KER 3: Intelligent Decision Support Algorithm for Just-In-Time (JIT) rail shuttle service

PLANET KERs are innovative, interdisciplinary knowledge exchange networks designed to foster collaboration and knowledge-sharing between different sectors. By facilitating the sharing of knowledge and experience obtained during the development of PLANET, KERs have offered an innovative vision for developing new solutions to complex challenges.

What are the Key Exploitable Results (KERs) in PLANET?

Overview

The KER Intelligent Decision Support Algorithm for Just-In-Time (JIT) rail shuttle service is one of the KERs developed within the framework of PLANET KERs. This KER is designed to improve the efficiency and effectiveness of rail shuttle services between the port of Valencia and logistics facilities in several destinations, using an intelligent decision support algorithm.

The Intelligent Decision Support Algorithm relies on the concept of adequately **selecting the most appropriate means of inland transport (train/truck) for import operations**. It suggests **the best transportation option for the terrestrial segment considering JIT rail shuttle service and truck** transportation as the two potentials based on trip duration, transportation costs and CO_2 emissions. Thus, the main objective of the algorithm is **to recommend the best transportation mean option** relying on the synchronization between the arrival of goods in the maritime segment and the departure of goods in the terrestrial segment, **optimising the use of trains/trucks** and **reducing the environmental footprint** of port and inland transport as well as disturbances to the local population.

Description	Artificial Intelligence (AI) based algorithm designed to support the decision-making process needed for offering **a JIT rail shuttle service between the port of Valencia and other logistics facilities located in Madrid and Zaragoza**. The JIT rail shuttle service is proposed as a potential solution managed by a railway operator focused on offering periodic trips by train for exchanging cargo between the port and logistics facilities in the hinterland. The **objective** of the algorithm is to recommend the best transportation mean option relying on the synchronization between the arrival of goods in the maritime segment and the departure of goods in the terrestrial segment.
Needs Addressed	The KER addresses the need for more efficient and sustainable rail transport in ports, improving the overall competitiveness of European ports.
KER Type	New service
Direct or indirect exploitation/use of KER	Technology development

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Business Model

The Business Model section will provide a comprehensive overview of the different aspects of the KER's business operations, including its key partners, resources, value proposition, customer segments, customer relationships and also highlighting the strengths and opportunities that this KER offers to its partners and stakeholders.

Key Partners	Railway operators, logistics and transportation companies, port authorities, technology providers, public institutions, regulatory bodies.
Key Activities	Data collection and analysis, algorithm development and improvement, marketing and sales, customer support, partnership building.
Key Resources	AI expertise and technology, transportation and logistics knowledge, infrastructure availability, financial resources, human capital.
Value Proposition	Assess impact of re-routing inland transport of shipments in terms of time, economy and environment through AI and ML, reducing, therefore, time processes and costs of transport, either economically and environmental. The solution lets the exchange of slots minimising idle time at container terminals achieving a ship-to-train interconnection and a greater flexibility, frequency and regularity of services; optimising the use of trains/trucks and reducing port's environmental footprint as well as disturbances to the local population.
Opportunities	AI algorithm can improve efficiency and reduce emissions in logistics chains by addressing inefficiencies in ports and hinterland and combined with autonomous shunting services, it can increase efficiency in ports. Railway operators can generate revenue from the solution, which can be used for further development and improvement and could be adapted to other logistics scenarios. The algorithm combined with JIT rail shuttle service can minimize handling movements and costs of transport, providing economic and environmental benefits.
Customer Segment	The market segment is Transport and Logistics and the targeted customers are logistics operators and shipping agents. The service is oriented to an existing B2B market composed of private railway operators offering a transport service or shipping agents contracting this service
Potential USP	The algorithm is shaped to Valencia port ecosystem and can be adapted to other logistics scenarios

Exploitation Pathway

In the short/medium term, the suitable exploitation pathway for the JIT KER will be "technology development", in order to continue advancing on the progress of the service to achieve a ready-to-market result. The different steps to consider in this exploitation pathway are the integration and customization of the algorithm in the shipping agents and railway operators' systems and processes to ensure a seamless operation. The next step will be the validation of the result by a pilot testing to ensure the accuracy and effectiveness of the result. The fourth step will be monitoring and improving the performance of the algorithm. Finally, the algorithm will be implemented for the JIT rail shuttle service between the port of Valencia and logistics facilities in several destinations.

For the long-term exploitation pathway, a good option could be the creation of a joint venture between the partners involved in the Decision Support Algorithm development.

Contact Information

For more information about the Intelligent Decision Support Algorithm for Just-In-Time (JIT) rail shuttle service KER, please contact the members of the KER owner: jagimenez@fundacion.valenciaport.com.

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