

# SMART RAIL

Smart Supply Chain Oriented Rail Freight Services

**GA No. 636071**

**Deliverable No.** D6.4  
**Deliverable Title** Alignment of the value case of involved stakeholders

**Document ID** Smart-Rail-D6.4 v1.1  
**Dissemination level** Public  
**Main Author** Paul Melia - Railistics GmbH  
**Issue date** 08.08.2016



## Disclaimer and acknowledgement



This project has received funding from the European Union's Horizon 2020 Programme Research and Innovation action under grant agreement No 636071

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### Document Change Log

Version	Date	Comments
v0.1	27.04.2016	First draft of document
v0.2	04.08.2016	Revised version based on the comments of Oleh Shchuryk (ECG) and David Krásenský (Abirail)
v1.0	05.08.2016	First final version, approved by Executive Board, (will be) submitted to EC.

### Document Distribution Log

Version	Date	Distributed to
v0.1	29.07.2016	Reviewers Oleh Shchuryk (ECG) and David Krásenský (Abirail)
v1.0	08.08.2016	EC via participant portal

### Verification and approval

	Name	Date
Verification Final Draft by WP leader	Mr. Udo Sauerbrey	29.07.2016
Approval Final Deliverable by coordinator	Mr Paul Tilanus	01.08.2016

## Executive summary

It is vital to consider the values offered by stakeholders when it comes to implementing the Smart-Rail cooperation model with the aim to enhance the attractiveness of SWL services in order to stop the current negative trend.

In this report the value case of CIT1 is described. This includes the analysis of business relations between the different stakeholders involved by describing their specific roles in this CIT and pointing out the manifold interrelations between the actors. Additionally the interests and values delivered by the stakeholders are addressed as well as individual drivers and barriers for realising the cooperation model named and assessed for each stakeholder. Furthermore the power relations of the parties, visualised in a sociogram, are important.

Taking this information into account is crucial, in particular to be able to adjust the SWL cooperation model as early as possible, if needed.

It becomes clear that finding the right balance between drivers and barriers is essential for the successful implementation of the Smart-Rail cooperation model for SWL.

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## Definitions & Abbreviations

CIT	Continuous Improvement Track
DoW	Description of Work
ERA	European Union Agency for Railways
IM	Infrastructure Manager
IT	Information Technology
LSP	Logistics Service Provider
OSS	One-Stop-Shop
RFC	Rail Freight Corridor
RNE	Rail Net Europe
RU	Railway Undertaking
SWL	Single Wagon Load
WP	Work Package

# 1 Introduction

## 1.1 Background Smart-Rail

The aim of the European Union Agency for Railways (ERA) is to construct a safe, modern integrated railway network with the overall target that railways must become more competitive to other transport modes and seek and offer high-quality, end-to-end services without being restricted by national borders.

To achieve the necessary modal shift from road to rail the rail sector faces an unprecedented challenge of providing the capacity for affordable and attractive services required to enable this modal shift. The current European rail freight market is a complex system involving a great number of different public and private stakeholders, such as Infrastructure Managers (IM), rail operators, terminal operators and freight forwarders who jointly manage the operation of running trains from A to B. The Smart-Rail project is aligned with the objectives of SHIFT2RAIL and will ensure that the results can be used in further research in this programme.

The objectives of Smart-Rail are:

- to contribute to a mental shift of the rail sector toward a client oriented and supply chain focus;
- to develop working business models for cooperation of different stakeholders;
- to develop a methodology and architecture for exchange of data/information required for the optimisation process, between stakeholders, making use of existing initiatives where available (for instance the European Corridor Management and national logistical information centres);
- to establish three Continuous Improvement Track (CIT) that each focus on different aspects and markets and implement the developed tools, methodologies and concepts. The purpose of the CIT is to test and improve the innovative measures in a real life situation. Specific and more dedicated business models, information systems and new rail services will be tested.

This CIT will address the issue of efficient and lucrative single wagon load (SWL) services in Europe and in doing so bring the missing piece to the Common European Rail System by taking its place among the other projects contributing to the vision of an open market in which trains can cross borders without stopping.

The existing SWL services of the traditional incumbent Railway Undertakings (RU) have been reporting a proportional decrease in volumes and losses (varying across Europe). This has led to the resulting modal shift from rail to road as has been witnessed across Europe. This is accompanied and further worsened by a reduction of specific wagon load infrastructure such as sidings and marshalling yards. This trend runs counter to European policy as stated in the 2011 White Paper where modal shift to rail for freight over 300km is planned to be 30% by 2030 and 50% by 2050. To achieve these modal split targets, efficient single load forwarding services by rail will be needed to feed the green corridors. To reverse the current negative trend a radically different and competitive approach is needed. Incumbent and new entrant RUs will greatly benefit from the increasing attractiveness of services if a genuine and transparent competitive approach is employed.

Shippers and Industries are still interested in reliable, flexible and cost effective services by rail supported by modern technological and operational solutions as evidenced in research projects such as ECOPMS, CREAM, and REORIENT, and demonstrated in projects such as RETRACK, ViWas, and VEL-WAGON. The success of the liberalised European railway freight transport market (trainload) has shown that railway companies, including the incumbents are able to provide high quality logistics. Unfortunately, SWL has not been part of this success story.

Nevertheless the transport of units smaller than block trains is one of the largest potential markets for rail in Europe in the future. The demand for this type of transport is increasing steadily with a relatively small percentage a year. With the growth of lean manufacturing and the reduction of stock in the supply chain, shipments have become smaller and, the working unit for goods today is the trailer or swap body, or even smaller such as pallets or boxes, all of which are suitable for use with the rail wagon.

This CIT will demonstrate measures to stop the current negative trend and to significantly enhance the attractiveness of this sustainable transport mode. This requires a major change of SWL's organisation, management and marketing. The approach of this CIT will be based on the existing, promising example of a successful SWL operation (of which partners are included in the consortium) to create a European network solution to follow up and expand on these practices.

Successful and new technological and operational solutions will be analysed and their market feasibility evaluated in detail. The costs and the benefits of all the innovations analysed and the potential improvement for operations and marketability will be examined.

Through this CIT, Smart-Rail will integrate existing monitoring and information systems to address ICT rail freight standardisation issues where each wagon is seen as a component of a European network and needs to be tracked and monitored in terms of location, technical condition, load condition and security through the whole transit including any road involvement in pre and end haulage.

Various single load operation schemes on rail will be assessed and innovative approaches identified alongside various different measures that result in enhanced efficiency in resource utilisation. Accurate cost structures for SWL services will be developed and form part of a financial support system that will enable pricing to be transparent and the contribution of individual traffic flows to be clearly identified.

## **1.2 Purpose of the document**

The purpose of this document is to examine the different values of the involved stakeholders and describe how they can be balanced. The different perspectives of the stakeholders are described: what do they bring to the table and what do they hope to gain from participating. To this aim, the Value Case methodology, a structured methodology that helps to find solutions that are acceptable for all stakeholders, is used. General results from WPs 3 and 4 concerning horizontal (within the rail sector) and vertical cooperation (within the supply chain, different modes of transport) will be taken into account. Although in line with the objective of this CIT the focus will be on WP3.

## **1.3 Document Structure**

**Alignment of value cases for involved stakeholders:** This chapter reflects the CIT's goal and the new cooperation model in place for this CIT. It provides the basis for the value case analysis.

**Business relations between stakeholders:** In this chapter the specific role of the stakeholders is described and the value network showing the interrelations and the value provided between the stakeholders drawn.

**Value Case Analysis:** The focus in this chapter is on the different interests and values delivered by stakeholders and the assessment of related barriers and drivers that can have positive or negative influence on realising the new cooperation model.

## **1.4 Deviations from original DoW**

### **1.4.1 Description of work related to deliverable as given in DoW**

Based on previous tasks the wagonload concept has been designed, the corridor for the CIT has been selected, relevant partners have been selected, the impacts of the service for their organisation have been shown and the required information exchanges have been specified. Alongside and in strong interaction with the previous tasks, the value case (including the business case) has to be aligned amongst the involved partners. For private companies the most important impact concerns the short term financial effects. However, for a successful long-term cooperation it is necessary to investigate long-term impacts and non-financial values (such as risks or own identity) as well. In case the sum of the values (financial or non-financial) is not positive for all involved stakeholders, there is little chance on long term success of the wagonload concept. If this is the case, a redistribution of values over the involved stakeholders is necessary to make them acceptable for all involved stakeholders by means of adaption of the proposed business model. This analysis and alignment of stakeholders will be carried out in close cooperation with WP 3, concentrating on cooperation within the rail sector and with WP 4, concentrating on cooperation in the supply chain. At the end of this task all preparations have been finalised including the business model for required cooperation and the wagonload concept is ready for implementation in the next task.

### **1.4.2 Time deviations from original DoW**

Due to delays in having the common workshop on Value Case Methodology for all three CITs the submission of this deliverable had to be postponed by one month in order to incorporate the results of this workshop.

### **1.4.3 Content deviations from original DoW**

None.

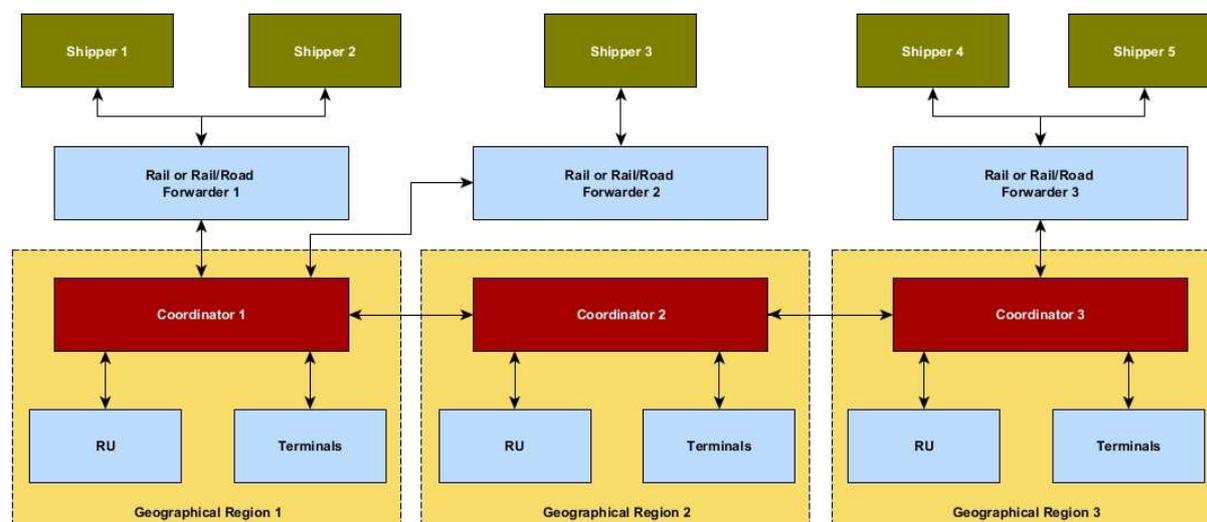
## 2 Alignment of value cases for involved stakeholders

### 2.1 Goal of this CIT

This CIT addresses the issue of efficient and lucrative single wagon load (SWL) services in Europe and demonstrates measures to stop the current negative trend as well as to significantly enhance the attractiveness of this sustainable transport mode. This requires a major change of SWL's organisation, management and marketing. For this reason a new cooperation model was developed within task 6.2, based on the existing, promising example of successful SWL operation (of which partners are included in the consortium) to create a European network solution to follow up and expand on these practices.

### 2.2 Cooperation structure

As described in detail in D6.2 – “Report on the impact of the concept”, the cooperation structure in place for this CIT is detailed in **Figure 2-1**.



**Figure 2-1: Smart-Rail Cooperation Model**

Briefly summarised – when a shipper wishes to utilise the Smart-Rail offer he engages the services of a forwarder who is in charge of overseeing the whole transportation chain and ensuring the efficient completion of the process. The coordination of flows from various shippers and requests from various forwarders is managed by one or more coordinators depending on the geographical scope in which they operate. Given the status quo of the pilot SWL operation, CIT1 aims to have one coordinator with responsibility for France/Belgium and a further coordinator with responsibility for Germany. This system allows for the addition of further coordinators if the geographical range spreads. The coordinator will then focus on matching the flows between various terminals and RUs in their geographical region.

With this model, all parties have to become active partners of the network and as a result each of them takes a proportion of the financial risk. The division of roles and financial benefits is based on a set of priorities that focus on the geographical area, the technical aspects of the operation and the risk as to which each participant takes.

A particular financial model has also been developed for this service in which the base cost of operating the service (locomotive rental, drivers cost, operational staff, energy

costs, track access charges etc.) is divided between the parties with additions made to cover the overheads, risk, coordination costs, LSP costs, and margin. From an analysis made in D6.1 these values indicate that rail transport can be more cost effective than road transport, depending on the corresponding distances travelled and commodity carried.

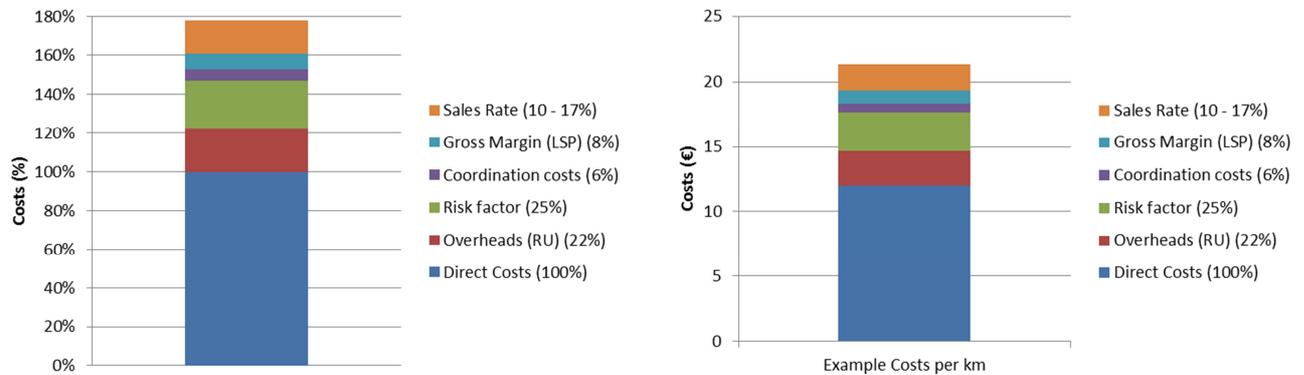


Figure 2-2: Breakdown of Costs

### 3 Business relations between stakeholders

A clear mutual understanding of the stakeholders and their role in this CIT is required to be able to enhance the attractiveness of SWL as well as to strengthen existing and to launch new SWL services.

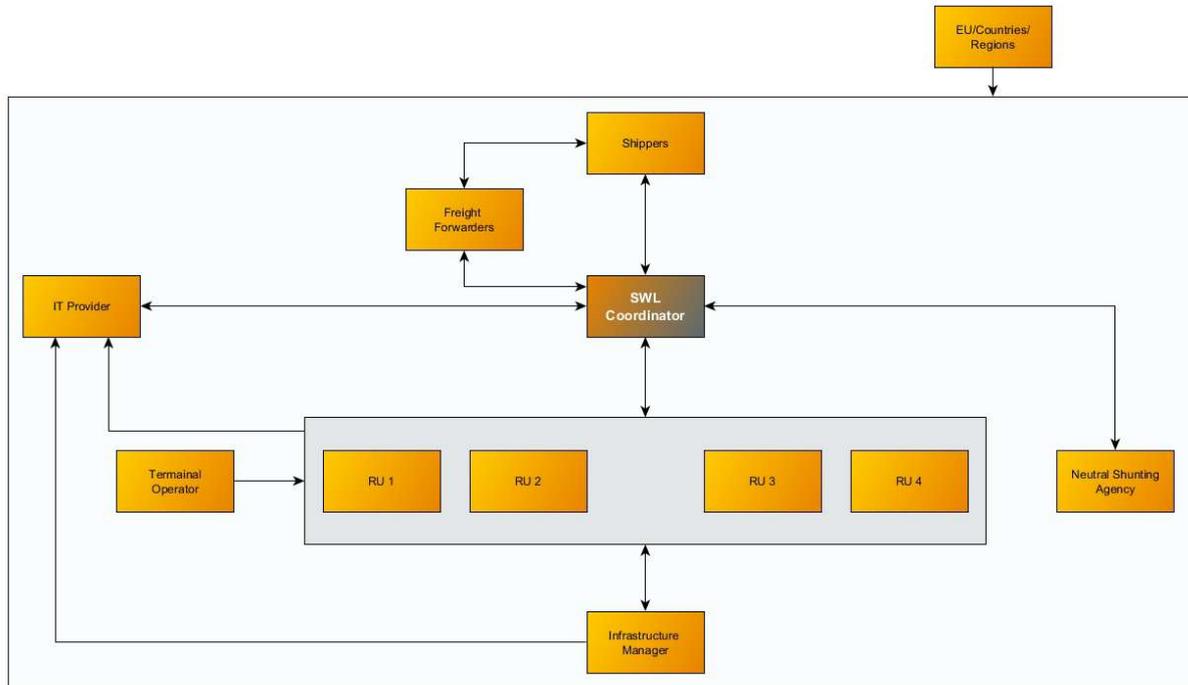
The business relations between the main stakeholders in this CIT and their specific roles are presented in below table. This is the first step of the value case methodology. Based on this, a value network was drafted indicating the interrelations between the stakeholders and the value each provides.

Stakeholder	Specific role in CIT
<b>Railway infrastructure Manager (IM)</b>	<p>Have overall responsibility for railway infrastructure in terms of construction, maintenance, safety, and management thereof. IM also manage and allocate the available capacity between passenger and rail freight traffic and monitor the train processes on the. IM are also responsible for the planning and dispatching of traffic.</p> <p>A railway infrastructure manager aims for effective utilisation of available infrastructure capacity. It has data on train paths at their disposal.</p>
<b>Railway Undertaking (RU)</b>	<p>Railway Undertakings provides traction for railway operators, shippers and logistical service providers.</p> <p>A railway undertaking aims for reliable transport and optimal use of assets and human resources. It possesses data on trains (e.g. number of wagons, length, tonnage).</p>

<b>Leasing Companies</b>	Provide locomotives and wagons to railway undertakings and shippers where required.
<b>Neutral Shunting Agency</b>	An independent/neutral shunting agency that can be used for the first or last mile service in a port or industrial region. At this moment this is a hypothetical position that may be developed at a later stage. This would require much political backing.
<b>Terminal operator</b>	Manages all types of terminals where goods can be interchanged within the same mode or to different modes or where trains can be formed. A terminal operator aims at efficient and effective use of its facilities and control over transports arriving and departing from the terminal.
<b>SWL Coordinator</b>	<p>The coordination of transport flows from different forwarders is managed by one or more coordinators depending on the geographical scope within which they operate.</p> <p>In the case of Smart-Rail this will include one coordinator with responsibility for France/Belgium and one with responsibility for Germany. Further coordinators then get added as the geographical range spreads.</p> <p>A coordinator is responsible for maintaining the relationships between the various RU and Terminals within their network.</p>
<b>One-Stop-Shop</b>	Single place to both request and receive answers relating to infrastructure capacity for freight trains crossing at least one border along the freight corridor. The one-stop shop takes decisions regarding applications for pre-arranged train paths and the reserve capacity for international freight trains.
<b>Freight Forwarders</b>	Organise shipments for individuals or corporations to get goods from the manufacturer or producer to a market, customer or final point of distribution. In the rail sector these will usually have contracts with an LSP or often multiple LSPs to move the goods. The forwarder will oversee the delivery of the goods from origin to destination on behalf of the shipper.
<b>IT Provider</b>	Developing and deploying systems or IT platforms that allow for the smooth and secure transfer of information between parties and that provide other functionalities like e.g. scheduling, monitoring and Customer-Relationship-Management.
<b>Shipper</b>	Shippers are interested in reliable, flexible and cost effective services by rail.
<b>EU/Countries/Regions</b>	Responsible for providing appropriate subsidies for the construction of infrastructure, supporting of research, and the implementation of new ideas.

**Table 3-1: Main stakeholders and their roles**

The business relations between the different stakeholders are depicted in a value network, as presented in **Figure 3-1**. The value network shows the interrelations between the stakeholders.



**Figure 3-1: Value Network**

Figure 3-1 illustrates the central role of the SWL Coordinator within the value network, which has already been described in previous sections 2.2 and 3. This highlights the importance of this stakeholder for the overall functionality of the CIT's cooperation model.

## 4 Value Case Analysis

### 4.1 Interests and Values delivered by stakeholders

Having identified the main stakeholders and their specific roles in more detail and drafted the value network, analysing this network is the next step of the value case methodology. An important part in the value case methodology is to create transparency in the distribution of effects of the foreseen innovation, which constitutes here the new cooperation structure. While some of the effects will be positive for one stakeholder (drivers) the same effects might be negative for the other (barriers). Based on this analysis interventions or measures can be derived, which are required to overcome barriers, while exploiting drivers.

As already shown in Table 3-1, the main stakeholders in this CIT have different interests and incentives for realising this new cooperation model. For each stakeholder, the interests and values delivered are summarized in below Table 4-1 to Table 4-11.

Stakeholder	
Coordinator	
Role	
Coordination of the overall Transport Chain	
Interest	Value Delivered
<ul style="list-style-type: none"> <li>• Efficient services</li> <li>• Efficient transfer of information</li> </ul>	<ul style="list-style-type: none"> <li>• Overall coordination of the service</li> <li>• Regional coordination with other countries/coordinators from other countries</li> <li>• Regional know-how</li> </ul>

**Table 4-1: Coordinator - Interest and value delivered**

Stakeholder	
Shippers	
Role	
Supplying volumes to the transport chain Commercial activity in the background	
Interest	Value Delivered
<ul style="list-style-type: none"> <li>• Reliability</li> <li>• Low price</li> <li>• Fast &amp; reliable transport</li> <li>• Higher profitability &amp; competitiveness</li> <li>• More efficient transport chains</li> </ul>	<ul style="list-style-type: none"> <li>• Source of income to all parties in the logistics chain</li> <li>• Frequency of supply</li> <li>• Information availability</li> </ul>

**Table 4-2: Shippers - Interest and value delivered**

Stakeholder	
Railway Undertaking	
Role	
Transporting goods Provision of traction	
Interest	Value Delivered
<ul style="list-style-type: none"> <li>• Better use of resources</li> <li>• Maximising business opportunities</li> <li>• New potentials for cooperation</li> </ul>	<ul style="list-style-type: none"> <li>• Regional know-how</li> <li>• Efficient services</li> </ul>

**Table 4-3: Railway undertaking - Interest and value delivered**

Stakeholder	
LSP/Forwarder	
Role	
Freight forwarding services	
Interest	Value Delivered
<ul style="list-style-type: none"> <li>• Price offers in a fast time frame</li> <li>• Reliability of services</li> <li>• Flexibility of services</li> <li>• Punctuality of services</li> <li>• Information flow</li> <li>• Personal contact</li> <li>• Open communication</li> </ul>	<ul style="list-style-type: none"> <li>• Customer base</li> <li>• Information flow</li> </ul>

**Table 4-4: LSP/Forwarder - Interest and value delivered**

Stakeholder	
One-Stop-Shop (OSS)	
Role	
Capacity Allocation on railway infrastructure / RNE Rail Freight Corridors (RFC)	
Interest	Value Delivered
<ul style="list-style-type: none"> <li>• Information flow</li> <li>• Simple communication</li> <li>• Timely Information</li> </ul>	<ul style="list-style-type: none"> <li>• Allocation of time slots</li> <li>• Single point of contact for the RUs</li> </ul>

**Table 4-5: One-Stop-Shop - Interest and value delivered**

Stakeholder	
Terminal operator	
Role	
Loading/Unloading/Transshipment facilities	
Interest	Value Delivered
<ul style="list-style-type: none"> <li>• Punctuality</li> <li>• Maximising utilisation</li> <li>• Short manipulation times</li> <li>• Accurate information</li> <li>• Punctual arrival/departure times</li> <li>• Information exchange</li> <li>• frequency of service</li> <li>• Reliability of services</li> </ul>	<ul style="list-style-type: none"> <li>• Efficient transshipment facilities</li> <li>• Loading facilities</li> <li>• Further connections to additional markets</li> <li>• Accessibility to the facilities</li> <li>• Multiple modes served</li> </ul>

**Table 4-6: Terminals - Interest and value delivered**

Stakeholder	
Leasing companies	
Role	
Supplier of wagons when the shippers don't have their own Supplier of locomotives/traction	
Interest	Value Delivered
<ul style="list-style-type: none"> <li>• More business and clients</li> </ul>	<ul style="list-style-type: none"> <li>• Efficient transshipment facilities</li> <li>• Loading facilities</li> <li>• Further connections to additional markets</li> <li>• Accessibility to the facilities</li> <li>• Multiple modes served</li> </ul>

**Table 4-7: Leasing companies - Interest and value delivered**

Stakeholder	
Neutral Shunting Agency	
Role	
Providing a neutral last mile service in a port or an industrial region	
Interest	Value Delivered
<ul style="list-style-type: none"> <li>• To avoid operational bottlenecks</li> <li>• Speed up the shunting process</li> <li>• Reduce the capacity utilised by the equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Offer the market a fast and reliable service for everybody on the basis of the same prices</li> </ul>

**Table 4-8: Neutral shunting agency - Interest and value delivered**

Stakeholder	
EU/Countries/Regions	
Role	
Improving the viability of rail based transport	
Interest	Value Delivered
<ul style="list-style-type: none"> <li>• Hit green/environmentally friendly transport targets</li> <li>• Improve attractiveness of rail transport</li> <li>• Achieving Modal shift</li> </ul>	<ul style="list-style-type: none"> <li>• Providing subsidies</li> </ul>

**Table 4-9: EU/Countries/Regions - Interest and value delivered**

Stakeholder	
Infrastructure managers	
Role	
Providing access to infrastructure Providing facilities for train manoeuvres Providing access to the main railway network from private sidings and industrial tracks	
Interest	Value Delivered
<ul style="list-style-type: none"> <li>• More traffic resulting in more revenue from track access charges</li> <li>• Better utilisation of existing capacity</li> <li>• Improved capacity allocation</li> <li>• Reliable information in terms of slot ordering</li> </ul>	<ul style="list-style-type: none"> <li>• Flexible slots</li> <li>• Information on facilities</li> <li>• Reliable and on-time information regarding the status of trains</li> </ul>

**Table 4-10: Infrastructure managers - Interest and value delivered**

Stakeholder	
IT Providers	
Role	
Providing IT platforms for combining services capabilities to support all parties in their decision making	
Interest	Value Delivered
<ul style="list-style-type: none"> <li>• More revenue from providing software solutions</li> </ul>	<ul style="list-style-type: none"> <li>• Structural information to support decision making</li> </ul>

**Table 4-11: IT Providers - Interest and value delivered**

## 4.2 Assessment of barriers and drivers

The preferred cooperation model will result in a change of business for the different stakeholders. For realising the future situation there will be different drivers and barriers for each stakeholder. Although, and improvement scenarios have not been defined yet, in general it can be foreseen that the changes to realise the improvement will have an impact on the main stakeholders as shown in Table 4-12.

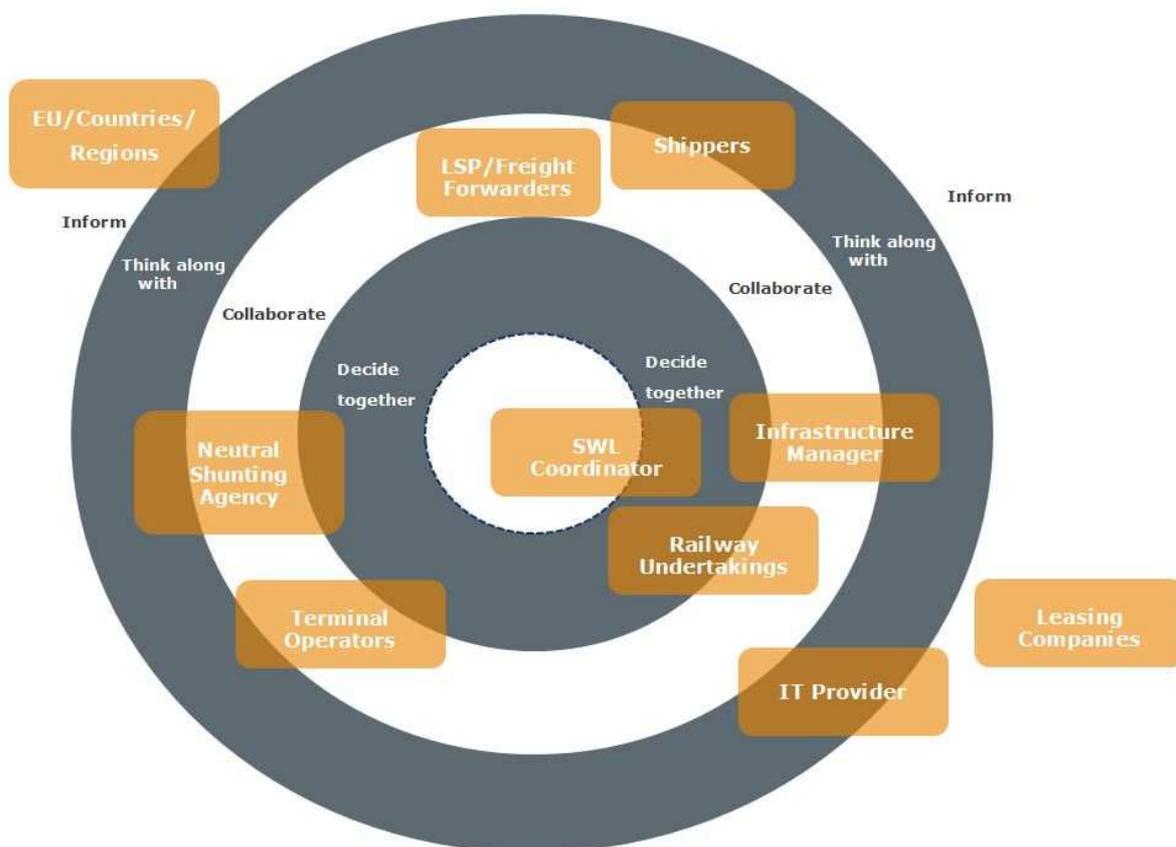
Stakeholder	Change in Business	Drivers	Barriers
1 Infrastructure manager	<ul style="list-style-type: none"> <li>Mostly no – however in some cases capacity might be freed up</li> </ul>	<ul style="list-style-type: none"> <li>Creating more business resulting in increased income</li> </ul>	<ul style="list-style-type: none"> <li>Some extra maintenance required for tracks that are currently less utilised</li> </ul>
2 Railway Undertakings	<ul style="list-style-type: none"> <li>Provide the necessary info to coordinator of their capacity and capability</li> <li>Follow the decision of the coordinator</li> </ul>	<ul style="list-style-type: none"> <li>Additional income</li> <li>Further customers</li> </ul>	<ul style="list-style-type: none"> <li>Critical mass required</li> <li>less decisions on their own</li> <li>More flexibility will be required</li> <li>Further coordination of sales and capacity</li> </ul>
3 Leasing Companies	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>Further business</li> </ul>	-
4 Neutral Shunting Agency	<ul style="list-style-type: none"> <li>None</li> </ul>	-	-
5 Terminal operators	<ul style="list-style-type: none"> <li>None – with the potential of more business</li> </ul>	-	SWL services will mean shorter trains occupying tracks that can be used for longer or block trains
6 Coordinator of the SWL business	<ul style="list-style-type: none"> <li>A new business.</li> <li>This could potentially be the role of existing stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>Further Business opportunities</li> </ul>	<ul style="list-style-type: none"> <li>To realise this new service</li> <li>Required know-how</li> <li>The barriers of many of the other Stakeholders</li> </ul>
7 LSP/Freight Forwarder	<ul style="list-style-type: none"> <li>More options for transport in terms of new SWL offerings</li> </ul>	<ul style="list-style-type: none"> <li>Competition in the wagonload market will drive prices down while increasing quality</li> </ul>	-
8 IT Provider	<ul style="list-style-type: none"> <li>No changes as platforms already exist</li> </ul>	<ul style="list-style-type: none"> <li>New Markets</li> </ul>	<ul style="list-style-type: none"> <li>Some small further developments will be required to adjust to a SWL service</li> </ul>
9 Shippers	<ul style="list-style-type: none"> <li>More options for transport in terms of new SWL offerings</li> </ul>	<ul style="list-style-type: none"> <li>Additional competition leading to lower costs, higher quality, and greener transport</li> </ul>	<ul style="list-style-type: none"> <li>Previously closed loading and unloading facilities may have to be reopened</li> </ul>

Stakeholder	Change in Business	Drivers	Barriers
10 EU/Countries/Regions	<ul style="list-style-type: none"> <li>None if the regulatory body is in place</li> </ul>	<ul style="list-style-type: none"> <li>Greener Transport modal shift</li> <li>Increased modal shift</li> </ul>	<ul style="list-style-type: none"> <li>May still be the owner of incumbent railways</li> </ul>

**Table 4-12: Drivers and barriers**

Based on the drivers and barriers, business and policy interventions can be derived for realising the improvement scenario. Since the improvement scenarios have not been defined yet in detail, this will be done at a later stage.

In addition to individual drivers and barriers, the power relations of the parties are important. The sociogram below shows the power of the stakeholders.



**Figure 4-1: Sociogram**

## 5 Conclusions and recommendations

Finding the right balance between drivers and barriers is essential for the successful implementation of the CIT's cooperation model. Monitoring the current situation and the expected future development is important to be able to relate to possible success factors. This will then be used as a guide as to how the value case will develop over the course of the project. In addition this allows to further fine-tune the cooperation model, if needed.

Having analysed the stakeholders individually in terms of value offering in the rail sector enhances the understanding of these stakeholders. It becomes clear that any successful implementation depends highly on the balance between the effort to realize a specific goal and the kind of reward that is expected from the perspective of the stakeholder. The Value Case methodology identified possible bottlenecks and opportunities that require attention during the further course of this CIT.

The results, presented in D6.7 at the end of the project, will confirm if the expectations have been met.