding of the cause and effects in the entire supply chain. The role of the supervisor is very important here. S/he must motivate the employees to take responsibility of the effects in all of the supply chain.
- Flexibility requires a flat and creative organisation, and does not allow bureaucratic and hierarchical structures. The system must be self-controlling, without the involvement of supervisors and other managers.

Cost reductions require a standardised transport system, with a minimum of work. This will be possible for the "80%" standard consignments. The reduction of unnecessary administrative tasks is essential.

4.3.3. Working Environment

New concepts and IT-systems for quality and control might result in a stressful situation for the employee. On the other hand s/he will receive a more comprehensive responsibility. The technological characteristics may change from market to market. High-automated and cost effective warehouses are important in some countries, such as England. In Sweden, which is a smaller market, flexibility is often seen as more important. New systems will often include new ergonomic equipment.

It is seen as a critical success factor that the organisation is in a good state and oriented towards development. This requires an important sensitiveness to any problem in the working environment. This does not mean that stress and other negative factors should not occur, but the problems cannot be allowed to be too high. Automation and the reduction of paperwork will also decrease much of the routine work, which is seen as an advantage.

Summary of expected effects

Reliability, integration and flexibility require a broader responsibility and more varying tasks. However, some workers might get a reduced variety of tasks, caused by increased automation. This can often be solved by job rotation.

Cost reductions can in some circumstances conflict with a good working environment. Therefore, it is important for employers and employees to find solutions where cost reductions and working environment goes hand in hand.

4.3.4. Employment Conditions

The salary systems will probably be more of an incentive nature, promoting high quality. An important problem today is the many different unions represented among the personnel. Employees are often organised by the union represented at their former employer. Despite the fact that the employees are doing the same tasks, they might have completely different agreements. This creates problems and conflicts.

The more comprehensive responsibilities enabled by new technologies, result in employers with a better understanding of operations. This also results in the fact that employees are more prepared to develop within the company. New career patterns evolve.

The most important change is that people have to work nights as well as days, caused by the 24-hour economy. Still, the employment conditions must be competitive. Factors like personal development are as important as salary. From one of the more dynamic organisations, it is argued that rules and regulations do not have a large impact on the business. Conditions must be good to keep the employees motivated and willing to stay on with the organisation. The managers argue that employees must have a positive development if the organisation shall develop. This is a common responsibility for both parties.

For some employees, it will be necessary to be away from home during longer periods. For example, more and more containers are transported by rail. There is a tendency towards long distance transport as well, for example Rotterdam-Munich. This means that the engine driver is away from home longer.

Summary of expected effects

- Reliability and flexibility are in several transport businesses seen as more important than high productivity. The salary system is therefore expected to be more incentive-based on transport quality, which can be described in terms of reliability and flexible services.
- Integration and cost reductions require new skills and an understanding of cause and effects in the entire supply chain; over functional as well as organisational borders. This will require different kinds of training and work exchange programmes.

4.3.5. Labour Relations

The degree of project groups and work councils increase. They form a sound base for internal development and change. It is also easier to find motivated and contributing employees, caused by the fact that new technologies have given them a more comprehensive responsibility and understanding.

The unions are still organised after a traditional industrial structure. This may be an important obstacle to the creation of new dynamic solutions along the distribution chain. Several industries are met, and employees doing the same tasks are organised by different trade unions.

Most unions accept the necessary changes to a 24-hour operation, but some links in the distribution chain do not. The result is a static solution, not responding to the new requirements on transport operations. It is important to have dynamic unions as well as dynamic companies. This will serve the interests of both employers and employees. However, in general, there is a good understanding between employers and employees.

Ability to handle labour conflict is seen as a competitive advantage - Common understanding between employee / employer organisations, is essential to both parties.

Summary of expected effects

- Reliability is the most important parameter, and has almost only positive effects for the employees as well as the business, if the organisation is successful. If employer and employees together are successful here, the business should be competitive and there should be room for development of good labour relations. On the other hand, a strike might destroy the companies' reliability, causing considerable negative effects for several years.
- Integration between functions and organisations requires a corresponding trade union structure, in order to give their members the best support. Conflicts between trade unions, caused by old industrial structures, will not gain any part.
- Flexibility requires more flexible working shifts. The number of personnel hired on short term to cover peaks will probably also increase.
- Cost reductions are necessary. It is important for the companies' reliability, that these cost reductions can be achieved in a co-operative climate between employer and trade unions. This is a demanding challenge to both employers and employees organisations.

Main general conclusions

The working culture will be significantly influenced by the new logistics and production systems. Changes will be seen for each of the five human factor elements: labour force, work organisation, working environment, employment conditions and labour relations.

Most of the trends in logistics and production systems are found to be important to the companies represented among the interviewees. The development in the companies must be seen as a mix of activities, where no company is following or reacting to only one trend. The companies must act dynamically, and respond to the development. This is what can give them competitive advantage.

It is also important to remember that it is not only the companies that must respond to the new trends and market requirements. It is equally important that the trade unions to respond to the new trends in order to look after the employees' interest.

It has been concluded that the support of four key factors must be a common objective to each employer and employee, in order to ensure a sustainable business. The key factors are :

- Reliability
- Integration
- Flexibility
- Cost reduction

Below each of the key factors will be discussed :

Reliability

The key issue, more important than anything else, is reliability, e.g. that a consignment is delivered at the promised time, that it is not damaged, or delivered to the wrong address or person.

Reliability requires computer-based integrated transport solutions. "80%" of the goods will be handled by a reliable system with a minimum of effort. The organisation must instead be focused on solving emerging problems. Individual efforts must be taken on the "20%" of goods that do not fit into the basic flow, requiring a creative and decentralised organisation, with high skilled people.

A consequence will be that the employees must get a broader responsibility with more varying tasks. However, some workers might receive a reduced variety of tasks, caused by increased automation. This can often be solved by job rotation. The salary system is expected to be more incentive-orientated, based on transport quality, which can be described in terms of reliability and flexible services. This is often more important than a high productivity.

Reliability has almost only good effects for the employees as well as the business, if the organisation is successful. If employer and employees together are successful here, the business should be competitive and there should be room for development of good labour relations. On the other hand, a strike might destroy the company's reliability, causing considerable negative effects for several years.

Integration

Reliable solutions require integrated solutions, where both management and operative staff have a full understanding of cause of own actions and effects for the end customer. The borders between blue- and white-collar workers will erase and the number of pure administrative staff will be reduced. Broader responsibility and more varying tasks are expected, but some workers might get a reduced variety of tasks caused by increased automation. This can often be solved by job rotation.

The role of the supervisor is very important. S/he must motivate the employees to take responsibility to the effects in all the supply chain. Integration requires new skills, especially a good understanding of cause and effects in the entire supply chain; over functional as well as organisational borders. This will require different kinds of training and work exchange programmes.

Integration between functions and organisations requires a corresponding trade union structure, in order to give their members the best support. Conflicts between trade unions, caused by old industrial structures, will not be an advantage to any of the parties involved.

Flexibility

Flexibility is essential. Shorter lead-time for new products and services will require a higher frequency of major change. Electronic commerce and commerce in general will lead to a large transport concentration to night-time.

There will be a demand for employees who are skilled in several tasks (both administrative and physical) and the market for personnel for hire will continue to grow in importance. Flexibility requires a flat and creative organisation, and does not allow bureaucratic and hierarchical structures. The system must be self-controlling, without the involvement of supervisors and other managers. It is essential that the employees can take a broad responsibility, resulting in various tasks. Flexibility requires more flexible working shifts. The degree of personnel hired to cover peaks will probably also increase.

Cost reduction

Competitiveness will always require cost reduction, not only a sub-optimisation, but also a cost reduction for the complete distribution chain. Cost reductions will require a continuous reduction in the number of employees. This will especially be true on the administrative side, where computer-based solutions will make old jobs redundant.

Cost reductions require a standardised transport system, with a minimum of work. This will be possible for the “80%” standard consignments. The reduction of unnecessary administrative tasks is essential. The cost reductions can in some circumstances conflict with a good working environment. Therefore, it is important for employers and employees to find solutions where cost reductions and working environment go hand in hand.

Cost reductions are necessary, but if badly managed can cause more damage than savings. Since, reliability is argued to be the most important key-factor, the cost reductions must be achieved in a co-operative climate between employer and trade unions. The same is true for the important supply chain integration. New skills and an understanding of cause and effects in the entire supply chain; over functional as well as organisational borders are necessary. Different kinds of training and work exchange programmes might be necessary. A cost reduction, not conflicting with reliability,

flexibility, integration or the labour conditions is a demanding challenge to both employers and employee organisations.

Task for the labour partners

To create a sustainable and good working culture is a demanding challenge to all parties involved in the process. It is necessary to keep the most creative dialogue between employers, employees, their organisations and the authorities, focusing on how to achieve reliability, integration, flexibility and cost reduction, and at the same time sustain a positive working culture, giving the best working conditions for the employees.

5. Hierarchy of key issues

5.1. Approach followed

In total five iterative steps lead to the required result of a hierarchy of key issues:

- a Delphi poll, based on mailed questionnaires, which were statistically evaluated and discussed in detail,
- a workshop, aiming at the harmonisation of the obtained data, which resulted in a definition of the measures «conflict potential», «problem potential» and «impact on human work (or labour relations)» as possible scales for ranking the issues,
- a further processing of the statistical results by performing the ranking of the issues according to problem potentials, conflict potentials, and impact on human work, including a discussion of the results;
- in order not to lose important issues, which could not be included in the Delphi poll, those issues were collected within the consortium and discussed during a workshop;
- a detailed analysis of the influences of new technologies and new logistics and production systems based on the experience of the experts within WORKFRET was performed.

For the Delphi poll a questionnaire was compiled and sent to correspondents of all 4 groups of main actors. The questionnaire consisted of 4 sections. The first section contained personal data of the correspondents, which was separated from the rest of the questionnaire in order to guarantee for anonymous processing of the data. The other sections contained pre-formulated statements concerning:

- organisational/managerial and technological trends and developments in freight transport,
- humans work and labour relations in freight transport,
- impacts of organisational/managerial and technological developments on human work and labour relations in intermodal transport.

The experts had mainly to specify their degree of agreement with pre-formulated statements on a three-point-scale. In the last section of the questionnaire they had also to assess how strong the formulated impact mechanisms will effect working culture. 84 experts were asked to participate and 49% of them, from 7 European countries, returned the filled questionnaire. The further data processing is described later in this chapter, where the results are presented.

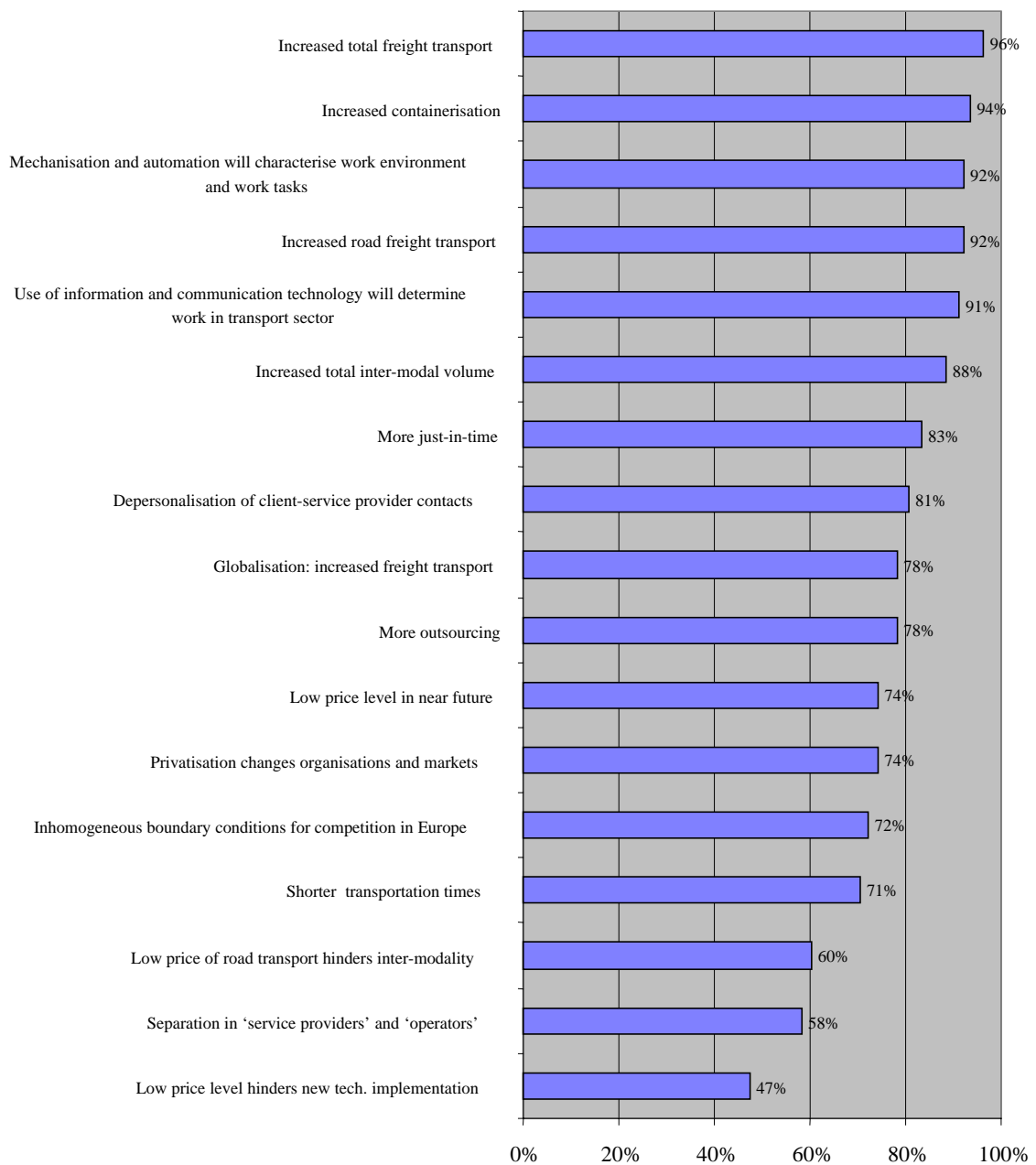
For the analysis of the influences of new technologies and new logistics and production systems the interviewers, who were involved in the expert interviews, assessed the influence of the individual new technologies and logistics and production systems on the working culture parameters. Their ratings were summarized statistically. Averaging

over all individual ratings was performed as well as analyses of variance to show whether the contributing experts agree or disagree.

5.2. Organisational/ managerial trends and developments

Figure 5.1 shows the average agreement values (possible range: 0...100%) for all items of the second section of the Delphi questionnaire. The formulation of the items did in most cases not show a direct relation to working culture parameters. The purpose of this section was rather to obtain estimations about more general lines of developments in freight transport, which might influence working culture. The results were intended to also be used as an input for scenario writing (see Chapter 6).

Figure 5.1 Average agreement on organisational/ managerial trends and developments



5.3. Impacts on working cultures in freight transport

As far as *trends in human work and labour relations* are concerned more than 75% of the respondents agreed fully

- that high time pressure characterises work in freight transport (average value 89%),
- that new qualifications and vocational training will be required in the transport sector to adapt the personnel to requirements (average value 88%).

It seemed also rather undoubted with more than 50% of the respondents agreeing fully and more than 75% at least partly that :

- a shift from physical to mental workload can be expected due to mechanisation and automation (average value 87%),
- the total number of jobs in intermodal transport will increase (average value 82%),
- professional profiles in freight transport will change considerably during coming years (average value 79%),
- flexibility in working time and contractual status will be required to fulfil the needs of the common European market (average value 79%),
- the employment of unskilled workers in freight transport will decrease (73%),
- the number of jobs in railway freight transport will decrease (78%).

Concerning the decrease of number of jobs in freight transport, the opinions depended heavily on the mode of transportation. They can be ranked by average values of agreement as follows:

- railway freight transport 78%,
- waterborne transport 44% (the lowest but one rating among all items in this section).
- airfreight transport 27% (the lowest rating among all items in this section).

For road transport more than 50% agreed fully and more than 25% agreed partly with the inverse hypothesis that the number of jobs will increase in road freight transport (average value 69%).

The rest of the items could be also found in this range of agreement, rather confirming than denying that

- physical conditions at workplaces will improve (average value of agreement 69%),
- the occupational safety and health standards will improve and hazards be reduced (average value 67%),
- collective bargaining will lose importance and will shift from a regional level to the enterprise level (average value 67%),
- that apparent self-employment of vehicle operators (road and inland waterways freight transport), who are de facto dependent on a single transportation service provider is a topic of increasing importance (66%).

For the individual *impacts of organisational/ managerial and technological developments on human work and labour relations in intermodal transport* two types of ratings were acquired. One is the degree of *agreement*, the other the expected strength of the *impact* of the stated mechanisms on human work. Figure 5.2 shows average scaled values for the impact ratings. Besides two of them, all items showed a strong impact of more than 50%.

The agreement ratings' for specific relations were lower than the respective ones in previous sections, but several items exist with more than 50% agreeing fully and at least 75% agreeing partly. These results are included in order of decreasing agreement values (indicated in brackets) in the following:

- The need of 24 hours operation requires more working in shift systems (86%).
- Implementation of new Information and Communication (IC) technologies will result in a demand of better educated people (85%).
- Globalisation will result in larger transport service providers taking advantage economies of sales (84%).
- EC within the supply chain requires higher educated personnel. Training and programmes for further education are fundamental for the successful implementation of EC (81%).
- Globalisation requires additional qualifications and skills of employees in the transport sector (81%).
- JIT on a regular schedule basis has less negative impacts on human factors, than tough schedules for non-regular freight, which result in time pressure and related stress (76%).
- Globalisation will lead towards the 24 hours economy and forces more flexibility in working time and/or contractual status of personnel (76%).
- The implementation of new IC technologies will lead to a reduction in unskilled and an increase in skilled labour (76%).
- Globalisation will lead to a higher goods flow and to a positive impact on the number of people employed (76%).
- More people will be temporarily hired to guarantee a high degree of flexibility of the organisation (74%).
- Through the implementation of new technologies a reduction in jobs per ton of transported goods can be expected. In parallel the number of employed will grow through the increasing volume of transportation (73%).
- Through the implementation of information and communication technologies, such as satellite communication, route planning as well as tracking and tracing systems, a higher degree of supervision of personnel will become reality and a loss of autonomy of work can be observed (especially in the area of road transportation) (70%).

5.4. Conflict and problem potentials

A *conflict* potential exists, if there are different points of views of the different groups of actors in the field (employers' representatives, trade unions, policy makers, and experts in science and research). It is assumed that there exists a high potential for conflicts, if the attitudes related to an issue of the different groups of experts differ considerably. Thus the maximum difference in the average agreement measure between all groups from the Delphi poll can be used as an assessment of the conflict potential.

A *problem* can be considered as an undesirable state, which shall either be avoided, or, if it already exists, shall be abandoned. Future problems can be characterised by a problem potential. The problem potential can be looked upon as a risk, which is assigned to the corresponding undesired future state. The risk can be regarded as a product of the severity of the potential 'hazard' and the probability of its occurrence⁴. As an estimate for the occurrence the average agreement of all Delphi correspondents can be used, again assuming that they answered based on sound expertise and knowledge about future developments. The severity of an issue was assessed separately.

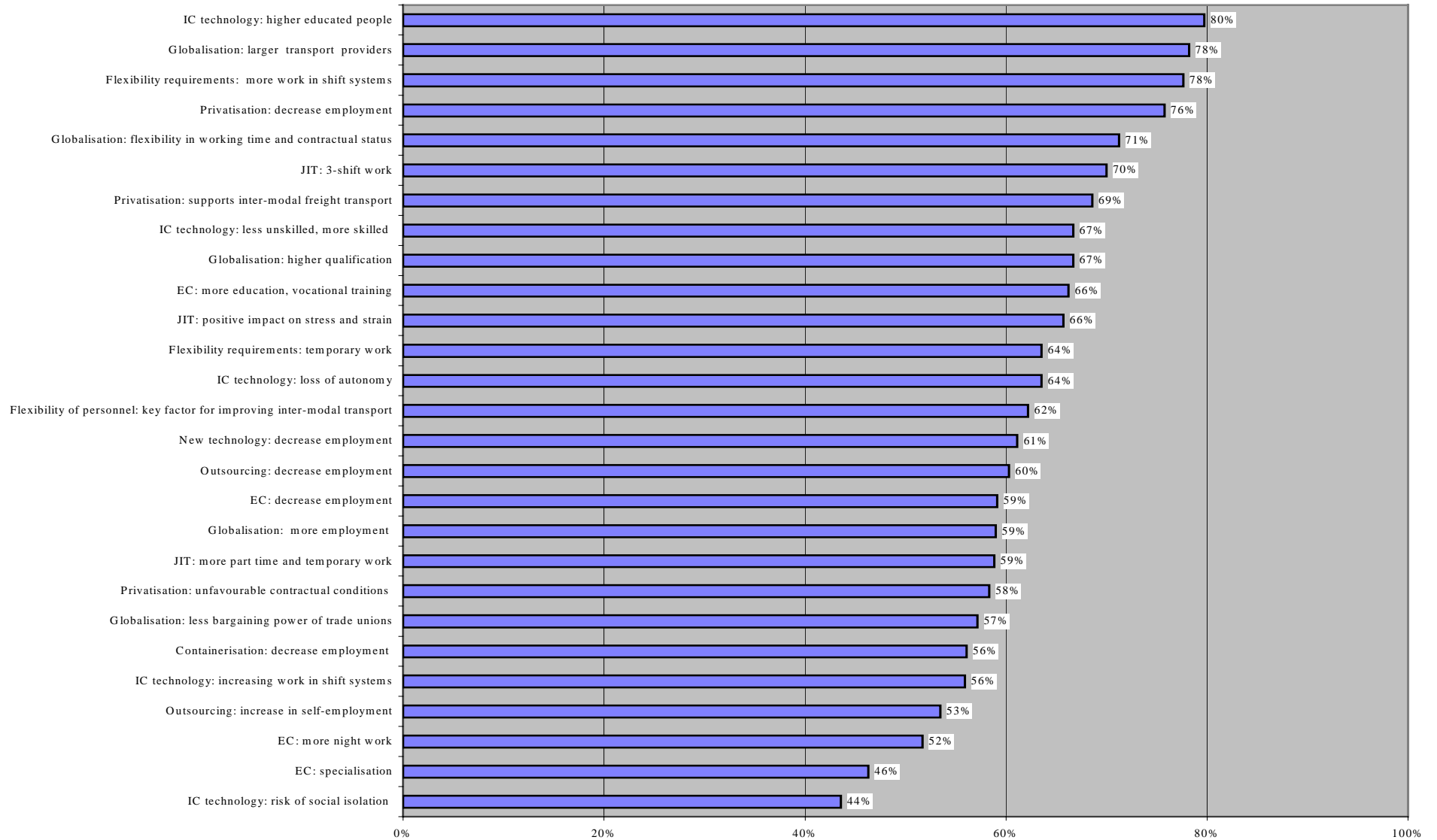
The values of both problem and conflict potential may vary between 0 and 1 (0% and 100%). 0 means that there is no such potential, 1 means that there is a very high problem or conflict potential.

For *human work and labour relations* section of the survey conflict potentials of 25% and more were found for the following "top ten" items:

- New qualification and vocational training (44%) is seen as necessary by policy makers, trade unions and researchers but employers did agree to only a limited extent. This could lead partly to conflicts as policy makers, employers and trade unions can all be seen as actors in this field.
- There was also a high disagreement (42%) that collective bargaining will lose importance and that there will be a shift from collective agreements to agreements on an enterprise or factory level. Trade unions replied lowest agreement levels, policy makers highest. It is remarkable that employers and researchers both agreed more on the average level and that the biggest conflict potential was not found between trade unions and employers.
- A conflict potential of 40% could be observed concerning the change of professional profiles. Employers rated remarkably lower than all other groups. Researchers agreed to the highest degree.
- Concerning the increase of the total number of jobs in road transport, there was a conflict potential of 39% between policy makers on the one hand and employers on the other. Policy makers agreed to a rather low and all others agreed to a similar high extent.

⁴ Thus two assessments are necessary to calculate a problem potential p : the severity s and the occurrence o ($p = s \cdot o$).

Figure 5.2 Rated strengths of impacts of organisational/ managerial and technological developments on human work and labour relations in intermodal transport



- For an improvement in occupational safety and health, a conflict potential of 38% was calculated. Trade unions were most sceptical and policy makers most optimistic. The two other groups were allocated near the policy makers' opinion.
- There was also a high difference in agreement for the necessity of flexible working time and flexible contractual status. Trade unions were more reluctant whereas the other three groups agreed to a high extent. This touches the field of social partnership and may lead to further disputes in the future.
- Concerning the total number of jobs with involvement in intermodal transport there are very positive expectations by trade unions and most pessimistic expectations by employers. The conflict potential due to this difference equals 32%.
- A similar pattern of conflict potential of 31% can be found for the question, whether the work in the transport sector is characterised by the presence of a high time pressure in many enterprises. The trade unions agreed on the highest level, the employers on the lowest. Researchers agreed on an average level. This result can be interpreted by different positions of social partners, which can also be relevant in certain disputes.
- The expectations concerning the improvement of physical conditions lead to a conflict potential of 27%. This difference could be found between employers and research experts. The latter were together with policy makers rather optimistic, whereas the employers together with trade unions had the same pessimistic position.
- Concerning the question, whether mechanisation and automation will lead to a further shift from physical to mental workload in the transport sector, there was a conflict potential of 26%. Trade unions were most positive towards this development and employers most reluctant. Research experts rated in the range in between.

This ranking has to be considered together with the problem potential measure. Some of the top items of the ranking were also related to a considerable problem potential.

- New qualification and vocational training (problem potential 44%)
- Shift of collective bargaining from regional to enterprise level (problem potential 67%)
- Change of professional profiles (problem potential 39%)
- Flexibility in working time and contractual status related with uncertainty for the employees (problem potential 79%)
- High time pressure as a stress factor (problem potential 89%)

In total 8 out of 15 items presented to the experts showed a high relevance in terms of problem and/or conflict potential and seem worth to be further considered. Rather highly ranked are:

- issues concerning level of education and vocational training in freight transport,

- issues concerning flexibility in working time and contractual status,
- issues concerning the structure of collective bargaining,
- issues, which are related to a decreasing number of jobs in different sectors of freight transport.

Conflict and problem potentials could also be found for the expected *impacts of organisational/ managerial and technological developments on human work and labour relations in intermodal transport*.

Two issues showed an extremely high conflict potential of 50% and 73%, respectively. Both are related to privatisation and the high conflict potential is due to a high difference in agreement between employers and trade unions.

- Employers disagreed heavily (8% average agreement level) with the hypothesis that privatisation will lead in general to worse contractual conditions for employees. Trade unionists however agreed to an average level of 81%. This difference in position of 73% might well influence the behaviour in privatisation discussions and processes.
- In contrast trade unions agreed only to a low degree and employers to a high degree that privatisation supports intermodal transportation and leads to more efficiency in this sector. The conflict potential amounted to 50%.

The following ranking shows 9 further items with a conflict potential of more than 25%:

- Outsourcing will lead to more self-employment (40%).
- Implementation of IC technologies will lead to a risk of social isolation (39%).
- More people will be temporarily hired to guarantee a high degree of flexibility of the organisation (38%).
- Implementation of new technologies will result in a reduction in jobs per ton of transported goods. It can be expected also that in parallel the number of employed will grow through the increasing volume of transportation (38%).
- Globalisation will have a positive impact on the number of employed (38%).
- Containerisation leads, due to rationalisation, to a negative impact on employment (36%).
- Trade unions will lose bargaining power through globalisation (30%).
- Electronic commerce will lead to a negative effect on the size of labour force (27%).
- Implementation of IC technologies will allow and support working in shifts (26%).

The vast majority of conflict potentials occurred between trade unions and employers, which shows the differences in positions especially between those groups. In all top eleven items trade unions always have an extreme position in their agreements, either the minimum or the maximum compared to other groups. Several of the high conflict potentials are due to a pessimistic view of the trade unions, which can be especially observed for employment issues. Besides employment, contractual conditions and working time issues are frequently represented among issues with high conflict potential.

The issues that revealed a relevant high problem potential of over 50% are ranked as follows:

- IC technologies will lead to a loss of autonomy of the employees especially in the area of road transportation (70%).
- Outsourcing will result in the reduction of transportation related personnel, and corresponding work will be transferred to a relevant transport provider (69%). The net effect of this development can be expected to be a loss of jobs but partly it will be a shift of jobs from the production industry to the transport sector.
- The implementation of IC technologies allows and will support working in shifts (68%).
- Privatisation will lead to a loss of jobs (68%).
- Just in Time requirements of customers will result in the need of three-shift work in freight centres (66%).
- Trade unions bargaining power will decrease through globalisation (62%).
- Electronic commerce will result in shorter lead times and reduce safety stocks along the supply chain. This will have a negative effect on the labour force and will lead to a reduction of personnel (58%).
- Containerisation leads to more rationalisation and automation in freight transport and results in negative impacts on the number of employees in intermodal transport (55%).

5.5. Main findings

It has been found that the attitudes concerning future developments differ partly considerably between the different groups of actors, which results in a conflict potential especially between social partners, who took the extreme positions for many of the issues presented to them in the Delphi questionnaire. This suggests the necessity of an intensive social dialogue at an European level as the points of view differed clearly between the groups of actors.

The "top ten" key issues, which displayed both, a high conflict and a high problem potential, ranked in the sequence of decreasing problem potential are:

- high time pressure in many enterprises in freight transport,

- the necessity of more flexibility in working time and contractual status,
- decrease of number of jobs per ton of transported goods, and increase of employment through growth of the freight transport sector,
- a shift from collective bargaining on regional level to enterprise level,
- a negative impact on employment by containerisation through rationalisation,
- a negative impact of privatisation on contractual conditions,
- the necessity of new qualifications and vocational training in the transport sector,
- the risk of social isolation through IC technologies and computer work,
- the change of professional profiles in the transport sector,
- the necessity of more temporary work/contracts through flexibility requirements.

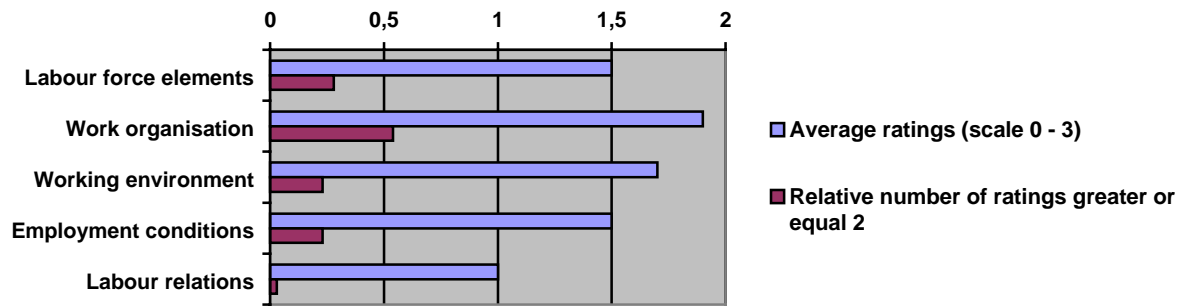
A focus should be set on those issues. Policy suggestions, which cover individual or even multiple of these issues have a high priority due to the high associated problem potential. But they are also sensitive in terms of conflict potential and thus require careful tuning, by integrating the social partners' points of view.

However, it has to be emphasised that other important issues must not be neglected, such as:

- quota of female employees in the transport sector,
- elderly and disabled issues,
- integration of foreign workers and immigrants,
- aspects of labour relations,
- aspects, which cannot be treated globally but depend heavily on the regional or enterprise context like job enlargement/enrichment, empowerment, etc.

Finally, the conducted influence analysis revealed that organisational changes like new logistics and production systems have considerably higher influence on working culture parameters in intermodal transport than purely technological changes. Among the considered new technologies, transshipment and freight handling technologies at terminals and nodal points have the strongest impact on working culture parameters. This suggests to further consider organisational or combined technological and organisational changes rather than pure technological changes. It was also found (Figure 5.3) that work organisation is more influenced by technological and organisational changes than labour force elements, work environment and employment conditions are. Labour relations seemed to be even clearly less sensitive than the other working culture parameters.

Figure 5.3 Sensitivity of working culture parameter groups concerning technological and organisational changes



6. Scenarios for future developments

6.1. Approach followed

The approach adopted in this part of the WORKFRET project is based on the work reported in chapters 3 and 4. The influence of new technologies in intermodal transport on working cultures and organisational structures were investigated there as well as the influence of new logistics and production systems. Expert interviews and a variety of interrelations were obtained. However the degree of consensus between experts could not be determined and thus scenarios could not be formulated.

Scenarios, as the term will be used in the context of WORKFRET, are "outlines of the future" defining a consistent set of the future characteristics of the system under consideration. Two basic approaches were used to obtain scenarios for working cultures. Firstly Delphi studies were carried out to obtain scenarios as a forecast of the future situation based on the consensus of the experts. Secondly expert workshops were organised in the context of the WORKFRET case studies to formulate scenarios in the sense of alternative sets of outlines of the future based on the present experts' view.

Two types of scenarios have been formulated.

- "Vertical scenarios", based on the case studies conducted within the project's framework and produced by Delphi methods (workshops and Vertical Delphi study). They include aspects of the specific site, because many of the working culture parameters are site-specific. "Vertical scenarios", however, do not focus only on the facility or enterprise level. They also include higher levels, i. e. regional, national or international aspects. But it is evident that the vertical scenarios with their local roots cannot cover the complete European level. Therefore another type of scenarios was used: the "horizontal scenarios".
- "Horizontal scenarios", formulated with a European view and covering the European level at a more broad and general scope. They were based on the Horizontal Delphi study. Figure 6.1 shows an overview of the WORKFRET scenarios.

Figure 6.1 WORKFRET Scenarios

European level	The combined transportation scenarios 2010 based on the "Vertical Delphi study"	"Horizontal scenarios" based on the "Horizontal Delphi" study		
		General trend scenario	Working culture scenario	Impact trend scenario
Regional/ national level	<ul style="list-style-type: none"> • European level • National level • Enterprise and facility level 	The Yorkshire region vertical scenarios	The Rotterdam Europort vertical scenarios	The Port of Thessaloniki vertical scenarios
Facility/ enterprise level		<ul style="list-style-type: none"> • Do nothing • Road transport development • Railway dev. 	<ul style="list-style-type: none"> • "Global competition" • "Divided Europe" 	<ul style="list-style-type: none"> • Pessimistic • Realistic • Optimistic

Besides the experts' input a system model of a generic nodal point was formulated and analysed, in order to obtain some recommendations on active parameters and "handles"⁵, which influence working cultures.

6.2. Horizontal Delphi

For the Horizontal Delphi⁶ a questionnaire was elaborated that confronted the experts with 59 items covering

- general trends in organisational/managerial and technological developments in freight transport,
- trends for working culture parameters, and
- impacts of organisational/managerial and technological developments on human work and labour relations in intermodal transport.

Experts were asked to express their degree of agreement. Average agreement levels were used as a measure to compile trend scenarios with high levels of consensus⁷:

- a general trend scenario of organisational/managerial and technological developments in freight transport (see 6.5.1),
- a general working culture trend scenario (see 6.5.2), and

⁵ A "handle" is a system parameter (or element) that can be changed by the actors to influence *to handle*- the whole system, to achieve a desired state. Normally a handle should not have unwanted side effects. It should not be sensitive to other parameters that are not under the control of the actor.

⁶ The data of this Delphi study was also used in chapter 7 for the hierarchy of key issues

⁷ Details about the approach including questionnaire design, respondents and statistical evaluation procedures can be found in WORKFRET Deliverable 6.

- an impact trend scenario regarding the impacts of organisational/managerial and technological developments on human work and labour relations in intermodal transport.

6.3. Vertical Delphi

The purpose of the Vertical Delphi was to supplement the more general scope of the horizontal study by the more detailed and in-depth view of a vertical study in order to be able to consider all aspects of working culture. It is obvious that working culture parameters are best observable at an enterprise or facility level, where working culture manifests itself. This study had therefore to cover all

- the European level,
- the national (or regional) level,
- and the enterprise or facility level.

In order to achieve this depth and taking into account the limited project resources the Delphi had to be restricted to a specific intermodal chain and one case study as specific background context.

The German case study on road/rail intermodal points was selected as background for the vertical study, because in contrast to the other case studies it deals with rail/road combined transportation in a more generic way without focusing on specific regional aspects. At the facility level a generic "freight centre" was used to find scenarios for a generic nodal point. At the national level the study focused on the German situation and is supplemented by the vertical scenarios in the other WORKFRET case studies. At the European level the Vertical Study has to be seen in context with the Horizontal Scenarios.

The approach is similar to the Horizontal Delphi. However, the options presented to the experts had not been unspecific in time. They targeted at a well-defined time horizon of 2010 for all the levels of scope. Again the experts were confronted with a set of statements, which now represented options for the future of 2010. The total number of options was 124, more than twice the number used in the Trend Delphi. The European level was covered with 26, the national level with 40 and the facility level with 58 options. The 24 experts involved were interviewed by telephone. They had three choices to react on the statements, which were presented to them orally: to agree, to disagree or not to decide. This form of data collection allowed to record also the reasoning of the experts and to take additional notes, which results in valuable background information for formulating scenarios. Like in the Trend Delphi average levels of agreement were calculated by adding the experts' answers and normalising them to obtain a measure of consensus.

6.4. The system model

Supplementing the two Delphi studies a generic system model of an intermodal platform was elaborated, representing a generic freight centre in combined transportation. This model contains five groups of parameters:

- 20 economic parameters,
- 5 technological parameters,
- 4 external resources parameters,
- 10 political/legal parameters,
- 39 working culture parameters.

The parameters can be looked upon as system elements. Together with their interrelations they form a system. A system graph (Figure 6.2) illustrates both, system elements and their interrelations. The system elements constitute the nodes of the system graph. The relations between the elements are represented by lines linking the elements. By using arrows, the direction of the influence can be indicated. A "plus" or "minus" to the "links" defines, whether the influenced parameter will be decreased or increased. By using different line styles the strength of the impact is quantified. This entire system model includes 80 parameters and 458 relations between them.

The model was used to perform an impact analysis to identify parameters, which can be potential "handles" to improve the working culture at an intermodal platform and sensible parameters, which are reactive on changes. This allows to draw conclusions about possible interventions. Figure 6.3 shows an example of an impact portfolio derived from the system model. It can be seen that "automation" as a parameter of work environment has a high impact on the system. In contrast "stress and strain" is a more reactive parameter, however displaying a certain feedback on the total system⁸.

6.5. Key development scenarios

6.5.1. General trend scenario⁹

The total freight transport in Europe will further increase. One of the contributing factors is further globalisation of production on the one hand and markets on the other hand. This is accompanied by further containerisation of goods in all modes of transport during the coming years.

There is absolutely no doubt among the experts that this will lead to an increase in the total volume of intermodal transport in Europe in the sense of transport of containerised goods using two or more modes of transportation. This development is only partly hindered by the actual comparably low price levels for pure road

⁸ A complete set of portfolios can be found in WORKFRET Deliverable 7

⁹ Based on the consensus of experts in the Horizontal Delphi study

transportation. The high competition in road transport will keep price levels also in the future low.

Figure 6.2: Example cut of a system graph

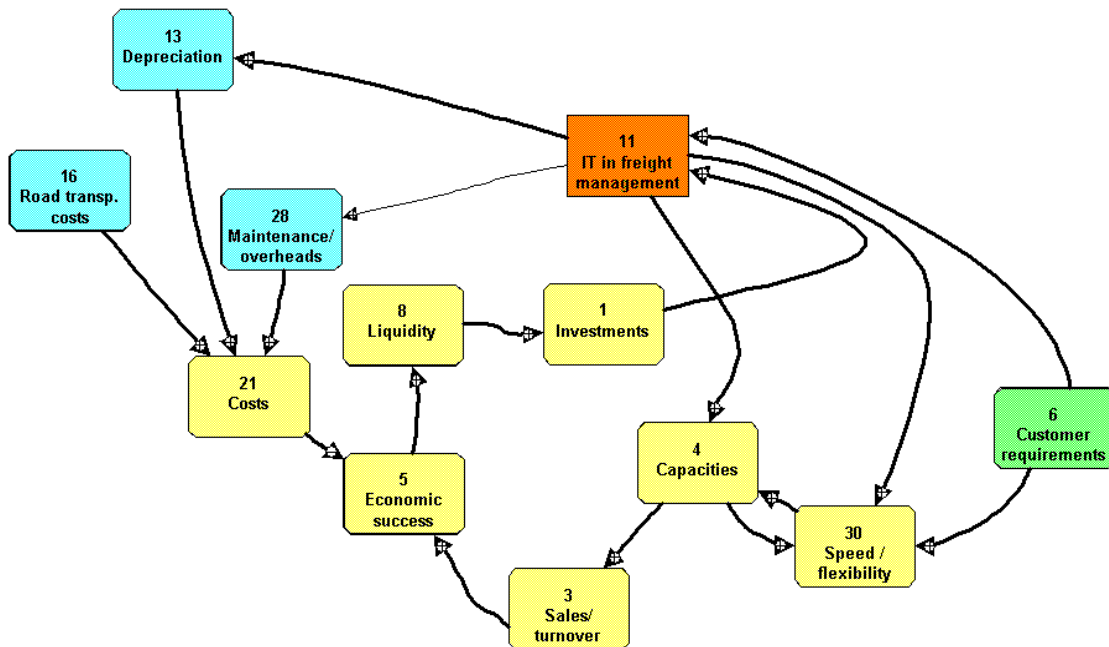
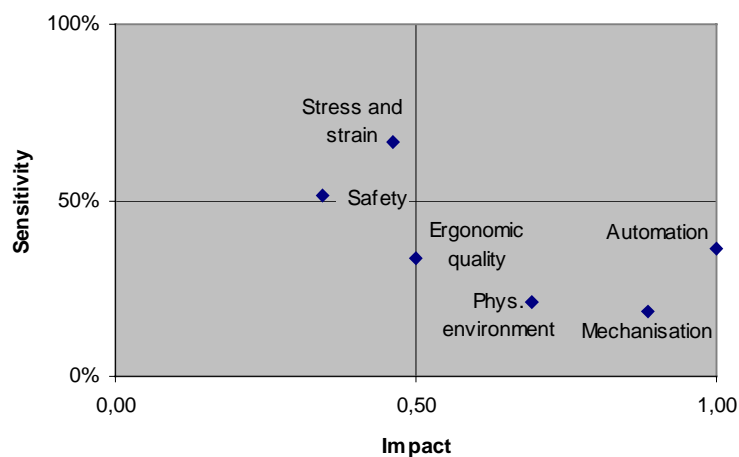


Figure 6.3: Impact portfolio of working environment parameters



Those low price levels and thus low profit will, however, not hinder the investment in new technologies in the transport sector. In general further technological developments in mechanisation and automation of goods transfer at terminals and nodal points can be expected for sure. Information and communication technologies such as Telematics, fleet management, freight tracking and tracing are key technologies and will be widely introduced during next years and decades in the

transport sector. Freight transportation services will be offered and ordered more and more at electronic market places in the sense of electronic commerce.

Privatisation in different fields of the freight transport sector will have further considerable impact on organisational and market structures in intermodal freight transport in Europe. Outsourcing of transport services in production industry, to the freight transport market will gain importance and lead also to structural shifts.

Concerning market demands in the transport sector there is a consensus that shorter transportation times are a market requirement in freight transport and will play an important role in the future. Just-in-time delivery is a market requirement as well and will also play an important role.

6.5.2. Working culture trend scenario¹⁰

The job structure of the transport market will change during coming years. The total number of jobs in railway freight transport in Europe will stagnate or even decrease, whereas more jobs will be created in road transport in Europe. The total number of jobs involved in intermodal transport in Europe will increase.

Due to technological and structural changes professional profiles in the transport sector will change considerably during the coming years. New qualifications and further education will be required in the transport sector to adapt personnel in the transport sector to changing requirements. In total the number of jobs for unskilled workers will decrease in all modes of transportation.

Mechanisation and automation will lead to a further shift from physical to mental workload in the transport sector. Physical conditions in the working environment will partly further improve as a result of e. g. noise and climate control as well as through improved machinery and handling facilities in all modes of transportation. Occupational safety and health standards also tend to improve in general.

Work in the transport sector is characterised by the presence of a high time pressure in many enterprises, which will also be the case in the near future. To fulfil the needs of the European common market more flexibility in working time and contractual status, such as part time and shift work as well as annualised hours and flexible overtime, will be required.

Apparent self-employment of vehicle operators in road and inland waterways freight transport, who are de facto dependent on a single transportation service provider can be expected to be partly a topic of the coming years. There is a trend that collective bargaining might lose importance and that the structures of collective bargaining might change. A shift from collective agreements to agreements on an enterprise or factory level can be expected in Europe.

¹⁰ Based on the consensus of experts in the Horizontal Delphi study

6.5.3. European level scenario 2010¹¹

The transport volume in Europe increased considerably since the nineties. However the extension of the European rail net stagnated for years as the national budgets seemed not to allow for extensive measures. In the first decade of the new millennium high traffic density became a severe problem on European roads. This again led to a further impact to railway development. An increasing extension of the rail net is planned but still not under construction.

The freight transport capacities on the rail are not fully occupied. However some of the gateways to the hinterland and for transit traffic are overloaded and are a bottleneck for intermodal transport. Container transport on the rail has quickly developed on hinterland and transit routes. But combined transportation does not play the main role in groupage business. In this field pure road transportation is of major importance. Combined transportation capacities on the rail between European centres of economy are rather developed. Thus for long distances even groupage on the rail is well established. However, national combined transportation is still better developed than the international.

Due to an ongoing concentration in freight transport during the last decade, the main volume of combined transportation in Europe is performed by only a few providers. But also small and medium sized companies are acting as providers of combined transportation towards the clients. They could survive the concentration trend by forming appropriate international networks and alliances and as providers on niche markets. All providers towards the market are again clients of local, national and international providers of rail transportation services. The privatisation and commercialisation of railway business in Europe led to a split of the railway cargo sectors to specialised companies.

Wages in freight transport in Europe are still not harmonised. Working conditions are better harmonised but not to a final extent. Also associated employer outlays are still different in the individual EU countries. The harmonisation is more advanced among the old EU member states than in the new ones.

Regulations for labour conflicts are still different for the individual European countries. But in the practical field national trade unions already co-ordinate their collective bargaining strategies on a European level. Trade unions in the transport sector co-operate closely in achieving their common objectives. Cross-border memberships in trade unions are possible and cross-border strikes have become a means to express the interests of the employees.

A critical group among the employees in terms of working conditions in the European freight transport system are still the truck drivers. The control of working times and regular breaks by means of electronic devices has been established. However regulations are still bypassed. The concentration in the trucking business led to the situation that local hauliers are often in a dependent position and are pressed in unfavourable contracts. Pseudo-self-employment has repeatedly been an issue in the last decade.

¹¹ This scenario focuses on combined transportation and is based on the Vertical Delphi and is written from the 2010 perspective

6.5.4. Generic facility level scenario 2010¹²

A variety of actors operate intermodal platforms in Europe. The majority of the intermodal platform warehouses still requires truck transportation to and from the transshipment terminal. However, main freight centres have only minimum distances to the transshipment terminals. For main relations loading wagons on a company-owned railway trackage is also an option.

The freight management is fully automated in modern freight centres and platform warehouses in intermodal transport. Freight marking with bar codes and transponders allows for paperless data management throughout the entire intermodal chain. Online freight tracing and tracking is a standard for hauliers. Business processes with bigger clients work completely paperless. Even communication with occasional clients is to a high degree based on Internet technologies. Due to the increasing importance of information technology, computer work gained even more importance in a freight centre compared to the late nineties. Dynamic route planning and fleet management is widely introduced in locally pre- and post-haulage fleets as well as in long-distance haulage on the road. Anonymous electronic links characterise the interaction of freight managers and vehicle operators.

Container handling and handling of swap bodies is mainly automated. The swap body retained its importance in the groupage business and became a standard for the intermodal sector in this field. Physical freight handling in the groupage business, however, did not allow for a high degree of automation. Thus palletising with forklift trucks and manually driven lift trucks still characterise the work in the platform warehouse. Especially loading and unloading trucks requires physical human work. In this sector unskilled work still plays its role in the freight centre. Even underground chain conveyors for pulling lift trucks turned out to be not profitable in small warehouses. However, a considerable rationalisation was achieved by organisational and information technological means and led to a reduction of personnel in freight centres to a minimum.

An efficiently operating freight centre or intermodal forwarder company are characterised by a high degree of outsourcing. Railway resources and trucks for the main haul as well as trucks in pre- and post-haulage do not belong to the forwarder. Also swap bodies and other containers are mainly rented.

The experienced stress in the freight centre during the late nineties was attributed to mental rather than to physical workload. Stress in the sense of time pressure was already during the nineties a dominant workload factor. This situation did not change, it even aggravated. Due to the support by information technology and relief of routine work, there has been a trend towards more responsibility of personnel and business process orientation.

¹² This scenario is based on the Vertical Delphi and is written from the 2010 perspective

6.6. Main findings and usability of results

6.6.1. Growth in the transport sector

Looking synoptically at the range of scenarios created¹³, there is undoubtedly a growth expected in the European transport sector. The developments of the different types of intermodal transport are, however, judged rather differently. Concerning the development in container flow in the Rotterdam Europort the prognoses have been always too conservative in the past. All the scenarios for 2020 foresee a drastic increase in container flows.

The development of rail/road combined transportation in Europe, in contrast, is seen much more reluctant. The prognoses and plans of the early nineties have proved to be too optimistic. Looking at the case studies it becomes clear that in the UK as well as in Germany or even Bulgaria the privatisation and commercialisation of the railways led to a decrease in railway transportation and especially in combined transportation.

Several expert rounds and workshops repeatedly revealed that there are serious concerns about the future of railway transportation in Europe. Quality problems were mentioned as barriers as well as high costs. However the Delphi studies showed consensus that the combined transportation on the rail will increase, but with a focus on profitable relations.

6.6.2. Technology and working culture

Two big lines of technological developments were studied: information technology and automation technology.

Containerisation and automation in container handling is a clear trend, which was expressed in all scenarios. New facilities for transshipment are highly automated and will need only a low number of operating personnel. But automation is not profitable for palette-sized consignments, neither for the moment nor in the next decade. In handling this type of freight in the range between parcel and container, human labour is still required. The automation of freight handling clearly depends on the size of the installation, i.e. the goods flow to be managed. High capacities justify a higher degree of automation as can be seen at Rotterdam or at big freight centres in Germany.

This is also a reason for clear differences in the perspective. While the Rotterdam scenarios with their high goods flows are rather clear and targeting far ahead, having a perspective of high automation, the Thessaloniki perspectives foresee technological development but still rather uncertain and not sharp in profile.

Concerning the automation of transportation itself, the Rotterdam scenarios are also ahead, already dealing in the present with AGVs and in the future with road trains. More reluctant is the judgement of the situation in railway automation. However there is a consensus that automatic shunting and automatic trains will be applicable within a decade. Automated roads did not play a role in the transport experts' short and medium term expectations.

¹³ Key scenarios as well as the ones derived from the case studies

In contrast to freight handling technologies the development of information technology in the transport sector is seen unrestrictedly increasing. The entire business processes in freight transport are expected to be managed by new technologies. Information technologies will penetrate customer relations, freight management, fleet management and tracking and tracing of consignments.

Those developments will characterise future working cultures and will have consequences on required education and training in the transport sector. It is expected to have challenging jobs with high responsibility and autonomy on the one hand. On the other, there are also technology-induced trends towards a loss of responsibility and autonomy, e.g. among truck drivers. Unskilled work will still exist in future, in freight handling as well as in transport-related sectors, e.g. in value-added logistics. This means that professional profiles in the transport sector will change severely. Consensus was found in the Delphi studies as well as in the concrete case studies, that the introduction of new technologies will result in rationalisation, a higher productivity and the trend of reduction of personnel. This is partly counterbalanced by the increasing transport volume.

6.6.3. Organisational changes and working culture

The most stirring organisational changes in the transport sector can be characterised by the terms

- privatisation,
- concentration, and
- internationalisation.

Those macro-trends will completely change the constellations in the transport sector in Europe and also influence working cultures in enterprises to a high degree. Specialisation and outsourcing is practised on the one hand, but on the other enterprises merge or are enlarged by taking over others under strategic aspects. Many companies will vanish from the markets. National enterprises will become European or global players. Due to the concentration tendency big international concerns will evolve.

Internationalisation of the enterprises will also result in more international activities of the social partners. Transport unions in Europe will co-operate closer. The structure of collective bargaining is expected to change. There is a trend to collective bargaining at a company rather than at regional level. Cross-border labour conflicts and strikes with all their risks will be also a consequence.

In the intermodal sector further new actors are expected. For the railway sector a further dramatic downsize is foreseen. The trend in the transport sector is towards international concentration for the mass markets. Experts expect SMEs also to be successful, but rather in market niches. Self-employment will also play an important role in road transport as well as in inland waterway transport due to outsourcing, flexibility requirements and cost pressure. Pseudo-self-employment is an expected phenomenon.

An example of mixed influences of both, organisational and technological changes, are the train drivers in several European countries. The recruitment policies in railway companies after privatisation led to a current lack of train drivers. The gap has now to be bridged by recruitment, education and training measures. But a decade

or two later, when automatic train driving is expected to be established, those new train drivers will be superfluous again.

In summary, turbulence can be expected in companies, on the labour markets, and, last but not least, in personal fates. It seems advisable for all involved actors to observe these changes systematically in order to obtain warnings about unfavourable developments of working culture parameters in due time and initialise appropriate action.

6.6.4. Conclusions from the system analysis

From an influence analysis of the generic freight centre system model it could be derived that a bigger influence of trade unions as representatives of employees might give some benefit concerning working culture issues. One actual problem in this respect is that the developments in the transport sector and especially in the intermodal field are rather dynamic. This is counterproductive for continuous work of trade unions in the enterprises. But strengthening the trade unions will not "automatically" lead to better working cultures, because the benefit is partly counterbalanced by the risk of labour conflicts. The "system might run out of control" for all involved actors, if labour conflicts occur. It has also to be considered that strikes in the transport sector, especially if they occur at a European scale will influence the other economic sectors as well.

Thus, the objective from a working culture perspective could be to strengthen the position of trade unions in such a way that labour conflicts are avoided. Only a constructive relation between social partners will allow for a positive development. This has to be considered in political decisions concerning harmonisation of labour relations regulations but also for trade unions' and employers' policies. In order to be able to better react on new developments at a company level, it seems advisable to strengthen participation and consultation. Both, trade unions and management should have an interest to support participation and consultation at a pragmatic level, which has to be distinguished from the social dialogue at a more political level.

The system model further shows that especially the introduction of new technology and automation will have a big influence on working culture as well as new contractual and working time models. It has to be made sure by all actors that the impacts of such measures are assessed carefully in the individual case. That should be within the interest of a European policy, which is aware of the obligation to protect European citizens at European work sites. It should also be to the interest of the employees and their representatives and it should be in the interest of the employers as well. The management of change in those cases should include a "management of working culture".

It is remarkable that, at an enterprise or facility level, organisational factors seem to have lower impact than technological ones. This is apparently in contradiction to findings reported in chapter 4, that organisational factors have a dominant impact. The difference can be explained by the scope. Organisational changes at a facility level have lower impacts than structural organisational changes in an entire economic sector. The fact that the dominant impact of new technologies is observed at facility level suggests performing technology assessment at that level.

The level of autonomy of work and the degree of centralisation are the most influencing organisational factors at an enterprise level and should be therefore carefully considered by the management.

7. The case studies considered and main project conclusions

In this chapter first a brief overview presentation of the case studies is made, concerning their context and objectives. Next, the main conclusions resulted from the WORKFRET project, are presented. The reader can also find a summary of each case study in the Annexes of this report and their full description in the respective deliverables (where public).

7.1. Case Study objectives and approach followed

The approach applied during the WORKFRET project involved the identification of the impacts on working cultures at various spatial and sectoral levels. At the case study level, a number of specific developments (technological innovations or organisational restructuring) were reviewed, in order for the adaptation process to be analysed and for the implications on the working cultures to be identified. In parallel, national workshops and reviews, as well as research at a European level, assisted in formulating a wider (though less detailed) perception of the potential impacts of the relevant developments at national and European level, taking into consideration the unique characteristics of each mode and the increased importance of intermodality. Impacts are analysed on the basis of the key working cultures elements affected, in order for the problem areas to be identified.

The case studies aimed to identify and describe the dynamics of change on the human element in intermodal freight transport systems, at the selected focal points, where various transport modes meet. Therefore, apart from the developments in the four main transport modes themselves (road, rail, waterborne and air), the focus is on effects of developments on the working cultures of intermodal transport, in any combination of modes, in the case study areas.

Based on the above rationale, the WORKFRET case studies could also be considered, in effect, thorough investigations of certain transition processes in the five focal points of intermodal transport. The transition process to be examined in each case might be in the form of the introduction of a new technology (or a group of new technologies or application or processes), or new logistics and production systems (that will affect the logistics chain and in turn the employees involved), or simply, a result of the increased need for intermodal services that require significant changes in the way the case study area worked in the past. The transition may also be the result of organisational restructuring that causes significant changes on the existing organisation where the case study focuses on, and is probably a consequence of the pressure for higher efficiency of the transport chain, probably also accompanied with one or more of the changes already mentioned.

Next, an overview of the case studies is presented where context and objectives are described briefly.

Case study of intermodal facilities in the UK

Context

- Leeds Freight Liner Terminal (existing terminal since 1967)
- Wakefield Europort (greenfield development)
- Doncaster International Railport (greenfield development)

Objectives

- Assess the impact of intermodal developments on key groups of people involved
- Obtain a deeper qualitative understanding of the main concerns and priorities of the different interest groups

The rail / road intermodal case study in Germany

Context

- Freight center of Bahntrans in Regensburg

Objectives

- Obtain clear picture of the working culture at the Regensburg freight center
- Investigation of changes in working culture due to the new technological / organisational structures implemented at the pilot site
- Study differences between employees with a different personal working life history

The port of Rotterdam case study

Context

- Multimodal Transport Center (MTC) in Maasvlakte
- Multimodal Transport Center (MTC) in Waal – Eemhaven
- The use and social impact of EDI in a cross – port logistical chain

Main objectives

- The development of multimodal transport centers in a mainport (also growth of VAL activities) and the impact of the introduction of new technologies on the human factor
- The change of the modal split: the expanded use of rail-, inland water-, short sea shipping transport and the limited growth of road transport (due to environmental and efficiency reasons).

The AGA case study in Finland

Context

- OY AGA AB company in Finland

Objectives

- Identify and describe the organisational changes, dynamics of change and barriers to change
- Elaborate on the conditions to improve efficiency and effectiveness
- Investigate how the introduction of new technology affects working cultures

The port of Thessaloniki and the intermodal axis Thessaloniki – Sofia case study

Context

- Port of Thessaloniki
- Road link Thessaloniki – Sofia
- Rail link Thessaloniki – Sofia

Objectives

- Obtain a deeper qualitative and, where possible, quantitative understanding on working cultures and main concerns on:
 - Port of Thessaloniki (analysis of port records, privatisation)
 - Road and rail parts in Greece
 - Road and rail parts in Bulgaria (restructuring of the sectors)
- Identify “interfaces” (similarities, differences, conflicts, ways to improve them) between an EU country and a former Eastern European one (Bulgaria)
- Elaborate conditions of improving efficiency, effectiveness and complementarity

In Annexes 1-5 a brief description of each case study together with main results is presented. For further reading one should refer to the specific case study deliverables.

7.2. Main conclusions in relation to the areas of importance

In Chapter 5 (Hierarchy of key issues) and chapter 6 (Scenarios for future developments) the “main areas of importance” (most important ones) concerning working cultures have been identified and their relative importance has been evaluated. The work performed in WORKFRET on the sectoral overview level (reviews and surveys) as well as on the specific case studies level (specific focusing)

has resulted in some main conclusions, which are presented here in brief in relation to the “main areas of importance”.

7.2.1. Size of the labour force in freight transport

The freight transport industry is experiencing significant changes as regards its operational and organisational framework. In the first case, the application of new physical and informational technologies, in parallel with the shift towards intermodal transport, has raised productivity levels and has reduced the size of the labour force. In the second case, restructuring, liberalisation, privatisation, concentration and other re-organisation trends have created a large number of redundancies, in order for higher organisational efficiency goals to be achieved. Even if the effect of the higher labour demand due to future traffic volume increases is taken into account, it is expected that developments in the freight transport sector will result in net losses considering the number of jobs in the industry. Regardless of the mode concerned, the impacts on the labour force are expected to be immense.

At a local level, the impacts of transition on the labour force vary among the various case study areas. Predictably, the transport modes concerned (combined with the role of each case study area in the transport chain), as well as the local social and economic environment, do influence the adaptation process of each organisation involved. Although the degree at which technological innovations were applied (or are expected to be applied in the future) differs in each case, the common issue of interest in all five areas is that of confronting and alleviating the negative impacts on the number of employees. The application of new technologies (and the subsequent increase in productivity) has caused (or will cause) a significant number of redundancies. This issue is of high relevance in every case, although the specific reasons for the negative impact on the number of employees are different. Moreover, the main actors in each organisation have taken different measures in order to promote their interests. For example:

- In the Rotterdam Europort case, the increase in productivity (as a result of new physical and information technologies applied) happened to coincide with a comparable increase in traffic volume, that partly absorbed the otherwise redundant personnel (although extensive re-training was necessary).
- In the port of Thessaloniki, restructuring plans call for a leaner organisation with a significantly lower number of employees. In this case, in order to avoid the social cost of massive redundancies, the Port Authority plans to gradually reduce the number of employees by not substituting retired employees for the next three years, in other words by fully bearing the burden of overstaffing itself.
- The change in the logistics and production systems of AGA caused a dramatic decrease in the size of the company’s labour force that could not be compensated for by either internal job shifts or (early) retirement schemes. The “cost” of these redundancies is carried by the social security system, in the form of unemployment benefits.
- In the German and U.K. cases, the impacts of increased productivity are not directly comparable to that of the rest, since the developments examined mainly influence the size of the total labour force in the industry (and not

that of the case study site). However, a substantial decrease in total employment can be foreseen, that needs an appropriate policy at a higher level (industry, national or European) to be followed.

Of particular interest was the case of rail freight transport, where negative trends have alarmed employees. The decreasing competitiveness of rail freight transport (despite E.U.'s efforts to promote sustainable transport and railways in particular) causes worries among trade unionists concerning the future of employees in that sector. In addition, the integration of the various modes of transport, due to the increasing shift towards intermodal transport, is also an issue of concern. Employees feel uncertain about their position in comparison with that of employees in other modes, as a result of conflicting working cultures and labour force issues in particular. Concerning the issue of the decreasing labour force size, opinions at the level of national workshops were rather pessimistic. Negative pressures are taken for granted and the compensation in terms of new jobs because of the increased volume is not expected to be sufficient. A general conclusion as regards the impacts on the labour force is that a limited number of opportunities are offset by a large number of threats.

7.2.2. Working Time

The increased focus on the 24-hour economy and the pressure for a more efficient transport system raise flexibility requirements for organisations and employees, that in turn increase time pressure for the whole transport chain. Furthermore, new information related technologies that enable better planning and control, facilitate the overall process but, at the same time, increase the expected levels of performance. Time pressure has direct repercussions on the working time of employees in the field. Apart from the obvious problem of shift and night work that is encountered on all industries, the transport industry has the unique characteristic of requiring employees to cover huge distances from their home base. Truck drivers, railroad operators, seamen, aeroplane pilots, etc. will often have to stay away or abroad for lengthy periods. They often have to consider the trade-offs between working overtime (and return back home) or following working time regulations (and stay abroad). Although safety is enhanced, driving time regulations also decrease the competitiveness of EU's transport companies (since companies from especially eastern countries do not, in general, respect such regulations).

Intermodal developments in general have transformed the role of freight transport and have integrated transport services into a part of the global 24-hour economy. As a result, changes observed in the case studies or during the national and Europe-wide reviews cannot be attributed to specific technologies or intermodal developments, but can instead be seen as a transitional process caused by productivity requirements raised by the economic environment. The main "employment condition" dimension that seems to be affected by intermodal developments is the issue of shifts and working hours. Since transport is becoming more capital intensive on one hand, and demands for 24-hour service are increasing on the other, work in the framework of intermodal transport has to be adapted to more flexible schedules.

The container terminal in the port Thessaloniki has started to operate on a 24-hour basis, seven days per week and as a result, working hours have worsened for the employees. A similar problem can be observed on the Thessaloniki- Sofia road axis,

where competition between Greek and Bulgarian transport companies has caused average working time to exceed 48 hours a week.

In the case of AGA, it is not unusual for drivers to start at 04:30 and end the working day at 16-17:00. It is very difficult for the self-employed drivers to take vacation since it is hard to find a person, having the necessary qualifications, to substitute the driver. It is a company requirement that the person distributing (driving) the cylinder gas is properly trained to handle the AGA equipment (handheld computer etc.) and routines.

In the three terminals in the U.K., long working hours are often observed. The reasons for that (up to 12 hour shifts and frequent rest day working) have more to do with the way in which the labour force on Britain's railways has been reduced in size over the past years.

The 48 hour working time directive on transport will probably have a far larger impact than any intermodal policy drive. As a result, both employers and trade unions see issues about working time, payment and employment procedures as important. The 48 hour working time directive has the potential to significantly affect working conditions in the transport industry, because if the long average working hours are shortened the payment systems will have to change.

The issue of working time in European freight transport is of major importance. However, according to the various actors that have contributed to the WORKFRET research, the available EU legislation doesn't allow the support of intermodal developments and economic activity, while also ensuring acceptable employment conditions and safety. It is believed that the dual goal of keeping European transport companies competitive and protecting employees in the freight transport industry cannot be currently achieved.

7.2.3. Payment, fringe benefits and social security

The differences in basic pay, incentives and especially additional payments between the transport modalities are significant. Payments in road transport and the inland waterway branches are relatively low (related to working time, overtime, work during the night or in the weekends) in comparison with the ones in rail transport and in the ports (stevedores).

The same is valid for sick pay and pension schemes. Moreover, cost differences among the various EU countries and, more importantly, with neighbouring countries, are an important obstacle to EU's integration as regards the freight transport sector and intermodal transport in particular.

Since European freight transport needs to become more flexible, payment structures are expected to change to ones based on incentives, as opposed to a flat rate. Trade unions are worried that, in combination with having to work longer hours, their members may be worse off. They are concerned that if a serious attempt is made to promote intermodal transport, and shift a significant proportion of freight from the road, it will need large investment that will require cost savings in employment conditions. But, trade unions are in fact supportive of intermodal developments if the potential problems are addressed in advance. Employers argue that intermodal developments can improve employment conditions, if they improve efficiency and profits that find their way to the worker in the form of incentive payments.

Examples from the WORKFRET case studies present a similar picture. In most cases pay levels have been maintained and, in order to cut costs, the number of jobs has been reduced. A good example of “fringe” benefits is that of the UK railway staff. Free and reduced rate “privilege” rail travel used to be the main such benefit, but recent tax implications have devalued privilege travel for many freight staff. Instead of free travel, railway staff now enjoys a new benefit; free shares in their company and the opportunity to buy and sell shares, a form of motivation that is widely applied in other industries too.

WORKFRET research has also recorded that imbalances in payment systems and welfare provisions among the various freight transport modes result in a labour cost competition between freight transport branches, that is seen as unfair by many actors. A harmonisation of payment systems and welfare provisions is suggested in order for employment conditions -especially in the road and inland waterway modes- to be improved.

Nevertheless, and regardless of transport mode, payment and benefits are seen as a key factor for the attraction of high quality employees to the freight transport sector. However, fair employment practices and equal opportunities are still necessary and the demand for linking rewards to quality improvements is becoming more intense.

7.2.4. Education and training

New physical and information technologies in freight transport have forced numerous changes in job requirements. Moreover, job descriptions have become, or should become, more flexible, resulting in combined technical and administrative tasks. The role of employees in freight transport changes radically, especially due to the introduction of new technologies and, in most cases, personnel needs to be retrained or new personnel, with relevant knowledge and skills, needs to be hired.

Training programmes for new technological developments are usually externally available, but the problem is that much of the required knowledge is company specific. Therefore, new training programmes should be designed, preferably tailor made, on a company basis.

7.2.5. Health and safety

New technologies in freight transport have contributed towards a significant improvement of safety levels and a spectacular decrease of work related accidents. On the other hand, new forms of health related issues have emerged, mainly as a result of high stress and other psychological reasons. New technologies and logistical concepts might result in a stressful working environment and a lack of personal contact. Due to the introduction of new systems in the organisation, the employee might find himself/herself in more demanding situations, especially when there is a combination of increased productivity objectives and new required employee knowledge and skills. Excessive stress can lead to errors and accidents and, most importantly, will have a negative long-term effect on the employee’s health. The lack of physical contact that results from the increased automation and autonomy new technologies offer can cause various indirect psychological problems, as well as boredom, that can potentially become a cause for accidents.

7.2.6. Recruitment procedures

The transitional phase in European freight transport has to be met by suitable recruitment procedures in order for the European integration to increase economic efficiency and create new opportunities. Given the positive impacts of new transport technologies on the social characteristics of the labour force, encouragement measures should be taken in order for under-represented social groups to be attracted to the transport industry (e.g. increase female participation that is currently only 19% of the total workforce). Another issue that should be taken into account is the possibility of recruitment from other, declining or not, industries (e.g. coal and steel industries, shipbuilding, etc.) from where useful skills can be transferred. However, there are currently strong obstacles to recruitment (such as monopoly on recruitment services etc.), and national educational/ vocational systems are not prepared for such social changes.

7.2.7. Organisational principles

The conducted influence analysis (chapter 6) revealed that organisational changes like new logistics and production systems have considerably higher influence on working culture parameters in intermodal transport than purely technological changes. Among the considered new technologies, transshipment and freight handling technologies at terminals and nodal points have the strongest impact on working culture parameters. This suggests to further consider organisational or combined technological and organisational changes rather than pure technological changes. It was also found that work organisation is more influenced by technological and organisational changes than labour force elements, work environment and employment conditions are. Labour relations seem to be, even clearly, less sensitive than the other working culture parameters.

The application of new technologies, or the adaptation to new logistics and production systems often requires (or are generated by) a general reorganisation, or restructuring process, within the organisation concerned. In this case, the introduction of an innovation replaces the old system together with old procedures and working practices. An adjustment to the organisation and a new orientation to the processes within the organisation are required. Information and communication plays a vital role in this development. Changes are taking place at a fast rate and organisations have to adapt. To achieve an effective management of change in this respect, it is necessary that privatising organisations or re-organising companies become aware of the impacts of their measures on employees. They should define their personnel-related objectives, procedures how to achieve them, and instruments to evaluate their success. In order to establish such a practice, standards and a code of practice have to be provided and, if necessary, to be backed up with regulations, which enforce their application.

7.2.8. Behavioural codes

A more skilled and flexible workforce is essential to intermodal developments, which require both organisational and technological change. The management of this change process needs a positive attitude from all those involved and a team working culture. This can only be achieved if the workforce feels valued, has interesting work and is participating in the process.

New emphasis on customer relations/ quality management should be given and constructive labour flexibility (enhancing skill and responsibility) should be attained. However, at the same time, new technologies (mainly IT) are being implemented which may have the effect of centralising decisions and creating greater stress (through lack of control) and social isolation.

7.2.9. Bargaining structures

EU social policy recognises a wide diversity between national systems of industrial relations and in some member states there has been a strong trend in the decentralisation (and marginalisation) of collective bargaining. The EU freight transport sector is therefore represented by a patchwork of union/management relations and cultural differences in negotiation and joint consultation. Intermodal developments are likely to result in changes in the traditional boundaries between trade unions and their members in the transport sector. Social partnership is promoted by the EU as a culture of industrial relations which encourages greater co-operation and employee participation in decisions at local level and at the same time creating a network which can provide co-ordination at national and EU level.

The expansion and restructuring of freight transport has been accompanied by the decline of national systems of collective bargaining. There is a need to review the current provision for normal employment relations at different levels and consider how some degree of harmonisation between collective agreements can be achieved. Collective bargaining procedures at a European level should be harmonised, while the decentralisation of the relevant processes should be also achieved.

7.2.10. Employee involvement and consultation

A changing environment and new orientation of organisations to this environment calls for strong involvement of trade unions and work councils in the consultation process. Given the changing working relations, partly as a result of the introduction of new technologies or new logistical concepts, labour relations should be well developed. Trade unions and working councils can play an important role. The belief that organisation of work and work related matters are best organised in an atmosphere of well functioning consultation between the social partners. By involving employees in the design & implementation phase and by periodically reviewing the results of the introduction of a new technology, an organisation might gain the user's acceptance and valuable input for further optimisation of the new technology.

7.2.11. Labour regulations

There is an apparent trend to increase the use of atypical contracts, particularly part-time employment, especially in northern Europe. The EU has introduced legislation to harmonise employment protection but there is still a climate of job insecurity and lack of career prospects in freight transport. In the freight transport sector there is a wide range of employment practices across transport modes and member states, which need to be harmonised to promote labour mobility and career development. An overall improvement is needed in employment conditions if the changes in work organisation and working culture identified elsewhere are to be achieved. The current emphasis on long, unsocial hours and uncertain prospects in the industry is not conducive to attracting the best labour force.

The transport sector and especially inter-modal transport is becoming more and more an international business with European-wide acting enterprises. Concentration among logistics service providers leads to the situation that the enterprises are not national anymore but become more and more international. Collective bargaining structures, however, are traditionally national or even regional. Regional structures of collective bargaining and business are not congruent anymore. Thus an enterprise is confronted with different wages and employment conditions at different business locations. Furthermore there are still national borders concerning the regulations related to social partnership, labour conflicts, i. e. strikes. The non-homogeneity of the legal situations makes it difficult for the social partners to act legally correct in the still "grey" and uncertain zone of international activities in social partnership.

7.2.12. Promotion of intermodal transport

The development of an intermodal transport system, with the emphasis on a modal shift to rail transport (and waterborne transport), is hindered by several problems. Rail transport is lagging the other modes of transport in terms of improvement of technology and logistical concepts; compare for instance the (potential) use of automated guided vehicles, combi-road, road trains and the concept of barge express and automated handling. Rail transport is not competitive with the other modes of transport in terms of efficiency and (labour) costs; the number of employed is often too high, productivity is low, while employment conditions are probably the best in the transport industry. It is therefore necessary to promote intermodality and sustainable transport in general and remove any barriers to change caused by impacts on working cultures.

7.3. General remarks and conclusions

- Research in WORKFRET identified the main issues of importance concerning the impacts of new technologies on the working cultures in freight transport. The impacts of new logistics and production systems, that to a large degree stimulate the implementation of new technologies or the application of new forms of organisation, were also examined.
- The methodology of WORKFRET followed two different but complimentary directions. In initial stages extensive surveys explored the issues of working cultures, organisational/ managerial structures, new technologies, logistics and production systems in freight transport, aiming to describe the situation and identify main issues at European and national levels in freight transport. The second direction involved research activities focusing on five specific case studies at selected intermodal focal points of freight transport in Europe. In parallel with the two first approaches used, expert consultation was extensively utilised in order for the findings to be analysed.
- Through the combined activities of the two research directions, twelve areas were identified as of particular importance where policy measures may be required: (referred in chapter 8). The importance of the above issues was recognised by the majority of participants in the various stages of the research activities, regardless of whether they were employees' / employers'

representatives or technology experts. There were differences however in relation to what each participant perceived as a favourable development. Opinions were often biased, depending on the background of each participant and the side they represented. As a result, two main lines of argument could be identified. The first, supporting the protection of the interests of employees, often neglected to consider the implications for the competitiveness of the E.U. freight transport industry. On the other hand, the supporters of increased effectiveness in freight transport failed to take impacts on the human element into account.

- In order to remain impartial, WORKFRET research activities had to take all opinions into account. It was not possible however, in the context of the project, to identify the optimum solutions that would satisfy both sides, since the available information was not sufficient. Both protective measures and new technologies have proved to have a high influence on working cultures, but the complexity of the system did not allow the quantification of the subsequent impacts from an intervention in one of the above areas. A qualitative assessment was possible instead and, in that sense, measures to improve the impacts of new technologies on working cultures could be identified.
- Turbulence can be expected in companies, on the labour markets, and last but not least, in personal fates. It seems advisable for all involved actors to observe these changes systematically in order to obtain warnings about unfavourable developments of working culture parameters in due time and initialise appropriate action.
- It is however apparent that concerted measures are required in order for both the efficiency of freight transport and favourable working cultures to be ensured. Moreover, given the complexity of the issues related to the human element and the numerous factors that influence working cultures, a thorough analysis of expected impacts is necessary at a facility level.
- It is important to remember that it is not only the companies that must respond to the new trends and market requirements. It is equally important that the trade unions respond to the new trends in order to look after the employees' interest.
- The support of four key factors must be a common objective to each employer and employee, in order to ensure a sustainable business. The key factors are : *reliability, integration, flexibility, cost reduction.*
- Several expert rounds and workshops repeatedly revealed that there are serious concerns about the future of railway transportation in Europe. Quality problems were mentioned as barriers as well as high costs. However the Delphi studies showed that the combined transportation on the rail will increase, but with a focus on profitable relations.
- To create a sustainable and good working culture is a demanding challenge to all parties involved in the process. It is necessary to keep the most creative dialogue between employers, employees, their organisations and authorities, focusing on how to achieve reliability, integration, flexibility and cost reduction, and at the same time sustain a positive working culture, giving the best working conditions for the employees.

- In general, freight transport has not shown signs of important differences with other industrial sectors in relation to impacts on the human element due to the introduction of new technologies. Apart from the issue of working time, which is a unique characteristic of freight transport's nature, all other issues of importance are also met in other sectors. The increased productivity and efficiency requirements probably affect freight transport as much as they affect all economic activities and the impacts on the human element can be expected to be of the same type. In a similar fashion, barriers to change, expressed as the employees' reluctance to adapt to a new technological environment, are similar. Generalising, freight transport still experiences the shift from a labour-intensive into a capital-intensive operation. The measures to soften the impacts on the human element are also of general application. In that sense, experience gained in other industrial sectors, in that respect, could prove useful for freight transport.

8. Policy suggestions

Intermodal developments, in the form of either new technologies or new logistics and production systems, affect the human element within the freight transport industry in several ways. The review of the impacts on the working cultures in freight transport, in combination with the hierarchy of the key issues as perceived by the various actors that have contributed to the WORKFRET project research activities, has led to the identification of twelve policy areas of particular importance (Table 8-1).

Table 8-1 Main Policy Recommendation areas

code	Policy Recommendations Area
PA1	Size of the labour force in freight transport
PA2	Working time
PA3	Payment, fringe benefits and social security
PA4	Education and training
PA5	Health and safety
PA6	Recruitment procedures
PA7	Organisational principles
PA8	Behavioural codes
PA9	Bargaining structures
PA10	Employee involvement and consultation
PA11	Labour regulations
PA12	Promotion of intermodal transport

Those twelve areas correspond to working cultures related issues for which policy recommendations are deemed as necessary. WORKFRET research has also revealed the interdependency among the various working cultures elements and the difficulty to examine the impacts of each element without taking the rest into consideration. As a result, there is a certain degree of overlap between working cultures issues and also each policy recommendation area covers more than one element, or even more than one main category. The twelve main policy recommendation areas coincide with the main problem areas that were identified as resulting from intermodal developments.

Intervention in order to decrease the negative impacts of new technologies (or promote their positive impacts) in most cases requires an array of policy measures. As a result, research during the WORKFRET project concluded in the formulation of ten specific policy suggestions that should be combined in order for solutions for each policy area to be promoted (Table 8-2). It is important to note that no single policy suggestion can cause a significant change on the impacts of intermodal developments on working cultures. The twelve policy areas and the ten policy suggestions require

concerted actions, and a clearly defined strategy, in order for innovations in freight transport to have desirable impacts on the human element.

Table 8-2 Specific policy suggestions

Code	Policy Suggestion
PS1	Mutually accepted dismissal policies
PS2	Reform of freight transport education and training systems
PS3	Establishment of a service to monitor shifts in labour force size
PS4	Working time directives
PS5	Payment systems
PS6	Collective bargaining
PS7	Incentive schemes
PS8	Local action networks
PS9	Human resources management
PS10	Job rotation schemes

The ten policy suggestions are explained next in brief whereas in Del 14 one can find for each one of them a more extensive description including a rationale, alternative policy measures, related actors and main impacts.

Mutually accepted dismissal policies

Minimisation of social cost of redundancies, through mutually accepted redundancy policies. Consultation and collective agreement on the process to be followed, in order to achieve both objectives: Increase of organisational effectiveness and minimisation of cost for the society. Redundant personnel should be retrained at the employer's cost for in- company re- employment or transfer to other companies/ sectors; the employer should bear the cost of the employees until they are re-employed. Whenever feasible, early retirement schemes should be also allowed. The change of contractual status (e.g. in cases of outsourcing to former employees) should be made only if the results of a social impact analysis are acceptable to all parties. However, it should be taken into account that increased job security may also increase unemployment, since companies are going to be quite reluctant to employ if they are uncertain of the future business prospects. Evidence from the USA shows that relaxing job security leads to lower unemployment rates in the long term.

Reform of freight transport education and training systems

The current and emerging requirements of freight transport imply that a balance between specialisation and generalisation is needed. Taking into consideration that job descriptions are becoming wider and that the work force has to be flexible, the skills and knowledge of formerly specialised employees will have to be enhanced. The required policy on training and education should:

- Determine new function descriptions resulting from the introduction of new technologies, especially information technology related;
- Make an inventory of missing knowledge and skills for existing personnel;
- Develop training programmes for existing personnel to deal with missing knowledge and/or skills;
- Reform vocational training programmes to provide 'skilled' workers;
- Stimulate information technology related knowledge and skills in general education programmes at an early stage;
- Provide assistance to unskilled workers who can not cope with new developments in order to find suitable work;
- Create or maintain low skilled jobs for unskilled workers.

Establishment of a service to monitor shifts in labour force size

The transport industry, and especially its intermodal segment, is deeply affected by organisational changes due to privatisation, concentration and other re-organisation trends. Restructuring often results in redundancies or sharp fluctuations of the demand and supply in the labour market. It should be the responsibility of the social actors, i. e. governments, employers associations and trade unions, to monitor those changes and to take measures in case of social problems such as an increase of unemployment or an imbalance between education and training and on-the-job requirements. Suggested policy measure is the assignment of a research task providing analyses of job migration in the transport sector for all regions of the EU. Installation of an update service for periodic updates of the analyses.

Working time directives

A new agreement on working time regulations should be reached, incorporating common objectives and guidelines, respecting national sensitivities and traditions, while leaving the freedom for specific/ modal deviations. In this context, a set of guidelines that will be followed by all actors in freight transport should be developed; its application should be compulsory within the borders of the EU by all freight transport service providers, regardless of whether they are EU nationals or not (i.e. citizens/ companies from third countries will be also obliged to comply in order for them to be allowed to offer their services)- control measures should be taken (e.g. compulsory use of digital tachographs for all E.U. trucks and all foreign trucks entering the E.U.) in order to ensure harmonisation and fair competition conditions. Those guidelines should be followed by EU companies even outside the EU, accepting the comparative disadvantage of operating with less favourable conditions than foreign companies, but still ensuring acceptable conditions for their employees.

Payment systems

Unfair competition between freight transport branches caused by labour costs differences should be avoided by the harmonisation of payment systems and welfare

provisions. Harmonisation eliminates unfair competition between rail on the one hand and road/inland waterway on the other and will stimulate a modal shift to rail.

However, it should be taken into account that in a free market the wages are set by supply and demand. By trying either to force certain groups to lower their wage demands or by legislative measures increase the wages of other groups may prove to be very difficult. One of the reasons pay levels in road transport and inland navigation are low is that those modes of transport can still attract “unskilled labour”. As transport becomes more “IT-intensive”, the wages will tend to become higher, since the relation between labour demand and supply will become more balanced.

Collective bargaining

The expansion and restructuring of freight transport have been accompanied by the decline of national systems of collective bargaining. There is a need to review the current provision for normal employment relations at different levels and consider how harmonisation of a certain degree between collective agreements might be achieved. A review of collective bargaining in freight transport at EU, national and regional level is therefore required.

However, a major drawback as regards collective bargaining is the fact that costs for providing services varies from city to city, from region to region and from country to country. For example, a wage increase has to be met by at least the same increase in productivity for the individual company. It is not possible to have the same productivity gains in all companies. As a consequence, a general wage increase, which in some companies exceeds the individual company’s productivity gains, will have an adverse effect on that companies profitability and in the long run, its ability to stay in business.

Incentive schemes

An overall improvement is needed in employment conditions if the changes in work organisation and working culture are to be achieved. The current emphasis on long, unsocial hours and uncertain prospects is not contributing to attracting the best labour force to the freight transport industry. Incentive schemes such as performance bonuses should be adopted. Employee acquisition of company shares should be encouraged.

Local action networks

The creation of Local Action Networks should be promoted, in order for concerted actions to promote intermodal developments to be facilitated. Such actions may include the following:

- Reforms of vocational training programs, to strengthen focus on IT and on basic skills (including language)
- Development of training programs for so-called unskilled workers (dockers, truck drivers etc.) in particular
- Certification procedures (of European wide validity)

- Target declining industries for recruitment of workers with skills compatible with transport sector
- Management training programmes focussed on managing change in freight transport
- Identify career development routes across transport modes.

Human resources management

Development of human resource management strategies in order for labour issues to be reviewed and liaisons with employee representatives to be maintained.

Job rotation schemes

Wider job descriptions and functional flexibility entail higher skill requirements. At the same time, technical and administrative tasks are becoming more interrelated and teamwork becomes essential. Experience shows that job rotation schemes can have positive impacts on the total effectiveness and productivity of organisations, while also ensuring job satisfaction concerning work content for the majority of employees.

Suggested policy measure is the development of job rotation schemes in order for the functional flexibility of the organisation to be enhanced.

An appropriate strategy for intervention in each policy area should consist of a combination of a number of policy suggestions. Table 8-3 summarises the correspondence of suggested policy measures to each policy area that needs to be addressed. It is evident that each policy area covers a wide range of issues to be addressed and, as a result, a concerted approach is required.

The extent of each policy suggestion's scope can be manifested by its coverage of working cultures elements. Apparently, every policy measure suggested can prevent negative impacts (or, respectively, promote positive impacts) of intermodal developments on a number of affected working cultures elements. It is also true that various attributes of impacts on working cultures can be emphasised or weakened by more than one alternative policy measure (although the combined effect of all appropriate policy measures will probably be more efficient).

Table 8-3 Correspondence of policy suggestions to policy areas

Policy areas	Main relevant policy suggestions
PA1: Size of the labour force in freight transport	<p>PS1: Mutually accepted dismissal policies</p> <p>PS2: Reform of freight transport education and training systems</p> <p>PS3: Establishment of a service to monitor shifts in labour force size</p> <p>PS9: Human resources management</p>
PA2: Working time	<p>PS4: Working time directives</p> <p>PS5: Payment systems</p> <p>PS6: Collective bargaining</p> <p>PS9: Human resources management</p> <p>PS10: Job rotation schemes</p>
PA3: Payment, fringe benefits and social security	<p>PS5: Payment systems</p> <p>PS6: Collective bargaining</p> <p>PS7: Incentive schemes</p> <p>PS9: Human resources management</p>
PA4: Education and training	<p>PS2: Reform of freight transport education and training systems</p> <p>PS3: Establishment of a service to monitor shifts in labour force size</p> <p>PS8: Local action networks</p> <p>PS9: Human resources management</p> <p>PS10: Job rotation schemes</p>
PA5: Health and safety	<p>PS2: Reform of freight transport education and training systems</p> <p>PS4: Working time directives</p> <p>PS6: Collective bargaining</p> <p>PS8: Local action networks</p> <p>PS9: Human resources management</p> <p>PS10: Job rotation schemes</p>
PA6: Recruitment procedures	<p>PS1: Mutually accepted dismissal policies</p> <p>PS2: Reform of freight transport education and training systems</p> <p>PS3: Establishment of a service to monitor shifts in labour force size</p>

Policy areas	Main relevant policy suggestions
	PS8: Local action networks PS9: Human resources management PS10: Job rotation schemes
PA7: Organisational principles	PS1: Mutually accepted dismissal policies PS3: Establishment of a service to monitor shifts in labour force size PS6: Collective bargaining PS7: Incentive schemes PS8: Local action networks PS9: Human resources management PS10: Job rotation schemes
PA8: Behavioural codes	PS6: Collective bargaining PS7: Incentive schemes PS8: Local action networks PS9: Human resources management
PA9: Bargaining structures	PS6: Collective bargaining PS7: Incentive schemes PS8: Local action networks
PA10: Employee involvement and consultation	PS1: Mutually accepted dismissal policies PS6: Collective bargaining PS8: Local action networks
PA11: Labour regulations	PS4: Working time directives PS5: Payment systems PS6: Collective bargaining
PA12: Promotion of intermodal transport	PS2: Reform of freight transport education and training systems PS8: Local action networks

Table 8-4 Working cultures elements covered by each policy suggestion

Policy suggestions	Relevant working cultures elements
PS1: Mutually accepted dismissal policies	size of the labour force; negotiations and consultation
PS2: Reform of freight transport education and training systems	functional structure; work structure; technological characteristics
PS3: Establishment of a service to monitor shifts in labour force size	size of the labour force; social characteristics of the labour force; functional structure; work structure; health and safety; technological characteristics; salary system
PS4: Working time directives	physical conditions; working hours; negotiations and consultation
PS5: Payment systems	salary system; welfare provisions
PS6: Collective bargaining	employee involvement; negotiations and consultation; union membership; labour conflict
PS7: Incentive schemes	salary system; working hours; welfare provisions; employment procedures:
PS8: Local action networks	size of the labour force; social characteristics of the labour force; functional structure; work structure; health and safety; technological characteristics; physical conditions; salary system; working hours; welfare provisions; employment procedures; employee involvement; negotiations and consultation
PS9: Human resources management	functional structure; work structure; health and safety; technological characteristics; physical conditions; salary system; working hours; welfare provisions; employment procedures; employee involvement; negotiations and consultation; labour conflict
PS10: Job rotation schemes	functional structure; technological characteristics; physical conditions; working hours; employee involvement

The analysis of impacts on working cultures and the identification of key policy areas clearly show that there is no single strategy that can guarantee the protection of the human element in freight transport. The main objective of the lists of key policy areas and policy suggestions is to identify areas of concern and specify the alternative actions that can assist policy makers and other relevant actors. It should be taken into account that every policy measure should be thoroughly examined as regards its associated trade-offs. Productivity, efficiency, effectiveness and flexibility are indeed of high priority within the freight transport industry, but social issues, not

necessarily limited in the context of working cultures, are of equally high importance. One should also consider the long-term effects of the application of new technologies or organisational changes, since direct gains in short-term monetary terms might induce higher indirect losses in long-term socio-economic terms. In any case, one of the main conclusions of this research effort is the identification of the need to conduct a social impact analysis whenever a major change in the operational or organisational framework of the freight transport industry takes place.

ANNEXES

ANNEX-1 The U.K case study of freight terminals in Yorkshire

1.1 Scope of the case study

Two new terminals were selected for study: Doncaster International Railport and Wakefield Europort. Both represent a new approach to staffing and operating a road/rail freight interchange and both were designed to handle relatively low volumes of traffic as economically and efficiently as possible. The study also looked at the long-established Leeds Freightliner Terminal, a much busier terminal organised and staffed on more traditional lines but which is also going through a period of change. In common with the other case studies in the WORKFRET project, the research focussed on the human implications of new ways of working. The case study results are intended to be used to test hypotheses formed by research in other parts of the project.

As far as practicable, the UK case study has followed the same methodology as the other case studies (in Germany, Greece, the Netherlands and Sweden). Some developments peculiar to the United Kingdom, such as the effects of privatisation of the railway industry and the development of a security régime for Channel Tunnel traffic, have also been considered.

The case study covers changes which have occurred in transport markets, ownership and organisational structures, and in the technology used, detailing their effects on the people who work with and within the intermodal companies which operate the terminals. It describes the changes which have occurred and are continuing to occur in the working culture of these terminals, i.e. it explains as far as possible how it feels to be employed in the business of intermodal transport. In particular, it examines the ways in which it feels different from the «zero state» of four years ago, before the Channel Tunnel was opened and before the restructuring of the railway industry began in earnest.

The three terminals are described in some detail and, in the case of the two new terminals, their impact on the local and regional economies is also considered. The case study ends with a list of policy recommendations for the future.

At a comparative level, the results of the five case studies contribute to the main objectives of the WORKFRET project by answering the following questions:

- How do the common general trends in the freight transport industry in Europe affect different sites, with varying technological levels and operational frameworks, at diverse geographical areas?
- How similar is positive or negative reaction to intermodal developments in those diverse situations?
- How do local conditions influence the differences in the transition processes and the interactions among the various actors?

The interest in the Doncaster and Wakefield terminals in the Yorkshire region of the UK arose because they are very modern, opened only in the last three years to cater specifically for intermodal traffic using the Channel Tunnel, and owned by different, competing players in the recently privatised rail freight market. They are both built on green field sites; they are both low volume terminals, staffed and managed in novel ways to allow for low throughput; they are both designed to meet Channel Tunnel security standards; and both received financial help from local authorities and from the European Regional Development Fund as part of efforts to regenerate the local and regional economies. In addition, every road/rail terminal in Britain has been affected by the restructuring of Britain's railway industry through re-organisation and privatisation and by the opening of a fixed link to mainland Europe through the Channel Tunnel.

These new intermodal facilities therefore have similar origins but are distinct from each other, particularly in terms of ownership, and represent a clear contrast with the well-established (since 1967) freight terminal at Stourton, near Leeds, which originated in the public sector and in many ways represents the pre-1994 situation. The contrast between these three terminals was seen as rich ground for exploring the social implications of privatisation, decentralisation and free competition in freight services with a particular focus on the policy aim of intermodal shift from road to rail.

It was expected that these developments would have a significant impact on the local economy and labour market in Yorkshire and Humberside. For example it was estimated that about 560 new jobs would be created at and around the site of Doncaster International Railport. At Wakefield the Council has aspirations to have some 5,000 people working on the Europort «freight village», with a further 1500 jobs created in the immediate area. However, the expected volumes of traffic have not yet materialised, and the number of new jobs directly created by these developments is presently less than 10% of the targets.

This case study was designed specifically to assess the impact of these intermodal developments on key groups of people: the terminal workforces; the company's management; the trade unions; the customers of the business; the people who work in partnership with these businesses; and the local authorities which supported the development of new terminals. The aim was to obtain a deeper, qualitative, understanding of the main concerns and priorities of these different interest groups rather than a prescribed pattern of responses. The research was therefore conducted mainly through semi-structured interviews with a range of individuals representing these key groups, on-site observations, and documentary analysis. This could not have been done without the full co-operation of the many organisations concerned, notably English, Welsh and Scottish Railway Ltd. (EWS); Freightliner Ltd.; Tibbett and Britten Ltd.; Wakefield and Doncaster Councils; and Yorkshire and Humberside TUC. The research team is most grateful to these organisations and to the many individual members of their staff who contributed their views and experiences to the project.

Topics, which are considered here, include:

- Multi-skilling - costs and benefits to workers and employers
- Physically remote management and increasing staff autonomy

- Changes in the technology used to handle freight
- Are the Doncaster and Wakefield terminals competing or complementary?
- Do low volume, low staff terminals have to mean long working hours?
- Job security and promotion prospects in a fragmented railway
- Increasing job satisfaction for security officers
- The perception of trade unions by new entrants to the industry
- The impact of privatisation on intermodal transport workers

1.2 The impact of the Channel Tunnel

Compared with the «zero state» of 1994, there has been a «quantum leap» in cross-Channel transport links

- Rail transport suddenly became faster, more frequent and potentially more reliable - less affected by extreme weather conditions
- Rail could compete effectively with road transport - on certain routes
- Rail marketing was radically revised
- Railways became wholesalers of train space, not retailers
- New companies were formed to market the rail offer to hauliers and forwarders
- A new security regime was developed

1.3 The impact of new terminals - Doncaster and Wakefield

These were completely new terminals on green field sites. They were expected to deal with a relatively low volume of freight traffic and therefore had to implement new operating and employment practices right from the start. They employed a small number of staff from non-rail backgrounds but trained them to carry out a wide range of tasks, including clerical and administrative work as well as operating and maintenance jobs.

Compared with Leeds, the management of these terminals is «remote», based some 90-150 km away at Daventry and Manchester. Doncaster has a Terminal Manager responsible for day-to-day operations but financial management in particular (accountancy, marketing and investment decisions) is at Daventry. This has worked well, with local staff benefiting from a high degree of autonomy and a feeling of responsibility for «their» terminal. There are no supervisory posts at either terminal.

However, a small number of staff means that long hours often have to be worked in order to meet customer requirements. At Wakefield, with only two operations staff, 12 hour shifts are the norm.

Neither development has so far had more than a modest impact on the local economy although job creation (directly and indirectly) was an important factor in winning financial aid from the European Regional Development Fund.

1.4 The impact of privatisation

Apart from the opening of a fixed link across the English Channel, there has been another very significant factor affecting working culture - privatisation. This has created a degree of competition - but it is still more between rail and other modes than between rail operators. In fact, operators such as Freightliner and English Welsh & Scottish Railway co-operate to a surprising degree, mainly to gain economies of scale. These and other players are investing heavily in the industry, and they feel more able to criticise and lobby the UK Government and the EU.

Workers in the industry have felt the pressures of privatisation through revisions to working practices and to pay and conditions. Staff employed by Freightliner have been the most affected - workers at Doncaster and Wakefield were recruited on «modern» terms but those at Leeds have experienced great changes and expect to see more. There is increasing pressure for higher productivity, generally through multi-skilling and the removal or redefinition of traditional demarcation lines between jobs. The distinction between clerical and operating roles is becoming blurred.

Many workers have gained financially in the privatised industry, but they are usually workers with specialist skills, such as train drivers, whose basic salaries have more than doubled. Employee share schemes, whereby staff are given or sold a number of shares in their employer's company, have had little impact so far.

1.5 New technology

Technology has not changed as much as the WORKFRET project anticipated. The movement of cargo in demountable bodies has been commonplace in Britain for over 30 years, by various combinations of rail, road and sea transport. Only the details have changed and these have had little impact on workers in the industry.

For example, there are now many more mobile cranes instead of rail mounted gantries. These have an impact on economic considerations and on the layout of terminals but the work involved in operating them is not so different. Mobile cranes do offer a more attractive working environment, particularly because the operator can be much closer to cargoes and to colleagues.

There are also new types of wagons and locomotives, and new types of freight containers. In particular, the swop body or *caisse mobile* has become quite common in Britain whereas it used to be confined to mainland Europe. One of the study's main findings was that the inspection and maintenance régime for swop bodies is not so rigorous as it is for ISO containers (the maritime type). Railway operators are hoping to devise a better system through the UIC (the International Union of Railways).

It is notable that only limited use is made of information technology, generally at the newer terminals like Doncaster. The movement of trains, wagons and containers on railway tracks is monitored by computer as it has been for nearly 30 years, but the movement and storage of containers within terminals is generally still controlled by pencil and paper or by a visual display of coloured metal markers on a magnetic board.

Overall, the feeling of the project team is that change is being driven by customer needs rather than health and safety of workers. This is not to say that anything unsafe is being proposed, simply to respond to customer needs. It is rather than health and safety considerations do not seem to inspire change or improvement on their own merits.

1.6 New people in the industry

Companies with roots in road haulage and distribution are now rail operators, and people with mining and maritime backgrounds are now railway workers. The researchers had some concerns that this might undermine the traditional safety culture of the railway industry but in fact, the opposite is true: new workers have come from other industries where safety is just as much a consideration and, to some extent, they have brought a new perspective to safety issues.

The role of security staff has expanded, increasing job satisfaction. They are no longer simply static guards, working unsocial hours in isolation from colleagues. They have quite demanding work, which demands a number of specialist skills, they work in teams, they work varied but unpredictable hours and they are often the physical face of the railway company for many customers.

It is notable that there are still very few women or disabled people in the intermodal industry. The trends towards multi-skilling and increasingly long and unpredictable working shifts, coupled with the traditionally masculine culture of freight terminals and exposure to the elements, mean that intermodal work has become less, not more, attractive or suitable to these groups of people.

The role of trade unions has declined somewhat, although the railway industry traditionally has had a highly organised labour force. Workers no longer see union membership as necessary and the decision to join a union, or not, seems to be a cultural thing: staff are more likely to join a union if their colleagues are already members. The study report suggests that trade unions will have an increasingly difficult job to recruit new members and to service their existing members in a fragmented industry.

1.7 The future

The conclusions of this case study are that intermodal freight terminals in future are increasingly likely to be small in scale, with a lower volume of traffic than in the past, and therefore a lower income. They are likely to be staffed by a small number of people with a range of skills and duties. Wakefield and Doncaster are good examples of two different approaches to the problems of running low throughput terminals.

It should be noted, however, that only inland terminals were studied, and that intermodal terminals at seaports are very different in scale and organisation. The trends observed in this study suggest that combined rail/road/sea terminals will continue to develop in quite different ways from purely rail/road inland terminals.

ANNEX-2 The Bahntrans case study in Germany

2.1 Scope of the case study

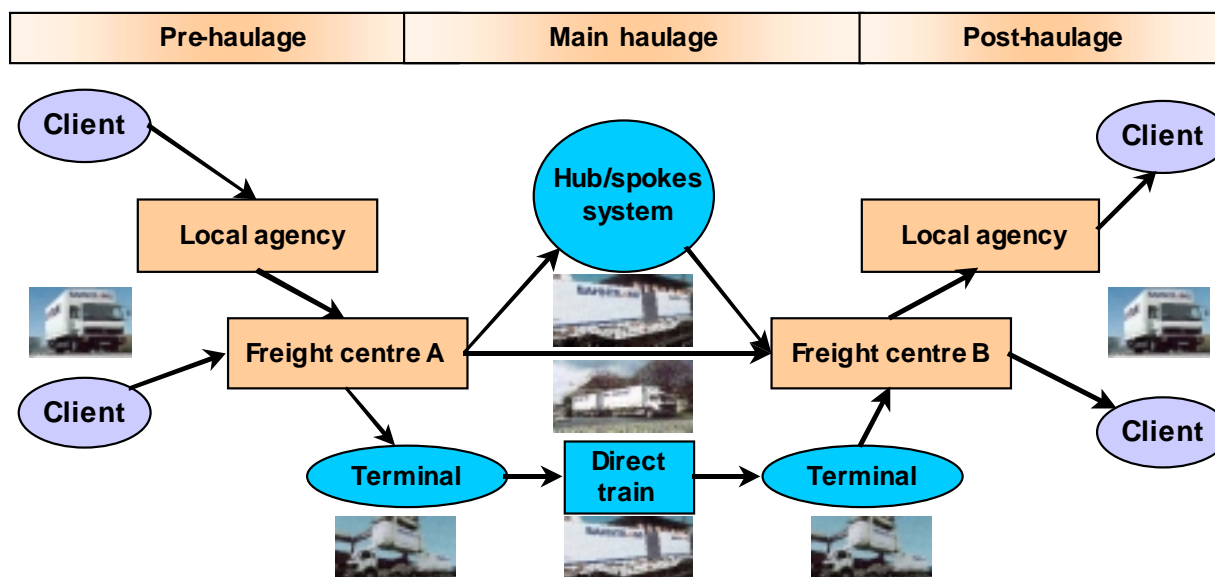
This case study was performed in and around the freight centre in Regensburg of BAHNTRANS, which is an important forwarder in the groupage business in Germany. In the BAHNTRANS company employees with a road haulier background and railway background work jointly together as an effect of railway privatisation in Germany. The working culture and their changes have been studied within a 20 months interval by an empirical approach, based primarily on interviews and questionnaires. During the first study it could be found that there was a significant difference between both groups of employees in terms of job satisfaction, experience of working atmosphere, job security and promotion chances. In the follow-up study statistically significant differences could not be found anymore. The conclusion was the hypothesis that melting two working cultures together can be performed in an interval of 2.5 years. A comparison between the situation of the employees in the freight centre and contracted truck drivers turned out that the latter are in a worse position as far as working environment, working times and contractual conditions are concerned. As a conclusion it is recommended to encourage and enforce the application of a sound management of change to reduce "painful" effects of privatisation and reorganisation. It is furthermore suggested to introduce protective measures for truck drivers in pre- and post-haulage of the inter-modal chain.

2.2 The Bahntrans concept

In the context of privatisation of the state-owned German railway it turned out that the mixed cargo (groupage) business on the rail was not profitable and could not compete with road transport anymore. In 1992 a new concept was published, how to continue with mixed cargo transportation on the rail in Germany (Essling and Gutsche 1992). The new concept was based on "containerisation" in swap bodies. It was intended to build freight centres close to new transshipment terminals, in order to put the freight on the rail efficiently. An efficient hub-spokes system on the rail was planned to allow for transportation of mixed cargo on the rail even at short distances.

Pre- and post-haulage were intended to be outsourced and operated by local truck companies. The freight centres are the platforms and the backbone of the Bahntrans concept. In the freight centre incoming freight from the pre-haulage is recombined in swap-bodies, which are bound for the same destination. They are sent out by truck either for transshipment on the rail or for main haulage on the road. Incoming freight from the transshipment terminal or from the main haulage on the road is loaded in trucks for post-haulage to reach the final destination. This intermodal chain is illustrated in Figure A2.1

Figure A2.1 The intermodal chain in the Bahntrans concept



2.3 The approach for studying working culture

Two studies were conducted in the Regensburg freight centre: a zero state analysis, which was performed in April 1997 and a follow-up study, carried out in November 1998. The interval of 18 months in between gave some time to allow technological, organisational and social developments to take place.

The objective was to observe the working culture parameters as defined within WORKFRET in order to be able to present a snapshot of the working culture at the zero state. Furthermore it was intended to get an insight in the changes of working culture that have occurred during the project's duration.

The information on working cultures was primarily received by interviews and questionnaire methods, which were supplemented by on-site observations and video recordings. Depending on observability the individual working culture parameters were assigned to different groups of actors to be interviewed:

- global Bahntrans management,
- trade union officials,
- local management of the freight centre in Regensburg,
- members of the local workers' council,
- a sample of employees from different departments of the freight centre.

A questionnaire was developed to address working culture issues that depend on individual experience. The questionnaire was distributed among all employees in the Regensburg freight centre. About 50% of the employees responded in the zero state study as well as in the follow-up.

Besides the empirical study scenarios for freight centres were produced targeting at 2010. They were based on a Delphi study. Potential policy suggestions were furthermore derived from the previous considerations.

2.4 Mixing working cultures

The questionnaire, which was used to investigate subjective issues turned out to be also useful in following the merging process of working cultures of former railway personnel and other BAHNTRANS employees, which have their background mainly in the road haulier sector. The latter were going on to work in a more or less familiar sector, whereas personnel with railway background had to adapt oneself to a completely new work environment with different work organisation, different tasks, and different working style. The following Figure A2.2 shows the items, which were queried by multiple-choice scales in the questionnaire.

Figure A2.2 List of items of the employee questionnaire

- | | |
|--|---|
| <ul style="list-style-type: none"> • Working atmosphere • Job security • Alcohol and drug problems • Working hours per week • Working in shifts • Involvement in decisions • Consideration of personal abilities and inclinations • Chances of promotion • Occurrence of work related disorders | <ul style="list-style-type: none"> • Relationship between employees with different background • Job satisfaction • Strain levels: <ul style="list-style-type: none"> - Noise - Dirt - Heat, cold, draught - Manual material handling - Continuous standing - Continuous sitting • Experienced time pressure • Ability to cope with work |
|--|---|

For the majority of those items no significant difference occurred between both groups of employees. However four important indicator items displayed statistically significant differences (Figure A2.3) during the zero state study.

Figure A2.3 Differences in attitudes between personnel with different background

Item**	Zero state (04/97)	Follow-up (11/98)	Changes in attitude "railway"
Working atmosphere	yes (2%*)	no	
Job satisfaction	yes (1%*)	no	
Job security	yes (2%*)	no	
Promotion chances	yes (1%*)	no	

* Significance levels of χ^2 -test

** All other items non-significant differences

It could be observed that those items were rated more negative by people with railway background: the working atmosphere was experienced worse, job satisfaction was lower, the jobs were assessed to be less secure and promotion chances were rated lower.

This means that the perception of working culture was still different between the two groups after one year of joint work. However the differences were found to have disappeared in the follow-up study. At least on a statistical basis it was not possible to prove a difference in perception of work between the two groups. As the follow-up study was performed 2.5 years after the union of both working cultures, the hypothesis is supported that after 2.5 years an adaptation to another working culture seems to be possible.

Some other findings from the evaluation of the questionnaires seem worth to be mentioned in this context:

- In both studies the relations between the two groups were assessed to have improved by 50% (zero state) and 60% (follow-up) of the respondents.
- The supposition that alcohol or drugs problems exist in the freight centre was rated significantly lower (2% level) in the follow-up than in the zero state analysis, especially among personnel with railway background. As alcohol and drugs consumption can be indicators of problems for coping with a situation, this finding seems to speak in favour of a progression of the adaptation process, too.
- Also it could statistically be proven (5% level) that the employees in the follow-up felt better able to cope with their workload.

During interviews with a sample of employees, it was found that they were well informed about the BAHNTRANS concept and that they were motivated to implement it. A good information policy and high degree of motivation and identification with the company objectives is well known to be a key factor for job satisfaction. Also it can be supposed, that this facilitates the adaptation process. However, even if there was a good information policy in the "management of change" at the freight centre of BAHNTRANS in Regensburg, this could not overcome all the working culture problems, which occurred with privatisation and structural changes.

2.5 The weakest link in the chain

After the zero-state analysis in Regensburg investigating the situation inside the freight centre, it seemed necessary to have also a look at the situation of the contractors and truck drivers in pre- and post-haulage. They are a typical group of actors in the type of combined transport policy Europe is aiming for. The objective is a reduction of pre- and post-haulage to a minimum. That means that the short-distance transportation from and to the final intermodal platform (i.e. a freight centre) is always a task for locally operating truck drivers. As the main haul in the groupage business is performed at night times on the rail as well as on the road, the driver's task is to do the post-haulage in the morning, transporting the freight from the freight centre to its final destination. In the afternoon pre-haulage has to be done, i.e. transporting freight from the client to the freight centre.

The following findings are mainly based on informal interviews that were made in the Stuttgart area with BAHNTRANS contractors and with drivers in 1998. The results seem, however, not to be typical only for the BAHNTRANS case. Also the AGA case study (reported in the B volume) turned out similar problems with outsourced road transportation.

The contractors and drivers are always in the weakest position in the intermodal chain. They depend on the "forwarders", e.g. BAHNTRANS, which are already under pressure due to the highly competitive situation. The cost pressure is forwarded to the contractors and finally experienced by the drivers themselves:

- Contractors are small companies or even self-employed drivers, acting on "own account".
- They are typically not organised in efficient associations or trade unions.
- They have to act in a highly competitive area. The pressure on the price level is extreme.
- Drivers are more and more forced to long working hours as the contractors are, to an increasing extent, not paid by rides or kilometers anymore but by transported weight.
- Drivers have bad contractual conditions in terms of working hours, as well as wages. The situation even deteriorates.
- Drivers are also charged to load their vehicles in the freight centres by themselves, which means an additional physical component of work (partly higher than for the workers in the freight centre).
- They partly experience bad environmental working conditions while loading and unloading on the yard, i.e. in winter or in rainy weather (in general they are worse than for the workers within the freight centre).
- They get more and more under a permanent time pressure, not allowing to respect break regulations (unlike the personnel in the freight centre, experiencing high peak workloads).
- In addition the drivers get completely under the control of the forwarders by the introduction of dynamic route planning and fleet management systems. This results in nearly complete delegation of control of the working process and responsibility to the forwarder, and reduces the job quality of the truck driver.

(Dynamic fleet management becomes, however, also a chance to control the violation of protective measures).

2.6 Implications to policy suggestions

Two important implications to policy suggestions shall be formulated now. One is related to truck drivers in pre- and post-haulage and the other is related to management of change in relation to privatisation and reorganisation in the transport sector.

The observations concerning the truck drivers in pre- and post-haulage require protective measures for this group very urgently. As the experiences of the past have drastically shown, single measures and pure regulations are not helpful in this respect. A concerted action, a round table of all involved actors is required. National solutions have turned out not to be helpful, as regulations, e.g. concerning the working time of drivers, have mostly been violated with the remark that other European countries do not apply such strict rules. Thus, only a European solution can help. The objective must be a real commitment of the employers on working conditions (working times, wages...). It has to be guaranteed that the self-employed drivers are also represented accordingly in the process. In addition a legal framework on European level and on national level and their enforcement including penalties in case of contravention seems advisable.

Concerning the management of change it became clear by the different case studies that privatisation and reorganisation measures have always impacts on working culture parameters. It became also clear that several of the negative impacts were neither foreseen nor have they been controlled by the management. The possibilities to learn from the experiences of others are also rather restricted due to a lack of availability of material. Thus, it seems necessary to disseminate the experiences in a code of practice to support management of change in privatisation and reorganisation. It seems furthermore useful to provide a standard for the management of change. This standard should require from management a "technology and reorganisation assessment" previous to such management measures. It should also urge them to plan the transition processes from a working culture perspective, specifying the steps to go. The standard should not be too specific because the management of change depends always strongly on the case. It should be also considered, whether the application of such a standard should be enforced by legal means on a European basis.

In conclusion it has to be emphasised that reorganising companies or privatising governmental bodies are responsible for their activities. Mostly these developments are driven by economic interests and under economic aspects. However, it cannot be accepted that the consequences of management decisions on human work are overlooked and are therefore not considered in many cases.

ANNEX-3 The port of Rotterdam case study

3.1 Introduction:

Scope of the Dutch case study

The research carried out for the Dutch case study in the three following fields:

- the development of two Multimodal Transport Centres (MTCs) in the Port of Rotterdam and the social impact. The MTCs Maasvlakte with main focus on container terminal automation and Waal-/Eemhaven with main focus on the modal shift to rail transport are included in the study;
- the use and social impact of EDI in a cross-port logistical chain.

Setting of study

The setting of the case study is the Port of Rotterdam in which technological and logistical innovations are taking place at a rapid pace. Intermodal transport is a key factor within the study. Facing the huge increase of the transport of containers in the next decades, the Dutch government and the Port Authorities of Rotterdam decided several years ago to develop the Dutch part of a European intermodal transport system.

Besides the focus on the MTCs and EDI in three separate cases, an inventory of relevant technical and logistical developments together with their social impacts is included in this study. In addition, a general description of the human factor elements in the Port of Rotterdam is presented.

3.2 Site description of the Port of Rotterdam

The Port of Rotterdam occupies an area of about 40km length located where several rivers (the Rhine, the Meuse and the Rotte) are flowing into the North Sea. The older ports are located near the centre of the city Rotterdam, like one of the sites of this study, the 'Waal-/Eemhaven' (port). This is approximately 32 kilometres from the seashore. The very large containerships (from 4.000 TEU) are not able to sail to these ports because of limited depth.

At the shore the last new ports have been build in an area called the 'Maasvlakte'. Especially three kinds of ports we will find here. Ports for the transshipment of liquid bulk (like oil), dry bulk (like iron and coal) and last but not least containers. The Dutch government and Port Authorities (and others, like environmental movements) are making up their mind over a planned huge infrastructural investment, the building of the second 'Maasvlakte' for the ports and distribution centres of the next 25 years.

This case study focuses on two port areas, the 'Waal-/Eemhaven' and the 'Maasvlakte' as far as container transport, -transshipment, -warehousing and -

distribution are concerned. In addition, a cross-port analysis of the use and effects of EDI is focused on.

To give an impression of the Port of Rotterdam, some key figures (1996) are presented in box 3.1.

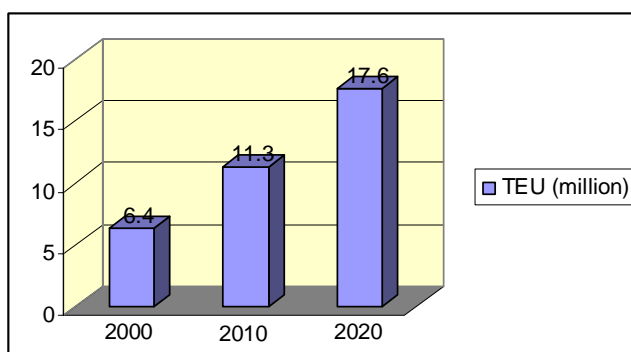
Box 3.1. Key figures Port of Rotterdam

length of the port:	40 kilometre
length of quay: kilometre	46
conventional cranes:	200
container cranes:	62
bulk cranes:	49
number of ships:	33.700
total transshipment (metric tonnes):	292 million ¹⁴
transshipment of containers/flats in tonnes (metric tonnes):	53 million
total number (or in TEU) of transhipped containers : million	3.1 (4.9)
direct 'port related' number of employed persons:	62.746
total (also indirectly related) number of employed people:	338.828

With these figures the Port of Rotterdam is the largest overall port in the world and ranked fourth in the case of container transshipment (after Hong Kong (13 million TEU), Singapore (13 million TEU) and Kaohsiung (5 million TEU). Hamburg is ranked seventh with 3 million TEU and Antwerpen ninth with 2.6 million TEU.

Container transshipment is considered one of the main areas of growth in the coming decades. In figure 3.1 an overview is presented of expected container throughput in the Port of Rotterdam. This estimation was made in August 1997.

Figure 3.1. Estimated container throughput in Port of Rotterdam



¹⁴ In 1997 307 million metric tonnes were transhipped.

For this reason, the huge expected growth, the Port Authority of Rotterdam, the Ministry of Transport and Public Works, (organisations of) employers (like ECT, NS Cargo, CBRB, TLN, NDL) and employees (FNV) are working together to create a part of a European intermodal transport system. Examples of platforms of co-operation are RIL (Rotterdam Internal Logistics), PMS (Platform Modal Split), Railforum and Port Community Rotterdam.

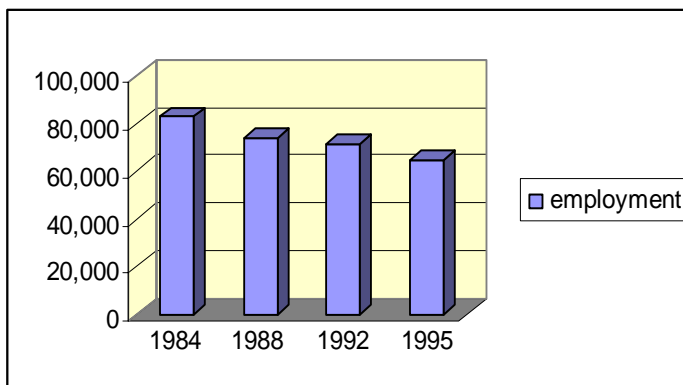
Objectives defined within the port are:

- a) to be able to transport/tranship this flow of containers;
- b) to limit in the meanwhile congestion as well as environmental pollution.

The Port of Rotterdam has two main areas/ports of transhipment of containers. The first area is the Waal-/Eemhaven (WEH) and the second the Maasvlakte, established respectively in the sixties and the eighties.

For example, the development of the number of people employed in the port is presented (see figure 3.2), divided per type of activity.¹⁵

Figure 3.2 Directly port associated employment



In addition, labour relations, including the functioning of the ‘labour pool’, employment conditions and working environment are described in great detail.

The three separate cases are introduced next.

¹⁵ Source: Port Authority of Rotterdam (1997).

3.3 The case studies:

Container terminal automation at ECT

Several years ago ECT and Sea-Land developed the first highly but partly automated container terminal, using automated guided vehicles, automated stacking cranes, a wide range of information systems and EDI.

This terminal was developed for several reasons. Besides improvement in productivity, efficiency and transshipment of very large container vessels, another reason was to become less dependent from the factor 'labour'. Especially the costs of labour should be stabilised and the risks of strikes should be minimised.

From the beginning the trade unions were shocked about this 'robot' terminal. The trade union density in the port is high and the militancy is normally well known. But in a social contract between trade unions, employers and port authorities a deal was made. Technological innovations on the one hand and social innovations on the other have to be combined in the innovation programs in the Port of Rotterdam.

In the case of the 'ECT automated terminal', the loss of employment is compensated by growth of employment as a result of growing containerisation and by *improving the quality of labour* in terms of a modern work organisation (based on self organising team concepts, job rotation and enrichment), improved working environment, adapted employment conditions, vocational training and an improved consultation of workers in the process of design and development.

An evaluation study and recent interviews show that the workers (under which a lot of former dockers in the break bulk sector) and management are still satisfied about this change in the quality of labour.

Based on this social evaluation, combined with positive technical and economic evaluations, ECT decided to build two other automated container terminals. One of them is already in operation, the other is under construction. All principles, technological as well as social are fundamentally the same as in the first case.

Nevertheless, there are *some new developments*.

For instance, the principle of non-exchange of (permanent) workers between teams and/or terminals (for reasons of team-cohesion) is in discussion because of the growth of the number of automated terminals. ECT wants more flexibility in human resource planning over the three terminals.

Not every (large) customer of ECT likes to use that advanced technology. Maersk decided in 1998 to build (in co-operation with ECT) a new 900,000 TEU terminal based on the Antwerp level of technology (straddle carriers will pick up the containers under the sea gantry cranes).

Besides this, the growth of inter-terminal transport (ITT) and external terminal transport (ETT) is growing very fast and the whole department BRC (Barge, Rail and Common Services) will be reorganised.

More in general the productivity and efficiency have to be improved and the long waiting times for road, rail and barges have to be shortened.

The *main conclusion* is that the introduction of new technology in combination with a modernisation of working culture in terms of new work organisations, job

enrichment, improved working conditions, etc., under the condition of a social contract between trade unions and employers is a successful approach, minimising social conflicts and other barriers in the development of intermodal transport.

Also of great importance is the permanent and systematised consultation of user groups and work's council during the design and introduction of new technology for operations as well as administrative procedures (ICT-systems).

Modal shift towards rail transport

The increase of rail transport of containers, as a chain in the intermodal transport system, is up till now a fact. Not only in absolute numbers but also in percentages. The modal split is shifting in favour of the modalities inland waterways, short sea and railways. The challenge is to enlarge this modal shift.

But there are some threats. The first one is the development of advanced technology for road transport and inland waterways. This development is, in our view, a threat for the competitiveness of rail transport in the long run.

The main developments for inland waterways are the enlargement of barges (for instance the 'Jowi') combined with automatic handling on inland terminals (BEX).

The most important developments for road transport seem to become the use of several kinds of road trains (like 4 TEU trucks, Combi road, etc.) in combination with automatic guiding systems (Automatic Guided Vehicles).

Against the background of a long-term potential decrease of competitiveness of rail transport, it is faced with two challenges.

The first one is to develop and use new technology (tracking and tracing systems, automatic driving, automatic coupling) and logistics (concepts like shuttles and line shuttles, pre- and end haulage, etc.) for rail transport too.

The second one is to improve the work organisation, skills and efficiency of rail transport. It seems to become the key factor to stay competitive with the other modalities. Although a great part of the job in this respect in the Netherlands already have been done, the remaining and necessary reorganisations of the work organisation, labour force and skilling still remain a challenge. The Dutch trade unions as well as management recognise these challenges and are willing to solve the problems. But the threat of loss of employment, multi- and re-skilling and a change in employment conditions might become real social barriers and can cause very serious social conflicts. Compared with countries like France and Belgium the Dutch experience so far is rather stimulating. The existence of a solid base of labour relations in the Netherlands is a positive factor. On the other hand there are complicating factors like the establishment of a new rail cargo company (European Rail Cargo) out of NS Cargo and DB Cargo and a renewed public debate about the necessity of new infrastructure for cargo transport like the Betuwe-railway.

These research findings have been confirmed during the Dutch national workshop.

EDI in logistical chain

In this section some conclusions are stated. Making general conclusion of the effect of EDI on the organisations involved in the case study is rather difficult since the organisations strongly differ. Differences exist in size and activities but more important in the overall approach towards EDI and the experience with this system. ECT has been a frontrunner in the use of EDI and has been active in EDI for almost 10 years, whereas the experience of Kersten Hunik is relatively limited as an organisation involved in a pilot study regarding the use of EDI. Given the above mentioned considerations some concluding remarks are listed below.

An interesting aspect of the use of EDI is that this is a system that enables a fundamental change in the production process. However, in the past EDI sometimes has been regarded as a system simply replacing a letter or fax, in other words an easy way of exchanging messages. Most organisations are positioned somewhere in between the two extremes of EDI as a process adjustment or as 'electronic fax'. Some organisations, such as Kersten Hunik, have been able to combine the restructuring of the organisation with the implementation of EDI.

Some of the pitfalls of the use of EDI are the following:

- Too much focus on documents instead of process.
- Technical differences: e.g. integration between EDI and the in-house computer system and lack of standards, such as codes table.
- Many procedures, codes and documents: since EDI is based on exchanging standard information between organisations, procedures and codes are very important. These might differ from the ones 'normally' used.
- Underestimation of time required developing a 'workable' system: as a result of both technical and organisational thresholds.

3.4 Policy recommendations

Container automation at ECT

For the introduction of new technology, logistic concepts and organisational changes in the field of intermodal transport several conditions seem to be supportive or even decisive in terms of success or failure. An overview is presented below.

1. Especially when the social impact of new intermodal developments (introduction of new technology, etc.) is large the *labour relations* should be well developed and improved or modernised. Trade unions and works council can play a new role in consultation processes, improvement of work organisation, etc. Sometimes this change in role is described as 'from boxing to dancing'. Employers (organisations) have to accept this new role, stimulating consultation on all levels within and outside the companies and facilitating this process with information, etc. The decision making process has to be adapted with consultation as a key element of it.

2. Not only the formal bargaining process between trade unions and works council versus the employers should be changed, but also the *consultation of (end)users* of new operational equipment and/or information systems is essential in improving the design and implementation. The design process should embed this consultation and evaluation elements.
3. Introduction of new technology and logistic concepts, combined with organisational changes causes mostly a loss of employment and a (smaller) growth of new higher qualified jobs. The risk of social conflict can be minimised if there are possibilities to reduce the labour force by early retirement and financial arrangements for good (pre)pensions.
4. Another good ‘momentum’ for the introduction of new technology is when the loss of employment is compensated by the growth of the activities, in this case containerisation, so when ‘per saldo’ no loss of employment is visible.
5. In line with the recommended improvement of labour relations and user consultation is a *modernisation of the work organisation* with the following elements: flat organisation structure; teamwork with large autonomy, responsibility and managing capacity; functional flexibility with job rotation and enrichment; permanent skilling and training. Organisational culture has to change from ‘top down leadership’ to co-operative teamwork.
6. In the design and/or redesign processes of new terminals monotonous and repetitive work, but also lonely workplaces have to be avoided.
7. Information systems should be supportive to the workers and their teams on all levels. Information systems should be decentralised decision support ones.
8. In the development of new work organisations in relation to new technology a new balance between workload and stress levels have to be found.
9. Problems in the working environment, especially connection with the introduction have to be assessed and solved.
10. *Employment conditions* have to be adapted according to the new work organisation, labour force, etc. Collective agreements can become more and more a general ‘framework’ with large autonomy for the works council on company level.

These suggestions are in line with the Green Paper *Partnership for a New Organisation of Work*, adopted by the European Commission on April 16, 1997. See also *The Dutch Comment on the Green Paper*, November 1997, Tilburg University/STZ Research & Consultancy.

Modal shift to rail transport

The railway transport modality is in the long run in serious problems and therefore all ‘hands need to be on deck’ and the noses should point in the same direction. The policy recommendations therefore are:

On regional level (Port of Rotterdam region Rijnmond)

The program for the *improvement of rail infrastructure* needs to be finished. It includes the enlargement of the existing Rail Service Centre, the building of a new

Rail Terminal West, the re-development of the new Botlek RSC, the Port Railway and perhaps the re-establishment of rail links between Hanno and RSC Eemhaven.

It should be favoured to develop modern *work organisations* like ECT in the new rail terminals and perhaps at the existing RSC Eemhaven as well. The *functional flexibility* has to be improved to become more efficient. In terms of *employment conditions* a long-term program of harmonisation between the modalities is necessary. The existing *labour relations* enable the partners to develop such a program avoiding social conflicts.

On national level

According to the prognoses for container rail transport in 2020 the Betuwe Railway (east and north) should be developed. But nevertheless, because of recent political debate, a *study is necessary to compare the competitiveness in the long run (2020) of rail transport with inland waterways and road transport* (in terms of new technology, logistic concepts and working culture). For instance what are the possibilities for rail transport under save conditions for the environment in the case of (semi)automatic guided rail transport in comparison with the use of (semi)automatic guided road trains and/or the use of large container vessels with partly automatic inland terminal handling?

In the meanwhile *implementing all kinds of new technology* like tracking and tracing, automatic brake control, coupling, etc.

In close co-operation management and trade unions have to develop modern flexible *work organisations* with enlarged *functional flexibility*. Not only on production level but also on overhead level.

A program of *harmonisation of employment conditions* between the transport modalities have to be developed not only on national level but also in the European context.

On European level

A strong program has to be developed for the survival of intermodal rail transport in the future. On the one hand co-ordination is needed between countries to create real efficient rail transport throughout Europe. All political barriers and conflicts to establish an efficient intermodal freight transport system (for instance in France and Belgium) have to be paid careful attention to in order to be lowered. On the other hand it needs perhaps some regulation of the development of road transport and inland shipping (for instance in terms of safety regulations).

Healthy *labour relations* in the Netherlands (and elsewhere) show that the necessary co-operation can be developed to establish efficient and competitive rail transport. The EC can play a role in the *harmonisation of employment conditions* between transport modalities and countries. The ideas, formulated in the EC Green Paper 'Partnership for a new work organisation', should be leading in a program to *modernise work organisations* of transport organisations all over Europe.

EDI in logistical chain

In this section a number of recommendations are described, structured in accordance to the human factor elements as described. In general recommendations are aimed at the level of companies. However, there are some recommendations specifically aimed at national and EU level. In a broader perspective, the role of the government could also be in facilitating a favourable environment for the companies in order to introduce some of the recommended actions.

Labour force

A general result of the introduction of EDI, especially in the long run, is a decrease of the number of jobs relating to data entry. An opposite effect in size of labour force is the newly created jobs in the field of system control. Net effect is expected to be a decrease in the number of people employed. Furthermore, the effects on size of the labour force apply to different parts of the labour force. Low skilled jobs will disappear and high skilled jobs are created. Therefore, the characteristics of the labour force need to be adjusted. Companies can play an important role in (re)training and educating their staff. The government can anticipate on this development by stimulating education in IT-oriented fields. In addition, computer skills could be taught to a broader range of people at an earlier stage.

A main concern in the functioning of information technology related issues in general and EDI in particular is the amount of labour input within a company dedicated to this issue. A dedicated EDI manager in a large organisation is not an exception, however, in SMEs information technology related tasks are often added to the tasks of someone with a general interest in computers. Time available is often not sufficient. A recommendation based on this development is to dedicate someone (partly) to IT-related tasks or to hire a (part-time) system manager.

Work organisation

The majority of the interviewed persons expressed the strong belief that EDI is not just an 'electronic fax' but that it is a total new way of thinking, in which processes within organisations have to be adjusted according to new possibilities brought about by EDI. A recommendation derived from this revolutionary way of thinking is that when introducing EDI, processes within the current organisation should be reviewed with special focus on potential gains from a new orientation towards the role of information in the organisation.

The case has indicated that a critical success factor of the introduction of EDI is the user acceptance. Therefore, a clear recommendation would be to strongly involve users at different phases in the process. For example, in the design phase users are co-responsible for issues such as working standards and layout of screens and forms. In addition, the functioning of the system needs to be periodically reviewed with the users in order to optimise the system.

A common standard within the logistical chain still remains a problem. EDIFACT currently does not provide the desired standard, resulting in communication errors and increased stress at the job. A very straightforward, but difficult to realise, recommendation is to further optimise the standards.

Working environment

A common problem indicated by the interviewed persons is that EDI might result in a loss of personal contact. Much of the data exchange takes place through EDI replacing frequent telephone contact. Personal contact might increase the awareness of problems 'on the other side'. A recommendation based on this development might be to stimulate personal contact, e.g. by temporary personnel swaps between companies. Personnel is able to visit a partner in the chain and to see how the organisation is functioning and what happens with the information input that normally comes from his own organisation

Stress has been indicated to increase as a result of the introduction of EDI. This might be caused by a decrease in personal contact, increased work pressure or increased transparency of the process. It is recommended to pay attention to 'de-stressing' of personnel involved in the production process. This could be achieved by job rotation or by creating additional breaks.

Employment conditions

Through the introduction of EDI contents of function change, employment conditions need to be adjusted to new functions. New function descriptions with new conditions may need to be developed.

Review of policy recommendations

The three case studies present a broad range of recommendations. Obviously, recommendations differ per case. This can be partly explained by the different starting points of the cases.

In the container terminal case new technologies and logistics have been introduced in an innovative environment. The ECT organisation has adjusted to new developments and in fact is in a process of ongoing change.

In the rail case the starting point is somewhat different. Railway in Europe is expected to face tough times, especially in the long run. Technical innovation is a prerequisite to keep up with competing modes of transport, such as inland waterways and roads. Besides the technical aspects, attention needs to be paid to organisational aspects as well. An important issue is international co-ordination in rail transport. Political pressures to facilitate a modal shift away from road transport to other modes of transport for obvious congestion and environmental reasons could improve the position of rail transport. Whether rail transport could benefit from this development depends on the ability of rail transport to restructure itself in order to cope with (new) customer demand.

The EDI case has yet another starting point. It is a common belief that EDI could lead to a new approach towards information and processes within organisations. This belief has for the majority of organisations not yet been translated into large scale restructuring. In many organisations only first steps are undertaken in the implementation of EDI. However, in the future EDI and other 'telematics' practices might result in a fundamentally different organisation structure and working style.

Given the different starting points, the three cases have a number of policy areas in common. In all cases information technology plays a role. A common

observation is that information technology replaces low skilled labour. At the same time there is an increased demand for high skilled labour in system control functions. The net effect is a decrease of the number of people employed. In the majority of the organisations involved in the EDI cross-port chain this development has not resulted in a reduction of the number employed, but through an increased productivity per employee in increased output.

The important role of information technology asks for new skills of the employee. This has resulted in extensive (re)training programmes within the organisations and to a changed demand on the labour market. New job profiles often include well-developed computer skills.

Another common development is a more flexible, flatter organisation and increased autonomy together with more responsibility of the workers involved. Increased flexibility is a collective trend in the cases that can be partly explained by the growing '24 hours economy' development. Also here information technology and automation play a role for it is the technology that facilitates continuous processing. Workers have to adjust to these changes by having a more flexible working approach.

ANNEX-4 The AGA case study

4.1 Case study objectives

The AGA case study is partly different from the other case study sites in the sense that it is selected as a reference case study to compare developments with an industrial company that produces gas with the other more transport oriented case studies. It is important to see if there is evidence of the fact that developments within the transport sector follow similar patterns as the other types of industry. Although one study at an industrial type of company does not prove this it will show tendencies towards certain types of developments, regardless of what type of technological or logistics systems change that takes place, or in what type of business this change is taking place.

It is important to note that the developments that have taken place and which have influenced human factor elements at the AGA case study site are just as dramatic as at the other four case study sites.

4.2 Case study description

This presentation covers the research carried out for the AGA case study of new developments at the AGA operations during a period stretching from the mid-late 80's to today. The starting point for this investigation or «zero state» is 1988 when a major reorganisation process started at the Finnish AGA operations concerning the filling and distribution of cylinder gas. This case study, studies how these changes have affected the people working within the AGA organisation with respect to working cultures and organisational as well as managerial structures.

AGA is one of the world's leading gas companies. The Group produces and sells industrial and medical gases in some 40 countries in Europe, the U.S. and Latin America. These operations employ over 10,000 people. The Gasaccumulator Company, later to be called AGA was founded in 1904. AGA has approximately 38,000 shareholders.

The Finnish AGA operations employ 432 people of which 110 are women (1997 year's figures). There is gas production in 11 locations and sales offices in 7 locations. There are two filling stations for gas cylinders and about 150 depots spread all around the country. The head office is in Esbo just outside of Helsinki.

Figure A4.1 displays how the gas is produced and distributed in Finland and other countries. It will give an idea of how the operations in Finland are set up.

An air separation plant (1) supplies customers via a pipeline or tank trucks. The gas at the air separation plant is also produced in liquid form and can thus be transported via tank trucks directly to the customers' storage tanks (2) or AGA's own gas cylinder filling stations (3). From the gas cylinder filling stations the cylinders are transported to retail outlets (4) or directly to the gas cylinder customer (5).

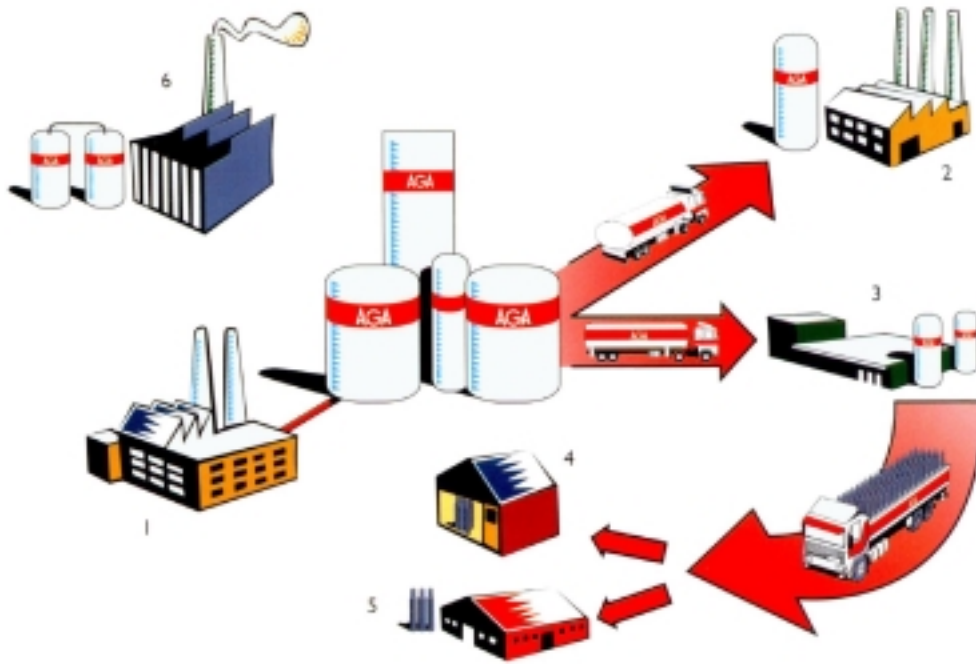


Figure A4.1- Gas production and distribution system of AGA

The cost of transporting gas is high in comparison to its production. Gas is, in simplified terms, produced from the air that we breathe which means that the «raw material» for gas production is available everywhere regardless of geographic location. This means that flexible local production as well as distribution networks have to be built up. The need for cost effective solutions are important and there is a variety of concepts that are utilised. As can be seen in the figure and as explained above there are three basic types of customer gas supply:

- Pipeline
- Liquid gas in tankers
- Gas cylinders

The case study has chosen to focus on cylinder gas production and distribution and the change that has occurred within this area during the more than last 10 years at the AGA operations in Finland. Viewing the figure below means that the change within area 3 and the ongoing distribution leg is studied.

The reason for this selection is twofold:

1. Major technological and organisational change has taken place within this area.
2. This area accounts for about half of AGA's sales revenue and affects many customers and employees.

The AGA case study was first planned to be conducted at the Lidingö plant in Sweden. Due to changes within the AGA organisation after the start of the WORKFRET project the plans for the case study were revised. An alternative case study location was selected. The specific new location was chosen to better study major change within AGA and the impacts of this change (see reasons for selection above). The best site to fulfil these requirements was not located in Sweden but in Finland where vast organisational change had already taken place.

Performing a case study at a location that has already experienced change has several advantages and very few disadvantages. The transitions have already taken place and the project does not run the risk of delays which would hinder the case study to study the effects of change which may not have taken place. The effects of the transition are well known by all people that have been directly or indirectly affected. One of the major disadvantages would be that it is difficult to obtain information from people that have left the organisation.

In this case study the zero state are the conditions that prevailed at the AGA operations in Finland in the mid 1980's. The present state are the conditions that are prevailing today in 1998.

Within the area cylinder gas production and distribution there are several new technologies and logistics concepts that have been introduced and these have had a considerable impact on the five human factor elements.

The Finnish AGA operations were operated in a decentralised manner in the early 1980's with numerable filling stations for gas spread all around the country. At the end of the decade and the beginning of the 1990's the Riihimäki filling station was built and set up to supply a greater part of Finland with cylinder gases. The gas filling operations became more centralised and all but two cylinder gas filling stations, including Riihimäki, remained after the reorganisation.

The Riihimäki filling station is a now very modern facility utilising new concepts for cylinder gas filling. Traditionally cylinder gases were filled and loaded outdoors, the work was characterised as being quite harsh due to heavy lifts and outdoor work. The Finnish climate with its severe winters put an additional strain on the work that was to be performed. With the building of the Riihimäki filling station most of the manual operations were moved indoors and were automated.

4.3 Methodology used

The WORKFRET project provides a common methodology for the case studies in order for comparable results to be achieved, while ensuring that the researchers in the five case studies have sufficient freedom to investigate specific issues of importance for each case study area. In all five cases a transition has been taking place and the aim of WORKFRET research is to examine how the actors in the case study sites react and how their working cultures are influenced. In combination with research conducted in other parts of the project, the outcome of the case studies will be useful transition examples that will allow the WORKFRET project to form conclusions on a wider scale. The six-step approach making up the common methodology can be summarised as follows:

1. Zero state assessment

2. Identification of transition
3. Identification of reasons for change
4. Translation of impacts into changes in working cultures
5. Identification of system interactions
6. Investigation of future situation

The first three steps were analysed by reviewing written material and through interviews and discussions with relevant people. Steps 4 and 5 are based on qualitative case study interviews. The interviews followed a questionnaire. The questionnaire was not used strictly but more as a check list in order to make sure that all areas were covered before each respective interview was terminated.

The answers were compiled and sorted under the five different Human Factor Elements (see below) that have been identified within the framework of the WORKFRET project. The material that did not fit into this format were summarised for each work category. The areas that are left unanswered were not answered by the interviewees or may in some cases be considered as not applicable, not available or superfluous.

Comments and quotes that could have been considered sensitive were removed from the respective interview results in order to ensure the personal integrity of the interviewee. Key problem areas and success factors were identified and conclusions were drawn in order for AGA to repeat success stories and avoid repeating mistakes when introducing new technology and organisational change.

Furthermore an investigation of future situation, step 6, was undertaken by studying official AGA corporate strategy. It should be noted that the investigation of the future situation is the author's own interpretation of the effects of the official corporate strategy and not the company's.

4.4 Interviews

A total of 11 people were subjected to one-hour interviews. The interviewees were selected in order to receive a cross-section of the company and its operations. The interviews were qualitative and followed a checklist in order to ensure that no areas were left unexplored. The interviews were conducted on-site. When no answers were given the respondent either had no opinion, did not know or the question was not applicable to his/her situation within the company. This means that the degree and extent of the answers naturally varied from job function to job function. The job functions that were selected were the following:

- Driver
- Transport planning
- Factory worker
- Order handling
- Computer department

- Helpdesk
- Specialist, individual cylinders
- A variety of key management personnel

Even though not all jobs are physically located in Riihimäki, the job functions are all related to the Riihimäki plant. Some more than others, for example the factory worker's job is related to cylinder gas filling at the Riihimäki plant only but the helpdesk will work with other things that are not related to Riihimäki as well.

The people not working in Riihimäki are employed at the Finnish head office in Esbo just outside of Helsinki. The driver is naturally not working in the Riihimäki plant itself but is working out of it.

4.5 Results

- *Labour force*

There has been a considerable labour force reduction due to the introduction of the Riihimäki plant and the closing of all the superfluous smaller filling stations. The outsourcing of drivers was also one way of cutting down the amount of personnel and concentrating on core business. The driver's working conditions are not satisfactory in the sense that the working hours are too long and the possibility of taking a vacation is difficult and these conditions are most probably affecting the quality of the transport services.

The employed personnel enjoy normal working hours. There is now a better possibility to receive a more even distribution of gender since operations have moved indoors and there is a higher level of automation.

- *Work organisation*

The organisation is in itself flat with easy access to discuss matters with superiors. Depending on the type of skill and experience the employee has, he/she enjoys more or less autonomy. Most people were working in teams although these did not seem to be working in a satisfactory manner. There was also evidence of the fact that the employees felt that all their skills were not utilised to their fullest, this was the case for the employees with some type of higher education

- *Working environment*

Generally there is a high level of automation in all job functions that normally would require manual labour. This opens possibilities for more people to be able to work with cylinder gas filling and distribution. Outdoor work has changed to indoor work when cylinder gas filling has moved indoors, this is seen as something positive by all. The work place is from an ergonomic point of view sound. The working environment can be stressful at times but the amount of stress has been reduced considerably since the Riihimäki plant introduction and the problems related with this

have been solved. At the start up of the facility the stress levels of some of the employees were very high.

- *Employment conditions*

The work time is a typical 40 hour week with five weeks vacation. Some of the office workers have flexitime and can choose to start their day between 700/800 and 900. The factory workers work in a 3 shift. The drivers have very poor working time conditions as previously explained under the heading Labour Force. Typically it can be said that those that are employed by AGA have the legislated working conditions of the country.

4.6 Future trends

This site specific scenario is the author's own interpretation of available public information. The conclusions are not official AGA standpoints. Since this case study is concerned with a company working in a fast moving market no projection will be given on very long term developments (10 to 20 years). A projection will however be given on the trend that the company will follow over the next five years and the effects this will have upon employment within the organisation.

The AGA operations world-wide are focusing more and more on cost reductions and centralisation of the operations. When studying AGA during the last few years the trend is quite clear. There will be more reductions in personnel as well as investments in more lean production and distribution activities. These developments are caused by an increasing amount of competition in existing markets and the fact that many of the progressive markets, such as South America and Russia, have, due to the recent economic recession, showed poor results.

Another critical factor is the globalisation/regionalisation of the gas market, which has had a negative effect on the gas prices for the industry. The nature of gas production forces the gas companies to large investments in relatively stationary equipment. It is very difficult to just move production. When new companies are entering a market there will be a pressure on prices in order to preserve the market share of the already existing companies.

Apart from cost reductions within AGA there are several other developments that can take place. AGA may sell off certain parts of the company and specialise or may also merge with some other company in order to grow larger and become more competitive. The merger would then most probably be with a company that would geographically complement the AGA production facilities.

It is however a fact that 60 production units will close by the year 2001. AGA will, according to an article in Dagens Industri 1998-12-12, cut its work force by 1700 employees. The company will by this measure reduce costs by SEK 900 million of which 500 million will be cut in 1999. The 1700 that are leaving the company shall be added to the 1300 that have lost their employment this year. This totals to about 35% of AGA's previous work force.

The trends and their effects on the case study site

The above developments that are the general company trend will of course also affect the Finnish operations. The rationalisation program may hit the other AGA operations in Finland but the case study site, the Riihimäki plant, will most probably remain intact. This assumption is based on the fact that the Riihimäki plant is the fruit of a massive rationalisation program in Finland concerning cylinder gases. The Riihimäki plant can be seen as a model for rationalisation within the rest of the AGA company. This would indicate that other AGA operations in other countries would adopt the Riihimäki concept or other similar solutions.

If AGA merges or is sold the Riihimäki plant will most likely be kept operative based on the assumption that the merging or acquiring company will be a company that will merge with or buy AGA in order to grow in the Finnish market.

One thing is certain – prices on gas will become lower due to increased competition both locally and regionally. This will force AGA to adopt more aggressive pricing and continuous cost reductions.

ANNEX-5 The port of Thessaloniki and the intermodal axis Thessaloniki–Sofia case study

5.1 Introduction

5.1.1 Scope and main objectives of the case study

This case study provides a more specific angle in researching the development of working cultures within the WORKFRET project. It encompasses the complex interaction of processes rooted in different socio-cultural environments – Greece and Bulgaria as neighbouring Balkan countries, and an EU based economic system with a «transition» country. This approach necessitates scope of the view that reaches far beyond the boundaries of the separate organisational unit – the Port of Thessaloniki and involves whole transport systems, especially on the Bulgarian side. The study was not aimed solely at identifying differences and ensuing difficulties in the process of work but more to the closeness of goals and mechanisms promoting cooperation and mutual interests.

The case study aimed at explaining the nature and the dynamics of the changes in the different areas of development of intermodal transport. Main stated objectives are:

- Identification of “main actors” in the port environment and also along the port of Thessaloniki - Sofia axis;
- Description of existing working cultures and emerging trends in the transport systems and axis and especially the ones of the part C analysis of the port records;
- Identification of the main impacts of driving forces such as privatisation of the port, restructuring of road and rail sectors in Bulgaria, on the working cultures and organisational/managerial structures in the area concerned;
- Definition of impacts, barriers to change in a sensitive area.

On this basis, elaborate conditions of improving efficiency, effectiveness, complementarily, facilitate «interfacing» between an EU country (Greece) and Eastern European one (Bulgaria) have been developed as an approach to future policies formulation.

The description of the case study developments distinguishes three parts, linked to the major research areas:

- a) The port of Thessaloniki development.
- b) Rail part, comprised of two subparts – Greek and Bulgarian.
- c) The road part comprised also of two subparts – Greek and Bulgarian.

5.2 The Port of Thessaloniki working cultures

5.2.1 Labour Force

Total workforce in the port of Thessaloniki includes 827 persons, 483 of them being salaried employees and 344 dock workers. Extensive growth of employment (56.4%) took place between 1980-1985, which has been replaced by a process of decline of dock workers in the last years. The trend is expected to continue in the near future and about 200 dockers will leave in the next five years through the mechanisms of natural waste, mainly retirement. Only 8.7% of the employees are below 35 years of age.

The recruitment process under the present status of the company is subject to complicated system of approval by the ministry of Merchant Marine and Council of Ministers before it reaches the standard procedures carried out by the port authorities. There is only one exception in the process - temporary personnel, which can be hired directly by the port.

5.2.2 Work Organisation

The Thessaloniki Port Authority is a Legal Entity under Public Law and belongs to the state. This situation entails a complex decision-making process, including general and specific rules in the workplace, payments to personnel external to the port, etc. In most cases, the decision taken by the Port's Administrative Council has to be approved by a combination of Ministries, sometimes up to seven.

The organisational structure of the port is following a hierarchical scheme with departments and divisions. It headed by an Administration council – body of wide interest representation, both internal, of different categories of port personnel and external, of local public authorities, commercial and shipping organisations.

5.2.3 Working Environment

The port presents an interesting case in the field of occupational health and safety. There is no special department or officer to deal with such matters although ports are among the most dangerous working environments. The major tendency observed however is one of significant reduction in the number of accidents from the 90's and onwards (91.2% reduction for the period 1981-1997). The major factors behind the tendency include the decrease of the number of employees, the introduction of new technologies and increased skill levels of the operating personnel.

Despite the positive developments in the area there still some typical problems to resolve. The monitoring and safety record keeping need improvement, especially in view of the expected new problems, linked to the introduction of information technology systems – mental overload, stress, etc. it has been recognised already that an occupational health and safety office should be introduced in the port.

5.2.4 Employment Conditions

Different working hours regimes are followed for different worker categories. The container terminal operates on three shifts for all days of the year while in the conventional port on two shifts.

Norms determine the limit in cargo volumes that each working group should handle during a shift. Norms for certain types of cargoes have been incorporated in the pricing policy. The process of setting the limits on cargo volumes handled by one shift involves also negotiation and agreement from the port workers.

Occupational training and education of personnel is considered a key factor in the future development of the port into private entity, more international competitive pressure and introduction of new technologies. Training will enable employees to participate more realistically and contribute to the development of the port. Efforts have to be made, especially in the areas of information technology implementation, foreign languages, patterns of goods handling, machine maintenance, etc.

5.2.5 Labour Relations

Trade union organisations follow the professional characteristics of the two main employment sectors. There are four trade unions representing the Managerial/Administrative/Technical/Supporting staff. They are linked to the Federation of Permanent Employees in Greek Ports, which in real life plays the active role in the relations with management.

Port workers' are organised by another four unions. Since the 1970-ies the structure of representation in this sector has passed through a number of mergers, sometimes accompanied by internal conflicts. Port unions are linked to the Federation of Transport Workers in Greece.

In the present conditions the privatisation scheme has led to raising of the tension and limited industrial action, but this case involves higher stakes than union-management relations.

5.3 The port privatisation issue

What appeared up to now is a «draft bill» concerning the transformation of the port of Thessaloniki from a Legal Entity under the Public Law to private company (Societe Anonyme).

5.3.1 Main provisions of the «draft bill»

- The Greek State retain 51% of the share capital of the company.
- The rest 49% will gradually fall to the hands of private interested parties via the Athens Stock Exchange.
- The new company will aim at serving the public interests but will operate under market rules.
- All fixed and mobile assets of the port are transferred to the company.
- The company life duration is set to 100 years.

As a result of the shift of ownership the decision-making and management process will become more flexible. The port's management under privatisation is expected to have more freedom of action, to set its own strategic policy and plans as well as to be able to take decisions faster. The new company will have administrative and financial autonomy and will be under the supervision of the Minister of Merchant Marine. Approvals for the studies and construction works become easier.

The proposed law facilitates also the recruitment of the port workers and operations on a private contract basis for periods of high traffic volumes as long as the total duration of their employment does not exceed a hundred daily wages in twelve month period. Certain guarantees for the salaries of the port employees are proposed which will maintain them not lower than present levels while there is also a possibility of providing special productivity rewards.

5.3.2 Main threats according to employees

Employees are concerned about major problems coming from three directions:

First, the effect on the employment status of the different categories. Privatisation will change the current treatment of the administrative/technical and supporting staff as civil servants of a permanent status. They will be privately contracted and thus they will be seriously affected.

In the case of port employees, although all of them will be immediately incorporated into the new private company as their present positions are considered «fixed» they will inevitably lose the permanency of their posts.

The guarantees offered in the initial stage of the process of privatisation have to be assessed against the existing legislation, which allows a private company to dismiss up to 100 employees in a month. For port workers the main threat however, is the possible hiring or selling parts of the port to private entities who will be entitled to employ their own workers.

The second direction of concerns is linked to social security and social benefits loses. Regarding pension provision, the port workforce will be incorporated within the pension scheme of the Institution of Social Insurance and will no longer be paid by the Thessaloniki Port Authority threatening current benefits.

Port workers that will be privately contracted may lose some privileges and benefits attached to their previous category, as well as the benefits they received as all civil servants.

The third direction is maintaining efficiency of the social dialogue and income protection. All previously mentioned changes will exert pressure to erode the positions of the employees and their unions. This will normally reduce their bargaining power and also their income.

The main demand of the port workers is to receive a guarantee that will keep their basic salary at current levels. Port workers also may agree to be employed in the future at lower rates in the new private companies emerging at the port as long as the new company will subsidise their salary so as to reach the agreed current level.

In contrast the government that has proposed the privatisation bill, the port employees believe that improvement in the competitive market position of the port

does not necessarily imply a change in its present legal framework. Their central position is that prior to privatisation open dialogue among all stakeholders in the port should start aiming to find ways to secure the port's competitiveness without deteriorating the well being of the employees.

The process of privatisation inevitably involves transition of organisational cultures (attitudes, beliefs, assumptions, orientations) of port employees from a secured employment environment to that of a private company environment with greater prospects of advancement based on merit but also greater employment uncertainty.

5.4 Working Cultures in Rail Transport, Bulgarian Part

The total number of personnel in the Bulgarian Railway Company (NRC) was 56 600 employees at the start of the case study in 1997. Its organisational background is marked by the attempts to raise operational labour discipline in the 1980-ies through implementing military type of rules and dependencies between jobs and professions. In this way the traditionally conservative, male dominated working cultures in the railway system have been transferred over time and consolidated strong identification the employees with the corresponding jobs and professions.

There are a number of trade union organisations in NRC but three of them are the important ones:

- the Union of Railwaymen in Bulgaria (URB)- member of the Confederation of Independent Trade Unions in Bulgaria (KNSB). It is the largest organisation in the company, with about 33 thousand members from different sectors and professions;
- the Union of Engine Drivers - member of the Union of Transport Unions - member of KNSB. A craft organisation, about 2000 members but with key importance in times of industrial action;
- Railway Union - member of the Confederation of Labour Podkrepa, the second largest trade union centre in the country. Not a big organisation, about 3000 members combining different professions.

Relations between the unions in the company are not easily managed. At the core of the tensions is the attitude between the two member organisations of KNSB, which leads to changeable combinations among all unions and most of all opens the space for management manoeuvring between them.

Each year there is a collective bargaining round, which ends with an agreement or an annex to a previous agreement with only specific changes for the current year. The last agreement is from 1996. With the decline of the economy and the mounting difficulties for the company the salaries have been continually losing in the race with inflation.

Despite all shortcomings the culture of dialogue and collective bargaining has taken roots in this very centralised management system and the new rights for the employees have led to considerable redistribution of power, already recognised by management. Whether this situation will be promoted or contained and marginalised

seems to form one of the major contest fields in the restructuring programme of the company.

Specialists in the field largely share the opinion that the most important asset of the Bulgarian National Railway Company is its human capital. In connection with the restructuring of the Company its human resources have to undergo a deep process of reorganisation and internal change and the process has already started. It has to be accomplished both in terms of numbers and quality of personnel, for which different approaches will be used in the short, medium and long term.

5.5 Working Cultures in the Road Transport, Bulgarian part

The road transport sector is undergoing dramatic changes due mainly to two driving forces:

- a) the "transition" from centrally-planned to a market economy and political democracy
- b) the collapse of the traditional markets in eastern Europe, sharp industrial output decline, dangerous internal government debt accumulation and the rise of social problems.

The development of road transport is characterised by two major processes - demonopolisation and decentralisation. The third trend that is gathering momentum is the privatisation of the new companies and the appearance of a viable and dynamic private sector in the road transport services.

Until 1990 the transport of loads and passengers had been concentrated in 29 state firms for internal connections and the firm SOMAT - for international freight activities.

After 1989-90 the process of restructuring of the whole transport industry started through separation of autonomous state companies, followed by privatisation of part of their assets or the whole enterprise. In this way small transport companies appeared on the basis of 1-10 vehicles. The giant international carrier SOMAT has been split, basically along its main units in several towns around the country and privatised separately afterwards.

There are three major trade unions operating in the field. The Union of Workers in International Road Transport, affiliated to the Union of Transport Unions in Bulgaria and the Union of Workers in Road Transport both are members of the Confederation of Independent Trade Unions in Bulgaria. Apart from them is the Union of Automobile Transport Workers - a member of the Confederation of Labour «Podkrepa».

Although the Labour Code provides that the conditions in the framework agreement are obligatory for the whole industry, in practice, the private sector is operating outside these arrangements, especially, in the small business sector.

The general trend in the area of unionism shaped by the above factors, is one of slow decline in membership and shrinking of the scope of coverage of the collective agreements.

In relation to intermodal transport in particular one of the main weaknesses is the mismatch between the technical characteristics - the length of the platform to handle the contemporary containers efficiently. In fact the new trucks, produced in Bulgaria are shorter and are inappropriate for some of the most common sizes of containers nowadays.

5.6 The Rail Link Thessaloniki - Sofia

5.6.1 The Greek rail part

The main goals regarding rail connection with Bulgaria are:

- Development of transit transport to Bulgaria through Promahonas/Ormenio
- Increase in rail transport activity to Central European countries through Bulgaria
- Development of intermodal transport
- Application of common tariff rate policy in rail freight transport
- Free commercial freight corridors
- Simplification of border control procedures
- Movement of quality passenger trains between Greece and Bulgaria

Proposals have also been made for the development of common border stations so that to reduce waiting time at borders and also share costs. At the moment, there is about a one-hour delay on each side of the borders and is expected to be reduced with the introduction of the common border stations to approximately 15 minutes.

During the past few years, international private transport operators have entered the market and continuously increase their activities. They hire rolling stocks that can be found at low prices from neighbouring countries, they close deals with interested parties and transport large quantities of cargo from Greece (mainly Thessaloniki) to Europe. Their main advantage is flexibility of the private operator that can quickly and without high costs to overcome the expected or unexpected difficulties presented at inspections. This is the element missing from the Hellenic Railways Association (OSE) that often results in delays of several days in order to transport the goods to their destination. OSE is looking for partners in order to cooperate with private companies in this field and is examining various scenarios depending on the level of the required investment.

Major structural changes, especially concerning working cultures, are not expected in Greek railways (OSE) unless the privatisation plans (something that appeared in press publications) are realised.

5.6.2 The Bulgarian rail part

In 1998 a long-term programme for the development of the railway transport sector in Bulgaria was enacted. Three stages are foreseen (up to the year 2000,

between 2000 and 2005, and from 2006 to 2020) throughout which BCR preserves the main activity - passenger and freight transport on commercial basis and exploitation of the infrastructure. The changes have to facilitate the start of privatisation of the company, particularly the freight activities as early as possible.

The main principles underlying the development of the new organisational structure of the National Railway Company since the middle of 1998 are as follows:

- reduction of the number of hierarchical levels;
- centralised management and uniform dispatcher monitoring of the operation, of the safety services, of the management of the pulling stock, norming of the train work, etc.;
- reduction of the labour force;
- establishment of structure following main business activities.

The structural changes have been paralleled by a process of reducing the labour force from 53,220 employees at the end of 1997 to 47,000 in June 1998. The process will continue at the rate of shedding off of about 1,200 employees annually till 2005. In 2020 the personnel has to be diminished to about 24,000 people.

The process inevitably entails certain problems and weaknesses. These result mainly from the necessity to:

- introduce new accounting activities;
- cope with the changes in the structure of personnel;
- institutionally separate infrastructure from other activities.

The personnel policy and the human resources management have to be modified in a way to ensure their linkage with payment and labour productivity. As a point of departure in this effort is underlined the fact that the Bulgarian National Railway Company is being restructured in order to become a market-oriented company. With the reduction of numbers each employee has to be engaged in performing a greater number of work tasks and duties. On the other hand, a broader range of incentives in payment has to be introduced so as motivate employees for good quality work. In such circumstances, the degree of employee internal movement is rather high and implies the need for a personnel management information system. There is no such working system in the Bulgarian National Railway Company at the moment and its introduction is considered a prerequisite.

5.7 The road link between Thessaloniki-Sofia

5.7.1 The Greek road part

Major structural changes are not expected concerning the Greek road part. The sector has adopted to a great extent the EC-directives and presents similar circumstances to other E.U. countries.

Greek hauliers realise that they are in a disadvantageous position in relation to their European colleagues and competitors due to the geographic location of the country and the need to cross many non-E.U. member countries with limited permits, difficult border crossing procedures "direct" and "non direct". This is valid for both the road through ex-Yugoslavia and the so-called "eastern road" via Bulgaria. The alternative is to cross the sea by ferry to Italy.

There is though a need to improve the "eastern road" as an alternative one and also as the one, which is used for the countries concerned as destination. Abolition of present obstacles such as the ones described in this report will facilitate Greek hauliers in their operation but is not expected to affect them generally.

5.7.2 The Bulgarian Road Part

The general trend is one of diminishing number of people working in road transport. This however, has to be specified by different directions of change within the separate internal sectors, found in three types of companies.

In the state-owned enterprises a diminishing jobs trend is observed, following the decline of the business, privatisation and natural factors (voluntary leave). Employees are being shifted mainly to the small business sector and other employment, also employee-management buyouts have been an employment stabilisation factor for the moment.

In the small and self-employed sector, companies are engaged in more than one type of activity, the information gathered is quite contradictory and indicates at very diverse patterns of working arrangements.

5.7.3 Development prospects of intermodal transport between Bulgaria and Greece

Following the examination of the current situation of the port of Thessaloniki as well as the Greek and Bulgarian road and rail transport industries, certain conclusions can be made in regard to the development of intermodal transport between Greece and Bulgaria and in the Thessaloniki axis in particular.

In the area of intermodal transport to Greece the following possibilities were identified:

1. Traffic operations for ferryboat Russian railway cars from ferryboat station Varna to Greece and back. This possibility could be realised in the short-term, considering the agreements already in place between Bulgaria and Greece.
2. In the field of container transportation the destination Sofia-Thessaloniki served by container block shuttle-type trains seems appropriate.
3. The Ministry of Transport of the Republic of Bulgaria submitted this project to the EC PACT Program (Pilot Actions in Combined Transport) for financial support. The project was initially supported by the EC but it was eventually suggested that it would be left to the initiative of the countries concerned due to the lack of funds. The likelihood of this project being implemented will grow after the eventual construction of a container terminal in Sofia by the Sealand Company and the enhanced container transport as a result of its operations in the region of Southeastern Europe. Its implementation may be expected in the medium range.

If Bulgaria becomes part of the European combined transport network using swap bodies, and unaccompanied semi-trailer transport and a distribution terminal is built up in Sofia, it is immediately clear that the Sofia-Thessaloniki destination will become a major one. Such a project could be implemented in the medium range.

4. The last possibility is in the field of combined RO-LA (Rollende Landstrasse) transport type "rolling highway".

Two routes are possible: Vidin-Kulata-Thessaloniki and Sofia-Thessaloniki. The first destination Vidin-Kulata-Thessaloniki is a natural continuation of the Vidin-Kulata destination, which is part of the Bulgarian strategy for development of combined RO-LA type transport from border to border. This project could be implemented in one single direction.

The second destination Sofia-Thessaloniki makes sense after Corridor No.8 (East-West) becomes operational and a terminal is built up in Sofia. The project may be implemented in the longer term.

Major problems that need to be resolved in the implementation of the above projects:

- Agreement as a matter of principle between Bulgaria and Greece on a relevant institutional level;
- Naming the operator of combined transport and the type of legal entity to represent him. Management and specification of the Bulgarian and Greek participation;
- Distribution of the railway car and locomotive fleet between the Bulgarian and Greek parties;
- Establishment of service staff, payment and incentive forms. Service staff proportion between the Bulgarian and Greek sides;
- Adoption of a special status and priority in the passage of trains through the border;
- Security measures, insurance and cargo protection;
- Establishment of a suitable train space and agreement of transport vehicle traffic schedules between Bulgaria and Greece;
- Project financing. EC assistance may be sought.

Failure to resolve any of these issues may turn into an obstacle to project implementation.

It should be noted that in a recent meeting of the Greek, Bulgarian and Romanian Ministers of Transport, Land Planning and the Environment in Sofia, an agreement was reached regarding the co-operation of these three countries in improving their transport system. The main decisions taken were: to develop common

railway stations and new tolls; to co-operate in the implementation of plans for road arteries of the area and of the Trans-European corridors 4 and 9; to simplify customs procedures beginning with Promahonas and Koula at the Greek-Bulgarian borders; to take measures for the protection of the environment; to develop a common co-ordinating tracking and monitoring system of trans-border transportation of toxic waste according to the relevant E.U. directives.

5.8 Policy Recommendations

The policy recommendations deriving from the Thessaloniki case study are:

5.8.1 Road Transport

«Interface» promotion

- Improvement (and possible simplification) of border and customs control procedures to reduce waiting time (unnecessary and unproductive delays).
- Remove practices of unfair competition e.g. illegal cabotage, unjustifiable fines and duties, paid at borders or during traffic police inspections, «under the counter permits» etc.
- Overcome infrastructural barriers e.g. improve road conditions and problems of standardisation e.g. weight limits per axle.

5.8.2 Rail Transport

Rail Transport is a system traditionally used extensively in former Eastern European countries. Its sustainability is endangered by the harsh deregulation of the local transport market. The E.U. should assist the survival the rail sectors of former Eastern Europe in the framework of E.U. «sustainable environmental policy».

«Interface» promotion

- Develop common border stations to reduce waiting time at borders and bureaucratic paperwork procedures for both sides (duplication of effort).
- Harmonisation of infrastructure, rolling stock standards and maintenance of high quality.
- Since both Greek and Bulgarian Railways are state-owned companies and do not have the flexibility to directly develop and implement policies and strategic plans, the respective transport ministers must try to foster greater co-operation between the railways of the two countries.
- Develop «common enterprises» for specific tasks e.g. a joint venture company located at the Greek-Bulgarian borders that could carry out maintenance work for rolling stock of both railway companies (sharing of costs, transfer of expertise, closer co-operation).
- Utilise existing infrastructure with excess capacity for exploiting market opportunities (e.g. shunting station for refrigerated wagons to and from Russia via Rumania where the axis was changed in order to be compatible).

- Resolve problems such as:
 - Distribution of locomotive and wagon fleet
 - Structuring of personnel-proportion, payment and incentive forms
 - Special status and priority of trains through the border
 - Securing measures, insurance and cargo protection
 - Suitable train space and agreement on traffic schedules between Bulgaria and Greece
 - Project financing

5.8.3 Promoting intermodality:

- Consider the intermodal transport as a chain from the users' point of view i.e. as a whole
- Greater co-operation should be achieved between the port of Thessaloniki and rail and road operators in order to enhance the level of intermodality at the port and exploit to a greater extent the business possibilities available. Enhancing intermodal transport will bring mutual benefits to all actors involved in the process but in order to achieve it strategic planning is required at all levels including infrastructure development and common pricing and marketing actions. The strategic planning process would be facilitated if the interested parties adopted a common approach and considered each other as partners rather than potential competitors. This could be achieved if they viewed the intermodal transport system as a whole with co-ordination of all levels in order to gain a competitive advantage rather than focusing only on their respective parts e.g. rail transport part and thus fragmenting the potential of the intermodal transport chain.
- Name the operator of combined transport and the legal entity to represent it.

ANNEX-6 Users' network for the WORKFRET project.

WORKFRET has identified key user organisations in the European intermodal freight transport field and established a network aiming at the following: consult widely and prioritise main themes and concerns, provide a source for survey research and other data, widen participation, promote an inclusive approach to policy development, be an outlet for the dissemination of results.

6.1 The European level

At European level, the representation of interests in the freight transport industry is to some extent a product of the communication structures that have been developed by the European Commission to consult on economic and social policy formulation. This is particularly the case in the social field where, in the case of the transport sector, there is a well established process of social dialogue between umbrella organisations representing employers and trade unions in different modes of transport. However, there are other European organisations of transport employers that are established for business reasons only and have a limited interest in social affairs. There are also European networks of research interests, which are either established by the EU or have an interest in projects concerned with European integration and associated research funding from the EU. Some contacts were already established from previous work done by the consortium partners while others were newly established in the course of visits and phone calls.

6.1.1 EU trade unions

The EU trade union network in the transport sector is coordinated by the **Federation of Transport Workers' Unions in the European Union (FST)**. This organisation represents 86 transport trade unions from the 19 countries of the EU and EFTA covering 3 million workers in transport and fisheries. FST has separate sections representing civil aviation, railways, inland waterways, fishing, ports and docks, sea transport and road transport. The FST was invited to participate in the WORKFRET project at an early stage and have since been involved in providing information, contributing to workshop discussions and assisting with a European postal survey of transport trade unions.

In each member state the FST has a number of affiliated unions ranging from one in Ireland to ten in Finland. There will be direct contact with the transport unions in the case study locations at national level. Other than that, communication on a European level will be maintained via the FST.

Beyond the EU, transport sector unions are also affiliated to the **International Transport Federation (ITF)**, which tries to bring together workers' interests in, for example, health and safety and technological change to combat the power of multinational corporations. It has a monthly journal, the ITF News, which highlights campaigns to improve working conditions in all modes of transport. Another world body concerned with safety and pollution at sea is the **International Maritime Organisation (IMO)**, which works with national governments to supervise

international agreements. Both these organisations have agreed to be associated with WORKFRET.

6.1.2 EU employers' associations

Employers in the transport sector are organised at EU level into associations representing different modes of transport (road, rail, sea, inland waterways, air) and intermodal locations (seaports, inland ports and airports). Air transport is also subdivided into national airlines and others.

Road transport employers are organised into three liaison committees at European level: passenger transport, professional goods transport (distribution services), and own account transport (providers of goods and services that use their own vehicles). These three committees consist of the European members of the **International Road Transport Union (IRU)**, which represents around 85% of transport businesses (with more than one vehicle) around the world. The IRU acts through these liaison committees as a social partner in EU social dialogue at industry level.

Rail transport employers have a European organisation called the **Community of European Railways (CCFE)**, which in 1995 represented the interests of 16 rail companies in the EU. This was when, in most member states, there was still one unified state system of rail transport. In the last few years, however, the process of privatisation, particularly in the UK, has resulted in the fragmentation of rail companies among a number of private sector operators. The CCFE represents rail employers in the process of social dialogue at industry level.

The interests of maritime employers at EU level are represented by the **European Community Shipowners Associations (ECSA)**. It acts as a social partner in the process of social dialogue at industry level.

The interests of employers in inland navigation are represented at EU level by two associations. The first, the **International Union for Inland Navigation (IUIN)**, is the association of inland waterways confederations in seven member states (Austria, Belgium, Germany, France, Luxembourg, Italy and the Netherlands). The second, the **European Shippers Organisation (ESO)** represents around 90% of self-employed carriers in the inland waterway system. They are both social partners on the industry committee for social dialogue.

Air transport (civil aviation) employers are divided into five categories, all of whom have a European level association which is represented on the Air Transport Committee. The largest body with 13 representatives is the **Association of European Airlines (AEA)**, which speaks for the major national airline companies that operate in the EU. The **European Regional Airlines Association (ERA)**; The **Independent Air Carriers of the EC (ACE)**, concerned with passenger transport, **The Air Charters Carriers of the EC (ACCA)**; and the **Airports Council International - European region (ACI)**, all have separate interests and a smaller representation (2/3) on the industry committee for social dialogue. (The last one of these could be considered in the category of intermodal "port").

The body that represents 98% seaports (port authorities) at European level since 1993 is the **European Sea Ports Organisation (ESPO)**. ESPO has an interest in port employment issues but does not act as a social partner in European dialogue. The interests of private operators who are increasingly responsible for cargo handling and

storage within seaports (13 associations in the EU) are represented by the **Federation of Private Port Operators (FEPORT)** who also do not participate in European level social dialogue. A third European association representing ports is the **Alliance of Maritime Regional Interests in Europe (AMRIE)** formed in 1994 which has a particular interest in regional development, including employment protection, education and training and health and safety. There is also a **European Harbour Master's Association**.

Inland ports that are linked to inland navigation are represented (14 from the EU) at European level by the **European Federation of Inland Ports (EFIP)**. Their members also have employment interests but EFIP does not participate in European social dialogue. This category of employer does not cover intermodal “ports” (terminals, platforms etc) which are road/rail only. There is, however, a road/rail transport association formally represented at EU level but not a partner to social dialogue. This is the **International Union of Rail-Road Transport Companies (UIRR)**. This represents road hauliers and freight forwarders that have set themselves up as combined road-rail companies (10 companies from the EU and others).

Contact has been made with all of these employers' organisations. Most of them have agreed to be associated with WORKFRET and many of them have cooperated with the European-wide postal survey. Apart from those employers who are part of the national networks associated with the case studies, communication has been maintained at EU level.

6.1.3 European research networks

The WORKFRET proposal originated at a conference organised by the **Hans Bockler Stiftung (HBS)**, a German trade union research institute that became an associate member of the project. They are part of a European network, which covers research interests in the broad area of work and employment conditions. Each member of the consortium also has a network of academic and research contacts across the European Union relating to their previous and current work in the transport sector, some of which is related to projects supported by **DG7**. The research libraries of **DG7** and **DG5** have also proved to be useful contacts in the research process.

Other contacts at EU level are with research institutes sponsored by the Commission. In the area of social affairs, this includes the **European Trade Union Institute (ETUI)**, which has assisted with the literature review and the **European Foundation for the Improvement of Living and Working Conditions (EFILWC)**, which publishes a wide range of material relating to the social impact of technological and organisational change. Other relevant EU bodies are the **European Agency for Safety and Health at Work** and the **European Environment Agency**. There are also voluntary networks, which embrace a broad spectrum of worker-centred research such as the **European Employee Support Network**.

6.2 Networks at national and regional level

In each of the countries represented in the WORKFRET consortium, a network has been developed of the main interests in freight transport and, in particular, the key actors that influence the social aspects of intermodal transport. Each partner has a list of key contacts, which are summarised below. National

networks vary depending on the organisation of the transport industry and structure of industrial relations.

6.2.1 United Kingdom

This network is divided into employers, trade unions and other interests.

The employers in freight transport are represented in different ways according to mode. In road, there are two employer's organisations (FTA and RHA) that represent many road transport firms but only as trade associations, not in the area of employment relations. In rail freight, there are three main employers, two large freight companies that have recently been formed following rail privatisation (Freightliner and EWS) and the new company responsible for the rail infrastructure (Railtrack). There is also a rail freight users group (RFA). Sea transport is covered by a shipowners' federation. Seaports are represented by an association of port authorities (also see web link). Inland waterways (a minority interest in the UK) is represented by British Waterways and an operators association. Some rail and road transport organisations have formed an intermodal association (the Piggyback Consortium). Contact has also been made with the Channel Tunnel operators and a piggyback transport manufacturer.

The confederation representing most trade unions in the UK is the Trades Union Congress (TUC). The trade unions in transport consist of a large general union, which has branches representing road transport, dock workers and airport workers (TGWU); a composite union for rail workers and seafarers (RMT); another general union which has members from the transport sector (GMB); a road transport union (URTU); smaller unions for different occupations in rail transport (ASLEF and TSSA); a ships officers' union (NUMAST); and an airline pilots' association (BALPA).

Other interests include national government (Department of Transport); local government (ACC (county), ADC (district), AMDC (metropolitan)); various transport research Institutes (Leeds, Huddersfield, Cranfield, Cardiff, Southampton); pressure groups (TRAIN); the transport correspondent of the Financial Times and Cargo Systems, a trade journal. There is also a web-site for transport research interests.

6.2.2 Germany

This network is divided into employers' associations, trade unions, and various organisations that have an interest in intermodal developments, including government departments, research institutes, marketing experts, transport companies, and site operators.

The employer's associations are grouped into a general federation, long and short haul road transport, railway companies, shipping, and inland waterways. The trade unions interests are covered by a general federation and unions representing public services and transportation, railway workers (2), and pilots.

6.2.3 Greece

The network in Greece on the trade union side is represented at three levels. Firstly, a general workers' confederation (GSEE). Secondly, a road transport federation of 130 trade unions (OYPAE), a federation of 18 unions in rail transport

(POS), a federation of 14 unions in sea transport (PNO) and a federation of 18 unions in civil aviation (OSPA).

On the employer's side there is a freight transport syndicate representing 80 associations in road transport (SXEM), a single employer for railways (state monopoly) (OSE), a shipowners' association (PSP), and a civil aviation authority (YPA).

6.2.4 The Netherlands

This network can be summarised as a general list and specific groupings related to road, rail, inland waterways, short sea/ports, air, and intermodal transport.

At **general transport** sector level the list includes the Ministry of Transport and Traffic, trade unions federations, employer's federations, research institutes, environmental groups, education and training institutions, and a marketing organisation. Interests in **road** transport are covered by two trade unions, six employer's organisations and six major employers who have a particular interest in intermodal developments. In the **rail** sector there is one trade union, the national rail freight company, a railway pressure group and various employers in rail freight. In **inland waterways** there are a number of employer's organisations and operators, a trade union, a government department and a marketing organisation. The **short sea/port** interests are represented by three employer's associations, two trade unions, port authorities, and an employment agency. The **airfreight** sector is covered by the national airline, the national airport authority and an air transport association. Finally, in the Netherlands there are a number of organisations specifically concerned with **intermodal** transport.

6.2.5 Sweden

The network in Sweden is divided into trade unions and employer's associations. Similar information is also given for Norway, Finland and Denmark.

In Sweden, there is one confederation of trade unions, which has five affiliates with interests in the transport industry. There is also a confederation of professional associations and separate union organisation in communications (rail and shipping) and the public sector. On the employer's side there is one main confederation of employers, which includes six employers' organisations representing different branches of transport.

ANNEX-7 List of publications, conferences, presentations

1. “THE IMPACT OF INTERMODALITY ON WORKING CULTURES IN EUROPEAN FREIGHT TRANSPORT” by Nick Rahtz (Sheffield Hallam University) and Martin Whittles (Leeds University), European Transport Conference, Loughborough, 14-18 September 1998.
2. “WORKING CULTURES IN FREIGHT TRANSPORT” Conference Proceedings, Brussels, December 1998, Editor : A. Naniopoulos including:
 - 2.1 “WORKFRET: APPROACH AND MAIN RESULTS” by Aristotelis Naniopoulos (Aristotle University of Thessaloniki- AUTH)
 - 2.2 “AN OVERVIEW OF CURRENT AND FUTURE DEVELOPMENTS” by Geert Smit (Netherlands Economic Institute- NEI)
 - 2.3 “MULTIMODAL TRANSPORT CENTRES IN THE PORT OF ROTTERDAM” by Theo Bouwman (STZ Research and Consultancy- STZ)
 - 2.4 “THE AGA GAS COMPANY” by Patrik Liljevik (TFK Transport Research Institute- TFK)
 - 2.5 “WORKING CULTURES AS A KEY FACTOR IN INTERMODAL DEVELOPMENTS” by Nick Rahtz (Sheffield Hallam University-SHU)
 - 2.6 “THE PORT OF THESSALONIKI-SOFIA LINK” by Grigor Gradev (Institute for Social and Trade Union Research- ITUSR)
 - 2.7 “FREIGHT TERMINALS IN YORKSHIRE, UK” by Neil Worthington (Sheffield Hallam University-SHU).
 - 2.8 “FREIGHT CENTERS IN GERMANY” by Harald Widloither (University of Stuttgart- IAT)
3. “WORK ORGANISATION IN FREIGHT TRANSPORT SYSTEMS. EUROPEAN APPROACHES TO DEFINE STRUCTURAL CHANGES AND POLICY REQUIREMENTS FOLLOWING THE INTRODUCTION OF NEW TECHNOLOGY” by A.Naniopoulos, Transporti Europei, Dicembre 1998 No.10 p.73-75
4. “IMPACTS OF NEW LOGISTICS AND PRODUCTION SYSTEMS ON HUMAN ELEMENT AND THE ORGANISATION OF WORK IN TRANSPORT SYSTEMS” by A. Naniopoulos, P. Christidis, P. Liljevik, 4th Panhellenic Conference on logistics, Athens, September 1999

ANNEX-8 List of Deliverables¹⁶

The project produced the following deliverables:

- D1:** An overview of existing working cultures and organisational/managerial structures in the European freight transport system.
- D2:** Establishment of a users network, definition of key parameters of working and organisational/managerial structures and questionnaire synthesis.
- D3:** Survey procedure and main findings on existing working cultures and organisational/managerial structures.
- D4:** New technology under introduction in freight transport systems in relation to the working cultures and organisational/managerial structures.
- D5:** New logistics and production systems in relation to the working cultures and organisational/managerial structures.
- D6:** Hierarchy of key issues affecting working cultures and organisational/managerial structures.
- D7:** Development and evaluation of scenarios for working cultures and organisational/managerial structures following the introduction of new technologies
- D8:** Planning of case studies.
- D9:** Case study of new intermodal facilities in the UK
- D10:** German case study on road/rail intermodal points
- D11:** The Rotterdam Europort case study in the Netherlands
- D12:** The AGA case study
- D13:** The port of Thessaloniki and the intermodal axis Thessaloniki-Sofia case study
- D14:** Results of the case studies and policy suggestions in relation to the various “actors”
- D15:** WORKFRET Conference Proceedings
- D16:** Report on dissemination actions of the WORKFRET consortium

- I1:** New technology under introduction in freight transport systems in relation to the working cultures and organisational/managerial structures.
- I2:** Report on the Delphi preparatory phase

¹⁶ The interested reader can find information on WORKFRET and download public deliverables, in PDF format, from the WORKFRET WWW site at <http://hermes.civil.auth.gr/wf/wf.html>

ANNEX-9 Glossary of acronyms used

A.A.T.M.S.	Airborne Air Traffic Management Systems
ACCA	The Air Charters Carriers of the EC
ACE	The Independent Air Carriers of the EC
ACI	The Airports Council International- European Region
AEA	Association of European Airlines
AGV	Automated Guided Vehicles
ALICON	Air-Lift Container System
AMRIE	Alliance of Maritime Regional Interests in Europe
A.R.P.A.	Automatic Radar Plotting Aids
A.S.C.	Automated Stacking Cranes
A-S.M.G.C.S.	Advanced Surface Movement Guidance and Control Systems
ATM	Air Traffic Management
B.E.X.	Barge Express
CCFE	Community of European Railways
C.M.S.	Communication, Management and Surveillance
C.T.	Combined Transport
D.G.P.S.	Differential Global Positioning System
EAS	Electronic Article Surveillance Systems
DSRC	Dedicated Short Range Communication
E.C.D.I.S.	Electronic Chart Display and Information System
ECSA	European Community Shipowners Association
EDI	Electronic Data Interchange
EDIFACT	Electronic Data Interchange for Administration, Commerce and Transport
EFIP	European Federation of Inland Ports
EHMA	European Harbour Master's Association
ERA	European Regional Airlines Association
ESO	European Shippers Organisation
ESPO	European Sea Ports Organisation
ETUI	European Trade Union Institute
FEPOR	Federation of Private Port Operators
F.T.P.	File Transfer Protocol
F.U.D.T.	Further and Updated Training
G.I.S.	Geographic Information System
G.M.D.S.S.	Global Marine Distress and Safety System

G.N.S.S.	Global Navigation Satellite Systems
G.P.S.	Geographical Positioning System
G.U.I.	Graphical User Interface
HCI	Human Computer Interaction
H.G.V.	Heavy Goods Vehicles
HMI	Human Machine Interface
HSP	High Speed Vessels
ICAO	International Civil Aviation Organisation
I.C.C.	Integrated Circuit Card
I.C.T.	Information and Communication Technologies
IMO	International Maritime Organization
INMARSAT	International Maritime Satellite System.
IRU	International Road Transport Union
ISO	International Standards Organisation
I.T.	Information Technology
I.T.F.	International Transport Federation
IUIN	International Union for Inland Navigation
LO/LO	Lift On/ Lift Off
M.B.U.	Multiple Box Units
M.C.A.	Multi Criteria Analysis
MITL	Multi Industry Transport Label
OBC	On Board Computer
R&D	Research and Development
R.C.C.	Rescue Coordination Centre
R.C.H.	Robotic Container Handling
R.D.I.	Radio Data Interchange
R.D.S.	Radio Data System
RFID	Radio Frequency Identification Technology
RO/RO	Roll On/ Roll Off
S.C.T.	Sailing Container Terminal
S.T.O.L.	Short Take-off and Landing aircrafts
S.W.O.T.	Strengths Weaknesses Opportunities Threats
T.E.U.	Twenty foot Equivalent Units
T.M.C.	Traffic Message Channel
T&T	Tracking and Tracing Systems
UIRR	International Union of Rail-Road Transport Companies
U.T.P.	Unit Transport by Pipeline

V.T.M.I.S.	Vessel Traffic Management Information System
V.T.M. S.	Vessel Traffic Management Systems
V.T.O.L.	Vertical Take-off and Landing aircrafts
V.T.S.	Vessel Traffic Services
W.A.P.	Wireless Application Protocol
WWW	World Wide Web

ANNEX-10 References

European Union level			
AEA	1996	<u>Association of European Airlines Yearbook</u>	AEA
ATOMOS	1996	<u>Advanced Technologies to Optimize Manpower on Board Ships</u>	Transport Research EURET, Maritime Transport
Bamber, G J; Lansbury R D	1993	<u>International and Comparative Industrial Relations</u>	Routledge
Bridgeford, J; Stirling, J	1992	<u>Employee Relations in Europe</u>	Blackwell, Oxford
EFILWC (a)	Paoli, P 1994	<u>First European Survey on the Work Environment 1991-1992</u>	European Foundation of Living and Working Conditions, Dublin
EFILWC (b)		<u>The European Database, Summaries of descriptions of Systems for Monitoring Health and Safety</u>	
EFILWC (c)	1987 and 1990	<u>Participating in Technological Change Parts 1 and 2</u>	Official Publications of the EC
EFILWC (d)	1986	<u>New Technology and the Quality of Life: The service sector in Europe</u>	Official Publications of the EC
EFILWC (e)	1994	<u>New Forms of Work and Activity: survey of experience at establishment level in eight European countries</u>	Official Publications of the EC
EFILWC (f)	1989	<u>New Information Technology and Participation in Europe: the potential of social dialogue</u>	Official Publications of the EC
EFILWC (g)	1993	<u>Workplace Involvement in Technological Innovation in the European Community vols 1 and 2</u>	Official Publications of the EC
EFILWC (h)	1993	<u>European Conference on Stress at Work - a call for action</u>	Proceedings, Brussels 9-10 November
EC (a)	1994	<u>Road Freight Transport in the Single European Market 0 report of the Committee of Enquiry - July</u>	DG7, Official Publications of the EC, Brussels
EC (b)	1996	<u>Commission Communication Concerning the Development of the Social Dialogue at Community Level</u>	Com (96) 448 final, Brussels 18/9
EC (c)	1996	<u>Social Europe: Social Dialogue 0 the situation in the Community in 1995</u>	DG5, Official Publications of the EC, Brussels
EC (d)	1996	<u>Social Europe: The adaptation of workers to industrial change</u>	European seminar, Toulouse 22/23 Jan, Supplement 2/96. DG 5, Official publication of the EC
EC (e)		<u>Social Europe: Flexibility and Work Organisation: Supplement 1/95</u>	DG5, Official Publication of the EC
EC (f)	1996	<u>Employee Representatives in Europe and Their Economic Prerogatives, Supplement 3/96</u>	DG5, Official Publication of the EC
EC (g)		<u>Social Partners Study</u>	DG5, Official Publication of the EC
EC (h)	1996	<u>Employment in Europe</u>	DG5, Official Publication of the EC
ESCA	1995/6	<u>Annual Report</u>	European Community Ship owner's Associations
EHMA	1996	<u>Report of the Working group on Training and Availability of the Port Marine Personnel</u>	6th Congress, Reykjavik, 16-23 June
ESPO	1996	<u>Report of an Enquiry into the Current Situation in the Major Community Seaports</u>	European Seaports Organisation

ETUI	1995	<u>Collective Bargaining in Western Europe</u>	European Trade Union Institute, Brussels
Ferner, A; Hyman R	1992	<u>Industrial relations in the New Europe</u>	Blackwell, Oxford
Ferner, A; Hyman R	1994	<u>New frontiers in European Industrial Relations</u>	Blackwell, Oxford
IRU	1996	<u>Annual Report</u>	International Road Union
ITF	1997	<u>ITF News 28 February</u>	International Transport Federation
Lecher, W	1994	<u>Trade Unions in the European Union - a handbook</u>	Lawrence and Wishart, London
MASIS	1996	<u>Human Factors in the Man/Ship Systems for the European Fleets</u>	Transport Research EURET, Maritime Transport, Official Publications of the EC
O'Brien, B; Marking, T	1993	<u>The Organisation of Working Time in the EEA Maritime Sector: final report</u>	Joint Working Committee on Maritime Transport
O'Brien, B; Smolders, W; and deVillele, H	1995	<u>Les Transports por Routes des l'Union Europeene: Aspects de l'organisation et de la mise en oeuvre des Reglements relatifs au temps de travail et de odute</u>	Working Committee on Road Transport, December
SWIFT	1996	<u>Specification foe Controller Working Positions in Future Air Traffic Control</u>	Transport research EURET, maritime Transport
TecnEcon	1996	<u>Study on the Maritime Professions in the European Union</u>	DG7, final report, August
THAMES	1996	<u>Technology and Human Aspects of Maritime Efficiency and Safety</u>	Transport Research APAS, Maritime Transport, Official publications of the EC
Van Ruyssveldt, J et al	1995	<u>Comparative Employment and Industrial relations</u>	Sage, London
Greece			
NSSG	1996	<u>Statistical Yearbook</u>	National Statistical Service of Greece
Klentos, A; Tselias, M; Christopoulos, E	1996	<u>Transport Systems in Greece from the employees point of view</u>	AUTH, Thessaloniki
TRADEMCO	1994	<u>The Impacts of New Technology in Transport</u>	TRADEMCO
	1993	<u>Panorama</u>	
	1996/7	<u>Transweekly (news reports)</u>	
	1996/7	<u>Wheels and TIR</u>	
The Netherlands			
Veen, I		<u>Kwaliteit van de Arbeid op de vaart</u>	Vervoersbond CNV
Bouwman, T	1994	<u>Snel weg: goederenvervoer, milieu en arbeid (freight transport, environmental pollution and labour)</u>	FNV/STZ
CBS		<u>Arbeidsrekeningen, produktiestatistieken, sociale statistieken</u>	CBS
CBS (2)	1995	<u>Pocketedition Traffic and Transport</u>	CBS (2)
Centraal Arbeidsbureau Scheepvaart 1	1995	<u>Werkgelegenheid Nederlandse Scheepvaart</u>	Centraal Arbeidsbureau Scheepvaart 1
COB	1995	<u>Raamwerk kwalificatiestructuur voor de Rijn- en Binnenvaart</u>	COB
Commissie van Duursen	1993	<u>Vaart in de keten: aktieplan ter bevordering van internationaal goederenvervoer via de binnenvaart</u>	Commissie van Duursen
Gebhardt e.a., W	1991	<u>In het spoor van de machinist (job satisfaction of engine drivers)</u>	Wetenschapswinkel Universiteit van Utrecht
Geldhoff e.a.	1997	<u>Sein veilig voor de Cargo, machinist, maar.. (about combi-jobs for engine drivers)</u>	Rijnconsult

GHR	1991	<u>Ontwerp Havenplan 2010</u>	GHR
Hoogendijk, L	1989	<u>Arbeidsomstandigheden in het vervoer: een sectoral schets (Working Conditions in the Transport Sector: an overview)</u>	NIA
Kooistra, S	1989	<u>Nieuwe wegen: over chauffeurs en nieuwe technologie (truck and lorry drivers and new technology)</u>	FNV/STZ
McKinsey and Company	1995	<u>Systematisering van productie als basis voor rendabele groei</u>	McKinsey and Company
Middendorp e.a, J	1992	<u>Wegtransport en kwaliteit van de arbeid (road transport and quality of labour)</u>	NIA
Min. van Verkeer en Waterstaat	1995	<u>Jaarbericht Vervoerend Nederland</u>	Min. van Verkeer en Waterstaat
Min. Verkeer & Waterstaat (3)	1992	<u>Filevrij over zee</u>	Min. Verkeer & Waterstaat (3)
Min. Verkeer & Waterstaat (6)	1995	<u>Zeescheepvaartbeleid, 1995</u>	Min. Verkeer & Waterstaat (6)
Ministerie Verkeer en Waterstaat	1995	<u>Jaarbericht Vervoerend Nederland</u>	Ministerie Verkeer en Waterstaat
NEI	1996	<u>Inland shipping in the european union (part of the report Minimise CS IV 1 titled "European markets and regulations": 1997)</u>	NEI
NIA (7)	1989	<u>Arbeidsomstandigheden in het vervoer</u>	NIA (7)
NIBconsult (5)	1994	<u>Ondernemerschap in de kustvaart</u>	NIBconsult (5)
NS	1990	<u>Toekomstplan voor het goederenbedrijf- Rail 21 Cargo</u>	NS
OBR/GHR	1996	<u>Naar een nieuwe economisch klimaat</u>	OBR/GHR
Reiche e.a, M	1996	<u>Haalbaarheidsstudie: opleidingsplan Rijn- & Binnenvaart</u>	Piers Groep
SOMO	1989	<u>Dwarsliggen en samenwerken: kwaliteitszorg en logistiek bij NS Goederenvervoer</u>	SOMO
Vakopleiding Transport en Logistiek	1995	<u>Beroepsprofielen functies in de Rijn- en Binnenvaart; X; 1995</u>	Vakopleiding Transport en Logistiek
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Vreeman, R	1989	<u>Chauffeurs, havenwerkers en industriearbeiders (trade union struggle, drivers, dock workers and industrial workers)</u>	De Balie
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