



Results of

# ***SWOT***-Analysis

Strengths, weaknesses, opportunities and threats of  
the chemical industry and respectively of chemical  
logistics in CEE countries



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# **1 Project ChemLog – Chemical Logistic Cooperation in Central and Eastern Europe**

## **1.1 Preface and acknowledgments**

The chemical industry in Central and Eastern Europe is mostly based on Russian raw materials. The use of roads and railways, the development of pipeline systems for the connection of raw material locations and production locations play an important role in this context. The important chemical locations in Poland, the Czech Republic, Slovakia, Austria, Hungary, Novara and East Germany are due to historic decisions taken inland about locations with no direct access to sea harbours. Therefore, these locations have competitive disadvantages, especially in relation to the higher costs compared to chemical locations in Western Europe that have excellent access to sea harbours and connected waterways. The existing cost disadvantages due to the traditional location and missing West-East connections are an important development barrier for the chemical industry in Central and Eastern Europe. These competitive disadvantages are even greater due to the disproportionate use of road transport and resulting lower use of low costs railways.

In many regions, especially in Eastern Europe, road traffic has reached its capacity limit. Further deficits are a barrier to the development of the chemical clusters: Capacities and the expansion of transport infrastructure are not sufficiently oriented towards the needs.

There is a lack of harmonisation of technical, administrative and social regulations and laws in Europe. Furthermore insufficient European coordination of transport related decisions of the particular countries are a problem. There are shortcomings in the organisation of transport, especially in the conception of intermodal terminals and the further development of technologies for the transfer of goods between different transport media. There is insufficient priority for freight traffic compared to passenger traffic. Finally there is no collective approach to share and find logistical solutions in the relevant regions and countries.

The target group of the project are chemical enterprises, logistic providers, national and regional politicians, national and regional ministries for transport and economic affairs, Regional Development Agencies, Chambers of Commerce and Research Institutions. There are about 2500 Chemical enterprises and 200 enterprises in the area of logistic providers specialised in chemicals in the partner regions. Furthermore there are about 50 Chamber of Commerce and 50 Research Institutes. The chemical enterprises and logistic providers are interested in improving framework conditions to transport their products and feedstock in Central Europe in relation to reduced costs, increased speed, better reliability and flexibility, higher safety. The logistics providers are interested in improved logistics and transport of chemical goods. The national and regional administration and chamber of commerce want to improve chemical logistic to strengthen competitiveness of the economy.

Transnational cooperation is vital for the achievement of the expected results due to the complexity and transnational dimension of the chemical logistic in Central Europe. The chemical industry itself is one of the most globalized industrial branches in Europe, 50 to



60% of its products are exported. Furthermore to largest part of the feedstocks are transported to the production locations, mostly from Russia. Therefore the chemical industry is responsible for a large share of transnational freight transport in Central Europe. The project wants to work on the different dimensions of logistics e.g. rail, waterway, intermodal transport, pipelines and harmonisation of regulations. The biggest barriers in these areas result from different framework conditions, policies and regulations in the partner countries. Especially the missing cooperation at transnational level in the area of transnational logistics is the reason for many deficits in the area. The project specifically wants to improve this situation. Moreover the division of Europe during the Cold War has not allowed developing functioning transport networks similar to those that have emerged in Western Europe in the past decades. Therefore the enlargement of the European Union is still a specific challenge for the chemical logistics.

In order to develop solutions to the above mentioned problems it is necessary to bring together the relevant stakeholders from the partner countries in order to initiate a transnational cooperation process. This process will allow the transnational transfer of experience and mutual learning. Furthermore Feasibility Studies for specific transnational logistic projects will be developed under participation from partners of different countries. Finally the development of the joint strategy and action plan is an undertaking that can only be agreed by partners from the relevant countries in order to agree on future priorities for infrastructure planning.

### 1.2 Project Idea

The project idea has been developed by the partners during the discussion of the High Level Group for the Competitiveness of the Chemical Industry in Europe, which brings together high-level representatives from the European Commission, Member States and Industry. The European Chemical Regions Network, which represents the joint interest of 19 chemical regions from 9 countries participates in the HLG and has proposed a deeper cooperation in the area of logistics in Central and Eastern Europe, which has been strongly supported by Member States representatives from Poland and the Czech Republic. In order to further develop the project idea a workshop was organised on 20.02.08 in Magdeburg with participants from Germany, Poland and Czech Republic and the European Commission, which have agreed on the main objectives and activities of the projects. In order to prepare the application a working group has been founded with representatives from all partners. The HLG supports the initiative. The project is financed by the INTERREG IVB Central Europe Programme and has been approved on 25.09.2008. The project duration is 3 years with an overall budget of 2.2 Mio. Euro, whereas 1.7 Mio Euro are financed by the European Regional Development Fund (ERDF).

### 1.3 Project Partners

The partnership consists of different entities, which fulfil specific functions:

- Regional and Local authorities, such as ministries for economic affairs or transport, municipalities or regional development agencies,
- Research and Cluster organisations,



- Interested Groups and Associations

This composition of partnership allows an efficient division of work and ensures a good implementation of project activities. The public regional and local authorities have the responsibility for infrastructure planning, provide sound framework conditions and offer substantial funding resources in the area. They are especially working in view of joint strategy development and action planning.

- Lead Partner: Ministry for Economy and Labour of Saxony-Anhalt (DE)
- Ministry for Regional Development and Transport Saxony-Anhalt (DE)
- isw Institute for Structural Policy and Economic Development (DE),
- Polish Chamber of Chemical Industry (PL)
- Association of the Chemical Industry Czech Republic, (CZ)
- Association of Chemical and Pharmaceutical Industry of Slovak Republic (SK)
- Usti Region (CZ),
- Province Novara (IT),
- FH OÖ Research and Development GmbH / Logistikum Competence Centre, Linz (AT),
- Regional Development Holding, Budapest (HU)

The research and cluster organisations fulfil a mediator function between the political and industrial environment. They are especially focussing their efforts in the analysis and exchange of experience. The identification and transfer of best-practice will be mainly supported by these entities. Furthermore they actively contribute to the mainstreaming and evaluation of the project.

The interest organisations have the direct contact to the enterprises, one of the most important target groups of the project. They will ensure the integration of the needs and interests of the enterprises in the project activities and disseminate the results to a broad range of relevant stakeholders. Furthermore the development of the feasibility studies is an important activity for them.

Altogether the partners are committed to establish an intensive cooperation to improve the situation for chemical logistics and provide concrete examples and recommendation for actions in the future. The combination of the specific strengths and joint interest of the partners will ensure a successful outcome of the project.

The relevant stakeholders and key actors are chemical enterprises and logistics providers and chambers of commerce from industry side, the national and regional ministries and development agencies from political side and research institutions from academia. The industry stakeholders will be involved in the project in the framework of the regional stakeholder meetings. Furthermore project partners such as the Chemical Industry Association will ensure involvement from industry. The political level will also be actively involved in the project activities, by participation in meetings or development of the action plan. Especially the advisory group meeting will be used to involve the political level (national and EU) in the mainstreaming of results. The analysis and exchange of experience activities will be implemented under involvement of relevant research institutions. The



different types of project partners will use their existing links to the relevant stakeholders for the project.

Transnational cooperation is vital for the achievement of the expected results due to the complexity and transnational dimension of the chemical logistic in Central Europe, as the biggest barriers in these areas result from different framework conditions, policies and regulations in the partner countries.

## **1.4 Project Objectives**

The project ChemLog has the general objectives:

1. to strengthen territorial cohesion in Central Europe by developing a Central and Eastern European Chemical Logistics Network as a platform for the joint discussion and cooperation for chemistry related transport issues,
2. to promote the internal integration by improving chemical logistics in Central Europe and
3. to strengthen the competitiveness of the chemical cluster in better connecting raw material and production locations and better accessing the growth markets in CE Europe.

The specific objectives are:

1. Strengthening rail and waterway transport for chemical goods in comparison to road to improve safety, environmental protection, reduce costs and increase speed and flexibility of chemical logistics.
2. Support the development of logistical centres for intermodal transport and their integration in infrastructure planning.
3. Facilitate the connection of pipelines for an effective Central and Eastern European Chemical Logistics Network.
4. Initiate transnational know-how and technology transfer for the development of transport and guidance systems focused in the West-East direction.
5. Supporting the realisation of Trans-European Traffic routs and harmonisation of regulations and coordinated planning of infrastructure and the use of Structural Funds.

The project will strengthen the territorial cohesion in Central Europe by developing a Central and Eastern European Chemical Logistics Network, which will improve the framework conditions for economic growth and regional development. A modern and safe infrastructure is also the precondition for new investments, creation of employment and increased productivity. Especially in regions lagging behind and in the new member states improved infrastructure will give impulses for growth and convergence and improve life quality. The project will promote the internal integration in Central Europe by improving chemical logistics. The countries of Central Europe are especially disfavoured due to existing barriers and missing connections alongside the former boarder between Eastern and Western Europe. The project will especially work on the further development of the



Transeuropean Transport Networks with specific focus on the transnational projects in the partner countries. The project will strengthen the competitiveness of the chemical industry in Central Europe, which is a major economic industry with strong impact on innovation and employment in the partner countries. Furthermore the chemical industry has a strong influence on many other industries alongside the value-chain. A better connection between the chemical locations is a precondition for the sustainable development of the industry in the long-run, especially taking into account the increased competition from Asia and the Far East. The know-how and technology transfer will help to increase the innovation capacity of the partner regions in the area of chemical logistics. Therefore the project will actively contribute to the Lisbon Agenda.

### 1.5 Project Activities

Besides Management in Workpackage 1, Dissemination activities will be implemented in Workpackage 2. The Work package 3 will focus in the first year on the analysis of the current situation and identification of needs and best practice. Workpackage 4 will work on the preparation of investment, by implementing 4 feasibility studies of infrastructure project with transnational relevance. The partners will develop an indicator system for the assessment of efficiency and impact infrastructure investment in chemical logistic as basis for the feasibility studies. The final Workpackage 5 will focus on the strategy development and the mainstreaming of project result. The major activities such as the establishment of the Central and Eastern European Chemical Logistics Network and the Joint Strategy and Action Plan will be implemented in the last year of the operation.



## 2 SWOT Analysis – Strengths, weaknesses, opportunities and threats

The SWOT Analysis is – together with the Best Practice Study, which will be finalized within the next project steps – the major output of Workpackage 3 – Analysis and Exchange of Experience and the main input for the upcoming Workpackages like Investment Preparation and Strategy Development.

The main objectives of the Workpackage 3 are to analyse the current situation of the chemical industry and respectively of chemical logistics in the partner regions as well as to identify strengths, weaknesses, opportunities and threats and to articulate needs for further actions as basis for the implementation of for feasibility studies in Workpackage 4. These will be done by a standardized method used by all project partners according to the SWOT concept. The next step is to analyse deeply and identify best-practice solutions for exchange of experience and to provide the results for the Workpackage “Investment Preparation”. All partners will contribute to these activities

SWOT Analysis	Best Practice Study
<ul style="list-style-type: none"> <li>▪ Analysis of the current situation of chemical industry in each partner region</li> <li>▪ Identify strengths, weaknesses, opportunities and threats of chemical logistics in the partner regions as basis for exchange of experience</li> <li>▪ Develop a description of chemical logistics to have a common understanding of current situation</li> <li>▪ Identification of regional needs and future potential areas for cooperation and implementation of feasibility studies</li> <li>▪ SWOT Report finished 04/09</li> </ul>	<ul style="list-style-type: none"> <li>▪ Deeper analysis of best practice solutions in the area of chemical logistics</li> <li>▪ Discussion of potential for the transfer of experience as basis for mutual learning</li> <li>▪ Show opportunities for further cooperation</li> <li>▪ Best practice report finished 11/09</li> </ul>

Table 1: SWOT Analysis and Best Practice Study

### 2.1 Structure of SWOT Analysis

The SWOT Analysis is a holistic concept to analyses a topic regarding its strengths, weaknesses, opportunities and threats. Strengths and weaknesses are understood as so called internal, supporting or hindering factor, which can be directly influenced by the company itself. Opportunities and threats are external, supporting or hindering factors or trends not, whereas the company is not able to influence them directly.

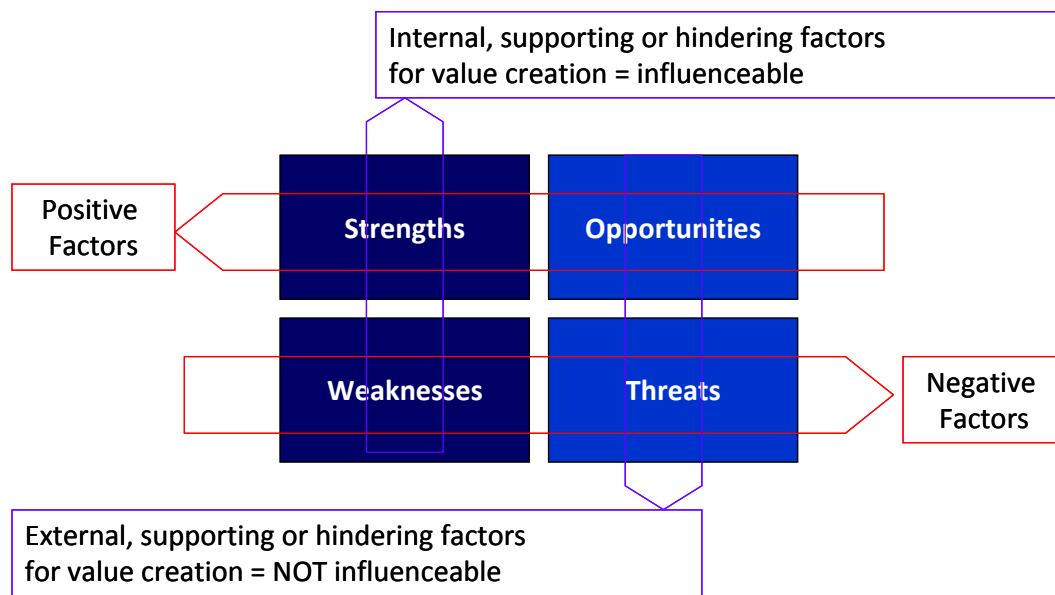


Figure 1: Approach of SWOT Analysis

For the purpose of the project the SWOT concept was implemented into practice as follows: In order to generate the information about strengths and weaknesses of chemical companies in general and in terms of chemical logistics in Central and Eastern Europe, individual expert interview were organized. To gain facts about global trends, external chances and risks the projects partners used to Regional Stakeholder Meetings as Expert Workshops. Furthermore experts were asked about improvements measures and about the identification of best practice cases. The idea behind that separation of individual interviews and workshops was that generally internal and company-specific strengths and weaknesses could be better discussed within single interviews, whereas global trends, opportunities and threats are not company-specific and discussable in a bigger group.

In fact each partner region carried out a SWOT analysis. A standardized template and structure was provided by the Logistikum in order to guarantee comparability.<sup>1</sup>

1. Introduction to region / country
2. Description of domestic chemical industry
3. Description of transport infrastructure
  - a. Intermodal
  - b. Pipeline
  - c. Road
  - d. Railway
  - e. Inland waterway
4. Internal strengths and weakness of the chemical industry from the logistical point of view in CEE
5. External opportunities and threats of the chemical industry from the logistical point of view in CEE

<sup>1</sup> See Attachments.

The target group of SWOT Analysis consists of the chemical industry itself but also of macro and micro economical experts and stakeholders with relevance for the chemical industry:

Table 2: Target group of SWOT analysis

In order to guarantee an efficient and standardized return of facts, figures and information

- were provided to the project partners.

Table 3: Methodological approach



## Expert Workshops

It was recommended either to use the Regional Stakeholder Meetings or individual organised expert workshops in order to gain information about global trends, chances and risks of the chemical industry and chemical logistics. It was proposed to arrange several group discussions with maximum 10 experts per workshop. These workshops were held between April and March 2009 in all partner regions. In advance the project partners received a workshop design with a preselection of spheres of influence and their factors on the discussed topic to ensure a productive and effective discussion. For opportunities and threats 8 spheres of influence (view table 3) with 74 factors were predefined to provide a guideline for group discussion. For each factor the experts had to evaluate whether it poses an opportunity or threat and further on to scale the degree of influence from -3 to +3. Additionally the contents of discussion were remarked.

The following graph shows a picture of one influence factor. According to that example each factor was discussed:

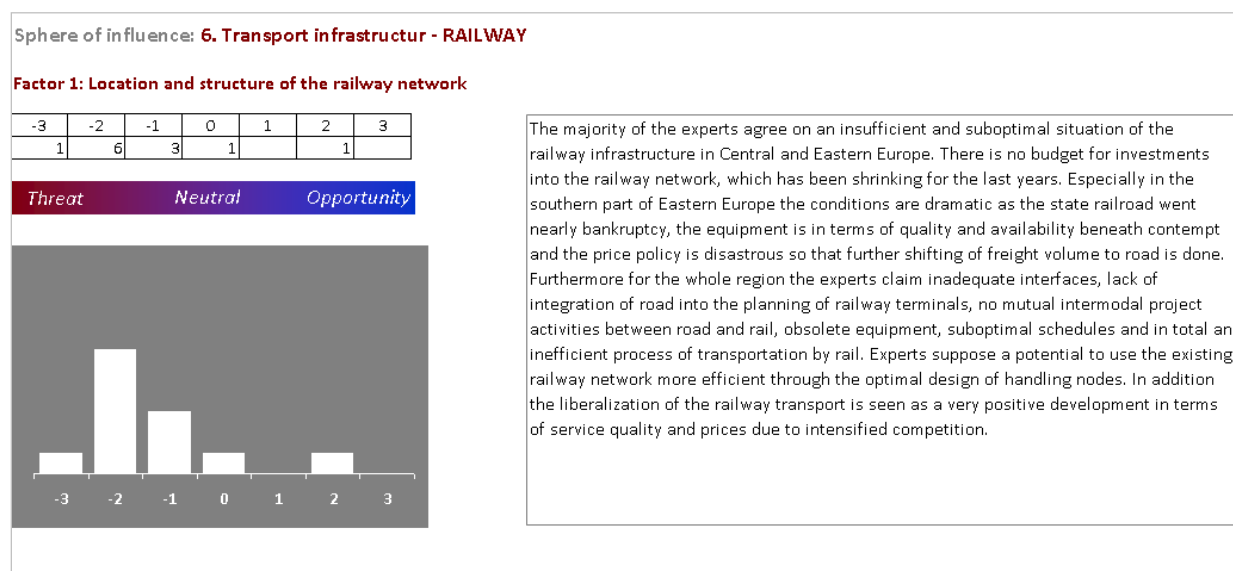


Figure 2: Workshop design

## Single Expert Interviews

Strengths and weaknesses – due to concealment reasons – were mainly hold as single expert interviews. For that purpose an interview guideline (view attachment) which at the same time can be used as questionnaire was provided to the project partners to organise either interviews or a postal questioning.

## 2.4 Structure

The structure of the SWOT Analysis, issued by each partner regions is based on a standardized model. After giving a brief overview about the partner region, the domestic chemical industry, logistics and transportation infrastructure is described in detail. In particular the regional SWOT Analysis includes the results of the expert interviews and workshops as well as needs and measures for future actions and improvements.

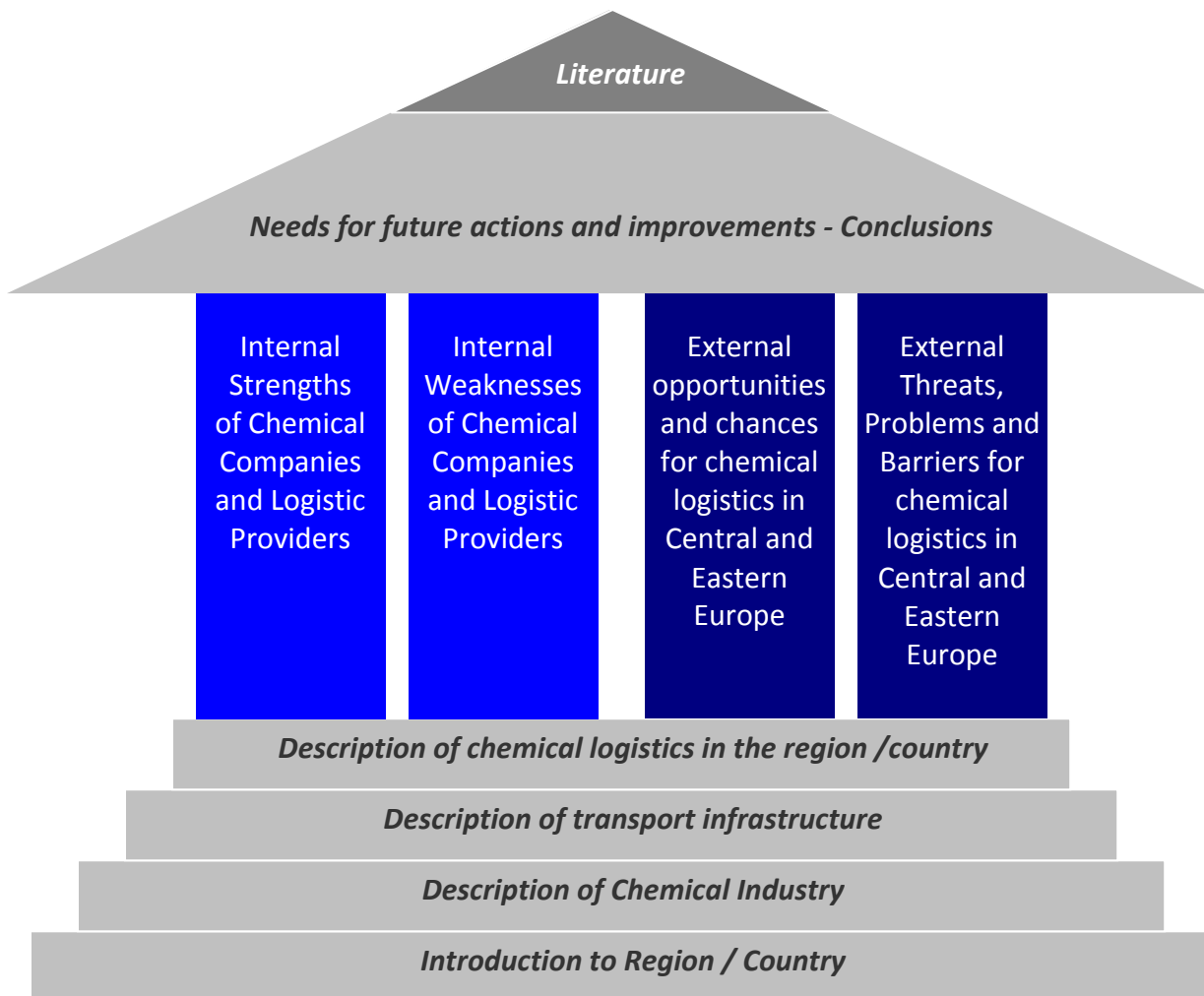


Figure 3: Structure of SWOT Analysis



### **3 Strengths and Weaknesses of the Chemical Industry and Chemical Logistics in CEE**

What are actually internal influence able strengths from a company's point of view regarding chemical logistics in Central and Eastern Europe?

#### **3.1 Strengths and weaknesses in procurement**

##### **Procurement Lead Time for Raw Material and Intermediates**

Regarding the procurement of raw materials the suppliers are located globally. Chemical sites in Central and Eastern Europe have to face a disadvantageous situation as important materials and products are supplied from overseas markets. Some chemical companies rely on just-in-time delivery of raw materials as especially within the commodity sector high volumes of raw materials are supplied, whereas companies try to avoid huge inventory. There are numerous but unreliable raw material producers in Eastern Europe and due to obsolete sites and technologies just-in-time delivery of raw materials is not possible under those circumstances. In order to prevent deviations of raw materials, prices often are agreed monthly instead of quarterly. Procurement of freights (freight management): freights are handled on the basis of contracts or via spots for the transportation modes waterway, road, railway and container.

##### **The Suppliers' Availability, Reliability and Flexibility**

Experts claim that the delivery time of supplies from third countries is problematic as quality of products and packaging from third countries (mainly China) is not sufficient, which leads to problematic handling of goods (unloading of goods could pose a big risk in terms of safety and security). The supplies of natural gas and crude petroleum are dependent on Russian federation and transit via Ukraine. Big companies use transport of supplies by pipeline and railway. Small commodities are usually transported by road. The import of supplies by rail from Ukraine and Russian Federation is influenced by broad-gauge track with a necessity of reloading or boogie shifting.

The general procurement policy is to guarantee at least two suppliers for products with critical availability. For non-time-critical products (in particular basic chemicals) – under the condition that warehousing capacities are sufficient – the procurement is depending on price and lead time. Sources of supply in those cases can be countries in Eastern Europe or South / East Asia.

##### **Collaboration Demand Planning**

For this factor it is essential to diversify if companies are part of a corporate group or not. Either the procurement strategy is agreed nationally or internationally headquarters or in best cases companies use collaborative demand planning with their supplier.

Opinion-formers consider collaboration as necessary during the planning period in particular, therefore „collaboration planning „ was identified as a factor of the „strengths“.



### **Supplier Assessment and Management**

Evaluation of suppliers in order to benchmark them by the means of standardized key performance indicators was qualified as one of the strengths. Suppliers' assessment with regular revisions especially for critical products is highly important from the companies' point of view and a fixed part of supplier management.

### **Communication to the Supplier**

Communication channels operate well. The ways and directions of the communication channels are clearly defined. The companies of the chemical sector consider it as one of the strengths.

### **Quality of Product and Packaging**

The products are well-packed and precisely labelled, they can be clearly identified. Therefore this category was evaluated as one of the strengths.

### **Terms of Payment and Delivery**

Payments prove to be settled according to the required proceedings. The delivery takes place subsequently to the event of ordering. Payment deadlines are kept. This category was qualified under the title of the strengths.

## **3.2 Strengths and weaknesses in warehousing of raw materials, semi-finished and finished products**

The share of raw materials on production costs is rather high. Furthermore raw materials are stored over long periods, due to comparably long delivery times and unreliable suppliers. Within the chemical industry products and materials are produced on stock (make-so-stock) or on the basis of sales forecast. Only few companies choose make-to-order strategies. Experts from chemical companies claim limited inventory capacities for raw materials, semi-finished and finished products. Furthermore product-specific characteristics and requirements are limiting the inventory time. In Eastern Europe warehousing facilities are available although in most of the cases adjustments are necessary, own investments have to be placed and qualifications of staff are low.

Nevertheless companies try to hold an optimal inventory and safety-stock level, meaning to keep the balance between the risk to run out of stock and high inventory costs.

Sufficient experiences with functional warehouse outsourcing are missing as the majority of companies have their own warehousing facilities or have consignment stocks with their suppliers. Consignment stores for raw and packaging material increase the flexibility of chemical logistics and reduce costs for the producing company. The supplier can develop a more intensive connection with the producing company. In this respect the selection of qualified and reliable enterprises (SQAS certification) is very important

Nevertheless companies claim a lack of specialized providers having the required experience for warehousing and handling chemical goods. Warehouse infrastructures are adequate, as far as capacity and safety are concerned.

Nowadays, there are strong tendencies to minimize warehouse stocks and utilize the raw materials and intermediates for production by „just in time approach“.



The chemical enterprises have developed innovative solutions for the stock management and control in order to contribute to optimisation of logistic processes. An efficient planning allows to early influence production and logistic processes.

### 3.3 Strengths and weaknesses in production logistics

The chemical industry in Central and Eastern Europe has a good competitive position due to its strong integration, optimised and stable structures of the production processes. High investments and a large-scale restructuring process in the framework of the privatisation after the reunification have created the basis for a highly modern and competitive chemical industry especially within Central Europe, which has grown above average in the past years. The establishment and the further development of clusters and networks alongside the value added chain are another location advantages for the chemical industry

Chemical companies report about stabile production processes with extremely low scrap rates. In general duration of production processes for finished products lasts about 2 days. In most of the chemical companies production is organised by three-shift models and in some cases also on weekends. The utilization of machines and production lines is well due to highly automated processes. Basic chemicals party have to face longer durations for production changes (set-ups and cleaning of reactors). Nevertheless some experts see high potential in the reduction of damages within the production processes and to decrease time for production change-over. Production planning is supported by IT-Tools and major objectives are to maximize delivery reliability and productivity. Furthermore companies try to minimize set-up and cleaning times. Flexibility in production process – often caused by short-term changes in customer demand – within the chemical industry is limited.

### 3.4 Strengths and weaknesses in distribution and transport

Highly different product-specifics lead to special requirements for distribution. Even within sectors of the chemical industry (e.g. commodities), customer demands vary regarding costs and quality of distribution logistics (e.g. fertilizer: high cost pressure, acceptable quality, little time slots for delivery or melamine: high quality demands, exact meeting of delivery dates or urea: high quality demand, not that time-critical as melamine). Chemical companies try to shift volumes from road to railway; in particular commodities are suited for railway transportation (bulk loads).

Multimodal transport is difficult due to insufficient transloading facilities and railway connections. Transshipment of cargo demands special equipment, but efficiency is depending on volumes and regular product or volume flows. This can only be achieved by generating synergies and cooperation with partners. Therefore major problem remains the last mile and the low utilization. Additionally interoperability between rail systems in West- and East-Europe, bureaucratic barriers, lack of quality of equipment and inflexibility as well as a lack of terminal structure for intermodal transport prevent companies to shift volumes to railway. Due to experts' view railway transportation is challenged by limited availability of wagons, which are sometimes in a poor condition and badly cleaned. Furthermore it could be the case that some equipment or wagons (e.g. NH<sub>3</sub>-wagons) are unsafe in their handling.



Some chemical locations have established public terminals for intermodal transport on their sites or in their proximity. These terminals are especially specialised for the handling of chemical goods and play a central role for the improvement of chemical logistics.

In some Eastern European countries road transportation is influenced by low quality and inefficiency of the road infrastructure and in particular country-specific administrative and social regulations (e.g. digital tachometer). Many companies remark that the customer defines the mode of transport according to their requirements in terms flexibility. Safety and Security when loading goods at chemical sites in Eastern Europe is challenging companies as partly staff does not wear personal safety equipment and there is a lack of means for cargo safety. Transportation and freight management is often outsourced. Transports to CEE countries usually are organised via international freight carriers, whereas transports within CEE countries often are carried out by local carriers. Main problem is the lack of utilities for cargo securing and insufficient use of personal protective equipment when transloading cargo in CEE countries. In general the equipment and the condition of the freight vehicles are inadequate. Coordination and communication with Logistic Service Providers in CEE countries is sometimes difficult due to language barriers and there is an absence of harmonization of social standards (e.g. driving hours). In addition experts partly claim the non-availability of people with excellent logistical background in terms of collaborations with Logistic Service Providers in CEE. In general experts see high potential in the development and improvement of the road infrastructure especially in those CEE countries, recently joined the European Union.

Inland waterway is the most important mode of transportation in terms of high quantities and bulk cargo – especially for commodities. The availability and effectiveness of the Danube is hardly calculable due to external influences like flood, low water and icing. Therefore this mode of transportation is not suitable for time critical cargo. Furthermore modern unloading facilities within ports in CEE countries are missing (e.g. roofed terminals). In terms of hazardous goods, dedicated transports are necessary although availability of vessels is sometimes not given. Low outbound volumes signify low utilization, which makes the inland waterway less competitive.

Selected chemical location in Central Germany and larger chemical companies have developed extensive pipeline networks, in order to ensure cost effective and safe transport of raw and intermediate materials. Pipelines are also an active contribution to environmental protection and avoidance of transport on road and railway.

### 3.5 Strengths and weaknesses in planning and controlling

Accuracy and reliability in Demand and Supply Planning or Forecasting with customers is according to experts' view rarely realizable, even the reliability of that data is depending both on the suppliers and the customers. The enterprises have problems with an insufficient reliability of selling forecasts, which are the basis for planning of the production. A high optimisation of production processes reduces in this framework the flexibility and market volatility can cause problems. The sector is affected by the necessity to act and react flexibly to plan production, distribution, procurement of raw materials and inventory levels. The

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## STRENGTHS AND WEAKNESSES

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planning of inventory levels depends on the supply and demand planning: the more detailed and reliable, the better planning of inventory levels. The accuracy and flexibility in production and delivery planning is well-developed and remarked as strengths.

In close cooperation between chemical enterprises and logistic service providers, a clear improvement of performance of the chemical logistic has been achieved by active support of the processes. There are a lot of best-practice solutions in this area. The chemical logistic is in a constant process of optimisation.

### 3.6 Strengths and weaknesses in order processing

Order processing is generally supported by software applications that make processes standardized, stable and transparent. The majority of interviewed companies see their strengths in short order cycle time and standardized and constant order processing.

### 3.7 Strengths and weaknesses in information logistics

PPS-Systems are used for production planning in order to maximize productivity and adherence to delivery schedules as well as to minimize cleaning and set-up times. In many companies software to manage the Supply Chain is in use. ERP and MRP systems are in action for order processing, procurement, production, inventory and transport.



## **4 Opportunities and Threats of the Chemical Industry and Chemical Logistics in CEE**

In order to gain representative results for opportunities and threats expert workshops were organized during the Regional Stakeholder Meetings. The main objective was to get as much information as possible about external non influenceable opportunities and chances for chemical logistics in Central and Eastern Europe? Representatives of the chemical industry, logistic service providers as well as experts from other stakeholder groups attended the workshops.

### **4.1 Economic trends**

#### **4.1.1 Current economic development**

Despite the current financial and economic crisis, the expected positive long term economic development and the increasing freight transport volumes are a chance for the growth and the further development of most of the chemical enterprises. This can be an important contribution for the stabilisation of markets and the improvement of customer satisfaction. Nevertheless present economic crisis endangers many chemical and logistic companies world-wide and on the regional level. Especially small and medium sized companies are highly challenged by the current economic situation and have difficulty to survive. Especially logistic service providers and freight carriers suffer from the decline in freight volume. Some experts expect a further intensification of competition after an ongoing reduction in customer demand. Other companies are more optimistic in terms of the economical crisis and expect an increase in consumption and investments both on global and regional level. The current economic situation is vastly difficult for the chemical industry, but should rather be regarded as chance and not as a threat. According to experts' opinions and based on experiences in the sectors of bulk, fine and speciality chemicals, German companies examine the economical crisis more critical than Austrian chemical companies.

#### **4.1.2 Internationalization of selling and sourcing markets**

Access to international selling and sourcing markets is a key success factor and vital for the chemical industry. Especially for new member states import and exports are now mainly concentrated on EU markets and therefore access to markets is easier. The majority of experts feel that the internationalization of sourcing markets poses a chance (wider access to sources versus higher prices or possible low quality) for the chemical industry in total, whereas the opinions in terms of selling markets were differentiated (increasing competitions, threat from cheap Asian products). Consequently this leads to an enlargement of the supply chain as well as to longer transportation distances. The sourcing of energy is put on regional suppliers, but only with limitations. Many experts think that the internationalization of sourcing markets is a huge chance for the logistic sector. From the sales point of view the internationalization of selling markets leads to higher product variety. An increasing replacement of production sites has been remarked within the last years, although experts are not sure how long this tendency will proceed in that intensity as labour costs in Eastern Europe are expected to increase further on. In Far East both labour costs and quality of chemical products are low. Event though experts predict that quality will



adjust to European level within the next few years. Quality awareness stays a question of mentality.

### **4.1.3 Intensified competition / global cost pressure**

Representative of the chemical industry mean, that intensified competition and as a consequent higher cost pressure is both seen as an opportunity and as a threat. The competition is vital for innovations and new distribution canals. Although there is a risky situation as European chemical companies have a comparative price and feedstock disadvantage in some products and their derivatives (e.g. Olefins) and are facing an upcoming wave of petrochemical capacity additions, especially in Middle East. In terms of logistics intensified competition secures similar basic conditions. Some experts remark an augmenting shake-out or market adjustment partly traced back to the economical crisis. Nevertheless a clear market position nowadays plays an important role.

### **4.1.4 Individualization of products and services**

Individualization of products and services is a must especially within the fine chemical sector and leads possibly to market segmentation. For the basic chemicals sector individualization is seen as a neutral factor, although special markets demand individualized products and services. For the mentioned sector this factor could be seen as opportunity as long as the customers are prepared to pay. From the logistical point of view small and medium companies are optimistic to the potential of value-added services which is not fully tapped yet, especially in the field of infrastructure. The customer is the pushing factor and oftentimes value-added services in the field of logistics are seen as a must.

### **4.1.5 Adjustment of Eastern European wage-level to Central European's level**

Labour costs in the EU chemical industry are high in a world-wide context with high differences within EU 27, although ULC levels in the EU are competitive with most countries.<sup>2</sup> Due to the adjustment of the Eastern European wage-level to Central European level, experts feel that Western or Central European companies will be more competitive due to educational level as there will be less focus on staff costs. The challenge is to hand that higher costs on to the customer. In terms of logistics companies benefit from the lower wage-level in Eastern Europe as in the future the mentioned trend will result in higher logistic costs. Actually rail prices are advantageous and partially that can be lead back to a low wage-level in Eastern Europe. On the other hand logistic experts possibly expect an opportunity especially for freight management due to the pullback of business to Central and Western European Countries. From the Eastern European countries or respectively from the new member state's point of view, experts treat that development as a threat due to worst competition conditions.

### **4.1.6 Regional development of production and labour costs compared to CEE**

Most of the experts regard that future development as neutral whereas the remaining part of the workshop group tends to see it as advantageous. Reason for that shall be a predicted price in production costs in CEE. Although Austria does not possess own energy or raw material sources, experts expect an increase in taxation in terms of environment (carbon

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<sup>2</sup> ULC – Unit Labor Costs, Productivity and International Competitiveness, RuG 2005.



dioxide emissions). Anyway the opinions agree on levelling. Trade restrictions to EU 27 and the reduction in demand for fertilizer are further mentioned as risks for the chemical industry or respectively for chemical logistics. Currently international acting companies rather disregard a regional or local economic development – focusing on the domestic or regional economy will take some time.

### **4.1.7 Change of image of the chemical industry**

Associations of the different countries have started campaigns in order to create chemical companies more open, especially in terms of environment, climate protection as well as regarding sustainability, safety and security. In general the focus is put on restructuring and redesign of the communication policy and public relations. Main objective is to re-experience the chemical industry, like “living chemical industry”.

### **4.1.8 Trend towards smaller production lots**

In the course of this trend, the dose rates are increased significantly in order to reduce the production lots, especially within the pharmaceutical industry. Thereby a more valuable effect is achieved as well as lead to higher requirements regarding quality.

### **4.1.9 Partners with competences in R&D**

Customers tend towards partners with well-developed strengths in the field of Research and Development in order to gain and keep strategic partnerships. During time periods of economic boom this step is easier as strategic co operations in R&D come along with high investments.

### **4.1.10 Think global, act global**

Centralization of decision makers within corporate groups poses a threat; therefore companies tend to form smaller decision-making units. Companies benefit from a large integrated European market with continued strategic restructuring efforts to adapt flexibly to globalized markets and high international orientation and global network to external customer industries.

## **4.2 Sociocultural trends**

### **4.2.1 Demographic change in CEE**

The opinions regarding the influence of the demographic change in CEE are divided as 50% see that development neutral and the other part of the group expect disadvantageous impacts on the chemical industry.

### **4.2.2 Availability of human resources in the field of logistics**

It was mentioned by representatives of logistics and forwarding companies that approximately 10 years ago there was a significant drain of Eastern European logistic specialists to Western and Central European countries, as in that countries has been remaining a lack of high qualified logistic staff. Nowadays the situation is almost stable, although some experts claim that graduates from technical universities still leave Eastern



European countries to the West or Overseas. There is low intention from students to study technical studies (chemistry, logistics, electrical and mechanical engineering).

In Central and Western European countries the availability of human resources in the field of logistics is still a risky factor as a lag of employees both in the operative and strategic field is expected. It is increasingly difficult to find qualified staff in the field of chemistry as well. Few companies have the possibility to stay optimistic, as they have a well-performing internal education system.

### **4.2.3 Skills of employees in the field of logistics (professional, social and intercultural)**

Most of the Eastern European experts the educational standard and in particular the skills of employees in the field of logistics is mentioned as a big chance and opportunity in Central and Eastern Europe. Furthermore companies refer to well-developed connections and relationships to educational institutions, universities as well as to research and development institutes. Some other experts' opinions regarding the skills of employees in the field of logistics in terms of professional, social and intercultural qualifications are widespread and seen both as a risk and as chance. Although intercultural competence is an important factor, it should not be overestimated. The accessibility to professional trainings and their standardization was qualified as an opportunity in the market-segments. There is a great demand in the application of training programs, since they had already been elaborated, they had already been accessible. They are ready to be applied. With reference to the big demand in experts in the field, by using the available standardized training programs, there is a solid basis for training the required groups of experts. Again experts stressed the lack of qualified experts specialized in the logistics of hazardous chemicals, therefore they qualified this factor as a potential threat. Furthermore some experts claim the increasing fluctuation of employees possibly leading to low level of skills and experiences in chemical logistics.

### **4.2.4 Public image of the chemical industry**

Public image of the chemical industry is evaluated by chemical producers as a big barrier, because people still are afraid of hazardous chemicals in neighbourhood. Therefore there have been a lot of measures and actions in order to put the chemical industry in a sustainable picture (more "green", responsible care, etc.); experts see a chance to position the chemical industry as a sustainable and secure workplace. For other experts this trend is not visible and has a neutral degree of influence.

### **4.2.5 Transition to flexible working hours**

Concordantly the transition to flexible working hours is seen an opportunity.

### **4.2.6 Changes in Values, Intercultural Competences**

In a heterogeneous cultural context like Central and Eastern Europe, a smooth co-operation, based on the consolidation of common values may happen with difficulties. In general it can be stated that the co-operation with the partners to the west of Eastern European countries suffers from certain deficiencies. A slight discordance of interests has been emerging with Germany and Austria and Turkey.



### 4.3 Technological trends

#### 4.3.1 Technology as core competence

Competence in R&D as well as in production and process technology are seen as huge chance for the chemical industry. Customer-specific applications come to the fore. Strong innovation efforts will generate new growth clusters: Biotechnology, Renewable feedstock, efficient energy use, health and new materials (e.g. nanomaterials) which have the capability to solve upcoming societal mega challenges.

#### 4.3.2 Information and Communication Technologies

Information and Communication Technologies definitively come along with the opportunity realize standardization along the whole Supply Chain, whereas the potential yet can not be fully tapped as long as the interfaces do not work properly and sometimes there is a gap between financial investments and practical use or benefit. Standardization also concerns accompanying documents in terms of language and symbols. Furthermore from the logistical point of view Information and Communication Technologies can be a competitive value-added service. Important aspect in terms of Information and Communication Technologies is to take infrastructure into consideration, for example the integration of terminals.

#### 4.3.3 Innovations in transport, cargo handling and warehousing

Innovations in transportation, cargo handling and warehousing should lead to standardization of infrastructure, vehicles and handling technologies resulting in cost reductions and increase of quality and safety. Especially when talking about cargo securing uniform types of vehicles with fixed platform gates is seen as a huge opportunity. Innovations are further awaited for terminal infrastructure, warehousing, handling and in order to achieve process security and reduce leakage (video control at cross-docking-areas and especially mentioned by the pharmaceutical industry). With dissentient vote consent this trend is seen as competitive factor. However in order to benefit from that competitive advantage it is necessary the technological developments in the field of logistics (e.g. monitoring during transport of the dangerous materials, tracking of the shipments, navigation, blockage of engine during the transport of explosives, etc.) are implemented by each company in the Supply Chain.

#### 4.3.4 Screening of Technologies

It is highly important for chemical companies to develop a technology-portfolio for production and process technologies. In that context the employees play a major role in order to create customer-oriented solutions.

### 4.4 Environment and Energy

#### 4.4.1 Climate change especially carbon dioxide emissions

This factor means a real threat for the chemical industry as according to the experts' opinions it results in a distortion of competition. Furthermore the real impact and the prospective possibilities of chemical companies to react on that development can not be



determined now. At the same time the climate change provides numerous chances for companies and new potentials as well as opportunities to go into collaborations.

### 4.4.2 Availability of non-renewable energy sources

Due to the fact that non-renewable energy sources are the main resources and raw materials for the chemical industry this development is a threatening challenge. Gas and oil has to be imported as Europe is neither a strong gas nor oil producer. Numerous European countries are energetically (crude petroleum and natural gas) dependent from one supplier – Russian Federation. The diversification and security of supply is crucial for a competitive domestic chemical industry. Other countries (Middle East, Russia, India, Brazil, etc.) have preferential access to these energy sources. Prices are lower than in Europe and additionally unfair commercial practices take place (e.g. double pricing). There is a huge threat of closing down or capacity changes of production units in Europe due to a lack of access to energy feedstocks.

### 4.4.3 Availability to renewable energy sources

Having no significant influence of the chemical logistics, the availability of renewable energy sources poses a chance for sectors within the chemical industry focussing on the exploitation and manufacture of for example biomass, biogas, bio-lubricants, agro-materials, bio-polymers or bio-fuels etc. Although in order to force the availability and use of renewable energy sources it is essential to enhance research and development activities, which is part of the responsibility of political decision-maker within the European Union and the Member State.

### 4.4.4 Internalising an externality

The increase in road transport of cargo has decoupled from economic growth for the last years. Only a small part of the caused external costs for infrastructure is paid by the road traffic. The costs will augment disproportionately with the increase of road traffic. Only 56% of all external costs are actually covered by congestion charges.<sup>3</sup> This - combined with the fact that there are congestion charges for railway too – leads to a distortion of competition of means of transportation. Doubtless for the logistics internalising an externality means a disadvantageous development.

### 4.4.5 Energy costs

Actually experts do not see any threat caused by energy costs. Due to expected sharp increases in energy expenses in the future, this development is highly risky for the chemical industry, as an energy-intensive industry sector. Primary this factor is a danger for the chemical industry, but at the same time as far as possible the sector can detect and benefit from new alternatives. Doubtless energy markets have a “quasi” oligopolistic organization with much too high energy cost for consumers and industry. Further possibility for chemical companies to reduce energy costs is to go into collaborations and realize co-generation plants. The development of the diesel price and toll fees is an important cost factor for chemical logistics. Increasing prices cause additional cost burden. National and European regulations, which lead to higher prices and fees compared to the global market, are a

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<sup>3</sup> cp. VCÖ (LKW-Maut auf allen Straßen – Daten und Faktoren 2006).



specific competitive disadvantage for European chemical enterprises. The discrimination and missing equal treatment of foreigners for the collection of toll fees is a special problem in Russia.

### 4.5 Politics and innovation

#### 4.5.1 International harmonization of transport and traffic related laws and regulations

Especially within international corporate groups the cross-border harmonization of transport and traffic related laws and regulations within Central and Eastern Europe is a huge topic and according to the experts' views overdue long ago – also in terms of equal opportunities. In particular this concern affects regulations for hazardous goods and safety and security. From the Eastern European Experts' point of view this development is seen as a threat. Different laws and regulations may hamper the smooth implementation of the necessary procedures applied in logistics and have an impact on the competitiveness of a business location. Furthermore, a marked attention should be paid to the regulatory environment of the countries to the East of the Schengen borders.

In the harmonisation and standardisation process the chemical enterprises have the opportunity to actively participate in the definition of joint standards and the transfer of knowledge. In a joint dialogue process joint efforts for the coordination of transport routes can be implemented.

An insufficient harmonisation of technical and administrative standards for the transport of chemicals causes increased costs and time for the handling of cross-border transports. Different safety and security standards for the transport of chemical goods lead to double red tape and further delays. Different social standards distort the equal level playing fields to the disadvantages.

#### 4.5.2 Prioritization of traffic infrastructure issues within the political programs

Partially neutral and positive were mentions of the experts relating the prioritization traffic infrastructure projects within the political programs as traffic comes along with economic development. Focus should be on international coordinated projects, for instance the highway connection Austria – Slovakia. A challenge is to consider each country-specific interests and requirement. According to the opinions of Eastern Europe the prioritization of traffic infrastructure in the political programs can be interpreted as an opportunity. This is evidenced by the fact that a remarkable amount of EU resources is devoted to this priority. Therefore, this factor was evaluated as one of the most outstanding opportunities by the respondents. However, it was interpreted as a serious drawback that policy-makers may reorientate the developmental targets and withdraw money from traffic infrastructure with reference to the decline of the available resources resulting from the economic crisis.

#### 4.5.3 Financing of traffic infrastructure projects

Providing the fact that the projects are sufficiently financed, the prevailing policy on financial subsidies in the field of traffic and transportation including infrastructure is identified as an opportunity. The majority of the respondents stressed again the fact that the amount of the available EU resources for infrastructure development may be shrunk in the context of the restrictive economic measures. This could result in a major set-back for the sector. For the



moment there are sufficient resources for fulfilling the developmental targets, however unified efforts should be made in order to sustain these financial conditions in the future. Furthermore experts claim on the one hand the lack of logistic competence within the ministry of transport, party political influence as well as the insufficient transparency and inefficient use of the existing infrastructure. On the other hand there are many chances for improvement within the political system.

#### **4.5.4 Infrastructure employment costs (costs of usage)**

Although congestion charges are vital for financing infrastructure projects, for the competitiveness of the Austrian business location in an international context, this development is disadvantageous.

#### **4.5.5 Cross-border capacity planning of traffic infrastructure across-the-carriers**

This factor is seen as a huge change, but demands an international collection of freight volume. The factor was clearly defined as a source of threats as the result of the emerging contradictions in this matter in the field of transportation in particular (e. g. definition of parity, difficulties caused by the provisions of the Schengen system (e.g. multi-hour queues at the Schengen border). Transregional integration of territorial development plans is difficult and slow.

#### **4.5.6 Policy on financial subsidies in the field of traffic and transportation**

When discussing about the policy on financial subsidies in the field of traffic and transportation, the experts did not strike an agreement if this poses a threat or a chance. Especially for traffic infrastructure and the carriers rail and inland waterway the experts expect a reasonable use of financial subsidies. The support of commercial zones without railway siding is hardly criticized, as the opportunity to move to alternative means of transport is prevented. For the dedication of financial subsidies a superior authority is requested. Some experts think that the competition shall regulated by itself. Policy on financial subsidies deforms market environment (different taxes).

#### **4.5.7 Public Acceptance of Infrastructure Projects**

The factor of public acceptance of infrastructure projects was evaluated as a source of a threat, since any kinds of infrastructure projects can be suspended even by a spontaneous initiative, and they can be prolonged as the result of an incidental social resistance (e.g. representatives of Green Politics, associations for the protection of the environment).

#### **4.5.8 Prioritization of Passenger Traffic**

The protection of passenger traffic is evaluated as a source of an indirect threat in the context of logistics due to the tendency to protect passenger traffic as opposed to the transport.

#### **4.5.9 Integration of Land-use planning into the Policy of Traffic Infrastructure**

According to the results of the polls, the majority of the questioned stake-holders do not consider the factor as relevant.



### 4.6 Transport infrastructure

#### 4.6.1 Railway

In general experts expect railway as a more competitive mode of transport in the future as fuel prices and road tolls will probably rise and generate higher costs of road transport. The chemical industry itself is highly interested to shift volumes, especially hazardous cargo, from road to railway, under the condition to increase the quality level of railway transport.

##### **Location and structure of the railway system**

The majority of the experts agree on an insufficient and suboptimal situation of the railway infrastructure in Central and Eastern Europe. There is no budget for investments into the railway network, which has been shrinking for the last years. Especially in the southern part of Eastern Europe the conditions are dramatic as the state railroad went nearly bankrupt, the equipment is in terms of quality and availability beneath contempt and the price policy is disastrous so that further shifting of freight volume to road is done. Furthermore for the whole region the experts claim inadequate interfaces, lack of integration of road into the planning of railway terminals, no mutual intermodal project activities between road and rail, obsolete equipment, suboptimal schedules and in total an inefficient process of transportation by rail. Experts suppose a potential to use the existing railway network more efficient through the optimal design of handling nodes. In addition the liberalization of the railway transport is seen as a very positive development in terms of service quality and prices due to intensified competition. In the southern part of Europe there is growing shortage of side tracks connecting the industrial sites: in spite of that, track dismantling goes on, compelling industries to choose road. Too often it happens that the industrial counterpart is seen by railway operator not as a customer to satisfy, but instead as a source of random interference.

The plan is to build a broad-gauge track and to expand the cross-border points with the neighbour countries, though high fees lead to a low level of utilization. Furthermore the conditions to increase the capacity north/south from Poland to Hungary are necessary.

The Hungarian and Polish experts remark that the railway network in their countries are well-developed and of high density. Poland benefits from the transit position near pan-European corridors. The domestic network is well developed, although the cross-border railway network has to be improved for example between Russia, Poland, and Slovakia as well as towards the southern part Hungary. The existing broad-gauge rail connection with Russia and the Commonwealth of Independent States are the advantage for the Polish rail network, ensuring fast and safe transport of goods to eastern markets.

Although many experts feel that the railway structure itself is well-located, the condition and quality of the railway track infrastructure is suboptimal and there are differences in classes between Eastern and Western European countries (most of railway tracks are class C - 20 tonnes weight per axle - instead of class D - 22.5 tonnes weight per axle - obligatory standard in Western European countries). Furthermore due to that class-differences rail equipment has to be adapted (class C railway tracks are not allowed to the modern rail tank cars – according to the RID, TSI, etc.)



The inadequate railway infrastructure in Central and Eastern Europe is a big barrier for chemical transport in this region. A large share of the chemical goods are transported on the roads, because the railway can only be used to a limited extent. But the capacity limits of the roads are already exceeded. A special weakness of the railway transport is the reloading at the border stations. The closing of identified railway infrastructure gaps in Central Germany is delayed due to time-consuming procedures for planning and realisation. An inadequate coordination between the neighbouring states leads to further delays and discontinuity in the transport routes.

### **Location of terminals**

The location of railway terminals is currently evaluated as a threat for chemical industry or respectively for chemical logistics. Within the Central and Eastern European countries there is a lack in terms of quantity, quality and accessibility. Capacity and efficiency of terminals is sub-developed and the equipment is obsolete or not adequate for the purposes of the chemical industry.

### **Availability and capacity of railway wagons**

Troubles in availability arise especially at ad-hoc or individual transports, whereas the longer the planning horizon, the better the availability (in particular for block trains). Tank wagons are mainly booked at private railway transport operators. The quality differs, depending on the origin country. Problematic is the sourcing of special equipment or wagons. So the experts' opinions about the mentioned factor were both neutral and risky.

### **Capacity and efficiency of terminals**

The views regarding the capacity and efficiency of terminals differ: most of the experts think that the terminals are not the bottlenecks within the logistical processes. A minority feels that the capacity and efficiency of terminals are a threat for chemical logistics in Central and Eastern Europe.

### **Access to terminals**

General this factor poses a risk with low influence. Especially mentioned as infrastructural bottleneck are the ports of Vienna and Krems. Krems for instance does not have an access for hazardous goods.

### **State-owned railway systems**

Private railway transport operators are well-situated in Central and Eastern Europe and are quite competitive due to the public price policy. Although the price policy of the state-owned railway system is seen as a threat due to the quasi-monopoly and non-transparent situation, numerous experts think that the market is self-regulating and that there will be further shake-out in the future. Especially logistic service providers benefit from a liberalized market of railway operators. Although the state-owned railway systems provide certain stability, the experts expect a further liberalization and privatization process of railway market and PPP investments in railway sector,

### **Interoperability – international standards**



Main problem of railway transportation in Central and Eastern Europe is that rail systems are not compatible, meaning that there are changes of tracks, country-specific security regulations and isolated systems. In general there is a lack of harmonization of admin, technical and social standards. Experts feel that in some cases interoperable systems are created to protect own structures and to keep proportion of power. Harmonization is expected and a huge chance for all parties within the supply chain. The incompatibility of railway networks and the different track with in Western and Eastern Europe are a special problem for chemical enterprises. An additional reloading causes higher costs, a big loss and higher safety risks.

### **Multimodality**

Experts evaluate a well-developed and accepted basic railway infrastructure with the potential for improvement within the processes itself. Due to restructuring of the railway network the last mile is lengthened.

### **Bureaucracy in Customs Clearance (RID SGMS)**

Complex customs clearance and partially different interpretation of regulations by the custom authorities are a handicap for cross-boarder chemical transports. Under these conditions, contract logistics is almost not possible and interferences have a negative impact on the customer satisfaction.

## **4.6.2 Waterway**

### **Location and structure of the waterway network**

Generally the network of inland waterway is network is advantageous located and fits to pan – European corridor, although in some partner regions it is limited to one or two main waterways. Nevertheless, in the long run, waterway appears as a highly competitive mode of transportation for the chemical industry, especially for bulk cargo, under the condition that the capacity and efficiency is guaranteed. In some harbours, rail tracks do not reach the docks, making intermodality difficult.

The Central European chemical industry has a location disadvantage due to the inadequate access to waterways and the overseas ports. Therefore the connection to the international commodity flows is more complicated and expensive. Hence, the inland transport via railway and road plays a more important role. Due to the congestion of ports in the Baltic and Black Sea, these ports can only be used for chemical transports in a limited way. Furthermore a capable port in the Mediterranean See is missing. Therefore chemical goods have to be transported via the cost intensive inland routes.

### **Location of inland ports**

Ports in Central and Eastern Europe are well-located and strategically well-positioned as well as in Central and Eastern Europe there is a high density of ports although private ports can not be used by third parties.

### **Capacity and efficiency of waterway**



In order to use the waterway transportation efficiently, it is essential to improve the navigability by attenuate the ice, flood and low water problems and to eliminate shoals. The conditions for inland navigations are dependent from weather and therefore instable. The Danube is navigable only from March to May with the exception for the time of floods and at low tide. Due to natural regions, for instance alongside the Danube, this projects are only partly realizable and therefore to keep the status-quo poses a threat due to the ongoing dependency on exogenous factors. For the port of Constanta it is planned to establish a container line with pre- and post-carriage via the Danube additionally to full-container loads. Furthermore there is a lack of pairing between imports and exports. Additionally differences and barriers in legal acts hinder to shift more volumes to that alternative mode of transportation.

### **Access to ports**

The opinions whether the access to ports is a chance or a threat highly differ. Linz (Austria) was mentioned as a negative example due to the lack of connections to the traffic and transport infrastructure. In some cases ports and terminals are closes on weekend meaning a significant problem.

### **Availability and capacity of water vessels**

The actual equipment of the water vessels is obsolete and there is a lack of reinvestments and expansion.

## **4.6.3 Road**

### **Location and structure of the road network**

Generally the infrastructure of road transportation is improvable in terms of quality and quantity. Although experts of Eastern European partner regions admit that the location and structure of the road networks is highly centralized, as opposed to a more synergic and more favourable decentralized network structure. The factor was identified as a source of threats. Poland with it's strategically advantageous transit position near pan-European corridors (I, II, III, VI) benefits from a high density of roads. Experts announce to enhance safety in terms of transportation of hazardous goods and to expand suburban road rings. In Central Europe a modern and capable infrastructure has been developed. Especially the connection of chemical enterprises to the Highway and road network is good.

### **Capacity and efficiency of trunk roads and motorways**

This factor is neither seen as chance nor as a threat. Experts see chances by expansion, the intelligent control of traffic, meaning for example to abolish the ban on driving in nights and on holiday in order to regulate the density of traffic or to lower congestion charges within determined time frames to dislocate the traffic. Experts from Eastern European countries claim that the capacity and efficiency of highways are not satisfactory due to poor quality of the road infrastructure.

### **Development of increase in road toll**



Different systems and evaluation methods in Central and Eastern Europe in terms of road toll lead to imbalance in international competition. Furthermore transport is shifted to minor roads in order to avoid road tolls. Experts think that an increase in road tolls is positive on condition that the money is used for investments in infrastructure. On the other hand road tolls could lead to higher efficiency in logistics, e.g. shorter distances, shorter delivery time, etc.

### **Interoperability - International Standards**

The degree of the application and compliance with the international standards is satisfying. The appropriate initiatives have already been launched for interoperability. Therefore the factor was evaluated as an opportunity by the polled companies. Harmonized social legislation, maximum allowed dimensions and weights of vehicles for international transport, transport of dangerous goods make physical logistical processes more efficient. However there is still a lack of harmonization in terms of tunnels between Central, Western and Eastern European countries: in connection with the transport of dangerous goods the present tunnels do not fulfil the requirements of ADR agreement. In addition the transport of dangerous goods is banned on several segments of international roads ("E") with negative impact on logistics. A lack of truck parking facilities makes difficult to fulfil requirements of social legislation.

### **4.6.4 Intermodal**

#### **Location, structure and capacity of intermodal nodes**

By the means of intermodal transport the majority of chemical producers expect the opportunity to better logistics and lower transport costs, higher safety and less damages of cargo. However they indicate the necessity of enlargement intermodal nodes and terminals as present terminals are rarely dedicated to the complex requirements of the chemical industry, especially in terms of handling dangerous goods. Further on neither the present network of tank cleaning stations is sufficient, nor are they integrated in the planning procedures for new build terminals. The majority of intermodal terminals are oriented on sea transports in order to arrange the hinterland transports due to pre-carriages and on-carriages coming from maritime harbours of Hamburg, Bremerhaven, Rotterdam and Koper.

Generally big terminals at strategic important nodes exist, although there is a lack of decentralized terminals area-wide. The handling technologies indeed are partly well-developed in the bigger terminals, but coverage of decentralized regions is quite difficult due to insufficient compatibility and inflexibility of system components. Furthermore there is a lack of comprehensive national and international concepts. Handling technology across all carriers requires high investments in order to develop sophisticated and adequate logistic terminals. In general experts claim that the political procedure of planning, coordination and control of the development of intermodal nodes is intransparent and inefficient, as far as the requirements of the companies are concerned: for the chemical industry intermodal centres outside of urban areas where chemical goods can be handled and stored safely.



At the moment there is no well developed structure for intermodal terminals in Eastern Europe. This leads to loss of efficiency of chemical logistics for the combined transport of railway and road.

### 4.6.5 Pipeline

#### Location and structure of the pipeline network

Generally the as-it-is situation of the pipeline network is seen as a threat, mainly due to the mentioned lack of well-developed structure. Pipeline network has been built in east-west directions. For the security of supplies it is necessary to build also north/south connections. There are numerous pipeline projects planned and ongoing in Eastern Europe in order to expand the existing pipeline network and to increase the capacity:

- Ethylene pipeline Plock – Bohlen to enhance to ethylene export to Germany and to focus on the possibility of the implementation of the project with other possible pipelines for propylene and LPG transmission.
- Odessa – Brody – Plock Pipeline to realize the transport of petroleum from oil pool in the Caspian Sea, mainly from Azerbaijan.
- Baltic Pipe (Skandled) to diversify gas supply to Poland from Scandinavian direction.
- Nord Stream pipeline: a gas pipeline to link Russia and the European Union via the Baltic Sea. It will carry natural gas to supply both businesses and households.
- Nabucco pipeline: represents a new gas pipeline connecting the Caspian region, Middle East and Egypt via Turkey, Bulgaria, Romania, and Hungary with Austria as well as further on to the Central and Western European gas markets. The pipeline length is approximately 3,300 km, starting at the Georgian/Turkish and/or Iranian/Turkish border respectively, leading to Baumgarten in Austria.

The inadequate pipeline network for Olefins is a big competitive disadvantage for the central German chemical industry in comparison to the Western European competitors. The enterprises are forced to transport a large share of their products on the road and the railway, which leads to higher costs and longer transport times.

#### Capacity and efficiency of pipeline network

Capacities of the pipelines are evaluated as marginal but in general the situation poses neither a threat nor a chance.

### 4.7 Safety and Security

#### International safety standards

There is no common Emergency Response and Crisis Management System in the Eastern European States outside the European Union (especially Russia and Ukraine). This is a big threat to the safety of chemical transports.

International unified Safety and Security Standards within Eastern and Western Europe pose a huge chance for the competitiveness of the chemical industry. The European harmonization of the legal framework of dangerous goods transport (ADR, RID, ADN, IMDG

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## OPPORTUNITIES AND THREATS

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code, IATA DGR) makes the conditions for transport easier and transparent. Further on REACH secures a standardized registration, evaluation and authorisation of chemical substances within the European Union. A further intensification of safety and security standards on an international level is expected by the experts.

The chemical industry in Central Europe has achieved a high safety standard in the production, logistic and transport in the past years. This ensures a responsible treatment of chemical products and processes in relation to the employees, clients and environment. Initiative such as Responsible Care and SQAS play an important role in this respect. .

### **Tracking & Tracing of cargo**

The international standards for tracking and tracing cargo were already initiated, however, the required infrastructure for GPS tracking solutions is not satisfactory, and therefore this factor was identified as a source of threats.

The tracking and tracing of cargo is not only highly interesting for the customer but also in terms of hindering misuse of dangerous goods by terrorists. This is easier when the vehicle is directly marked according to ADR, RID by UN code or even the name. Even the rail tanks create higher danger of misuse than accompanied road transport.

There was a great importance given to the factor by the experts, although for the majority of companies, which are not dealing with logistics the tracking and tracing of cargo is a neutral parameter. For the logistic and forwarding companies this factor represents strengths, because it represents a value-added service for customers.



## 5 Need for future actions and improvements

### 5.1 Need for future actions and improvements – in terms of politics for transportation and infrastructure

#### **Better coordination of Pan-European infrastructure projects – European-wide harmonized standards for planning and controlling of traffic, transportation and infrastructure.**

A better coordination of the pan-European infrastructure plans in West-East and East-West direction is necessary to agree on common priorities for the development of transport routes and to speed up the respective extension of infrastructure. The relevant stakeholders from policy, industry and administration have to be actively integrated in this coordination process in order to ensure high chances for implementation and the focus of planning according to the expected needs. The different political levels regional, national and European have to be involved according to their specific regulatory and decision making competencies. The ChemLog project wants to deliver a special contribution for the area of chemical logistics in this respect. At the same time the project aims to develop close cooperation with similar initiatives such as the programme of the Chamber Union Elbe Oder for the development of infrastructure, ensuring mobility and access, strengthening of economic development. In general planning horizons for cross-border traffic projects, especially for European corridors shall be speed up significantly.

#### **More effective distribution of EU funds**

The development of cross-boarder infrastructure projects in Central and Eastern Europe should be supported by a more efficient use of EU Structural Funds in interaction with other regional and national funding sources. This should contribute to the integration of the new Member States in the European Union and to strengthen competitiveness of the Central and Eastern European industry. The EU funding has due to its leverage effects for the mobilisation of further public and private investments a special importance. In the framework of the use of EU funds a prioritisation on especially important infrastructure projects is necessary. Further requests are to increase political acceptance of and priority assignment to the investments required for transport infrastructure. Although some experts fear major setbacks of EU funds due to the impacts of the financial and economic crisis.

#### **Long-term, rational and sustainable-oriented transport policy**

According to the experts' opinions, traffic and transport infrastructure are of prime importance for the successful future of the chemical industry and especially for chemical logistics. The transport policy should place the centre of attention on an integrated, long-term and legislation-period-overlapping approach. The main objective is to develop an optimized global traffic system. Challenges of the complex traffic system can only be met through the all-embracing consideration of the relevant political sub areas and by taking the mutual consequences into account. By the means of an integrated transport policy rational, coherent and sustainable goals are pursued. In order to reach the political objectives in terms of multimodality, the conditions have to be adjusted to the requirements of the economy. Main target is the optimization of the quality along the whole multimodal supply chain. Depending on economical demand and geographical location the expansion and customization of neutral bimodal and trimodal terminals shall be forced.



**Institutionalization of an integrated planning of traffic infrastructure and land-use planning. Infrastructure analysis creates a transparent basis for decisions to increase efficiency and utility and/or to expand transport infrastructure.**

Improved assurance of areas to expand infrastructure and the transparent land-use planning procedure along high-ranking infrastructures can be ensured by mutual commitment, reconciliation of interests and long-term planning and financing reliability. Every measure to increase capacity and efficiency of infrastructure shall be coordinated both with traffic and land-use planning issues. This recommendation accompanies the request for analysis of existing, planned and needed infrastructure – a comparison of estimated demand and existing capacity – as a basis for infrastructure building projects or to improve efficiency in operating. Furthermore it is essential to standardize the legislation with the European Union within the sectors of traffic and land-use planning. For logistic purposes it is recommended to define a master plan for the territorial use for logistic purposes on national or regional level.

### **Efficient use of infrastructure by mileage-related charges and intelligent control**

Through traffic control measures the degree of utilization of transport infrastructure can be enhanced. Further possibilities to guarantee the efficiency of traffic systems are innovative instruments of use optimization: for example timely different and demand-reliant pricing of the infrastructure as well as intelligent traffic control depending on capacity utilization are able to optimize the degree of efficiency and to prevent or reduce time of congestion and loss. Thereby self-organizing effects are stimulated.

## **5.2 Need for future actions and improvements – from the general logistical point of view**

### **Globalization of logistics: Act and React**

The internationalization of business, for example Global Sourcing, the deployment of production and the international division of labour, causes greater distances, an increase in transport volumes and in the number of transports. Under consideration of changing flows of traffic multimodal transport solutions will gain in importance. Decelerating vertical range of manufacturing in western industry countries as well as displacing core competences effect an escalation of intercontinental overseas container transports. The intensified interdependencies between western industry countries and the Asian market enable novel, innovative and global logistic concepts, which are essential to deal with rising complexity in supply chain networks. Thus, the importance of the discipline of logistics and the demand for experts will go up continuously. Logistics provides potential for rationalization and consequently for reduction of inventory respectively for effective management and bundling of transports and thereby non-productive return shipments can be diminished.

### **Innovative network structures and logistical co operations to achieve excellence on both sides**

Concentration tendency in markets serves as an important driver for strategic competitiveness, especially in logistics. A growing number of partners and locations lead to increasing complexity within supply chain networks. Thereby the challenge is to connect



actors and process in both counts of physical and informational matching. Logistical collaborations predominantly centre on classical and basic functions: procurement and distribution. To ensure successful and sustainable vertical partnerships between logistic service providers and their customers the coverage of the whole range of services is preconditioned. Horizontal cooperation opens up new chances when structuring international logistics and supply chain networks and generating synergies especially in freight management, inventory management as well as in information and communication technologies.

Cooperative contacts and networks are important although not every cooperation project is profitable. Intentions to cooperate with high investment effort are only recommendable if there is a strategic benefit for the company. Investing time and resources into collaborations with customers or suppliers in order to drive innovation and differentiate services should pay-off and create value for all involved companies. In terms of logistics reduction of costs and tied-up capital on both sides by decreasing inventories, reduction of transportation costs and storage costs can be achieved. In addition more effective and efficient processes through reduction of order cycle time, lead time and increase of delivery performance create shared success. Taking out non-value added activities on both sides like the decline in errors or the reduction of production change over and additional set-ups pose objectives of a logistic cooperation. Short-term improvement projects regarding transport and distribution could be the consolidation of shipments on selected products and destinations or the increase of direct shipments in order to reduce shipping, transportation and inventory costs. To create processes more efficient in the fields of order processing and demand or supply planning better coordination between supplier and customer could lead to a diminishment of lead times and the reduction of safety stocks by collaborative forecasting. More intensive cooperation can be found in strategic product development, joint optimization of product portfolio or collaborative projects on process innovations. For sure trust and openness between partners is the key success factor to build reliable supply chain and logistic chances. In general alliances among small and medium sized companies in order to increase international market access and penetration as well as to facilitate scale economy shall be forced.

### **Companies have to face rising demand for superior logistic services**

Rising customer requirements for best-in-class logistic services and demanded continuous improvement challenge providers within globalized markets. Few fixed capital guarantees flexibility in designing transnational logistics processes. Flexible network structures are increasingly the key factor in dynamic markets. In order to ensure product availability worldwide at customer-defined conditions, enterprises are challenged to optimize their logistical concepts. This is essential to meet high requirements on flexibility due to necessary short-term reaction on customer orders, smallish order sizes and decreasing acceptance for delivery failures or delays. The challenges cause adjustments of logistics strategies and have to be orientated towards the following competitive factors:

Customer service: The modern meaning of logistics takes up the position that the customer is the central point of all entrepreneurial activities. For this reason logistics is the ideal initial point for customer-binding measures and the generation of competitive advantages. Customer-oriented logistical measures do not have to be attended necessarily by customer-specific design of logistics concepts; product-supporting services can generate customer value too.



Delivery performance: Rising quality requirements regarding delivery performance as well as the continuous optimization of logistic costs bring out a conflict of objective. Demanded superior logistic services, shorter periods to response on customers' requirements and other changes within the supply chain pose difficult challenges for companies. If product attributes and price does not differ significantly, logistic service will be the decisive purchase criterion as the customer will probably choose that product which is available for adequate conditions. In this case delivery time and reliability are the major competitive factors, crucial for the strategic success of the company.

In each field (B2B, B2C, etc.) customers require the personal and institutional perception of responsibility. This involves a new significance of the role of logistic service providers, evolving from typical task fulfilment to innovative and creative designing within a reliable partnership.

### **Companies are challenged by growing demand for customized logistics solutions**

Standardization and Optimization within the management of customers and networks will be determining challenges for logistical processes as at the same time enterprises and logistic service providers have to meet requirements which apply specifically to a concrete problem, sector or customer ("standardized individuality"). Logistic solutions "ready-made" will not be viable in the future: all the more customized and efficient concepts focused on the customers' topics represent important success factors for companies to differ from competing companies. Furthermore the well directed application of logistics technology systems focused on customer-oriented product and service specifications will be indispensable. Complexity and cost pressure come second to robustness and security in supply chain management as concepts for stockless or low inventory (in times of uncertainty and risks in a worldwide turbulent environment) have to be reconsidered and new optima have to be defined. A return to a European-wide strengthened networking can not be excluded.

### **Optimization of logistical processes as the key for cost reduction and transparency**

A significantly important objective of logistics is the reduction of costs through optimization of the total system, especially of operational activities which come along with increasing market performance. The growing range of tasks would in fact lead to an increasing share of logistic costs on overall costs, although costs can be further reduced continuously by process optimization. The development of intelligent logistic solutions in mind with the efficient design of operational sequences enables companies to continue cost reduction. Freight costs optimization have high influence, which can be realized by optimizing the payload, re-evaluate the distance to customers and the transportation mode as well as optimize the freight tariff. Process monitoring and -controlling with Supply Chain Event Management Systems highly create competitive advantages. Outsourcing can pose a chance to optimize logistical processes too and therefore stays attractive for companies, even though motives for industry and retail are changing. In addition to required concentration on core competences, cost and quality aspects are centred. Single-sourcing strategies will gain importance in this context.

### **Companies shall be prepared for accumulated and intensified safety regulations**

Accumulated safety regulations in global trade increase the complexity for logistic processes. Examples would be: (1) long waiting periods in already overloaded entrance ports, hence



resulting in (2) demurrage costs for containers, incalculable turn-around times as well as (3) incomplete information availability and (4) an additional expenditure at administration and handling. Those parameters often entail unpredictable indirect costs and aspects of quality. The examination of „Worst Case “- scenarios allows to maintain the stability and operability of the supply chain and applies beside flexible processes and structures as a success criterion. A substantial contribution to increase attack security in supply chains is carried out by the information and communication technologies. In container traffic technologies like RFID, GPS and Smart Container enable consistent transmission pursuit and the identification of deviations and potential dangers. In the scope of sensor engineering the electronic seal is a possibility for the recording of incidents; the market penetration is inhibited because of the lack of standardization. The topic security in global supply chains does not require only the operational, but likewise the strategic viewpoint of all elements and parties, in particular the focus has to be put on the weakest member link in the chain. Due to the strategic importance and in the sense of prevention and response it is essential to place this topic on the level of management.

### **Rising importance of intelligent information and communication technologies in the field of logistics**

The technological progress opens up new ways for process innovations within the logistical field. A possible and potential solution instrument for many logistics-relevant, in particular traffic related problems, is the Information and Communications Technology (ICT). Experts assume that in the future many vehicles will be equipped with Information and Communications Technology interfaces resulting in an eased implementation of additional options (e.g. improvement of the extent of utilization of the vehicles). Beyond that the future vehicles are interlaced and equipped with just-in-time (JIT) information services. The customers will call for transparency and information availability at any time in the supply chain; fulfilling this customer demands will also be a competitive advantage for the companies. By the use of information and communication technologies as well as the integration of internet-based solutions, the speed and transparency can be ensured to enable cross-company planning and the control of complex logistics chains. To cope with the complexity of the supply chain and to integrate the partners and the processes of global cooperative networks and logistic operational sequences of international enterprise activities, intelligent information systems were required. In logistics research in the field of self-monitoring is needed, namely the tracking of goods during the transport by systems reacting in case of deviations.

### **Increasing requirements for the logistics staff**

The global dimension of the flows of goods and information leads to higher and differentiated requirements to the logistics personnel. Apart from the cross-cultural competence special attention has to be put on the cooperative strategy, plan and target setting. Further the technological requirements will rise notably. To handle the complexity of logistics solutions in accordance with the requirements of the economy and the customers, technical and overall know-how, cross-company cerebration and acting as well as soft skills are necessarily. In the future on average better skilled qualified employees will operate in the logistics industry. Expert related further education in companies will become more important und amplifies the innovation in the range of logistics.

### **Sustainable management of logistic systems**



The consequences of a rising environmental sensitivity of the population for logistics should not be underestimated: increasing aversion against road transport could force companies to rearrange their transport-intensive delivery chains and change over to the carriers' rail and inland-water way or sea. However, this could not be the only reason for a restructuring of logistics. Today the cost analysis concentrates only on the indirect traceable costs, for example warehousing, transport and inventory costs. To a lesser extent considered are environmental costs caused by logistic activities. Because of the still missing methodical agreement of calculating the external costs and the lack of political willingness to internalize those, these costs and the resulting macroeconomic adversity can not be assigned to logistics. In the future, the stronger environmental adjustment of the society, for example the regionalization of the transportation flows, will possible causes a decrease of transportation volumes. Undisputable is the fact that because of new legal requirements to reduce emissions and to save resources additional tasks to the supply chain management will be assigned. This requires detailed knowledge of the entire value chain, since each part can directly or indirectly generate or avoid emissions. The management itself has to act in line with long-term goals and to ensure the sustainable use of the potentials for success, not for short term profit maximization.

### **Integration of logistics in the business strategy**

Referring to the companies the above listed and discussed opportunities and threats require a strategic view of the logistics-relevant challenges. The logistics strategies and targets have to be integrated in the strategic plan and system of objectives of the companies. Continuous changes and re-orientations within the logistic processes as well as global economic dynamics require both a company-wide and cross-company oriented approach and also flexible processes and structures.

## **5.3 Need for future actions and improvements –for chemical logistics in CEE**

### **Develop vision of a pan-European Olefin Pipeline network**

The development of a vision for a pan European Olefin pipeline network in Central and Eastern Europe is an important contribution for the strengthening of competitiveness of this region especially in comparison with the highly integrated Western European chemical locations. The pipeline network can only be implemented under consideration of the interest of private enterprises in close cooperation with the political level. The pipelines can contribute to avoidance of transport especially on the congested roads and railway, to improve safety of chemical transports and to reduce costs for chemical logistics. The external effects and costs of pipelines are almost negligible and limited to the construction of the infrastructures and the energy production for the pumping installation. It is therefore obvious that a modal shift in favor of pipelines is in line with the EU Transport Policy and constitutes an excellent opportunity to integrate transport in sustainable development and promote European regional cohesion. The improvement of gas infrastructure, diversification gas supply projects from Scandinavian direction (Baltic Pipe, Skanled) have the key importance for Eastern European countries.

### **Improvement of Transportation Network and Systems in CE & EE**

Extensive investments in the railway and road infrastructure in Central and Eastern Europe are necessary for an improvement of chemical logistics. Especially the barriers at the boarder crossing and at identified bottlenecks should be overcome. Important transport



corridors for the chemical industry are starting from Central Germany to the economic centres and growth markets in St. Petersburg, Moscow, Vladimir, Kiev or Odessa and furthermore to China. Furthermore in cities and agglomerations ring road section construction shall be taken into consideration as well as the improvement of transit conditions through big cities. Improvements also address the increase of safety on road, especially in terms of hazardous goods. Partly present and planned road tunnels are not classified for dangerous goods according to ADR. These issues shall be taken into consideration within planning procedures of road infrastructure. Furthermore experts recommend installing bigger parking facilities with higher security standards, as lack of truck parking makes it difficult to fulfil requirements of social legislation. Transporting dangerous goods on road shall be more transparent, meaning on the one hand to reassess the restrictions for transport of dangerous goods on several segments of road network, on the other hand to make a draft of transit road network for transport of hazardous goods.

Especially railway system is challenged to increase efficiency, respectively to modernize rail corridors (according to AGTC agreement) and to speed up the transition from bureaucratic or partly monopolistic culture and mentality to a market-driven habit with the main objective to satisfy customer demands, respectively to continue the privatization and liberalization process. It is expected that this will lead to lower costs, in particular to reduction in infrastructure management costs. The attention and investments shall not only be dedicated to passenger traffic, but also to cargo transport. Particularly investments shall be made in modernization and purchasing of rolling stock with European Funds fit to modern technologies. Additionally it is proposed to consider big transalpine projects on European level as a unique opportunity to encourage transition from road to rail. Harmonization of technical, social and administrative regulations within rail transportation is primordial for the competitiveness of a business location. These requests are not only addressed to political decision-makers but also to private logistic operators.

First priority to enhance inland waterway transport in CEE is to reduce bottlenecks, to create conditions for year round navigation and to develop and integrate European inland waterway transport according to the European Agreement on main Inland Waterway of international Importance (AGN). The investments in improvement of the water infrastructure shall be done according to EU standards.

### **Investments in Terminals for Intermodal Transport**

Investments in Terminals for intermodal transport have a special importance for the chemical industry. The combined use of different transport modes especially railway and road are especially important for an efficient inland chemical logistics in Central and Eastern Europe. Intermodal Terminals have to be developed, extended and connected especially close to the economic centres alongside the important transport corridors and shall be accessible to all operators. Furthermore an increase in efficiency of cargo handling between the transport modes and the capacities of cargo terminals has to be achieved. Intensified utilization of Information and Communication Technologies (ICT) in the area of multimodality shall be forced and technical innovations financially supported shall be launched. New intermodal or distribution centres shall be better adjusted to the requirements of the chemical industry, respectively in terms of storage and handling of dangerous goods. Chemical companies are recommended to consider private or PPP investments. Although a better cooperation between private and state-owned logistic



operators is necessary, additionally to long-term and strategic governmental support for intermodal sector.

Chemical companies recommend as well the expansion of intermodal terminals by installing value-added-services dedicated for chemical industry (e.g. tank cleaning).

### **Build alternative ports for short sea transport**

The extension of alternative ports for the short sea transport is important for the chemical industry, to improve the access to the international transport flows and to bypass congested existing ports. The harbour interconnection both via road and railway shall be highly supported by hinterland logistic infrastructure in order to increase inland waterway transport.

### **Harmonization of standards**

The harmonisation of standards in the technical administrative area as well as in the safety, security and social dimension are necessary to improve efficiency of chemical logistics for cross-boarder transports, to reduce costs, to reduce delivery times, to minimise safety risks and to ensure an equal level playing field.

### **Implement ER and Crisis Mgmt Systems for the Chemical Industry**

In the area of safety standards, best practice solutions from Western Europe can be transferred to Central and Eastern Europe.

### **Know how Transfer**

Know how transfer to Central and Eastern Europe can contribute to an improvement of chemical logistics. The experiences of the constant optimisation process of logistics can be used in closed cooperation between the relevant stakeholders in mutual advantage.

### **Coordination and Bundling of transport**

The coordination and bundling of chemical transports from one region to a selected target destination can produce synergies and cost advantages. This approach requires a high level of cooperation between the relevant chemical enterprises and logistic providers across the borders.

Solutions can only be developed and implemented in close cooperation between Enterprises / Logistic Providers and Politics and Administration at regional, national and European Level

## **5.4 Need for future actions and improvements – from the ecological point of view**

### **Strategic orientation of the environment and energy policy regarding a sustainable development**

Currently short-term orientation and a heterogeneous picture of the environment and energy policy are obvious in their controversial discussion regarding future availability of resources, implementation of climate protection programmes and the tax policy of fossil energies. Therefore it is highly recommended to achieve EU-wide harmonized environment regulations as determining factors for a sustainable development. Environmental policies have to be internationally agreed in order to guarantee international competitiveness and

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## NEED FOR FUTURE ACTIONS AND IMPROVEMENTS

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has to be oriented towards the polluter-pays-principle. The provision of neutral terms of competition by European-wide harmonization of the taxation of energy considering prior performance is vital for the European Chemical Industry.

For the chemical companies the growth of a sustainable chemical industry shall be targeted, actively participating to Responsible Care Programmes.

### **Support of research and utilization of alternative energy sources**

Political decision maker shall force research, development and utilization of alternative energy sources by the allocation of financial benefits. This would lead to a diversification of the sources and possibly as a consequence to higher security of supplies.



## 6 Outlook to Mainstreaming and Implementation of Project Results

The SWOT Analysis has been the first step of the ChemLog project to identify the internal strengths and weaknesses of chemical companies and the external opportunities and threats for chemical logistics in Central Europe. On this basis the project partners have drawn general recommendations on needs for future actions and improvements, which have been described in this chapter.

These general recommendations will be used for the further development of the project activities with the objective to achieve the mainstreaming of projects results with a high practical implementation orientation for the improvement of framework conditions and the support of infrastructure development for chemical logistics in Central and Eastern Europe.

In the next step of the Work Package “Analysis and Exchange of Experience” the identified strengths and weaknesses will be used to further explore best-practice solutions in chemical logistics in the partner countries (from June to November 2009). This analysis will initiate an intensive process of exchange of experience among the partners and involved stakeholders and should allow mutual learning. With this activity the project wants to facilitate deeper cooperation in the area of chemical logistics in Central and Eastern Europe and support the transnational know-how transfer.

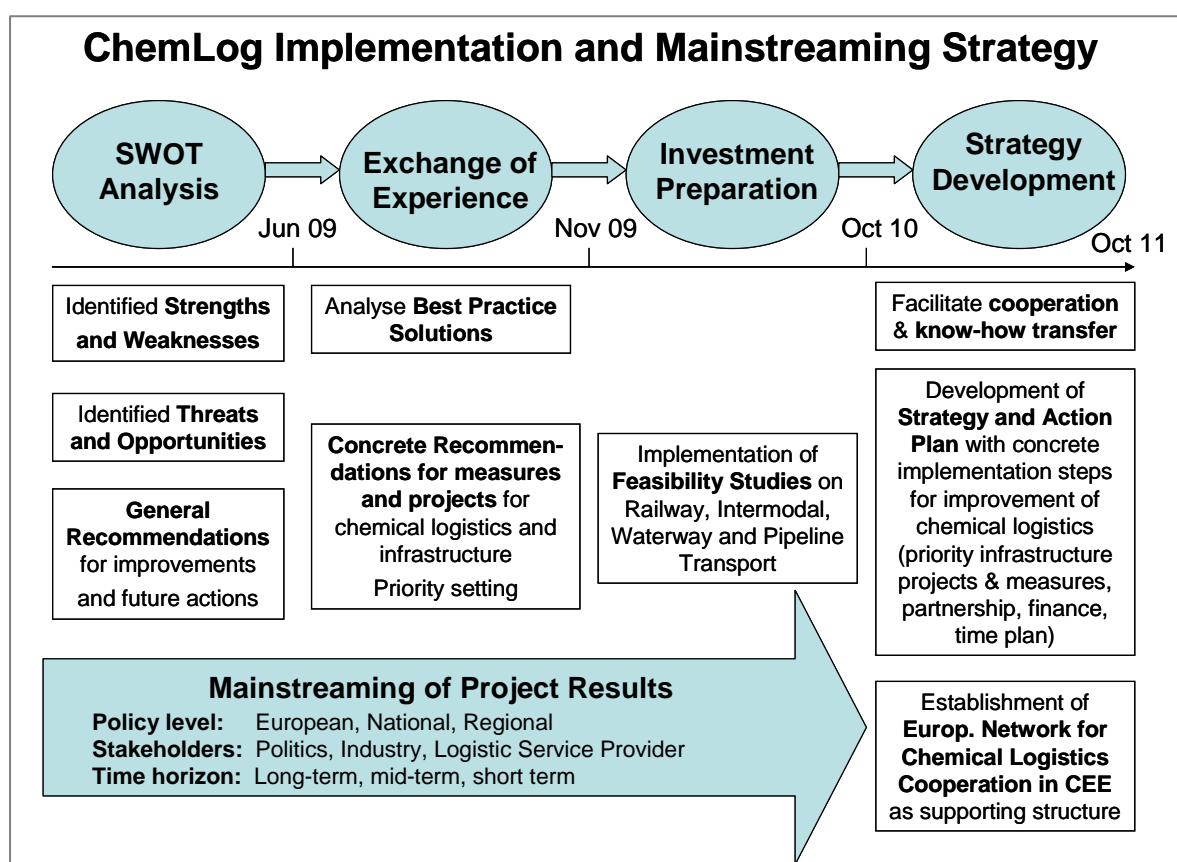
The general recommendations of the SWOT Analysis will be further developed and specified in the course of the project with the objective to agree on concrete recommendations for measures and projects for chemical logistics and infrastructure. The project partners should set priorities for specific measures and projects in order to focus joint efforts on promising activities with high impact for the chemical cluster in Central and Eastern Europe. The tangible output of this exercise will be a short list of potential concrete measures and projects with description of current situation, needs for improvements and a road map for implementation. This mainstreaming process will reflect the different dimensions at policy level: European, national and regional; at stakeholder level: politics, industry, logistic service provider and the time horizon: long term, mid-term and short-term. The project will establish a Policy Advisory Group to involve the relevant stakeholders from different policy levels and industry in the mainstreaming process.

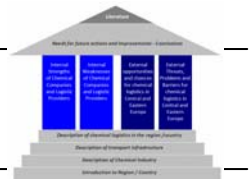
In the process of further specification of potential measures and projects, the partner will implement several feasibility studies from November 2009 until October 2010. These feasibility studies will focus on transnational infrastructure projects in the area of railway transport, intermodal transport, waterway and pipeline transport. These in-depth studies should be used to assess the feasibility of selected infrastructure projects with high potential for the chemical industry and contain detailed conclusions for the realisation of this infrastructure in view of investment preparation.

In the last year of the project from November 2010 to October 2011 the partners will focus their efforts on the strategy development and mainstreaming. On the basis of the mainstreaming process and the results of the feasibility studies the partners will develop a joint strategy and action plan with concrete implementation steps for the improvement of



chemical logistics in Central and Eastern Europe. This strategy and action plan will contain a list of priority infrastructure projects and measures for cooperation and a description of relevant stakeholders and partnership for implementation of these plans. Furthermore the financial framework for will be specified in view of combining public funding from different sources (EU, national and regional) and private investments. The Strategy and Action Plan will also include a time plan with concrete implementation steps and milestone in the years after the end of the ChemLog project. Finally the project will establish a European Network for Chemical Logistics Cooperation in Central and Eastern Europe in order to create a supporting structure to implement the recommendations of the strategy and action plan and to continue cooperation in the area of chemical logistics after the project end.





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## OUTLOOK

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