Developing a Decision-Making Framework for Collaborative Practices in Long-Short Distance Transport Interconnection

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Abstract

During the last decade the European Union has developed a common transport policy framework as an overall strategy integrating sustainable development, including economy, land-use planning, social education and urban transport, as well as budgetary and fiscal, competition and research policy. Nevertheless a serious obstacle in achieving this strategy, is the lack of an integrated Decision-Making (D-M) framework for long and short distance transport interconnections, that takes into account the involved parties. The present paper attempts to overcome this barrier through proposing a rational and innovative D-M framework. In order to achieve so, the paper analyses the D-M framework that covers the interconnection of long and short distance transport networks, through the identification of the involved stakeholders, the review of relevant existing national regulatory framework and European legislation, the analysis of the planning and financial framework across Europe on the issue, the research and assessment of collaborative practices that enhance the coherence of the D-M processes in the domain of efficient interfaces of long and short distance transport networks and the introduction of D-M guidelines. The data collection relies on the creation of a pan-European stakeholder database, comprising of all interested parties, and an analysis is followed to demonstrated problems and gaps, as well as opportunities for better fertilization among actors, so that to enhance long and short distance interconnection.

Keywords: Decision making; long-short distance transport; interconnection; legislation; stakeholders; planning; financing.

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1. Introduction

Transport is a basic pillar of the European Union (EU) Policy. It forms an essential concept for the full operation of the EU single market and is vital to fulfilling two of the four liberties set down in the Treaty of Rome (http://europa.eu/abc/treaties/index_en.htm), i.e. the free movement of people and the provision of services across the Community. This means that transport providers (whether they are involved in the transport of passengers or goods) should be allowed equal access to all national markets within the EU. Despite treaty obligations and the profound importance the free movements and operations, progress in integrating transport across the EU was very slow until the late 1980s, as result of the unwillingness of member states to give up national control of transport. However, during the last decades integrated transport has become one of the most prominent areas, in which the EU has played a role through the formation of concrete policies in the field (i.e. single European sky, European railway area), the creation of mechanisms for funding transport facilities (i.e. funding through EU’s Framework Programmes from 1980 and after) and the establishment of priorities for the various transport networks.

The Common Transport Policy (CTP) was first proposed in 1957 within the framework of the Treaty of Rome (http://europa.eu/abc/treaties/index_en.htm). However, the progress was very slow till 1986, when transport was included in the Single European Act (http://europa.eu/legislation_summaries/institutional_affairs/treaties_singleact_en.htm) that formed the basis of plans to complete the single market. As a result of this, a process of rapid change began and during the 1990s it became much easier for foreign transport providers to work across member states’ borders. The EU also set out guidance for common standards on pollution, safety, transport pricing and environmental sustainability. A particular focus was set on improving the quality of railway links and eliminating bottlenecks, with substantial funding into Trans-European Networks (TENs) of rail, road and waterways.

In 2001, the EU published a White Paper (COM (2001) 370 final) on the future of the CTP that stressed safety and environment, creating a balance between different modes of transport and making the shift between rail and road for freight movements. With the 2004 enlargement of the EU, improving transport infrastructure in the new member states and linking them up to Western Europe became a priority, although there was criticism when pan-European projects fell behind schedule. Ten years later, in 2011, the EU Commission announced a new White Paper (COM (2011) 144 final), which detailed plans across twenty-five policy areas, stressing aspects, such as: moving away from a reliance on fossil areas, strengthening rail, ensuring that a percentage of at least 40% of aviation fuel comes from low carbon sources by 2050 and creating a single market in transport.

Despite the fact that serious action has been taken, there is still a missing link between policies, practices and final outcome. This missing link can be defined as the lack of a sufficient and concrete Decision-Making (D-M) framework. The present paper attempts to overcome this barrier through proposing a rational and innovative D-M framework, focusing on the interconnection of long and short distance transport networks, both for passengers and goods movements.

2. Basic concepts

The definition of D-M processes in transport seems to be a complex procedure that follows general principles, such as the national legal framework and the compliance to European and international directives, but also depends on the legal status (public, non-profit, private, etc.) of the bodies that are directly or indirectly involved in the transportation chain, and make decisions concerning the transportation of passengers and goods. D-M can be considered as the process that the responsible parties follow, in order to choose the “best” option when planning, financing, scheduling and implementing a transportation project. In most cases, this “best” option or solution is usually the outcome of a technical
and economical analysis, integrated, during the last years, by issues, such as the environmental protection and the energy conservation.

The scope of the present research is the investigation and identification of the key drivers that compose a coherent D-M framework for the efficient interconnection of the long and short-distance interfaces. For the needs of the present paper, “interconnection” refers to the “physical flow”, i.e. the chain of different modes (for example, rail-air) for the transfer of passengers or the movement of goods between long and short distance networks, while “interface” is considered as the “information flow”, including issues, such as ticketing, booking, provision of information, etc. For the definition of long and short distance transport networks, four different spatial scales are identified: urban, regional, national and European/international level and it is considered that interconnections among long and short-distance networks are developed under multiple legs, which do not belong to the same spatial scale (Andersen et al., 2010).

Based on the above concepts, a D-M framework for collaborative practices in long and short-distance transport interconnection is proposed. Moreover, the main findings of the conducted research in six representative European countries are presented and relative recommendations are provided.

3. Methodological approach

As it has already been mentioned in the previous paragraphs, decision-making in transport, is a rather complex process, in which the involved parties make decisions, taking into account legal, economical, environmental, social, etc. aspects. Though, since the outcome of a D-M procedure is the identification of the “best” alternative, based on an economical and technical analysis and evaluation, the role of the relevant parties that have interests and consequently participate in the procedure, is considered as catalytic, and in most cases, define the final decisions.

The methodology developed in the present paper, is based on the following distinct steps:

- Identification of the involved stakeholders, stakeholder categories, corresponding interests and goals, competences, role in the decision making process and interaction among them and with other parties
- Review of the existing national regulatory framework and European legislation as regards the planning and provision of transport infrastructure and services, and assessment of the degree of the flexibility of European legal instruments among EU countries
- Review and analysis of the planning and financial schemes developed in Europe and refer to the interconnection of long and short-distance transport networks
- Research and assessment of the collaborative practices that enhance the coherence of the D-M processes in the domain of efficient interfaces of long and short distance transport networks.

More specifically, following the above methodology, representative European countries, i.e. Spain, France, Norway, Finland, Czech Republic and Greece, were used for the analysis, in order to investigate the national conditions that are developed in the relevant D-M processes, and to identify and evaluate potential commonalities and differences among them. The first part of the conducted work included the identification of the main parties or institutions that are involved in the D-M in transport and especially in the interconnection of long and short-distance transport, in terms of planning, design, operation and financing. The identified stakeholders were categorized in six categories, namely: transport policy decision makers (local, regional, national and EU level), terminal operators, long distance transport operators, short distance transport operators, infrastructure providers and demand side stakeholders/customers. Also, the role of the stakeholders in the D-M process was defined (i.e. infrastructure ownership, infrastructure management/maintenance, operations and services, and regulations), as well as their interests and objectives (environmental, social and/or economical) and the interaction of each stakeholder with other parties, in terms, for example, of coordination, contracts,
agreements, etc. Moreover, in each of the representative countries, the D-M processes were investigated under four levels, namely, planning and policy, infrastructure, operations and demand side.

As far as legislation is concerned, the European transport institutional framework was identified, as well as the European legislation regarding the planning and the provision of transport infrastructure and service and the national legislation of the representative countries, were reviewed. Four main pillars were used for the review of the EU legislation, i.e. legislation covering transportation modes (road, rail, waterborne and air), the transport system environment (energy, environment, mobility and passenger rights, and intelligent transportation systems), intermodality and financing.

Regarding the assessment of the commonalities and differences in planning and financing processes among the European countries, a template was developed, including key points that address relative procedures in each country, i.e.: the type of transportation plans developed (national, regional, local), the documentation of the transportation plans (objectives, responsibilities, involved actors), the public participation (if any) in the planning process, the regulatory framework, the consideration of the environment protection, the planning horizon, the monitoring and assessment, as well as the relative financing schemes, divided into two stages, procurement/development and management/operation.

The last step of the methodology concerns the research on collaborative practices that may form a coherent D-M framework in the domain of efficient interfaces of long and short distance transport networks. The research included the retrieval of good practices at specific passenger and freight terminals in European countries and representative examples are given in the paragraphs that follow.

### 4. Developing a coherent D-M framework

The D-M processes on long and short distance transport networks, involve a wide range of public and private bodies. The strategic frame for the long-short distance transport interfaces is illustrated by planning and policy stakeholders, further specified as an integrated plan, referring separately or in accordance to the development of the required infrastructure, and the system operation. The demand side works as a catalytic key driver that affects the D-M at any level, i.e. strategic, tactical or operational.

From all the countries used as case studies for the identification of a robust D-M pattern, it is possible to identify five main categories of actors: European Union, national governments, regional and local governments, private firms (i.e. operators) and users (i.e. travelers, consumers). The role of each one is described in table 1, with discrete topics of interest and more specifically on policy, environment, social concerns and financial aspects.

<table>
<thead>
<tr>
<th>Level</th>
<th>Stakeholder</th>
<th>Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
<td>Various EU parties</td>
<td>Formation of the policies in the respective fields (i.e. transport, regional development, environment)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Financing tools and allocation of resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Legislative and regulatory framework concerning equity issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Initiatives for environment protection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Actions in order to enforce the environmental policies</td>
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</tbody>
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Table 1: Actors and areas of involvement
<table>
<thead>
<tr>
<th>National governments</th>
<th>Ministries of Transport, Economy, Environment, Energy</th>
<th>Formation of the national policy and strategy according to EU guidelines Regulations</th>
<th>Financing of the development of interfaces (infrastructure, construction, services, etc.) Initiatives for investments in the domain</th>
<th>Provision of equal transportation services to all citizens Promotion of information society</th>
<th>Improvement of transport energy efficiency Promotion of green transport Administration of energy and climate change programmes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional/local</td>
<td>Regions/ municipalities</td>
<td>Further specification of EU guidelines and national strategy</td>
<td>Financing of the development of interfaces Benefits from the provision of passengers and freight services Administration of resources for regional development</td>
<td>Provision of sustainable urban transport to all citizens Improvement of infrastructure or extension of network for the widest coverage of passengers’ needs</td>
<td>Protection of the environment within their administrative areas (i.e. construction) Consideration of environmental protection and energy saving in regional transportation planning</td>
</tr>
<tr>
<td>Firms / Users</td>
<td>Terminal and transport operators /demand side</td>
<td>Pressure for integrated and high quality infrastructure/services</td>
<td>Funding of technologies and equipment Land investments for the development of interfaces Stability in pricing policy Criticism of rationality of investments</td>
<td>Equal transportation conditions to all users Enhancement of safety and security for passengers and goods Improvement of work conditions</td>
<td>Compliance with national and European environmental issues Demand for environmentally friendly transport projects Avoidance of land and nature encroachment</td>
</tr>
</tbody>
</table>

More specifically, at a national level, the involvement of transport ministries in the D-M processes is significant and regards the surveillance of the compliance of legislation, as well as the planning and financing of the development of the interconnections between short and long distance transport networks. In order to achieve better administration of relative issues, a common strategy foresees the distribution of responsibilities among several sectors or directorates of the above ministries. Other ministries, i.e. ministries of economy and environment are also involved in the D-M, covering issues such as the financing of transport projects and the protection of the environment, respectively. At a local and regional level, it was observed that the administrative regions and municipalities have a catalytic role in the D-M processes, regarding the integration of interconnections at a local or regional basis. The governmental involvement at this stage is related to the administration or financing via regional resources of local passenger or freight terminals, public transportation services, etc.

Investigating the D-M processes at a terminal level, it was identified that the ownership status of the terminal (i.e. state-owned or private) defines the role of the involved bodies and the relative D-M procedure. The generic framework foresees the constitution of a Board of Directors, which makes decisions, under the supervision of the state, in public terminals, or under internal regulations, in case the
terminal is private. In both cases of ownership, the existing national and European legal frame and the 
compliance of the rules of competitiveness are taken into account. In addition, non-governmental 
stakeholders are also involved in the D-M process. Indicative examples include the participation of 
institutes or researchers regarding the technical support of the decisions, the review of new legislation by 
chambers or public organizations and the involvement of professional drivers’ associations, users and 
disabled people associations, ensuring or improving passenger and professional rights.

Regarding the European transport policy, a development has been noticed, showing an increasing 
involvement of the European services in the area of transport policy and forming a rather comprehensive 
approach taking into consideration issues such as competition and economic growth under the terms of 
sustainability. Especially referring to the interconnection of long and short-distance transport networks, 
focused EU legislation on this issue has not been set till now, although, a number of laws, 
communications or directives include or refer to matters that affect or even define the framework under 
which the interfaces between long and short-distance networks are developed. For example, in the 
Transport White Paper “European transport policy for 2010: time to decide” (COM (2001) 370 final), the 
integrated organization of the interface of long distance and last mile freight transport was proposed, 
while the Directive 91/440/EC (Directive 91/440/EC), set the rights for railway undertakings for the 
operation of international combined transport. In addition, the Commission Green Paper “Towards a new 
culture for urban mobility” referred to the encouragement of co-modality, the integration of follow-on 
connection with public transport, the integration of existing infrastructures and the improvement of the 
integration of freight distribution in urban areas through local policy-making and institutional settings 
(COM (2007) 551 final). Regarding passengers’ intermodality, the EU’s study “Towards passenger 
intermodality in the European Union”, developed a frame for the enforcement of passenger intermodality 
in Europe for long distance and cross-border transport (EC, 2004).

The review of the national framework and legislation of the representative European countries showed 
common characteristics in the interrelationship among EU legislation, national legislation and the D-M 
processes. More specifically, it was observed that D-M processes are developed under the generic scope 
of the relative national legislation, compliant to European and international directives, and it is foreseen 
that the implementation of EU regulations is obligatory for all member-countries, without required 
integration in national legislation, whereas the implementation of Directives, although is obligatory for 
countries, first, needs to be integrated in national legislation, while the adoption of the rest legislative acts 
(opinions, actions, positions, etc.) is not obligatory for national legal frameworks.

The results of the analysis of the research on the planning processes followed in the representative 
European countries, showed that the strategic scheme of these processes in the long and short-distance 
transport networks, is usually a “National Transportation Plan – NTP”, in the frame of which, among 
other issues, the objectives and the time horizon of relative investments are considered. The main 
responsible party for the preparation and administration of the NTP is the ministry of transport, while 
before its finalization an “open” procedure is usually followed aiming at the notification of the content of 
the NTP to the public. The issue of co-modality is also considered in the NTPs, focusing, for example, on 
the Trans-European Networks Transport (TEN-T), and the needed development of infrastructures of 
countries to “connect” to these networks. From the scope of regional and local/urban level, common 
processes were also observed among the countries, which foresee the preparation of Regional Transport 
Plans (RTPs) and Urban Mobility Plans (UMPs), covering regional and local transportation needs, 
respectively.

Investigating the financial processes, it was identified that the majority of transportation projects are 
co-financed by the EU, as well as by national resources and private funding (i.e. in case of 
expropriations). The allocation of the co-funding of the projects is defined in the relevant plans (NTPs, 
RTPs or UMPs), and the financial management in each country is under the responsibility of the ministry
of economy in each country, which supervises the whole process and sets the priorities, in terms of timing and amount, in funding several transportation projects.

Regarding the planning schemes identified at specific terminals in the representative countries of analysis, the research showed that these schemes vary from country to country, and from mode to mode. The general frame foresees that the status ownership (i.e. private, state-owned, public-private) defines the parameters both for the planning and financial processes, while their content is dependent of the national and European legislation, the location (i.e. topography and technical appropriateness, etc.) and the accessibility of the terminal (i.e. distance from ports, airports, nearest highways, etc.). Due to the differences of the legal framework and planning and financial processes of the various countries, and the diversity of the long-short interconnection terminals, which affect the D-M process, indicative concepts were investigated and their characteristics are briefly presented below.

The involvement of multiple stakeholders, modes of transportation and logistics operations in the interconnection of long and short-distance transport, form a very complicated environment, in which jurisdiction and cooperation issues are identified as very important. For example, in Great Britain, both interurban coach and urban bus services were deregulated, and allowed competition with the exception of London, aiming at the reduction of public investments, the provision of innovation, and the increase of the travel alternatives and the public transport use (http://www.uitp.org/). In Norway, regarding the impact on passengers, in order to cope with the involvement of multiple stakeholders, operators developed co-operations for the provision of new and faster services, crossing the boundaries for their traditional areas (Leiren & Fearley, 2008). In some cases, countries have adapted the local services to the existence of express services and chose to buy specific additions to the express services to fulfill local needs (Van de Velde, 2009).

From the scope of freight terminals, an important directive was Directive 91/440/EEC (Directive 91/440/EEC), which granted the right of access to railway infrastructure for undertakings that aim at providing international combined services. This option requires the organizational independency of the infrastructure management from the transportation operations, meaning that basic functions, i.e. rail capacity allocation, infrastructure charging and licensing have to be separated from transportation operations to enable new rail operators fair access to the rail market. An indicative example is the HøjeTaastrup rail freight terminal in Denmark, in which the Danish State railways own the terminal, while DB Schenker, the dominant rail freight carrier, operates the terminal on a time-restricted contract. Soon, however, the ownership will be transferred to Bane Danmark, the rail infrastructure manager. This reorganization will facilitate fair and equal access to the terminal for all rail freight operators in Denmark. Finally, in Italy, the company “Interporto Bologna S.p.A.” was established in order to build Bologna Freight Village. The company was originally formed by the public authorities in Bologna (namely the Municipality, the Province and the Chamber of Commerce) and was progressively joined by other organizations and institutions having direct and indirect interests in the development of the transport centre, including the Italian Railways. This company is the first example in Italy of an extensive and complex partnership between public and private capital.

Based on the above results of the research conducted in the representative European countries (Spain, France, Norway, Finland, Czech Republic and Greece), in terms of identifying the involved in the D-M processes stakeholders, reviewing the national and European legislation and investigating the planning and financial procedures followed in the specific countries, as well as taking into account the outcome of the research on collaborative practices in the domain of efficient interfaces of long and short distance transport networks, it can be concluded that a feedback cycle exists among the identified actors and their role in the D-M framework, as showed in figure 1. According to figure 1, it can be noted that the whole process is dynamic, with two discrete time horizons, i.e. the short to medium term, from 0-5 years, in which all the decisions and prioritizations take place at a national level and the feedback cycle
acknowledges between the state and the firms, the regions/municipalities and the citizens, but also the citizens and the state. In the last case, the demand side through the end users raises the problem, usually associated with lack of the appropriate infrastructure or inefficiency of the services provided, to the administration and the respective authorities. The authorities have the responsibility to identify the exact problem and to start a new decision-making process. At the short to medium term context the whole process is rather simple as it follows the following steps (Baker et al., 2001):

- Step 1: Problem identification and definition (input provided by citizens)
- Step 2: Requirements identification, i.e. specify requirements that the problem must meet and set the goals that solving the problem should accomplish
- Step 3: Identification of alternatives
- Step 4: Development of an evaluation procedure, based on the primary goals and other policies (i.e. resources for investments) – criteria setting
- Step 5: Evaluation – selection of the solution – final decision
- Step 6 (running step): Monitoring the effects of the implementation of the decision taken in step 5 – recording of the preferences and the requisites of the demand side, i.e. end-users.

In the medium to long term (i.e. 5-10 years), European Union holds a decisive role, as its institutions formulate the policy framework, with the goals for each domain of interest. In order to promote the respective policies, to tackle regional unbalances and to stress special interest to visions like “greening the transport system”, EU allocates the available resources appropriately. Thus, in the previously mentioned procedure another step interferes. The monitoring results of the transport related decision as well as similar results for other decisions (i.e. environmental, social) are scrutinized, in order to form a new strategy. This strategy takes into account particularities of the member states, as well as general trends in science and research worldwide for each field of interest. This general strategy is open to public consultation from all member states and the final outcome is a strategic document on which consensus has been achieved.

Fig. 1. Basic actors and interrelations between them

Summarizing, it is possible to ascribe the following roles to the actors of the D-M process:

- EU legislative actors give the general trends in policy related aspects to EU member states and the financial instruments to implement them
- National governments form their policies and strategies according to EU general provisions and the special concerns of their country. At the same time, national governments “translate” their strategies in priorities for investments and operations and proceed with the utilization
Regional/local authorities specialize further the general provisions of the EU and the guidelines of the national government and usually utilize initiatives at their level.

Firms are responsible for exploiting efficiently the provisions of the public bodies, in terms of supply (infrastructure) and legislative-regulatory framework.

Finally, the end users, consumers of services and goods have the right to turn the outcome of the D-M procedure into advantage for them and the obligation to raise inefficiencies of the system.

5. Recommendations

It is possible to identify two critical barriers within the Decision-Making (D-M) framework, i.e., the involvement of more than one entity in each stage of the D-M process and the overlapping responsibilities among public parties. Both barriers are reinforced through the absence of a hierarchy mechanism, with distinct role for each stakeholder and a central coordination from a national or regional authority, according to the case in hand. Accepting this condition as the mainstream, the first affected stage is the evaluation and financing of transport projects.

In addition, a parameter that affects more this stage and gives a strong argument in the direction of financing or not certain transport project/activity subject to each stakeholder’s activities or aspirations is “land use”. As land forms a valuable and exhaustive commodity, the dilemma of using a particular area for commercial activities or transport infrastructure and/or services exist. But, is this dilemma valid? Decision makers should consider the development character of transport systems, as well as the opportunity for reallocation of activities that a transport related intervention causes to the built environment or to brownfields.

Considering the above points and some best practices identified, it is possible to conclude in a number of recommendations:

- **Development and establishment of a cooperative framework** between various stakeholders, putting emphasis on the coordination role of public entities and the complementarity between modes and thus operators for both freight and passenger transport.

- **Differentiation among** transport infrastructure managers and operators according to EU legislation and directives, in order to establish equity conditions and health competition in the transport markets.

- **Amplification of** Private-Public Partnership (PPP) model and usage of innovative financing techniques in order to promote viable and cost effective transport infrastructures and services, solving at the same time complex local and regional problems and financing issues.

Especially in the case of freight centers or complex freight structures like a freight center network, the D-M process should, at least, take into consideration the following recommendations:

- **Elaboration of a Strategic Framework for the deployment of freight transport**, at international (i.e. European), national, regional and local level, that encompass policies strongly related with the terrestrial – regional development, economic and environmental balance, in order for the efficient initiatives and projects to be synchronized, so as to avoid competition and rivalries and to promote the balanced development and integration of wider areas.

- **Stressing the importance of EU and national co-funding or funding of transport projects**, as a necessity to guarantee the financial assurance.

- Creation of the appropriate structures for attracting private investments as a supplementary tool to public ones, in order to increase the financing of innovative, pioneer projects, which introduce modernistic ideas and methods of knowing how and create the environment for intermodal freight transport, making the shift between road and the other means.
• **Public participation in the D-M process**, through the consultation of administrative authorities of all levels and other stakeholders, so as to identify and promote synergies for financing and operating freight transport markets.

• **Ensuring equal access to all interested parties**, “healthy” competition, reinforcing supplementary and avoiding the rivalries between companies, freight centers and regions.

• **Coordination and “clear” assignment of duties to stakeholders.** The management and the administration (technical administration, economical and marketing department) should be explicitly defined in the establishment framework of the freight center.

**Acknowledgements**

The present paper is based on the research that has been conducted till now in the framework of the CLOSER project (Connecting Long and Short-distance networks for Efficient tRansport), which is co-funded by the European Commission within the 7th Framework Programme. The authors would like to thank both the consortium of the project and the European Commission.

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