

Advanced logistics and supply chain management for intelligent and sustainable transport

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Abstract

An overarching advanced logistics organisation may significantly contribute to a sustainable intelligent transport system, by making it more efficient, cost-effective and competitive, in a way that other sectors and the European economy as a whole will benefit from this. The paper presents an approach for creating an open European platform of excellence in the area of supply chain management and logistics in connection with hubs and gateways. Its purpose is to enable research-driven regional clusters throughout Europe for collaboration and exchange of experiences for increasing sustainability and competitiveness of logistical services and (intermodal) transport operations.

Keywords: logistics, platform, research-driven, clusters

Introduction

Global developments in transport and logistics need cost-efficiency and flexibility of the European transport and logistics sector. Demands from different perspectives have resulted in a suboptimal European transport system, which is causing challenges, in terms of sustainability issues related to social, economic and environmental parameters. To face these challenges, open innovations (both technological innovation and service innovation=T&S) are needed for logistics concepts, transport modes, and infrastructures. This concerns for instance innovations within supporting T&S in Information and Communication Technology (ICT), T&S energy systems, T&S in legislation, T&S in public-private cooperation and T&S in governance. Broadly, scholars had suggested that suboptimal systems may be the result of missing regional networks (Freeman, 1987), interactive learning (Lundvall, 1988), regional authorities' taxing, finance, policy, and university-industry strategies competences (Cooke, 2001).

Clusters are (regional) concentrations of businesses including their networks of complementary businesses. Successful research-driven regional clusters mostly involve a complementary mix of three kinds of legal entities (called "triple helix") (Etzkowitz & Leydesdorff, 1997), namely: 1) legal entities conducting research; 2) business entities or their local groupings; and 3) regional/local authorities. In addition to the three categories, other regional/local entities are involved, such as technology transfer offices, chambers of crafts, commerce and industry, financial entities, as well as management consultants. Complementarities are expected to grant clusters low-cost access to specialised skills, technologies hubs, and governmental services and support for businesses (Rosenfeld, 2002).

The Smart Specialisation Strategies (RIS 3) advocate such complementarities. However, RIS 3 and triple helix strategies have paid more attention to science and technology than commercial and innovation elements of the trans-national clusters collaboration for interaction and learning. Furthermore, the RIS 3 international dimension of the design strategy tends to be broad, i.e. for regional or national systems (Foray et al., 2012) more than for clusters. The authors claim that formal clusters international interactions, learning, and collaboration mechanisms need to be built by design rather than as a by-product of regional strategies. To enable research-driven regional clusters (see Figure 1) throughout Europe to collaborate and exchange experiences for increasing sustainability and competitiveness of logistical services and (intermodal) transport operations, a proper approach for creating an open European platform of excellence in the area of supply chain management and logistics in connection with hubs and gateways needs to be investigated.

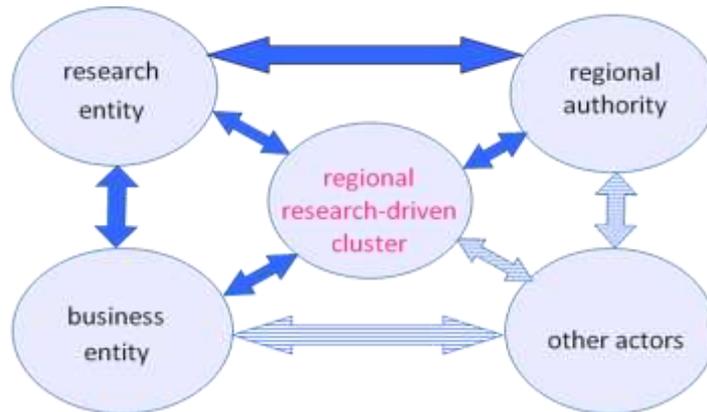


Figure 1 - Illustration of regional research driven cluster

The paper explores systematic approaches for creating such an open European platform of excellence. Some preliminary results and in depth discussion will be presented. Finally some conclusions are drawn.

Methods

The authors hold the vision that an overall advanced logistics organisation may significantly contribute to a sustainable transport system, make it more efficient, cost-effective and competitive, and that other sectors and the European economy as a whole will benefit from this. It should be emphasized that the system should not be treated as only transport; it is about supply chains, i.e. from raw materials to end products, and even including recycling (see Figure 2).

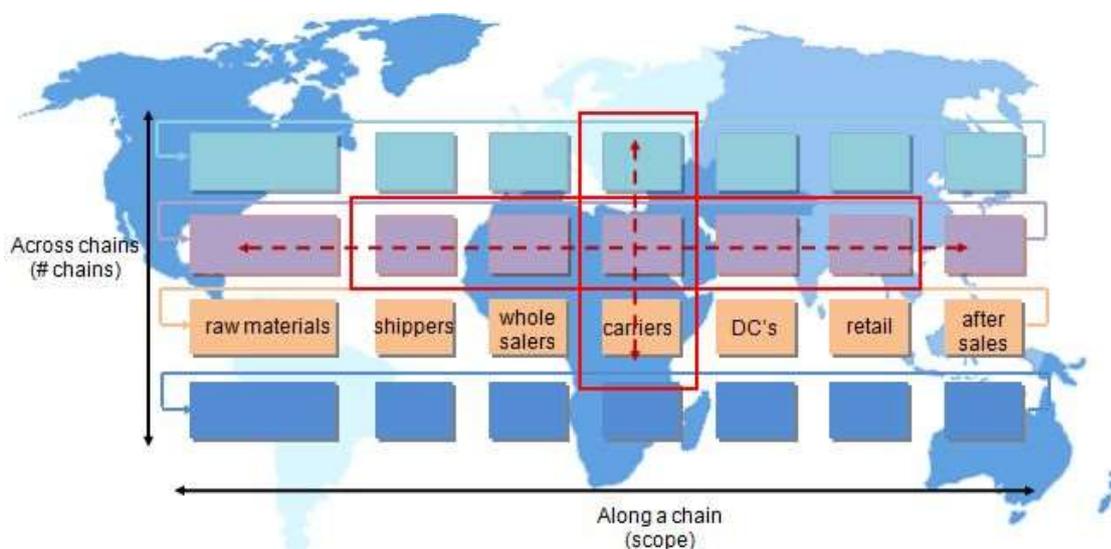


Figure 2 - Illustration of logistics and supply chain management (Source: A. Douma, 2011)

The research-driven clusters of logistics substantially contribute to strengthening the regional competitiveness and generative capability. Goal-oriented mechanisms for a strategic cluster development are illustrated in Figure 3. In order to foster trans-national cooperation between research-driven clusters as well as mutual learning between regional actors, we propose an approach, which includes the following components:

1. Analysis of the drivers from the logistics sector for regional economic growth.
2. Elaboration of a strategy for international "coopertition" (cooperation and competition).
3. Initiation and implementation of regional and European joint action plans.
4. Promotion of training activities for regions with a less developed research profile.

This approach builds upon existing governance structures without undermining the possibility of creating new ones, and going beyond the sharing of experiences by international experts with international joint action plans by clusters.

To address the first component, the following methods are used: 1) Statistical analysis, for instance, determination of indicators for logistics clusters, and analysis of collected regional data. Thorough analysis may help to discover the drivers of the economic growth of each cluster. 2) Online questionnaire. Its purpose is to collect the opinions and needs of the stakeholders. 3) Interviews. This method is especially for obtaining the strategic views of experts in the area concerning state of the art, obstacles, feasible solutions and the future. 4) Meta analysis. Through extensive literature study of each cluster, a better overview of the history, the state of the art, and the development trend of the logistics sector will be acquired.

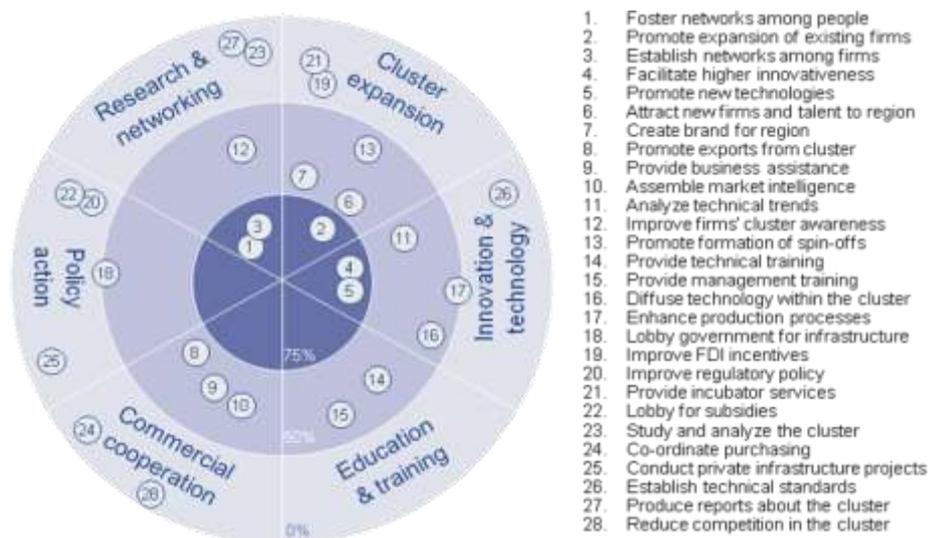


Figure 3 - Goal-oriented mechanisms for a strategic cluster development (Source: Raschke & Huther, 2012)

The second and the third components (elaborating a strategy for international cooperation and competition, and initiation and implementation of regional and European joint action plans) can be mainly developed through systematic events, such as (brain storm) workshops, seminars, and conferences, with involvement of and substantial contributions from stakeholders and experts. The joint action plans could also be linked with various business plans. International cooperation and joint action plans may help to stimulate the creation of an open European platform of excellence.

Best practices should be shared by each cluster. Regarding to the fourth component, promotion of training activities for regions with a less developed research profile could help them to enrich their knowledge basis, and create and reinforce transnational relationships. This could be carried out training clusters in performing SWOT analysis of the regions and their requirements, and strategic planning by the regions for establishing research-driven clusters.

The following preliminary results are part of the meta-analysis of the history, state of the art and trends of the logistics sector of the South-West of The Netherlands.

Preliminary Results from the South-West of The Netherlands

The South-West of The Netherlands is an exemplary case due to its substantial geographical advantage as hinterland of the Rotterdam and Antwerp harbours. There are many logistics, product development, projects as well as conversational collaborations among (education and research) institutes, companies and authorities. This region is very attractive for logistics companies, due to its liveability and ecological and industrial activities. It has many inland water terminals, and a large number of producers and shippers are located here (with high competition). The attitude of companies in this region is open for collaboration, and the companies are strongly willing to look across the borders.

Cluster drivers

The trends in logistics and supply chain management are: 1) increasing information sharing, and further development and deployment of ICT-based logistics; 2) facilitating synchronisation and optimisation in the supply chain; and 3) development of different partnerships and supply chain configurations. Such trends are driven by the need for urgently implementing co-modality and synchronomodality by implementing a system with optimal flexibility and sustainability: different modes are available as options, and quick shifts between these modes are feasible. Synchronomodality is only possible with high volumes and high-frequency hinterland connections. (ECT, 2011)

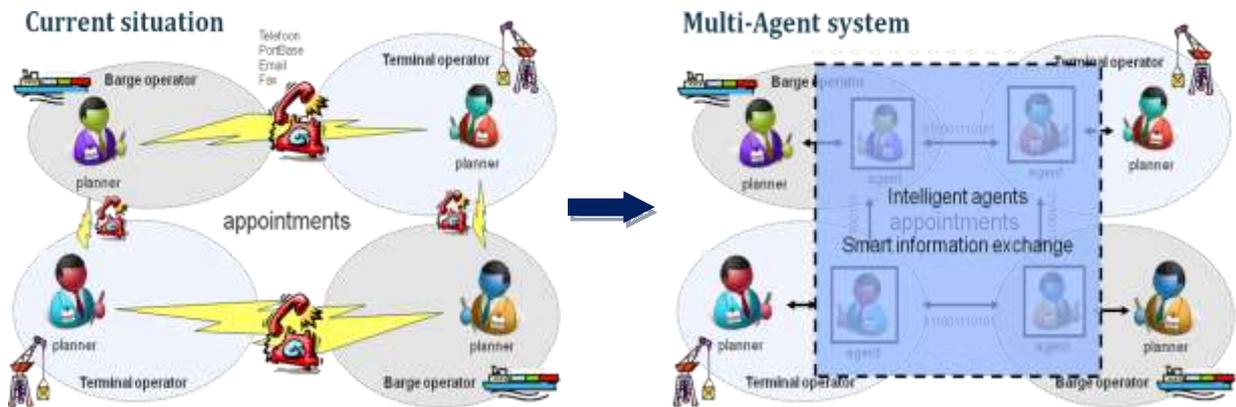


Figure 4 - Changes in supply chain coordination (Source: A. Douma, 2011)

Coopertition and Joint Action Plans

To create an open European platform of excellence, European Joint Action Plans (JAPs) need to be developed. A JAP could be categorised as a mix of: processes, infrastructure projects, technologies, cluster management activities, common standards and education programmes. (SoCool@EU Consortium, 2011).

SoCool@EU Consortium had put forward the following Joint Action Plans for The South-West of The Netherlands, based upon the exercise of a regional triple helix (education and research institutes, industries and regional/local authorities)(Table 1).

Promotion of training activities

To improve the competitiveness and innovation in the region the following training activities are recommended:

1. Capability building and change the EU policy to also support small projects (European Research Council).
2. Clear regional development agendas. Competence building for linking clusters strategies with the most recent development of the RIS 3.
3. Stimulating open-mindedness and willingness to share knowledge and to learn from each other at local and trans-national levels.
4. Research oriented mind shifts for the logistics industry.
5. Promote and intensify collaboration.

Table 1 - Summary of the relevant topics and goals for European JAPs according to each of the categories of the triple helix

Education & research institutes	Industries / business entities	Regional/local authorities
<ul style="list-style-type: none"> - develop Service Logistics - encourage Supply chain Finance - develop and deploy synchromodality - develop the Emerging Market (China, India) - Shorten and strengthen the Supply Chains - strengthen image of the region - enhance logistics network - further improve Supply Chain coordination - improve innovation & business climate enhance the competitive position of the Dutch logistics sector 	<ul style="list-style-type: none"> - share information of all projects - create win-win situations - establish an intermodal and international information platform - implement synchromodality for efficient, cost-effective and environmental friendly logistics - develop a better competitive position 	<ul style="list-style-type: none"> - stimulate research-driven clusters - improve innovation via projects - enable smart competition, and realise smart logistics - fund more technical projects (such as Cross Chain Control Centers or Control Tower) - dismiss bottlenecks - enhance triple helix collaboration within the region and with other regions - labour market-oriented development - stimulate the process for transforming knowledge to businesses

Preliminary Results from the Aragon Region

The South-West of The Netherlands is an exemplary case due to its substantial geographical advantage as hinterland of the Rotterdam and Antwerp harbours. There are many logistics, product development, projects as well as conversational collaborations among (education and research) institutes, companies and authorities. This region is very attractive for logistics companies, due to its liveability and ecological and industrial activities. It has many inland water terminals, and a large number of producers and shippers are located here (with high competition). The attitude of companies in this region is open for collaboration, and the companies are strongly willing to look across the borders.

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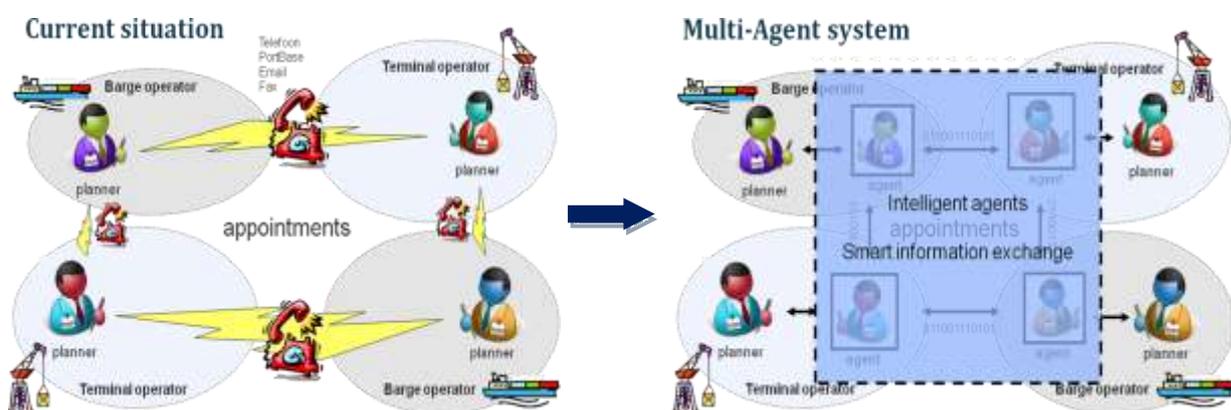


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Promotion of training activities

To improve the competitiveness and innovation in the region the following training activities are recommended:

6. Capability building and change the EU policy to also support small projects (European Research Council).

7. Clear regional development agendas. Competence building for linking clusters strategies with the most recent development of the RIS 3.
8. Stimulating open-mindedness and willingness to share knowledge and to learn from each other at local and trans-national levels.
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Conclusions

The important factors for a successful and innovative cluster can be summarised as follows: 1) businesses with adequate potential output in terms of economic performance, market access and ability to innovate; 2) clear expectation of and orientation towards benefits as a basis for active involvement of the partners in the cluster and the cluster activities - creation of Joint Action Plans to strengthen the competitive advantages of the companies and create competitive regions; 3) readiness to engage in active pooling of knowledge; 4) establishing and maintaining reciprocal trust as a basis; and 5) development of a common image to the public and the markets - joint objectives.

In general, the main barriers for innovation are: 1) lack of adequate information; 2) insufficient support from public policy; 3) unreliable and inconsistent government (policy); 4) inability to recruit and keep qualified professionals; 5) difficulties for funding small projects; 6) the European bureaucracy; 7) inadequate transport facilities and logistic infrastructure; 8) regional or national regulations and facilities regarding the borders; 9) nationalist tendencies; and 10) a lack of collaboration (although orally people do agree to cooperate).

Should the logistics sector search for further streamlining the logistics in the future, the triple helix community may want to take into special consideration the will to cooperate at the operational level.

All in all, although regions and nations are important for development, clusters and their supply chains seem to play a key and crosscutting role for the competitiveness of the European area; henceforth, along with strategy devices such as RIS 3 and triple helix, the research-driven European platforms of excellence like SoCool@EU may increasingly contribute to the Innovation Union objectives of smarter, sustainable, and inclusive growth.

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