



**Developing Infrastructure and Operating Models for Intermodal Shift**

# **International co-ordination of combined transport terminal development (Workpackage A8)**

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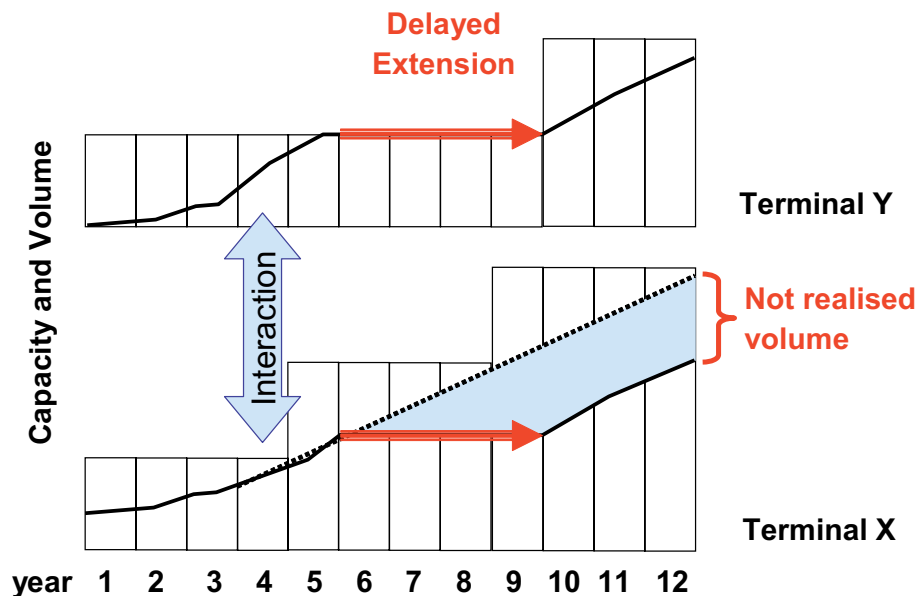
# 1 Objective and methodology

The 2004 UIC “Study On Infrastructure Capacity Reserves For Combined Transport By 2015” called for a massive enlargement of combined transport (CT) terminal handling capacity across Europe by 2015 to ensure the forecasted growth of CT volumes. It also strongly recommended to investigate opportunities for an improved international co-ordination of terminal development to avoid that a capacity constraint at one terminal:

- impedes the establishment of a new CT service;
- impairs the quality and development of an existing service.

Capacity constraints could affect both domestic and international CT. This for various reasons, one of which is that the terminal handling capacity need has not been recognized on time owing to a **lack of synchronization** with the transport development and capacity supply in corresponding transport areas. **Figure 1-1** shows how delays in extending the terminal capacity could also limit the growth of corresponding terminals.

**Figure 1-1: Impact of non-synchronized terminal developments**



Source: KombiConsult

The objective of the present study was to investigate if and how international co-ordination of the development planning of combined transport terminals could avoid or at least alleviate temporary or enduring capacity constraints and facilitate the implementation of international CT services. This requires for:

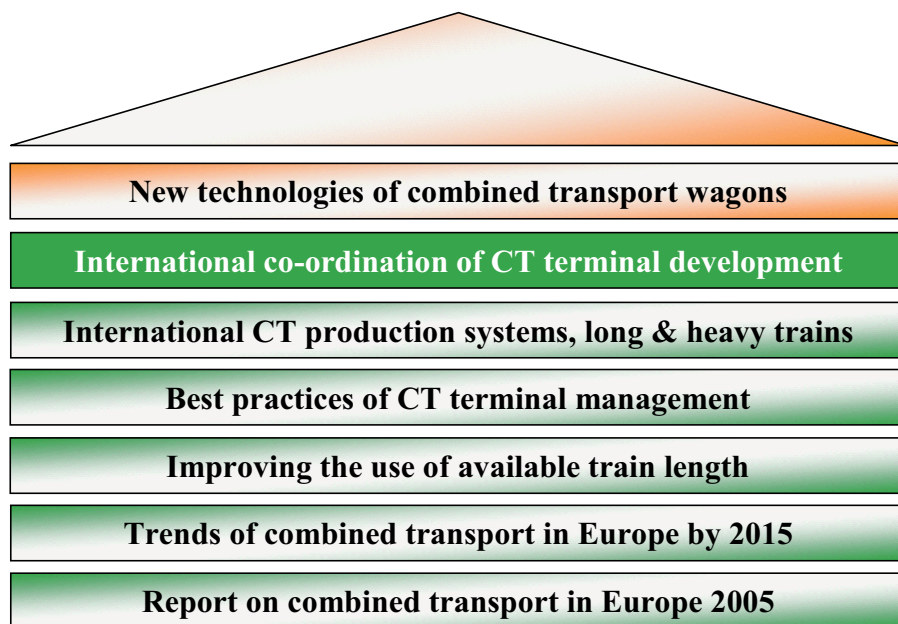
- an identification of development needs (market demand > capacity), i.e. enlargement of an existing or building of a new terminal;
- a synchronization of development plans, at least for public CT terminals allowing for non-discriminatory access.

The study has been carried out using the following methodology:

- (1) Collect evidence of co-ordination deficits
- (2) Analyse and evaluate potential co-ordination solutions
- (3) Recommendations for the international co-ordination of CT terminal development

The findings of the present study, like those of the other DIOMIS modules are an input into the UIC “Masterplan on combined transport 2015”, which will contain recommendations on how to enhance and promote the combined transport industry in Europe (cf. **Figure 1-2**).

**Figure 1-2: Components of DIOMIS Masterplan process**



## **2 Analysis of co-ordination deficits**

### **2.1 Evidence of co-ordination deficits**

When we carried out the 2004 “Study on Capacity Reserves” mentioned above we observed that the establishment and enlargement of public intermodal terminals whose investment costs were paid with taxpayers’ money at least in part, is everywhere across Europe a matter of national concern. These findings were confirmed during our investigations performed for the DIOMIS module A1 on the evolution of unaccompanied combined transport in the six countries Austria, Belgium, France, Germany, Italy and Switzerland by the horizon 2015.

The decision to create handling capacity at a certain place is usually to be based on the local transshipment capacity need related to domestic and/or international services to be implemented. However, investors take more or less for granted that sufficient handling capabilities will be available on the other end of the routes especially if it comes to international lanes. While funding administrations are committed to ensure a co-ordination of terminal enlargement schedules on a domestic level in order to avoid a misdirection of investments and a distortion of competition, a regular procedure for an international co-ordination of terminal developments hasn’t yet been set up neither generally nor bilaterally nor on corridors.

The interviews of intermodal and terminal operators carried out in the framework of this survey have confirmed that, on an international level, intermodal terminals have developed asynchronously. This has generated capacity constraints, which have impeded implementing new cross-border CT services at least temporarily, e.g. on the following itineraries:

- The Netherlands/Germany – Italy;
- Spain – The Netherlands;
- Germany – Czech Republic;
- Belgium – Germany;
- Germany – Poland;
- Austria – Germany.

These constraints are not only for single trains, but were encountered on each of the itineraries for several relations and for regular daily roundtrips, thus the impacts are considerable for the stakeholders. The enforcement and optimization of CT services also is suffering from a lack of transparency of terminal development plans – if any – and the uncertainty whether the financing of enlargement schedules will be secured.

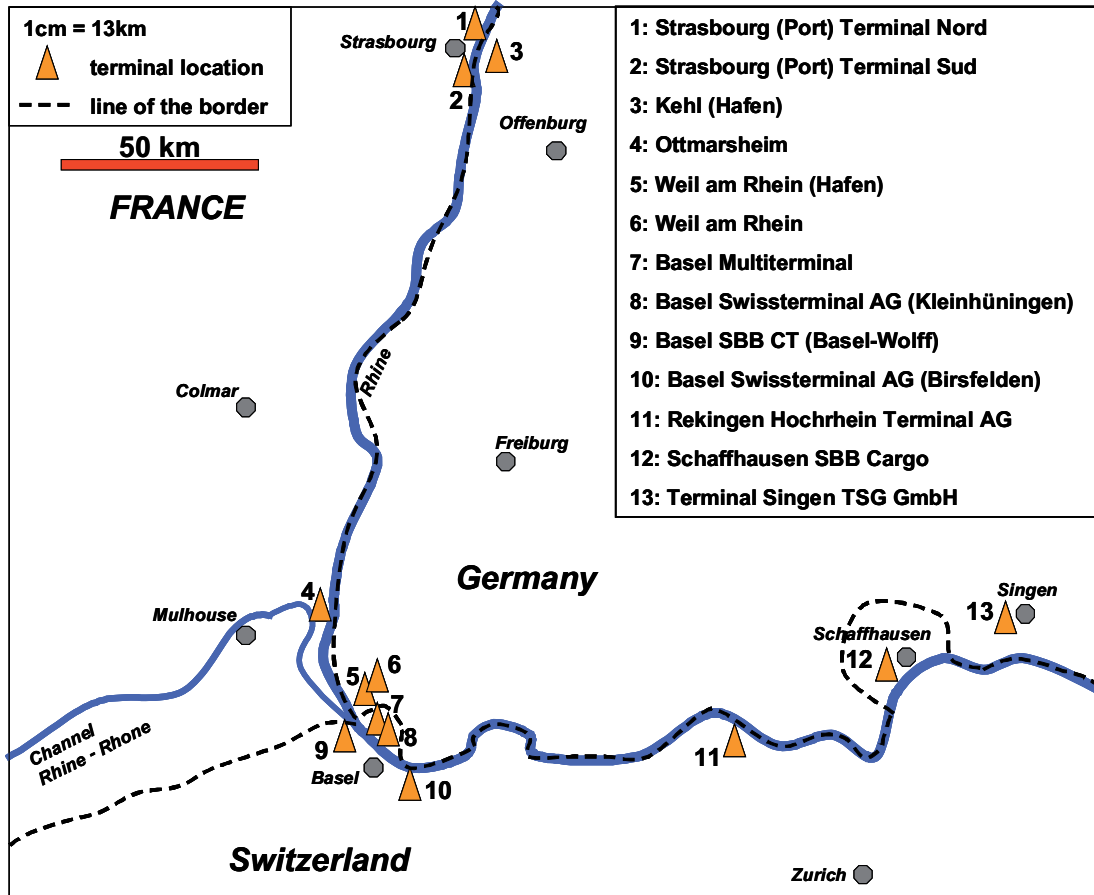
We have observed furthermore that, in some regions, the terminals of neighbouring countries do compete with each other since, owing to their vicinity. As a matter of fact, the catchment areas of intermodal services are due to be overlapping e.g. in the Wien-Bratislava area, terminals in the Greater Basel area or terminals in east Belgium and German terminals in the lower Rhein valley. Amongst others the Swiss and German national regulations that govern the funding of the construction of CT terminals require from investors that they take into account whether their terminal project is conflicting with existing terminal sites across borders. However, this consideration can not take account of future enlargement plans of the respective other country by definition. Furthermore, it seems to be difficult to enforce such provisions without further monitoring or implementing an appropriate cross-border co-ordination instrument.

As a typical case for a potential competition between CT terminals situated near borders we have analyzed the “Greater Basel area”. Ten terminal sites in France, Germany and Switzerland are located rather closely within a radius of approx. 75 km. It would be a total of 13 terminals if we also included the sites in Kehl and Strasbourg (cf. **Figure 2-1**).

While the port terminals partly co-ordinate their development by focusing on respective functions, co-ordination for road-rail terminals could not be identified when talking to the regional stakeholders. Even those terminal sites, which are located almost next to one another, e.g. in Basel, have been established rather independently. An improved regional cross-border co-ordination might have avoided the scattered capacity and non-synchronised enlargement. This opinion was shared with the market parties that were contacted during the case study and they expressed their general willingness to co-ordinate their activities in the future. However, a co-ordination mechanism and in particular an initiator for the cross border co-ordination is lacking.



Figure 2-1: Non-synchronised cross border co-ordination

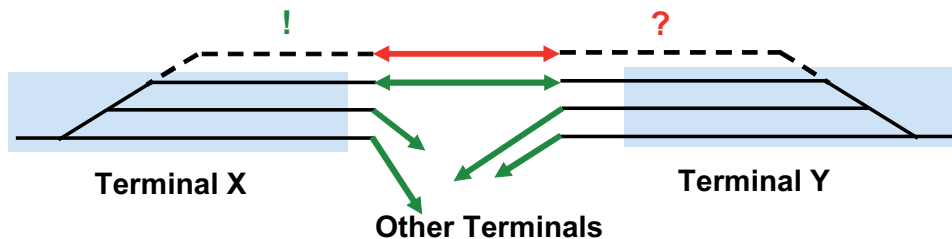


Source: K+P Transport Consultants

## 2.2 The cost of co-ordination deficits

Since the extension of terminal capacities is not synchronized on an international level, intermodal operators, over and over again, were inhibited to inaugurate a new cross-border CT train or increase the frequency of an existent service at the time when the market asks for it. Even if the terminal in one country had sufficient transshipment capacity the preferred corresponding terminal in the other country wasn't able to accommodate the new service (cf. **Figure 2-2**). At best, the service could be implemented with a delay of one to four years (cf. **Figure 4-1**). But in some cases the operator couldn't commence it at all since the market had already "vanished" when, finally, handling capacity was available.

**Figure 2-2: Non-synchronized international co-ordination**



Source: KombiConsult

The costs of such a lack of international co-ordination are reflected in the profit and loss statements of terminal operators, intermodal operators, rail infrastructure managers, wagon operators and railway undertakings but this deficit also has an impact on society as a whole. These impacts will exemplarily be presented for the case of a daily international CT block train service between the terminals X and Y that couldn't be inaugurated on time:

- When the operator of the X terminal couldn't supply his transshipment services to the CT operator owing to capacity constraints at the Y terminal operator X would not realize about 12,000 annual handlings, considering a typical start-up of six to ten departures per week and a train capacity use of about 60%. The terminal will therefore lose a contribution to its fixed costs of about € 210,000 per year of delay.
- The infrastructure managers who couldn't sell the train paths for the CT service wouldn't generate annual revenues of € 780,000, calculated on six to ten trains per week, 45 operational weeks and 800 km distance depending on the route affected.
- A railway undertaking who otherwise used her wagon or locomotives would not earn approx. € 360,000 per year as a contribution to their fixed costs (example of 50 CT wagon rented for a whole year) if she would not be able to use them elsewhere.
- In addition, social costs arising from the volumes being carried by road instead of rail can be calculated using an average distance of 800 km and 10 tons per TEU as well as the difference of the social costs of road and rail according to the "Marco Polo calculator" provided by the European Commission to about € 2.07 to 3.36 m per year.

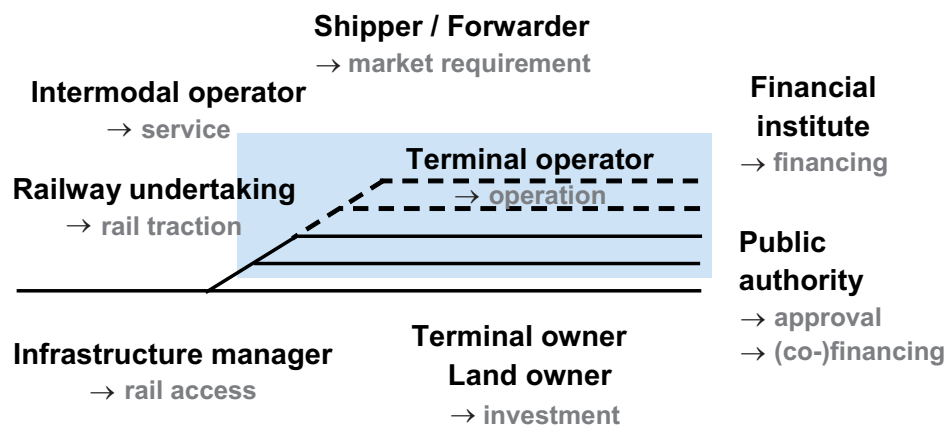
Taken altogether the opportunity costs incurred by CT stakeholders and society for every service not launched on time owing to a non-co-ordinated terminal development would amount to approx. € 3.4 to 4.7 m annually.

### 3 Potential solutions for the international co-ordination of CT terminal development

#### 3.1 Approach

Based on our survey we were able to clearly validate that the evolution of terminal handling capacities isn't co-ordinated on an international level. In order to conceive appropriate measures for reducing or eliminating capacity constraints which hamper combined transport in Europe it is required to identify the driving forces behind terminal investments and analyze their behaviours. *Figure 3-1* presents the stakeholders and their main roles in the evolution of CT terminals. However, every stakeholder may also adopt various functions, which may even raise conflicts of interest inside the company.

**Figure 3-1: Stakeholders and their roles in CT terminal development**



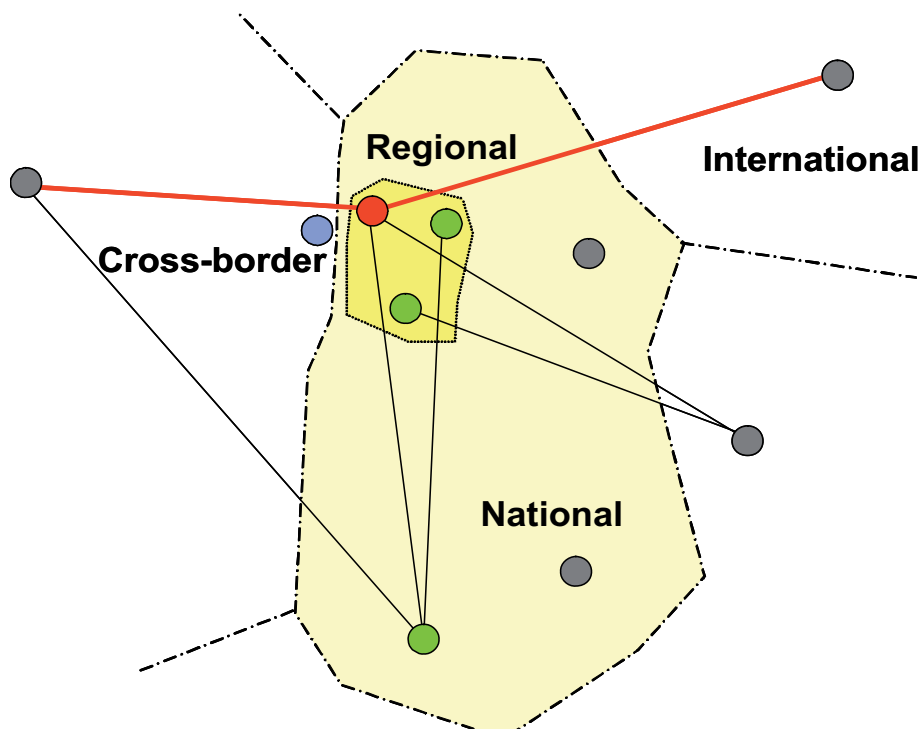
Source: KombiConsult

Empirically, most of the groups of stakeholders are involved when a CT terminal is to be built or enlarged though – depending on the project – to a varying extent and distinctive way of involvement. With respect to the objective of the present study it was relevant to identify particularly those actors who recognize a constraint; initiate and implement the measure.

As concerns existing sites the terminal owner and the operator as well as intermodal operator supplying services are likely to be the first recognising a capacity constraint. Each of them may initiate an extension though it's up to the terminal owner to plan and enforce the investment. In contrast to that the observation of a need for a new CT terminal site could be made by any stakeholder such as shipper, forwarder, CT operator, railway undertaking or public authority based on market survey. Too, each of them could take the initiative for implementing the construction of the terminal.

Apart from the identification of the driving forces it was relevant to determine at which level a potential co-ordination on terminal development could be achieved. **Figure 3-2** shows the levels of co-ordination at regional, national, and international level as well as the specific case of a cross-border co-ordination that is required when two or more terminals are located in separate countries but very closely.

**Figure 3-2: Levels of co-ordination**



Source: KombiConsult

In view of the deficits in co-ordinating the international evolution of CT terminal handling capacities and the cost of non-co-ordination we have conceived the following potential solutions:

- [A] Status quo: “business as usual”
- [B] Co-ordination process driven by terminal owners and operators
- [C] Co-ordination process driven by CT operators or railway undertakings
- [D] Co-ordination process driven by a European co-ordinator
- [E] Co-ordination process via terminal committees

Each approach has been characterised and evaluated in terms of strengths and weaknesses in the following paragraphs.

### **3.2 Status quo: “business as usual”**

Currently, a regular mechanism for the international co-ordination of building up terminal handling capacities, which ensure the extension of CT services, hasn’t been established. Co-ordination only occurs “incidentally”, which generates hardly any impact on the medium and long-term supply of CT terminal capacity.

On the one hand, this situation allows different approaches to work in parallel in different countries. It is market-oriented to the extent that market parties’ or user needs are involved in the process by operator or railway initiating the development.

On the other hand, the results of this solution [A] (cf. chapter 2) are not sufficient. The lack of international co-operation and co-ordination often leads to temporary and recurrent capacity constraints, which result in a significant loss of revenues with various stakeholders (see above). In addition, small- and medium-sized operators have only limited resources and market power to influence the enlargement of corresponding sites, while larger network operators provide for better opportunities to enforce their interests in respective terminal areas.

### 3.3 Co-ordination process driven by terminal owners and operators

Since terminal owners and operators are usually the first to recognize capacity constraint in their terminal, they appear to be the “natural-born” leaders for co-ordinating terminal development planning on behalf of this group of stakeholders. They are also used to operate market-oriented and are familiar with relevant approval procedures in respective countries/areas. Moreover, the terminal owners are responsible for initiating and enforcing enlargement investments.

The co-ordination process driven by terminal owners/operators would mainly be bi- or trilateral negotiations between terminals involved in the same CT services, eventually along a transport corridor. As an output of this process according to solution [B] the terminal owners could agree on detailed mutual enlargement plans for their terminals. A proposal on how such an agreement between those partners could be conceived is given in **Figure 3-3**.

**Figure 3-3: Proposal for a model agreement between terminal owners**

The CT terminals of A and B are linked by intermodal services. The terminal of A has an annual handling capacity of \_\_ loading units (LU), the terminal of B of \_\_ LU. In order to meet the increased demand for intermodal services the owners of terminals A and B envisage to increase the transshipment capacity to \_\_ LU for terminal A and \_\_ LU for terminal B.

The parties hereby agree to undertake the necessary steps to achieve the capacity enlargement by the year 20\_\_ /year 20\_\_ provided that the necessary approvals will be obtained on time.

Done at ... on ...

Signatures

Annexes: Plan of the sites, implementation plans

Source: *KombiConsult*

The drawbacks of this solution are as follows:

- The success of this procedure completely depends on the initiative, capabilities and availability of terminal owners and operators.
- The owners and operators particularly of high-volume terminals, which serve numerous intermodal trains, would have to communicate with quite a large number of corresponding terminals. It is rather unlikely that the relevant managers would be available for such a task without neglecting their proper assignment.

- The owners and operators would also be required to be informed of the extension plans of intermodal operators who might not be willing to disclose their strategic expectations regularly and sufficiently in advance.

Despite of indisputable benefits of this solution particularly as concerns the pragmatic approach and the proximity of the relevant stakeholders to CT markets and the problems to be addressed, the disadvantages seem to prevail. The solution in particular will not be able to achieve a European dimension in the sense of a comprehensive international co-ordination of terminal investments though it may be suitable for alleviating the situation within a limited geographic scope.

### **3.4 Co-ordination process driven by CT operators or railway undertakings**

The solution [C] assigns the leading role to combined transport operators and railway undertakings. Both groups of stakeholders are interacting extensively in their supplier-customer-relationship. Thus they usually will share the best knowledge about the current and future transport market and the opportunities for additional or improved intermodal services. Against this background both of them should observe capacity constraints at intermodal terminals at a comparatively early stage if a planned service can't be realized at all or with the required schedule.

Based on their knowledge combined transport operators and/or railway undertakings would organize the co-ordination process by:

- collecting solid information on the expected development of intermodal services and the demand for transshipment capacity for each terminal site involved;
- addressing existing or anticipated capacity bottlenecks;
- stimulating and promoting terminal development investments.

Like for solution [B] the outcome of the co-ordination process could be an agreement on the development of CT terminals though, as a matter of fact, the stakeholders of this solution are dependent on terminal owners and financial schemes to enforce investments.

Even though operators and railways have a competitive edge in market intelligence they are not necessarily informed of every saturated terminal in Europe. Most typically, they will be aware of capacity constraints of terminals they're serving already, but not of those

they don't yet. This is also why, presumably, these stakeholders will rather aim at corridor-oriented improvement plans that involve those transport areas, which find their strategic interest. Like for the concept [B] only the aggregation of individual plans would lead to a European coverage.

What especially militates against this approach to an international co-ordination process is the increasing horizontal competition in the operators and railway business. They will hardly be prepared to disclose their "real" expansion plans and share this knowledge with their competitors so early that terminal enlargement will become operational (cf. **Figure 4-1**). Only this would allow for recognizing whether various operators or railways plan for the same routes and deriving precisely the transshipment capacity need per terminal site. Even if this problem could be resolved the efforts required for the co-ordination process would probably only be matched by large-sized companies. Again, small- and medium-sized companies might not be able to provide for the necessary resources.

### **3.5 Co-ordination process via a European co-ordinator**

Similar to the co-ordination of investments on TEN-T or ERTMS corridors a European Co-ordinator<sup>1</sup> managing the international co-ordination of CT terminal development plans, could be nominated. The establishment of a European Co-ordinator would require for acknowledging CT terminals as a European task.

The technical work of a European Co-ordinator could advance from assessing existing studies such as the DIOMIS reports. He/She would have to be an objective mediator and evaluator of stakeholders' interests. He/She would need to consult at least representatives of all European countries who are dealing with the planning, authorisation and financing of CT terminals, and, where appropriate, involve also CT market parties. In contrast to the previous concepts this solution [D] is directly addressing the European dimension. The European Co-ordinator would be committed to observing the – eventually conflicting – capacity requirements of the entire network and not only corridor-related needs. The outcome is to be a European development plan on intermodal terminals.

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1 Six Co-ordinators for the Trans-European transport networks (TEN-T) and the European Rail Transport Management System (ERTMS) have been appointed by European Commission decision EC (2005) 2754 and amended by decision EC (2007) 3190.



What, however, is a severe restriction to this procedure is the complexity of the opinion- and decision-making process owing to the heterogeneity of stakeholders concerned (state, region, municipality, market parties) and the geographic coverage. This could invalidate the outcome if the co-ordination process results in inconsistency across countries or a wish list of enlargement projects.

### **3.6 Co-ordination process via terminal committees**

The solution [E] assigns the key role to the national ministries for transport for seeking to achieve a co-ordinated international development of terminal capacities in bi- or multilateral consultations (cf. *Figure 3-4*):

- In a first step, on a domestic level, terminal committees would analyze the state-of-affairs concerning terminal capacity employment and investment plans, and assess the expected terminal capacity needs both in the own and foreign countries. Chaired by the ministry for transport the committees should comprise representatives of the main CT stakeholders, i.e. infrastructure manager, railway undertakings, intermodal operators, terminal owners and operators. Committees should convene at regular intervals at least once per year to evaluate the progress of work and identify capacity needs.
- In a second step the national ministries would exchange both their domestic terminal development plans and the requests on terminal capacity in the corresponding countries. The capacity needs and investment programmes should be co-ordinated during joint meetings on a bi- or multilateral level or corridor-related. The results would be fed back into the national terminal committee and the respective development plans.

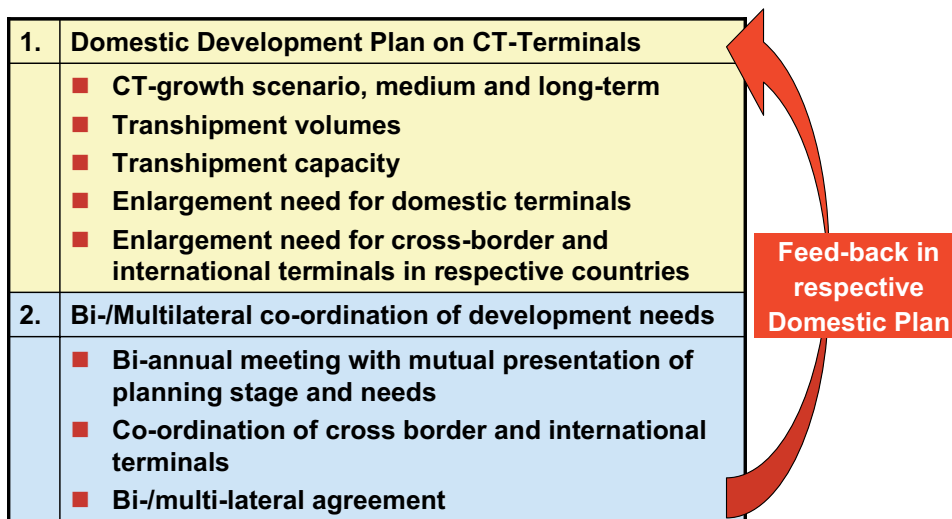
Compared to other concepts this solution promises to generate valid results. Due to the two-tier procedure it also helps to minimize both the complexity of the co-ordination and communication process and the transaction costs. For it could be embedded in existing co-ordination and planning routines on a domestic level and as concerns international consultations of transport authorities with comparatively small additional efforts.

What, however, is required to ensure valid information on capacity needs is an openness of CT stakeholders in national committee meetings. Here they must clearly disclose their intentions or expectations towards the development of CT services. Proper results, however, may be generated by the self-interest particularly of CT operators who may wish

to signalize their requests towards terminal investors to enable them supplying sufficient capacity on time.

Finally, the co-ordinating authorities will have to observe whether participants pursue certain “political” interests and try to influence the priority of terminal investments in this respect.

**Figure 3-4: Two-tier international co-ordination process**



Source: KombiConsult

### 3.7 Evaluation of solutions

First of all, we have evaluated the five solutions being investigated according to their geographic focus or potential coverage (**Figure 3-5**). Only the European Co-ordinator is directly addressing a European wide coverage, while all other approaches are developing from bi- or multilateral consultations and the capacity supply at European level is “only” the result of these different negotiations.

Figure 3-5: Survey of geographic coverage of different approaches

Initiator/ Driver		Geographic Coverage		
		Bilateral	Corridor	Europe
[A]	Business as usual	●	●	X
[B]	CT Terminal	●	●	○
[C]	CT Operator	●	●	○
[D]	European Co-ordinator	X	●	●
[E]	National Ministries	●	●	○

Source: KombiConsult analysis

The evaluation of the five approaches for an international co-ordination of terminal development took into account the following criteria:

- Market knowledge about
  - Current and future handling capacity of a transport area
  - Current and future handling volume of an area
- Responsibility for
  - Planning CT terminals and related infrastructure
  - Authorisation of CT terminals
  - Financing of CT terminals
  - Operation of CT terminals
- Level of commitment of involved parties
- Transaction cost for co-ordination and consensus building

The result of our evaluation is presented in **Figure 3-6**.

**Figure 3-6: Evaluation scheme of solutions for international co-ordination of CT terminal development**

Initiator/ Driver	Market Knowledge		Responsibility				Level of Commit- ment	Trans- action Cost
	Capa- city	Volume	Planning	Authori- sation	Finan- cing	Opera- tion		
Business as usual	Too different to be evaluated							
CT Terminal	●	●	●	●	●	●	●	●
CT Operator	●	●	●	●	●	●	●	●
European Co-ordinator	○	○	○	○	●	○	●	●
National Ministries	●	●	●	●	●	○	●	●

● High/large      ● Medium      ○ low/small

Source: KombiConsult analysis

We have found clear evidence that the current procedures that are characterized by a more or less “incidental” international co-ordination process concerning the development of CT terminals, don’t generate satisfactory results. It is therefore recommended to implement a **dedicated co-ordination mechanism** replacing the existing “laissez-faire”.

**Figure 3-6** shows that each of the other four solutions analyzed has its characteristics, strengths and weaknesses. The smallest increase of improvement is likely to be produced by the nomination of a European Co-ordinator because this position would have limited own knowledge about the market needs and no formal responsibility for enforcing CT terminals as concerns planning approval and financing. Too, the transaction costs are expected to be comparatively high due to the involvement of many stakeholders at central level.

According to our evaluation a co-ordination process managed by one of the market parties, i.e. terminal owners and operators, intermodal operators or railway undertakings, could yield improved results in terms of the relationship between benefits and efforts. This is due to the market knowledge, the self-interest and particularly the opportunity of these groups of stakeholders to influence the enforcement of investment measures or the supply of intermodal services. Weak points of these concepts are the limited resources to organize

a corridor or even European co-ordination process, as concerns terminal owners and operators, and, with regard to CT operators and railways, the requirements to eventually disclose market knowledge and sensitive strategic interests at a very early stage.

In this respect the solution [E] managing the co-ordination process via terminal committees would not completely avoid this conflict. If, however, the domestic terminal committees were organized smartly by the national ministries of transport they could collect relevant market information and capacity expectations without revealing detailed competitors' market intelligence. At the second committee level only aggregated data would be handled at any rate. Thus the two-tier process of domestic and international terminal committees is expected to generate optimum results as a dedicated tool to co-ordinate the development of CT terminals internationally (cf. **Figure 3-4**).

## **4 Conclusions and recommendations for the international co-ordination of CT terminal development**

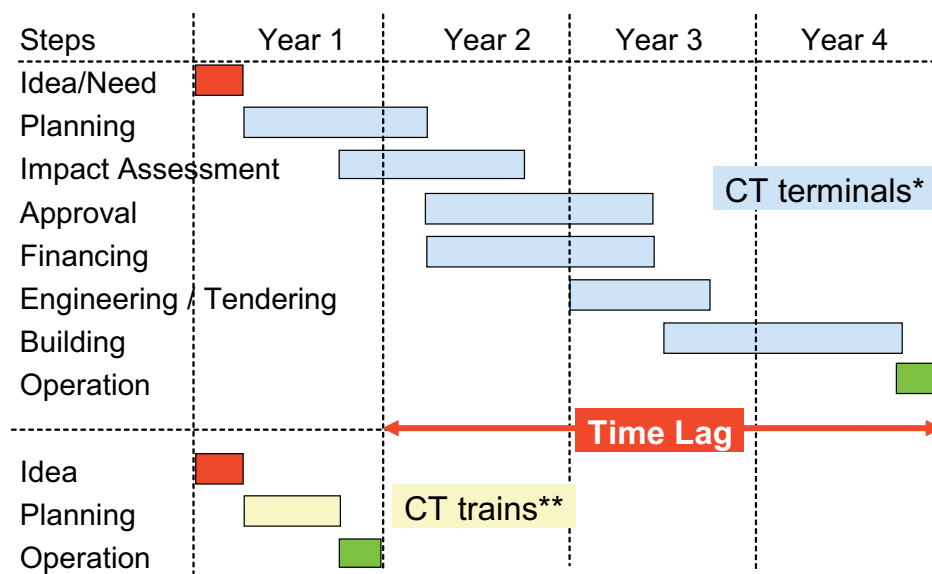
More and more intermodal terminals in Europe, which often have a key function for domestic and international networks of intermodal services, are confronted with handling capacity constraints. For the DIOMIS report "*Best practices for the management of CT terminals*" we have collected and evaluated numerous "soft" measures that enable a considerable increase of the transshipment capacity at congested terminals without requiring for major infrastructure investments. However, these measures can only contribute to enhancing the efficiency of the existing infrastructure utilisation and deferring the gridlock. At the end of the day it will be required to invest in physical infrastructure in all European economic centres. This has been highlighted by our DIOMIS report "*Trends in domestic combined transport*". If bottlenecks can't be removed timely they could hamper or even jeopardize the otherwise possible growth of combined transport volumes over the years to follow. In this respect saturated CT terminal capacities would have a similar impact as the capacity constraints on major sections of the European rail network.

In the present report we have demonstrated that a lack of international co-ordination of terminal development plans also produces temporary or even longer term capacity constraints, which increasingly impede the extension of CT services and volumes. In addition these shortcomings negatively impact on revenues of CT stakeholders and cause external costs for society.

With an aim to investigate if a dedicated international co-ordination tool could contribute to achieve the timely provision of sufficient terminal handling capacity we have designed four co-ordination concepts and evaluated their effectiveness against the status quo, which could be characterized as a "laissez-faire" attitude. Each of the four solutions has its characteristics, strengths and weaknesses. The establishment of a two-tier process of domestic and international terminal committees, however, seems to produce the most promising results since it would be able to achieve an optimum co-ordination of the distinctive interests, behaviours and internal processes of the various CT stakeholders. In fact the timely implementation of terminals needs the commitment of a series of private

and public partners. The different planning horizons e.g. of CT operators and CT terminal owners (cf. **Figure 4-1**) are requiring to look beyond the daily capacity needs and provide a future-oriented framework for investments into CT terminal capacities in Europe.

**Figure 4-1: Comparison of planning processes for CT services and terminals**



\* if sub-processes are not delayed \*\* up to 15 months for regular trains

Source: KombiConsult analysis

The two-tier process led by national ministries for transport (or infrastructure, depending on their responsibility) and involving the CT stakeholders at national level would be a proper mechanism to balance the short term planning horizon of the CT-operators and railways to set up a new service, and the medium to long term supply of terminal capacity.





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