

the publication develops concurrent enterprise (CE) and activity matrix (AM) representations.

- Deriving research agendas for manufacturing and logistics systems: a methodology, IJPE (2014), 157, 49-61. The paper focuses on developing a methodology for producing research agendas to improve logistics system performance. The methodology systematises the choice of system stages and topics to investigate possible logistics systems changes. The topics selected become an ‘implementation agenda’ and/or a ‘research agenda’. The changes could be system changes, or research investigations to improve understanding that may lead to system changes. Such investigations can help to determine a systems implementation sequence when undertaking logistics systems research and development.
- Performance measures for sustainable logistics (presented to the 18th ISIR Symposium in Budapest 2014, is currently under review for publication in the IJPE. The paper discusses performance measures for sustainable logistics. Performance measures encourage organisations to make decisions on a consistent basis. On the other hand, there are potential dangers with always making decisions based on maximising the return on capital, particularly if the decisions have widely different purposes. For example, performance measures (PM) for ethical or social decisions are likely to differ from PMs for financial decisions. Too rigid adherence to cost measures may create what has been summarised as ‘knowing the price of everything but the value of nothing’. Secondly, because measurement is the basis of systematic appraisal, the approach can emphasise measurable factors, which may unbalance and distort priorities and actions.
- In addition, a recent paper by the authors, The economic order quantity revisited: an extended Exergy Accounting Approach, Journal of Cleaner Production (2015) 105, 64-73 extended the performance measures to include measures based on exergy. This work provides the opportunity to examine the consequences of comparing the exergy needed in different parts of the world to achieve equivalent results e.g. provide equivalent inventory cover or to distribute similar numbers of products.

14:00-14:45

Ernest Bedito; Albert Corominas; Jordi Olivella; Rafael Pastor

Institute of Industrial and Control Engineering (IOC) and Department of Management, Universitat Politècnica de Catalunya

Lyon- Madrid freight transport corridor greenness: indicators and actions

1 Introduction

Green Corridor for freight transport is a concept that still need a wide accepted definition (Demir et al., 2014). European Commission (2007) states that freight Green Corridors “rely on co-modality and on advanced technology in order to accommodate rising traffic volumes while promoting environmental sustainability and energy efficiency”. According to Psaraftis & Panagakos (2012) “Green Corridors aim at reducing environmental and climate impact while increasing safety and efficiency”.

As part of the European project CLYMA1, an analysis of the more appropriate indicators to monitor the greenness of the Lyon-Madrid corridor has been developed. In addition, the possible actions to foster the greenness have been categorized and priorities have been proposed. The analysis performed was based on previous projects, a wide experts' consultation and the other tasks of the project CLYMA.

2 Indicators

To determine appropriate greenness indicators, we established the more relevant factors to assess the actions intended to make a freight transport corridor green, by conducting an experts' consultation. The experts interviewed was 20 members of shippers, operators of infrastructures, transport and logistic companies, public administration and environmental agencies. The consultation consisted in wide semi-structured interviews. The interview people gave details about their available information and positions. A total of 69 factors were identified. The factors identified are operational (21), regarding environmental and climate impact (11), regarding economic and social impact (22), and referred to infrastructures renewal or construction (15).

A set of indicators reflecting the general functioning of the corridor and based on the factors selected by the experts have been defined by taking into account the factors obtained and the indicators proposed by some previous projects. An overall of 16 indicators are proposed (Table 1). A total of 9 indicators were previously proposed by SuperGreen project (Psaraftis & Panagakos, 2012), 2 by EWTC II (2012) project and 5 are first proposed.

Table 1. Full set of indicators proposed

<i>Block</i>	<i>Indicator</i>
Operations	Direct costs of transport
	Frequency of service
	Safety measures
	Security measures
	Proportion of co-modal transport
	Quality of service in intermodal transport
	Reliability of service
	Transport time
	Alternative fuels filling stations

¹ Project CLYMA, Development of the connection LYON-MADRID on the Mediterranean corridor. Co-financed by the European Union. Trans-European Transport Network (TEN-T). <http://www.clyma.eu/>

Environment and climate impact	CO2 emissions
	Engine standards
	SOx emissions
Economic and social impact	Activity of the areas served
	Impact on physical environment
	Total goods volumes
	Use of capacity

4 Actions

The possible actions to foster the greenness of the corridor have been identified and categorized by taken into account: (1) the opinions and information obtained in the experts' consultation; (2) second interviews with some of the consulted experts, representing some of the stakeholders involved; (3) an analysis of the presentations and debates developed on the Stakeholders Summits of the CLYMA project; and (4) the results of other tasks of the project CLYMA. The actions identified are presented in Table 2

Table 2. Actions to foster the greenness of the corridor

<i>Block</i>	<i>Actions</i>
Functioning of the corridor	<ul style="list-style-type: none"> • Actions on road traffic, as time restrictions, speed and rules for Heavy Goods Vehicles (HGV). • Harmonization of regulations. • Improve the management, interoperability and frequency of rail transport and the throughput of rail terminals. • Promote good practices as eco-driving and using implementing planning systems. • Separation of passenger and goods when possible or prioritization of goods in the rail traffic.
New technologies	<ul style="list-style-type: none"> • Harmonization of ICT. • Promotion of Intelligent Transportation Systems.
Physical infrastructure	<ul style="list-style-type: none"> • Alternative fuels supplying. • Electricity supplying for trucks and vessels in ports and trucks in parking areas. • In relation to railway, electrification, extension of European gauge and harmonization of electric and signalling systems. • Investments on inland waterway, maritime ports, rail, road or transshipment ports.

Political measures	<ul style="list-style-type: none"> • Actions to facilitate the participation of the inhabitants of the areas affected on the planning and management of the corridor. • Actions to promote the existence of a competitive market altogether with collaboration in the corridor. • Define a roadmap for the corridor. • Facilitate and encourage short sea shipping and inland waterway in the corridor.
Sustainability awareness	<ul style="list-style-type: none"> • Analysis of the carbon footprint of the corridor. • Facilitate comparison of freight alternatives in the corridor regarding pollution. • Posting the pollution information of each carrier.
Whole transport system	<ul style="list-style-type: none"> • Actions referred to security and safety, as education, norms that are more rigid and investments. • Actions referred to the global planning of freight transport. • Actions related to the assessment of social, economic and environmental aspects of the new projects. • Implementation of CO2 labels. • Tax policies to promote sustainable behaviours. • Update regulations to allow greater train capacity by acting on load; speed; distance between trains, vehicle configuration; and train length.

5 Priorities

As a results of the information and opinions obtained in the two rounds of experts' consultation and the other information available, priorities are recommended. The priorities are the following:

- Encourage initiatives aiming to facilitate and promote co-modal and sustainable transport, even if the actions have a limited scope.
- Resolve outstanding issues of harmonization, frequency and reliability of alternative modes and create a habit of using these means, before considering new infrastructure.
- A more intensive use of the information and communications technologies and data processing, to improve economic and environmental efficiency.
- Improved planning processes, ensuring that all the interests involved are taken into account and that the necessary social consensus is obtained, while a reliable temporary plan facilitate decision making by different agents involved .

References

- Demir, E., Bektaş, Laporte, G. (2014) A review of recent research on green road freight transportation. *European Journal of Operational Research*, 237, 775-793.
- EWTC II (2012). *Green Corridor Manual Task 3. Final Report*.
- European Commission (2007). *Freight Transport Logistics Action Plan*. Brussels, EC.
- Psaraftis HN & Panagakos G (2012). Green Corridors in European Surface Freight Logistics and the SuperGreen Project. *Procedia - Social and Behavioral Sciences*, 48, pp.1723-1732.