CO³ TEST PROJECT REPORT:

CREATION OF AN ORCHESTRATED INTERMODAL PARTNERSHIP BETWEEN MULTIPLE SHIPPERS

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“THE LOGISTICS LABORATORY”

(Orchestration, application and validation)

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Executive summary

This document describes the creation and management of an orchestrated horizontal community for collaborative intermodal transport between 4 shippers, 2 logistics service providers and a neutral trustee. This test case has been developed as the 2nd applied example in the context of the EU-finance project ‘Collaborative Concepts for Co-modality’ or CO³. More information about this innovation project can be found on the consortium website www.co3-project.eu.

TRI-VIZOR, a Belgian spin-off company of the University of Antwerp, acted as neutral orchestrator (=offline/online trustee) and project manager on behalf of CO³ consortium. It started the preparation of this test case in September 2011, working with both shippers and logistics service providers to realize the project, and concluded the test case in May 2013.

Conform the standard methodology promoted by the CO³ consortium, TRI-VIZOR applied a 3-phased approach to set up this test case:
- Phase 1: identification of compatible shippers and transport flows
- Phase 2: preparation of a collaborative concept and business case
- Phase 3: operational implementation and management

Acting as ‘offline trustee’, TRI-VIZOR first identified a number of compatible shippers and calculated their potential transport network synergy. It then created a horizontal collaboration community with 4 of those shippers to set up a balanced and synchronized transport loop with Full Truck Loads between Belgium and the northwest of Spain.

The participating shippers in the project are:
- Baxter: a global healthcare company with intercompany flows between Belgium and Spain
- Colruyt: a Belgian retailer importing wines and beverages from Spain to Belgium
- Eternit: a Belgian company exporting building and construction materials from Belgium to Spain
- Ontex: a fast moving consumer goods company with intercompany flows between Belgium and Spain

On behalf of the community, TRI-VIZOR then designed the collaborative concept, calculated the business case and organized a Request for Proposal to help select the most adequate logistics service providers to organize the physical and operational transport aspects. Because increased sustainability and reduction of carbon emissions were explicit goals of the community, the choice was made to make maximal use of short sea shipping between Spain and Belgium. The participating logistics service providers in the project are:
- Corneel Geerts Transport: a Belgian family-owned provider of intermodal transport solutions
- Transfennica: a Dutch-based short sea shipping operator and provider of integrated transport services

Acting as ‘online trustee’ and community manager, TRI-VIZOR also took care of the transport order collection and processing, proactive FTL load planning and synchronization between Belgium and Spain, capacity booking with the logistics service providers, incident solving and management of the administrative and financial flows. Because the pick-up and drop addresses of the shippers in Belgium were located close by each other and the test volume was not large enough to create cost synergies on the short sea trajectory, all transport synergies of the community were realized by optimally combining and synchronizing pick-up/drop times and locations in Spain. This process was supported by TRI-VIZOR’s specialized planning unit and proprietary collaborative control tower, the ‘Cross Supply Chain Cockpit’.

The test case went live in January 2013 and finished in April 2013. The community successfully synchronized and shipped back and forth more than 60 FTL loads between Belgium and Spain during this period. This was sufficient to provide the CO³ consortium with interesting learnings and conclusions with regard to efficiency (cost), effectiveness (service level) and sustainability (carbon emission) of the concept. In addition, interesting observations could be made with regard to scalability, legal aspects and fair gain sharing.
In terms of sustainability, the community achieved a substantial carbon emission reduction of more than 30% compared with individual road transport before the collaboration. In terms of service level, the shippers experienced no significant transport problems or delays, in spite of occasional operational and technical problems in the field. As such, short sea shipping was very well accepted by the shippers as a reliable and sustainable alternative for road transport.

In terms of profitability, the community experienced a slight cost increase of ca. 3% when compared with the total baseline cost of road transport before the collaboration. This was caused by an unforeseen drop in roundtrip volumes just before the go-live of the project, in combination with the suboptimal geographic spread of the shippers’ pick-up and drop locations in Spain. This created a number of missed intermodal connections and a higher than foreseen number of empty road kilometers in Spain that had to be covered by transport company Corneel Geerts.

Looking to the future, TRI-VIZOR believes that orchestrated horizontal communities for synchronized and balanced intermodal closed loop transport, as described in this test case, can work very successfully and with a high degree of efficiency, effectiveness and sustainability. Critical success factors are a sufficient total amount of overlapping transport volume (critical mass), strategic and operational fit between the shippers in the community, careful selection of the community’s corridors and geographical locations and the ability of a neutral trustee to design, manage and synchronize in real-time the operations of the community shippers. This requires deep knowledge and visibility of shipper transport networks as well as specialized and advanced ICT and collaborative planning (control tower + ‘sense and respond’) capabilities on the side of the trustee.

The neutral trustee can only perform its tasks well if it is supported by capable carriers and logistics service providers, who act as equivalent and transparent parties in the community. The advantages for LSP’s and carriers to participate in a collaborative community are stable and guaranteed transport volumes, dense and balanced flows, minimal empty kilometers and a high degree of asset utilization (financial return-on-assets). Corneel Geerts and Transfennica, the participating LSP’s in this test case, have definitely ‘walked the talk’ in demonstrating their belief and support for this new concept.

A classic challenge for intermodal transport providers is to find a profitable balance between the capacity they first have to put in the market and the amount of stable freight volume they can then attract to fill this capacity. The high fixed costs of rail and short sea capacity in comparison with road transport make it difficult and risky to organize new intermodal connections with a sufficiently high service level or frequency. To complicate matters, intermodal transport providers seldom have a direct commercial relation with shippers: they often interact with intermediaries such as logistics integrators and freight forwarders who apply an ‘FTL groupage’ business model. This limits the possibility to proactively bundle freight flows at the source and to create dense, balanced and synchronized transport volumes with long-term stability. This CO³ test case demonstrates that applying horizontal collaboration principles, i.e. working directly with a neutrally orchestrated shipper community, can help intermodal providers to solve this ‘chicken-and-egg’ problem. More specifically, Transfennica would be able to increase its guaranteed service level between Belgium and Spain from 2 sailings to 3 sailings per week in case the orchestrated shipper community would commit a sufficiently high and balanced critical mass of FTL volume to short sea transportation. Moreover, the test case indicates that orchestrated horizontal collaboration can offer a way for Transfennica to attract not only balanced FTL volumes but also synchronized LTL (co-loaded trailers or containers) flows from the community of shippers. This would open up an entirely new market segment for intermodal transport providers.

In this context, an anti-trust compliant legal framework or multilateral contract has proven to be a necessary building block and contributing factor to the success and stability of orchestrated horizontal communities. This also holds true for the pragmatic use of the Shapley value for fair gain and cost sharing between community members. Both concepts deserve and will need continued promotion, dissemination and support to become accepted as best practices in the European market.
Last but not least, from a European and national policy perspective, this CO³ test case demonstrates that the smart introduction of carbon taxation (e.g. Ecotaxe Poids-Lourds in France) can help establish the necessary tipping point to stimulate shippers and logistics service providers to proactively bundle transport flows, to shift volumes from road to intermodal solutions and to create profitable and stable horizontal communities. Similarly, monetizing the realized carbon savings of a collaborative transport community might in the long run become accepted as a way to help reach a positive business case.
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<td>CO³</td>
<td>Collaboration Concepts for Co-modality</td>
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<tr>
<td>EMEA</td>
<td>Europe, Middle East and Africa</td>
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<tr>
<td>EMS</td>
<td>Environmental Management System</td>
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<td>FMCG</td>
<td>Fast Moving Consumer Goods</td>
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<td>FTL</td>
<td>Full Truck Load</td>
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<td>GHG</td>
<td>Greenhouse Gas</td>
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<td>LTL</td>
<td>Less Than Full Truck Load</td>
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<td>NUTS</td>
<td>The Nomenclature of Territorial Units for Statistics or Nomenclature of Units for Territorial Statistics (NUTS) is a geocode EU developed standard for referencing the subdivisions of countries for statistical purposes.</td>
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<tr>
<td>OBU</td>
<td>On-Board-Unit</td>
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<tr>
<td>RORO</td>
<td>Roll-On-Roll-Off</td>
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<td>SME</td>
<td>Small and Medium-sized Enterprise</td>
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1. Introduction

1.1. Background

The EU-funded project CO³ (Collaboration Concepts for Co-modality) aims to develop, professionalize and disseminate information on the business strategy of logistics horizontal logistics collaboration in Europe. The goal of the project is to deliver a tangible contribution to increasing vehicle load factors, reducing empty movements and stimulating co-modality through collaboration between shippers and logistics partners, thereby reducing cost and transport externalities such as congestion and greenhouse gas emissions without compromising the customer service level. The project will coordinate studies and expert group exchanges and build on existing methodologies to develop legal and operational frameworks for collaboration via logistics “bundling”, i.e. co-loading, backhauling and synchronization of European freight flows. Furthermore, the project consortium of knowledge institutes and innovative industry players will develop new business models for logistics collaboration. The developed tools, technologies and business models will be applied and validated in the market via test cases. Finally, the CO³ consortium will promote and facilitate matchmaking and knowledge-sharing through conferences and practical workshops in order to transfer knowledge and increase the market acceptance of collaboration.

The core of the CO³ project is referred to as the “Applied Research Cycle”. This cycle has been set up as a continuous learning and feedback loop between the models and tools needed for supporting collaborations, the most suitable business models for groups of shippers wanting to collaborate and finally the actual test cases for collaboration. These elements are developed under individual work packages as shown below. The test cases are carried out in Work Package 4, also known as the “Logistics Laboratory” of CO³.

![Figure 1: The CO³ Applied Research Cycle](image)

1.2. Context of this test case

It is the ambition of the CO³ “logistic laboratory” to implement a least 4 different test cases of horizontal collaboration and freight flow bundling. These case studies should have increased levels of complexity and should ideally benefit large multinational shippers and logistics service providers as well as midsize SMEs in different European regions and industry sectors. Ideally, the case studies should demonstrate the economic, societal as well as environmental benefits of logistics horizontal collaboration.
After setting up a successful test case of orchestrated horizontal collaboration for road bundling or co-loading between 2 shippers (referred to as the “JSP-Hammerwerk” test case), this case study is dedicated to setting up a multimodal partnership between more than 2 shippers, bringing together a large enough volume to enable use of international railway or short sea shipping on a transport corridor between 2 European regions. The aim of this case study, with increased complexity compared to the road bundling case, is to demonstrate the potential for sustainable modal shift and maximal asset utilization through horizontal collaboration by bringing together a sufficient critical mass of compatible shipper volumes.

In summary, the scope of this test case is the creation of a closed loop shipping corridor between Belgium and Spain for 4 different shippers, reducing empty kilometers with regard to road haulage and creating a cost-effective and sustainable transport solution. To reach a more environmentally friendly solution, the alternative transport modes of short sea and railway shipping are considered to create an intermodal link between Belgium and the northwest of Spain. In order to make optimal use of transport assets and intermodal capacity, the freight flows of the different participants need to be synchronized (aligned in time) by a neutral trustee. Because the chosen transport mode of every load has no influence on its service level, this mode transport is in a way transparent to the shippers. As such, this test project is at the same time a successful example of what is sometimes called “synchromodal logistics”.

1.3. Stakeholders

The following paragraphs will introduce the different stakeholders in the test case, i.e. the shippers, the selected logistic service providers and the neutral trustee of the project.

The participating shippers are the following:

- **Baxter**

  Baxter International is a global, diversified healthcare company, employing around 50,000 people worldwide, that applies a unique combination of expertise in medical devices, pharmaceuticals and biotechnology to create products that advance patient care.

  With manufacturing facilities located throughout the world, Baxter’s philosophy of manufacturing locally allows the company to better manage production, costs and pricing. Baxter has significant presence in Europe, Middle East and Africa (EMEA) with manufacturing and research facilities in more than a dozen countries including Austria, Belgium, Czech Republic, Germany, Ireland, Italy, Malta, Poland, Saudi Arabia, Spain, Switzerland, Tunisia, Turkey, and the United Kingdom.

  The Belgian manufacturing and distribution operations are based in Lessines, with a 75,000m² production facility and a distribution center receiving pharmaceutical and medical products from all over the world and serving around 7000 European customers.
Baxter defines sustainability as a long-term approach to include social, economic and environmental responsibilities among its business priorities. Baxter has strict environmental priorities and goals concerning the reduction of its carbon footprint, the use of natural resources and the creation of a greener supply chain.

Baxter uses several approaches to decrease its environmental impact, including associated greenhouse gas (GHG) emissions of product transport. For example, since 2002 Baxter has increased the use of intermodal transport in Europe and the United States to shift toward more energy-efficient modes. Shipping containers are moved from manufacturing plants by truck and then transferred to more efficient and cost-effective rail or barge transport for longer distances, and then shifted back to truck for final delivery. This increases fuel efficiency per ton of product transported, decreases costs and reduces emissions. Since it started collaborating with pharmaceutical company UCB in 2011, Baxter has also been an early adopter of horizontal collaboration in transport and logistics.

**Colruyt**

The activities of the Colruyt Group encompass retail, wholesale and food services, corporate activities and other activities such as engineering and petrol distribution. Colruyt is one of the retail distributors within the Colruyt Group and is well known for its low prices and no-nonsense discount policy. The economical furnishing of the stores and the working methods are designed in order to be as efficient as possible and to reduce cost. The retail activities include about 225 retail stores with an average store surface area of 1,400m² are mainly located in Belgium, France and Luxembourg.

The mission statement of the Colruyt Group is: “Together, we create sustainable added value through value driven craftsmanship in retail.” Corporate sustainability is in the Colruyt Group’s DNA. With a minimal consumption of resources and energy and minimal human effort, the group aims to provide maximum sustainable human, economic and ecological added value. In the area of mobility, the Colruyt Group is constantly working on more efficient, safer and ecological commuter traffic and transportation.
of goods. The group's distribution system also limits the number of truck kilometres in all segments of the logistic chain to a minimum. Colruyt is well known for its state of the art logistics and supply chain activities and constantly explores and implements alternative innovative practices in transportation of goods to improve its environmental performance while reducing overall cost.

- **Eternit**

  Eternit is a brand from the Etex Group. Etex manufactures and sells high-quality building materials and solutions. With headquarters in Belgium, the Group is present in 44 countries, operates 121 production sites and employs more than 17,000 dedicated people. The Group’s activities encompass small and large roofing elements, dry construction solutions based on boards in fiber cement and plaster, integrated systems of passive fire protection and high performance insulation and ceramic floor and wall tiles. The Belgian Eternit production facility is based in Kapelle-op-den-Bos and produces fiber cement boards and sidings, clay tiles, concrete tiles, fiber cement slates and fiber cement profiled sheets.

  Sustainable development is one of the top priorities for Eternit. On the ecological side, energy reduction, the use of solar energy, waste management and the use of more sustainable transportation modes are strategies being performed to reduce the company’s environmental impact. For example, more than 85% of the raw material supply has been shifted to barge navigation, avoiding around 6,000 trucks on the road every single year. Eternit also uses barge navigation for the distribution of their finished building materials to its distribution center in Bretagne (France).

- **Ontex International**

  Ontex International is the European market leader in hygienic disposables for the private label sector and employs about 4,250 people. Headquartered in Belgium (Zele) and with two production facilities (Buggenhout and Eeklo), Ontex operates 12 manufacturing facilities in eight countries and has sales offices in 11 countries.

  The manufacturing facilities are strategically placed to make the best use of logistics in delivering products to Ontex’ customers on a timely basis. Ontex offers a wide range of products for baby care (nappies and wipes) and feminine care (sanitary towels, panty liners and tampons). Ontex is also a key supplier to the adult incontinence sector through its healthcare division.

  Ontex is committed to implement sustainable business practices and demonstrates this commitment to the environment through many activities and product developments. All factories are introducing an Environmental Management System (EMS) based on the principles of continuous improvement and
minimization of environmental impact. One of Ontex’ key focus areas is waste management, which includes transport efficiency and the many environmental challenges that it poses.

The participating Logistics Service Providers in the test case are:

- **Corneel Geerts Transport Group**

  Corneel Geerts Transport Group is a Belgian logistics service provider specialized in long distance road transport and with experience in the organisation of multimodal transport. The group has since long emphasized environmental aspects within its activities. Between sixty and eighty percent of all kilometres throughout the year are performed over water or by railway. With these figures, transport group Corneel Geerts is one of the leaders in intermodal traffic by rail or by roll-on-roll-off shortsea systems.

  The Corneel Geerts transport company was selected from a shortlist by the shippers in this test case as a joint transport provider for the execution of their door-to-door road transport. A main factor in this selection was that the group already had an existing Spanish partner, “Transportes Almacenes”, which enabled smoother coordination and higher performance of the transport activities in the Spanish regions that were in scope of this test project.

- **Transfennica**

  Transfennica is the logistics service provider that carried out the short-sea transport under supervision of Corneel Geerts Transport Group, who operated as single point of contact for the operational execution. As a member of the Spliethoff Group, Transfennica is a Dutch owned European shipping company with fast liner services between the main European ports, including a short-sea connection from Zeebrugge in Belgium to the port of Bilbao in Spain.

  The Transfennica fleet consists of 14 advanced multi-purpose roll-on-roll-off (RORO) vessels, providing short transit times and high service levels. Their advantage lies in the fastest total lead times coupled with extensive information technology and fast cargo handling, flexibility and safety. The aim of Transfennica is to constantly develop new, fast and efficient services to support their customers in their value-added logistics activities.

  Transfennica understands the importance of environmental issues and recognizes the need to shift to more sustainable transportation modes. The company is committed to reduce emissions with a modern fleet that optimally uses energy resources while offering a sustainable and reliable transport solution for logistics service providers and shippers.
Last but not least, the neutral trustee of the test case is the following:

**TRI-VIZOR**

TRI-VIZOR is a Belgian spin-off company of the University of Antwerp, specialized in horizontal collaboration. It acted as neutral trustee, facilitator and project manager for this collaborative logistics test case on behalf of the CO³ Consortium. In this role, TRI-VIZOR brought the interested companies around the table, evaluated their potential logistics synergy, facilitated the integration process and helped the companies and their staff to overcome various operational and mental barriers.

The CO³ consortium has come to the conclusion that neutral trustees are essential new players to create and manage horizontal collaboration in the logistics market. Trustees can have two main functional roles, which are described as an “offline” and “online” functions.

The first possible function of the trustee is the “offline function” which provides neutral external support to the collaborative shippers. This role encompasses, but is not limited to, activities such as matchmaking between shippers, the search for compatible volumes and critical mass, providing stability and transparency, transport sourcing support, offering a fair gain sharing method, taking care of legal compliance (with regard to anti-trust), community entry and exit policies, conflict resolution and ensuring data confidentiality for the community.

The second possible function of the trustee is the “online function” which encompasses neutral real-time coordination and intervention in the daily operational collaborative process. Examples of online functions performed by the neutral facilitator are load combination and synchronization, prioritization, real-time network orchestration, providing visibility through specialized ICT platforms or “collaborative control towers”, incident management, freight invoicing and payment, etc. An online trustee operates as a central information hub and single point of contact for the collaborative partners, i.e. the shippers, carriers and logistics service providers.

In this particular CO³ test case, TRI-VIZOR played both an offline and online role.

### 1.4. Lane identification and trajectory definition

The starting point of this test project was the evaluation of the business potential for collaborative intermodal cargo shipping between Belgium and Spain in both directions. The logistics corridor between Belgium and Spain was identified by TRI-VIZOR as a particularly interesting one to work on, because a previous high level market analysis showed that it is a difficult transport market with volatile pricing, imbalanced freight flows and lots of seasonality effects. For example, in the orange season, north-south truck capacity is relatively cheap while outside of the orange season, north-south trucking becomes much more scarce and expensive. It is widely recognized that flow imbalances and seasonality are big obstacles for the efficient and sustainable organization of transport networks. They also hinder the development and use of alternative transport modes and often cause road transport to be perceived as the most adequate option for shippers.

Since its start-up in 2008, TRI-VIZOR has been building a large database containing the logistics network and freight flow data from a large number of shippers in the European region. From this database, TRI-VIZOR identified a list of tradelanes with potential for horizontal collaboration between Belgium and Spain. The focus of this selection was put on FTL movements and ambient cargo. As such, a number of shippers were identified that had flows with Spanish or Belgian origins and destinations, which at least in theory would allow the creation of a balanced and synchronized closed loop transport corridor.
This shortlist of suitable shippers was contacted and invited for an introductory meeting, where TRI-VIZOR introduced the CO³ project and explained the goals of the test case. The shippers gave TRI-VIZOR permission to act as neutral trustee and to collect more detailed lane level data. This detailed data included origin-destination information but also names of incumbent carriers and transport costs, i.e. factual information needed to evaluate the collaborative potential and business case. Further analysis confirmed that the transport trajectory between Belgian and Spain indeed offered a promising context to try and set-up a closed loop shipping corridor with synchronized and balanced northbound and southbound flows.

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1.5. Motivation of the shippers

1.5.1. Individual motivations

In May 2013, after the finalization of the test case, TRI-VIZOR sent a survey to the 4 shippers and the 2 logistics service providers with regard to their initial motivations to participate and their individual perception about the success of the project. For confidentiality reasons, the conclusions of this survey cannot be published on an individual level. However, the high level feedback can be summarized as follows:

- Shippers (Baxter, Colruyt, Eternit and Ontex): all of the shippers already had an internal environmental policy and placed a significant focus on environmental sustainability before the start
of the test case. Carbon footprint reduction through intermodal transport, as well as cost savings through new logistics concepts such as flow synchronization and balancing, were the primary drivers to participate. Biggest challenges were the search for other shippers with compatible volumes and the selection of a suitable joint transport provider. All of the shippers agreed that the role of the neutral trustee, both in the preparation and the execution phase of the project, was essential and value-adding. Establishing trust and transparency on all levels of the community, as well as modifying some operational processes to align with the high level collaboration concept, were perceived as critical success factors. An insufficient amount of critical transport volume and therefore the lack of a positive business case were the biggest showstoppers and the main reasons to discontinue the test case. However, all of the shippers were satisfied with the test case learnings and expressed a desire to further explore the use of horizontal collaboration in the future.

- Logistics Service Providers (Corneel Geerts Transport and Transfennica): neither of the 2 participating LSP’s had an officially published environmental policy, but both companies inherently place significant importance on sustainability. Drivers to participate in the test case were the increasing difficulty to find balanced transport volumes, partially due to the tough economic situation in Spain, and the opportunity to explore innovative logistics concepts. Biggest challenges to make the test case profitable were the insufficient amount of critical transport volumes dedicated by the shippers and the sub-optimal locations of pick-up/drop addresses in Spain. The LSP’s regarded trust and transparency on all levels of the community as main critical success factors. In this respect, the role of the neutral trustee/orchestrator as matchmaker and catalyst of collaborative shipper communities was perceived as highly useful and complementary to the LSP role. Both C. Geerts and Transfennica expressed a desire to further explore the use of horizontal collaboration in the future.

1.5.2. The upcoming French Ecotaxe

In addition to the already difficult transport market between Spain and Belgium, which contributed to each shipper’s individual motivation to participate in the test case, an extra driver for the shippers to explore transport synergies and to test horizontal collaboration, was the pending new road tax that was announced to become effective in France as from 1st October 2013. This tax is expected to result in a ca. 5% net cost increase for road haulage between Belgium and Spain.

The ‘Ecotaxe Poids Lourds’ is essentially an environmental initiative which aims to reduce heavy freight traffic on non-toll roads in France. The tax will apply to all heavy goods vehicles (+3,5T) regardless of nationality and will gradually increase depending on the truck category. Maximum payload and the number of axles are parameters taken into consideration. An additional factor is that the tax per km will increase, based on the truck engine’s EURO-norm. The tax rate for trucks equipped with a EURO5 engine will be 5% lower while EURO6 and electrical vehicles would profit from a 15% discount. Trucks equipped with a less environmentally friendly engine would have to pay a gradually increasing surplus: the tax for EURO3 trucks will be 10% higher, EURO2 vehicles 15% and EURO1/0 vehicles would have to pay 20% more than the tariff for a EURO4 truck, which is seen as the baseline for the tax rate.

For example, a standard truck with 4 or more axles and a gross weight of more than 12 tons (category 3) equipped with a EURO 4 engine would be taxed 0,14 € per kilometer on the roads included in the scope. This extra cost will rise in the future because there is already a tax increase announced for 2014 in the “Journal Officiel”. For the previously mentioned vehicle, the road tax will increase to 0,154 € per kilometer adding an extra 10%.

FIGURE 9 : ECOTAXE OBU
The above mentioned tariffs only concern carriers who are occasional users of the French road network, who have to equip their vehicle with an OBU (on-board-unit) at the French borders. Frequent users can equip their trucks with a fixed OBU and sign a user contract with one of 6 designated service partners, which gets them an invoice at fixed times and an 10% discount on the tariffs.

The Ecotaxe PL is in a way intended to prompt modal shift, as the burden of the tax on transporters should encourage them to change their mode of transport and consider use of inland waterways, short-sea-shipping or railway transport. Because intermodal transport requires thick, stable and balanced freight flows in order to be economically viable, horizontal collaboration between shippers can greatly enhance the possibility to shift to alternative modes, creating a cost-efficient and more environmentally friendly alternative for road transport.

In September 2013, upon publication of this test case report, it was still not clear when the Ecotaxe PL in France would actually become effective.
2. Project phasing

In its role of neutral trustee, TRI-VIZOR facilitated and guided the collaboration process between the prospective community members. It used the 3-step methodology that is being promoted by CO³ as a standard approach to guide the shippers from the first contact to the actual test phase of the horizontal collaboration:

This straightforward and simple roadmap offers a clear guideline for all members in a logistics coalition. It has proven to be an effective way to start a horizontal collaboration project and build stable communities. It should be mentioned that although for each horizontal collaboration project the 3 basic phases are identical, every project requires a tailor-made approach depending on its complexity, its stakeholders, its group dynamics and its operational level of ambition. The identification phase and preparation phase may overlap because it is not uncommon for additional partners to join the community at any moment during the 2nd project phase. On the other hand, it can also happen that community members drop out of the project for a variety of reasons, forcing the search for compatible shippers (identification phase) to start all over again. Even during the operational phase, the collaborative community is often a very dynamic environment which needs constant monitoring and support from the neutral trustee.

Figure 10 illustrates this by showing a high level overview of the 3 different phases with their different dynamics throughout the test project. The phases are then explained in more detail.

**Figure 10: Project Timeline**
2.1. Phase 1: Identification

In the first phase of the CO³ methodology, the neutral trustee identifies shippers who are interested in horizontal collaboration and collects information about their structural European freight flows. It is important to select structural flows rather than spot flows, because their high volume and/or frequency will give them a certain degree of predictability, which will contribute to the stability of the collaborative community. As soon as shippers are found whose logistics flows appear to be compatible, the trustee introduces them to each other and invites them around the table to initiate the logistics collaboration and to set up a common project team and roadmap. The shippers have to confirm their ambition to set up a joint collaboration community and outline a high level scope. The neutral trustee identifies important project stakeholders and champions within every participating shipper and documents the potential benefits and expected roadblocks of transport collaboration. In a joint go/no-go decision, the embryonic community will then decide whether further elaboration of the project is worthwhile.

2.1.1. High level quantification of collaboration potential

A first high level screening of the shipper networks and tradelanes in the TRI-VIZOR database confirmed the presence of significant synergy potential between a number of shippers who had palletized, ambient product flows between Belgium and Spain. TRI-VIZOR then focused on a number of Spanish regions, based on market feedback about where the highest collaborative potential could be expected. For the definition of the regions in Spain, TRI-VIZOR used the standard European NUTS nomenclature, as shown in figure 11.

<table>
<thead>
<tr>
<th>ES1</th>
<th>North West</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES2</td>
<td>North East</td>
</tr>
<tr>
<td>ES3</td>
<td>Community of Madrid</td>
</tr>
<tr>
<td>ES4</td>
<td>Centre</td>
</tr>
<tr>
<td>ES5</td>
<td>East</td>
</tr>
<tr>
<td>ES6</td>
<td>South</td>
</tr>
<tr>
<td>ES7</td>
<td>Canary Islands</td>
</tr>
</tbody>
</table>

Once the most promising regions, tradelanes and shippers had been identified, the relevant target companies were invited for an initial meeting where the concept of horizontal collaboration and the goal of the CO³ project was clarified. The synergy potential for shipping between Belgium and Spain was illustrated and the ambition to build a community with stable roundtrip transport flows with a minimal number of empty kilometers was laid out. After this introduction meeting, a number of shippers confirmed their interest to participate in a test case and TRI-VIZOR started to collect more detailed flow data from these candidates, in order to evaluate on which specific Belgium-Spain trajectories the horizontal collaboration could be most profitable.

The detailed volume analysis (Figure 12) based on full truck load (FTL) equivalent volumes from a selection of 12 shippers showed that there was sufficient potential to set up at least a few balanced, closed-loop transport trajectories between Belgium and Spain and back.
To limit the complexity of the test case and to ensure a smooth operational execution, the next step in the project was to select a subset of compatible flows and to define 1 or 2 base communities with a lower number of shippers. Supported by a more detailed analysis of the flows by TRI-VIZOR, the shippers decided to focus on the North-East (ES2) and the Centre-Madrid (ES4-ES3) regions, because the potential to create a balanced North-South closed-loop freight flow appeared to be the highest in these regions. This subset of flows included only 6 shippers, which would allow to create a community with at the same time enough flexibility and a manageable complexity level.

### 2.2. Phase 2: Preparation

As soon as the candidate partners confirm their desire to create a shipper community to implement logistics horizontal collaboration together, a detailed business case needs to be made and the potential benefits and risks need to be quantified. This important step will build momentum and tackle internal scepticism, provide a stable basis for the operational implementation afterwards and will enhance the ‘sense of community’ between the coalition partners. In this phase, the neutral trustee collects all relevant and detailed information from every shipper and evaluates possible solutions and alternative scenarios to come up with a solid business case. At this point, also logistics service providers will be approached as value added partners in the community.

#### 2.2.1. Data collection & analysis

In order to build a detailed business case, the 6 community candidates were requested to provide an update of their historical freight flow data together with detailed information on their shipment and product profiles, cost data and incumbent logistics service providers. The updated data received from the 6 selected shippers showed a slightly different picture than the initial historical data set in the TRI-VIZOR database, as shown in table 1 and figure 13. Detailed number per shipper are not shown.
# Table 1: Updated Shipment Data vs Original Data

<table>
<thead>
<tr>
<th>Company name/ID</th>
<th>From BE</th>
<th>From ES</th>
<th>From BE</th>
<th>From ES</th>
<th>From BE</th>
<th>From ES</th>
<th>From BE</th>
<th>From ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Baxter</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Eternit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ontex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total FTL</strong>*</td>
<td>254</td>
<td>864</td>
<td>1393</td>
<td>540</td>
<td>242</td>
<td>1075</td>
<td>1022</td>
<td>467</td>
</tr>
</tbody>
</table>

* Full Truck Loads (FTL) or in case of company P9, FTL equivalents

Table 1 shows that Baxter, Eternit and Ontex were already part of the initial group of shippers. It should be noted that Colruyt was not yet part of the group because the retailer joined the community only in a later stadium of the project. The shippers identified as A3, P9 and S1 did not make it through the next stages of the project and did not take part in the test project. The reasons for this were manifold. For example, in spite of the initial enthusiasm for the concept and after providing detailed flow data, companies A3 and S1 struggled with internal management resistance and dropped out of the community. A non-compatibility with the existing transport strategy was for example one of the reasons to quit the project. To limit risk and complexity, TRI-VIZOR proposed to only include FTL shipments in the test case and not to pursue co-loading. This proposal was accepted by the community members. For this reason company P9, a shipper with an LTL profile, could not take part in the pilot (the flow data for company P9, which only ships LTL loads, is shown in Table 1 as FTL equivalents).

![High Level Volume Flow Analysis](image_url)
The updated flow data of the candidate shippers in the community still showed a significant lack of balance between southbound and northbound FTL volumes. During a community meeting in February 2012, TRI-VIZOR proposed the following actions to close this gap:

- Contact additional shippers to ask if they had any northbound flows
- Invite LSP’s to fill the gap with their existing volumes and client base
- Identify local shippers in Spain with potential export flows to the north

In the search for additional northbound flows, TRI-VIZOR identified Belgian retail company Colruyt as a potential partner for the community. After several meetings with TRI-VIZOR and an analysis of their flow data, it was indeed confirmed that Colruyt had a significant number of flows from the northwest region of Spain to Belgium (deliveries of Spanish wine). Colruyt consequently joined the test case and the shipper community, enabling it to better balance its northbound and southbound freight volumes.

2.2.2. Intermodal alternatives

While collecting detailed transport data from the shippers, TRI-VIZOR reached out to a number of Logistic Service Providers (LSP’s) to explore the operational feasibility of the test case, the high level cost implications and possible intermodal alternatives. An intermodal approach was considered due to the fact that all current shipping lanes were based on road freight and modal shift to a more environmental friendly mode (short sea shipping or railway) was expected to result in both cost and carbon footprint benefits for the community. Another important driver for choosing an intermodal solution, already mentioned before, was future cost-avoidance with regard to the upcoming French Ecotaxe for road transport vehicles of +3,5 tons, which would add an extra cost to the road transport between Belgium and Spain.

![Railway Bettembourg (LUX) - Le Boulou (FR)](image1)

![Short Sea Shipping Bilbao-Zeebrugge](image2)

**FIGURE 14: INTERMODAL ALTERNATIVES BELGIUM-SPAIN**

One possible railway service that could be identified by the community was the connection between Bettembourg in Luxembourg and Le Boulou in France near the East Spanish border. This connection went “to the wrong side of Spain”. Another possible railway service from Belgium, passing Bordeaux and going to Irun just across the West Spanish border, was identified but had in the past been experienced as unreliable by some of the community members. It was therefore not retained by the shippers as a suitable intermodal solution. In addition to railway transport, the short sea shipping connection from Zeebrugge in Belgium to the port of Bilbao in Spain, operated by short sea operator
Transfennica, also looked very promising because it provided a high service level with multiple sailings each week.

Because only 2 of the community members (Colruyt & Baxter) were familiar with short sea shipping through past experience, the entire community was invited on July 2nd 2012 to visit Transfennica’s operational facilities located in Zeebrugge. The aim of this visit was to make the community members more familiar with short sea shipping and to explain the practical aspects of this transport mode. With a visit to the Transfennica ship “MV Kraftca” during loading operations, the community members had the opportunity to experience the operational aspects of RORO-short sea shipping. In addition, this visit was also an important part of the community building process. This relates to the fact that the social aspects of building a successful horizontal collaboration should never be underestimated.

![Image](72x797 to 108x823)

**FIGURE 15: VISIT TO TRANSFENNICA “MV KRAFTCA” ON JULY 2ND 2012**

### 2.2.3. The business case

Based on the existing individual transport rates and the freight flow details of the community members, TRI-VIZOR made a high level business case calculation for the collaborative FTL scenario. For confidentiality reasons, no individual transport budgets per shipper can be shown but only the total budget of the community is given in table 2:

<table>
<thead>
<tr>
<th>Company ID</th>
<th>BE &gt; ES</th>
<th>ES&gt;BE</th>
<th>BE &gt; ES</th>
<th>ES&gt;BE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Baxter</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Eternit</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Ontex</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>S1</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>€ 2.306.472,00</strong></td>
<td><strong>€ 1.794.960,00</strong></td>
<td><strong>€ 2.176.960,00</strong></td>
<td><strong>€ 1.794.960,00</strong></td>
</tr>
<tr>
<td><strong>Total budget</strong></td>
<td><strong>€ 4.101.432,00</strong></td>
<td><strong>-5,62%</strong></td>
<td><strong>€ 3.971.920,00</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Potential community savings**

-3,16%
This high level business case was the result of applying the most competitive available rate per region (ES2 or ES3/4) on all flows in the community. This would immediately result in an overall potential community budget saving of >3% or +/- 130K € / year, based on 2011 tariffs. Southbound savings could even be potentially higher than 5%.

2.2.4. Environmental performance

To calculate the impact that the collaboration, the shift to a more environmentally friendly transport mode and the reduction in empty kilometers would have on CO₂ emissions, TRI-VIZOR used the “ADEME Bilan Carbone®” methodology. This is a French-based but commonly accepted standard method for carbon footprint calculation in Europe.

It appeared that making maximum use of the short sea shipping option would have a huge impact on carbon emissions generated by the community, as shown in table 3.

**TABLE 3 : CO₂ CALCULATIONS**

<table>
<thead>
<tr>
<th>Door-to-door road transport</th>
<th>Per trailer</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium - Spain (ES2-ES3-ES4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prehaulage</td>
<td>n/a</td>
<td>Total KM</td>
</tr>
<tr>
<td>KG CO₂ road</td>
<td>0</td>
<td>KG CO₂ road</td>
</tr>
<tr>
<td>Total CO₂ eq.</td>
<td>5.655.796</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intermodal SSS transport Zeebrugge-Bilbao-roundtrip</th>
<th>Per trailer (=2,25 TEU)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium - Spain (ES2-ES3-ES4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BE Haulage</td>
<td>426.750</td>
<td>Line haul</td>
</tr>
<tr>
<td>KG CO₂ road</td>
<td>506.279</td>
<td>KG CO₂ SSS</td>
</tr>
<tr>
<td>Single trips</td>
<td>206</td>
<td>Total KM</td>
</tr>
<tr>
<td>KG CO₂ road</td>
<td>385.403</td>
<td></td>
</tr>
<tr>
<td>Total CO₂ eq.</td>
<td>3.302.228</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CO₂ - savings</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂-savings (KG)</td>
<td>2.353.568</td>
</tr>
<tr>
<td>CO₂-savings (%)</td>
<td>41.61%</td>
</tr>
</tbody>
</table>

Although carbon footprint savings in logistics innovation projects are seldom monetized at the moment, there is a possibility that this may change in the future if the economic and political climate continues...
to focus more on sustainability. The ‘monetary value’ of 1 ton of CO₂ reduction is a matter of scientific debate and depends on the valuation of the negative external effects that carbon emissions have on the environment, the economy and society. A wide variety of numbers can be found on this subject, ranging from a few to several hundreds of euros per metric tonne. There also exist several markets for carbon offsetting or trading of GHG emission reduction certificates, which form a commercial basis for CO₂ pricing. However, their use and acceptance in the logistics sector has been very limited until now.

Assuming a price of 20€/tonne CO₂, which is seen by the European Commission as a realistic target by the year 2020 (see for example: http://econews.com.au/news-to-sustain-our-world/forecast-eu-carbon-market-price-may-rise/), this horizontal collaboration test case would yield an extra € 47.080 as annual recurring revenue for the community members.

### 2.2.5. Selecting the right logistics service providers

As neutral trustee and single point of contact for the community, TRI-VIZOR was asked by the shippers to informally approach a number of logistics service providers and ask for non-binding price quotes for the total volume of (intermodal) Belgian-Spanish roundtrips. Throughout this process, it was always clearly stated that this communication was performed by TRI-VIZOR on behalf and for the account of the shippers in the community.

The reactions from the LSP’s quickly made apparent that their first high level price offerings for the roundtrips were significantly higher than the sum of the existing single leg road transport budgets of the individual shippers in the community. This was considered to be caused by the fact that the LSP’s took a rather cautious and conservative approach to the proposed concept of horizontal roundtrip collaboration. Many doubts were raised and it became clear to the shipper community that the concept and potential benefits of this horizontal collaboration test case had to be clearly explained and worked out together with the LSP’s.

In May 2012, on behalf of the shipper community, TRI-VIZOR released an official information package and Request for Proposal to 19 LSP’s that had been selected based on market research, perceived international and intermodal capability and preferences from the shippers community. Afterwards, every responding LSP was invited to an individual meeting to fully explain the concept, remove any existing barriers and explain which advantages could be achieved for the LSP by participating in the concept. It was explained that the design of the horizontal roundtrip community could eliminate or limit a number of traditional risks and/or costs for the logistic service provider:

- Avoidance of extensive waiting time for backloads (e.g. return loads only available 1 or even 2 days after unloading)
- Predictable and reasonably limited number of empty driving kilometers (max. 7,5% of total driving distance in the current set-up, but goal was to decrease this further over time)
- Reduced need for the LSP to use internal and commercial resources to search for backloads, because they are automatically provided by the shipper community
- Higher asset utilization and quicker vehicle turnaround times
- Long term volume stability in accordance with the CO₂ legal framework and principles

From the 19 invited LSP’s, 12 did not respond at all to the released RFP. Only seven logistics service providers indicated they were interested and came back with a proposal. As is shown in Table 4, 3 of those providers could only offer road transport while the others also were also able to provide an intermodal solution.
After a first screening of the proposed LSP budgets and intermodal capabilities, the community selected a shortlist of 3 possible providers (LSP1, LSP3 and LSP4 – one of them being Corneel Geerts Transport) that could provide a cost effective intermodal solution. TRI-VIZOR organized follow-up meetings with these 3 LSPs, while direct contact with Transfennica was established to get a better understanding of ferry rate structures in relation to freight volumes and service flexibility. Although LSP2 offered a very competitive price for road transport, it was not retained for further evaluation because it was unable to guarantee the necessary capacity to serve the total community volume. TRI-VIZOR presented the results of the RFP and discussed it with the shipper community during a meeting in June 2012. The benefits, costs and transparency of each proposal were evaluated for each of the 3 selected service providers on the shortlist.

Face-to-face meetings between the shippers and the shortlisted service providers LSP1/LSP3/LSP4 were then organised to get better acquainted, to discuss the details of the proposed solution, review operational execution aspects and start a price negotiation on the proposed budget. It could again be observed during these commercial meetings that the concept of horizontal collaboration with balanced and synchronized roundtrips was rather unfamiliar and hard to grasp for all 3 of the shortlisted LSP’s. In most cases, they were quite sceptical of the idea and did not think it would be operationally and commercially feasible. All shortlisted LSP’s had a natural reflex to look at roundtrips as combinations of 2 individual legs, and to also price them as such. After further explanation and negotiation, the community eventually selected Corneel Geerts Transport for the operational execution during the pilot phase. Corneel Geerts was willing to support the roundtrip concept and could offer a solid intermodal solution in partnership with short-sea operator Transfennica. It was agreed that Transfennica would explicitly act as a full and equivalent member of the community, but that Corneel Geerts would operate as their front office and door-to-door service provider for the shipper community. In legal terms, Transfennica operated as supplier of short-sea capacity and services to Corneel Geerts, who acted as lead logistics service provider.

2.2.6. Setting up the test case

As soon as all necessary preparations had finished, it was time to move the test project to the operational phase and evaluate the concept in practice. Only a real-life test could prove the business case and operational feasibility, both in terms of reliability and lead time adherence. To enable the operational test phase, the shippers first of all had to make available a portion of their freight volume for the agreed 3-month duration of the pilot run.

Although including LTL’s in the pilot case could largely benefit the financial business case through the effects of co-loading, TRI-VIZOR and the shipper community agreed to only deal with FTL’s in this initial phase, in order to avoid complexity and to keep the planning process relatively simple. This meant that the shippers were asked to make available a number of FTL loads.
The reserved volume for the test case had been initially agreed to comprise approximately 10-15% of the total freight volume shipped by the community members. The reasons for keeping the volumes low in a pilot phase are straightforward: the duration of the pilot is limited in time, shippers don’t want to take unnecessary risks and above all they don’t want to jeopardize their commercial relationship with their incumbent logistics service providers.

At this point in the test case, due to the ongoing economic crisis and difficult market situation in Spain, as well as for reasons of additional risk minimization, several community members requested a reduction of the agreed pilot volumes. In addition, just a few days before the final kick-off meeting of the operational phase of test case, one of the community members (S1) that had been active from the start, regretfully had to drop out of the community due to an internal, last-minute “NO-GO” decision. These 2 unforeseen events resulted in a significant drop in the pilot volume, reducing the necessary transport capacity for the test from 6 trucks that would continuously operate in roundtrips, to just 3 trucks. The drop in total volume also impacted the transport frequency, service level and empty kilometres for the remaining shippers, in the sense that it became more difficult to match up every southbound movement with a timely northbound movement from a close by location.

In spite of this setback, the 4 remaining shippers in the community (Colruyt, Eternit, Baxter and Ontex) together with their selected LSP’s Corneel Geerts and Transfennica agreed in a final go/no-go meeting on the 19th of December 2012 to go live with an operational pilot for a fixed duration of 3 months, starting in January 2013 and ending in April 2013.

2.3. Phase 3: Operation

2.3.1. Operational aspects

For the pilot run, TRI-VIZOR made a forecast planning based on Transfennica’s sailing schedule between the ports of Zeebrugge and Bilbao and the expected freight volumes that the shippers could dedicate. The objective of this forecast planning was to create balanced and synchronized transport movements between north and south, avoiding empty kilometers as much as possible. After this forecast planning was approved by the shippers and LSP’s, the operational test phase was ready to start.
During the pilot run, online trustee TRI-VIZOR was responsible for receiving the transport orders from the shippers, real-time synchronisation and balancing of the transport movements in both directions and the operational planning which was subsequently forwarded to the LSP. Transport orders were received from the shippers through a standardized Excel template that was filled in and sent via email to TRI-VIZOR’s planning unit. These orders were then uploaded to TRI-VIZOR’s collaborative planning software, the “Cross Supply Chain Cockpit®”. This state-of-the-art control tower system has been custom designed for collaborative planning and synchronized execution of bundled transport activities. It offers real-time follow-up and continuous optimisation of transports, as well as administrative support and an automated solution for allocating and net invoicing of transport costs.

2.3.2. Operational management

Operational challenges

During the 3 month long operational pilot phase, a number of interesting operational challenges were encountered. These ranged from a flat truck tire, damaged cargo packaging due to heavy rainfall, storm at sea with resulting sailing delays or vessel damage to snowy roads in the Spanish mountains. On some occasions, these incidents impacted the smooth flow of the collaborative transport activities and disturbed the synchronization. These operational issues were tackled by the neutral orchestrator, acting as single point of contact for the shipper community, in collaboration with the logistic service providers who were responsible for the physical transport. Some examples of the trustee’s interventions: last minute changes to unloading-loading combinations in order to recover from earlier delays and still make the ferry sailing, follow-up and documentation of the transfer of goods from one (damaged) trailer to another to make sure all was done in compliance with the shipper’s quality standards, administrative support of claims handling on behalf of the shipper, etc. The incidents that occurred offered a lot of learning opportunities and represent a realistic picture if cargo transportation, which is often influenced by external factors that cannot be predicted. TRI-VIZOR’s control tower
helped the community to react quickly to these unforeseen events and demonstrated the importance of real-time monitoring ("situational awareness") in combination with the ability to react quickly to exceptions and incidents ("sense and respond"). The conclusion was that the availability of a specialized planning unit and a logistics control tower are highly critical success factors for successful collaborative transport and logistics.

![Images of flat tire, storm, cargo damage, snowy roads, and vessel damage]

FIGURE 17: OPERATIONAL CHALLENGES

2.3.3. Operational learnings and results

2.3.3.1. Cost performance

The road transport costs in the test case were based on an activity (distance) based cost model which had been pre-agreed with Corneel Geerts. The tariff for the haulage in Belgium was agreed to be fixed because the companies were all located in the same geographical area with relatively small distance differences between the different pick-up/drop locations and the port of Zeebrugge. For the road haulage in Spain, transport costs were calculated based on actual distance, given the much bigger geographic spread between the pick-up and drop-off points. For example, there was a maximum relative distance of almost 550 km between the 2 farthest shipper locations in Spain (Valverde and Sabinanigo). This generated a high number of empty kilometers and a high transport cost when a truck had to move between these 2 locations. Unfortunately, this was often the case and the resulting empty kilometers proved to be a real challenge for the community, as they ‘consumed’ the profits that were realized on more efficient roundtrip combinations in the test case.

Table 5 below shows a portion of the trips that each of the 3 trucks in the test case were driving, with their respective dates, pick-up and drop locations. The table also shows the amount of loaded and empty kilometres for every truck movement in Spain. Based on this cumulative utilization rate, the average efficiency of the transport community could be calculated.
### TABLE 5: EFFICIENCY OF THE TEST CASE

<table>
<thead>
<tr>
<th>Truck N°</th>
<th>Loading date</th>
<th>Shipper</th>
<th>Origin</th>
<th>Direction</th>
<th>Destination</th>
<th>Loaded KM ES</th>
<th>Empty KM ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15/01/2013</td>
<td>Ontex</td>
<td>Buggenhout</td>
<td>South</td>
<td>Valverde</td>
<td>368</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>15/01/2013</td>
<td>Baxter</td>
<td>Lessines</td>
<td>South</td>
<td>Sabinanigo</td>
<td>289</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>17/01/2013</td>
<td>Ontex</td>
<td>Valverde</td>
<td>North</td>
<td>Dendermonde</td>
<td>368</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>17/01/2013</td>
<td>Baxter</td>
<td>Sabinanigo</td>
<td>North</td>
<td>Lessines</td>
<td>289</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>18/01/2013</td>
<td>Ontex</td>
<td>Buggenhout</td>
<td>South</td>
<td>Valverde</td>
<td>368</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>22/01/2013</td>
<td>Colruyt</td>
<td>Fuenmayor</td>
<td>North</td>
<td>Ghislenghien</td>
<td>127</td>
<td>331</td>
</tr>
<tr>
<td>1</td>
<td>22/01/2013</td>
<td>Eternit</td>
<td>Kapelle-op-den Bos</td>
<td>South</td>
<td>Portillo</td>
<td>307</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>22/01/2013</td>
<td>Ontex</td>
<td>Buggenhout</td>
<td>South</td>
<td>Valverde</td>
<td>368</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>25/01/2013</td>
<td>Baxter</td>
<td>Sabinanigo</td>
<td>North</td>
<td>Lessines</td>
<td>289</td>
<td>548</td>
</tr>
<tr>
<td>1</td>
<td>25/01/2013</td>
<td>Colruyt</td>
<td>Oyon</td>
<td>North</td>
<td>Ghislenghien</td>
<td>113</td>
<td>288</td>
</tr>
<tr>
<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
</tr>
<tr>
<td>3</td>
<td>15/03/2013</td>
<td>Ontex</td>
<td>Dendermonde</td>
<td>South</td>
<td>Valladolid</td>
<td>281</td>
<td>0</td>
</tr>
</tbody>
</table>

Total after 47 runs | 13,860 | 6,423  | Efficiency Ratio after 47 runs | 68% | 32%

Table 5 above shows a portion of the 47 single trips which have been executed between January 15th and March 15th. The total cost of these pilot shipments turned out to be slightly more expensive than the sum of the baseline rates of the individual community members, with a cost surplus of +3.17%. In total, more than 60 FTL-shipments were successfully executed between January and April 2013, with a similar cumulative efficiency effect (ca. +3% cost increase in comparison to the individual shipper baselines). Another way to describe the efficiency of the pilot community is to say that the average number of empty kilometres for every trip in Spain was 137 km. The ‘negative synergy’ resulting from this excess of empty kilometres in Spain resulted in the discontinuation of the pilot community at the end of the test period.

In hindsight, and as a suggestion for future expansion and stabilization of the collaborative community, the overall cost savings potential could be significantly improved by taking the following remedial actions:

- By injecting LTL-shipments in the community, transport savings could be achieved much easier than in an FTL-only environment (as already demonstrated in the CO³ co-loading test case with JSP and Hammerwerk). However, it would have been too time consuming and complex to also include this aspect in the scope of the test case.

- During the pilot phase, 32% of all truck kilometres in Spain turned out to be empty. This was caused by the distances between the different loading points for northbound backloads. There are several ways to reduce these empty kilometres:
  - Increase the volume within the existing community: during the pilot phase merely 12-15% of all loads were allocated to the pilot project. Adding more volume would create increased planning flexibility to avoid the most inefficient unloading/loading address combinations;
  - Look for additional community members with more suitable pick-up locations;
- Invite the LSP to actively look for local Spanish freight to compensate for the cost of empty running between the community’s unloading/loading locations. Reducing the empty kilometres in Spain by 40% or more would result in a net cost saving for the entire community.

- The cost avoidance effect of using short sea shipping instead of road haulage in view of the upcoming French Ecotaxe is not calculated into the above business case. It would add an additional few percent to the bottom line saving for every shipper, as soon as the Ecotaxe became effective.

2.3.3.2. Environmental performance

The environmental performance of this pilot run is shown in table 6. The CO₂-calculations based on 47 loads between 15/01/13 and 15/03/13 were in line with the expectations and resulted in a significant environmental improvement. By using an intermodal transport solution and minimizing the empty kilometers during haulage in Belgium and Spain to maximize asset utilization, the shipping community was able to save more than 32% in CO₂-emissions, in comparison with conventional door-to-door road transport.

<table>
<thead>
<tr>
<th>TABLE 6: ENVIRONMENTAL PERFORMANCE PILOT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Do-to-door road transport</strong></td>
</tr>
<tr>
<td>Belgium - Spain (ES2-ES3-ES4)</td>
</tr>
<tr>
<td>Prehaulage</td>
</tr>
<tr>
<td>KG CO₂ road</td>
</tr>
<tr>
<td>Total CO₂ eq</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Intermodal SSS transport Zeebrugge-Bilbao roundtrip</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium - Spain (ES2-ES3-ES4)</td>
</tr>
<tr>
<td>BE-haulage</td>
</tr>
<tr>
<td>KG CO₂ road</td>
</tr>
<tr>
<td>Single trips</td>
</tr>
<tr>
<td>Total CO₂ eq</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>CO₂ - savings</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂-savings (KG)</td>
</tr>
<tr>
<td>CO₂-savings (%)</td>
</tr>
</tbody>
</table>

2.4. Final evaluation and possible next steps

After the final shipments of the pilot phase had been executed and the foreseen duration of the CO³ test case (January-April 2013) had ended, the community took some time to evaluate the results and to collect feedback from all partners. After due consideration, it was decided not to prolong the test period with an additional 1 or 2 months. The current pilot had been sufficient as proof-of-concept and allowed TRI-VIZOR to draw sufficient conclusions and learnings to feed the applied research cycle of the CO³ consortium.

During the evaluation and debriefing meeting, all partners agreed that the most important missing elements to achieve higher cost savings and service levels in the community would be a higher number
of loads or extra shippers in combination with a reduced number of empty kilometers in Spain. However, an extension of the test period with 4 to 8 weeks would probably not have been sufficient to reach this level of critical mass, while this type of commercial expansion was also out of scope for the CO³ test project. As a result, it was agreed with all parties to phase out the test case, make a general evaluation, document the learnings and publish them through CO³.

It should be noted that the shippers, LSP’s and trustee remain open to reactivate the collaboration in the future and to form an expanded community, in case sufficient extra shippers and critical mass can be found to allow lower cost and higher flexibility.

2.4.1. Lessons learnt

- The benefits of horizontal collaboration between 2 shippers in road transport had already been demonstrated in the previous CO³ test case for co-loading between Hammerwerk and JSP. Setting up an intermodal horizontal collaboration between multiple shippers turns out to be equally beneficial, but it is considerably more complex to realize. It takes a high degree of skill and effort from the neutral trustee to build a sustainable and cost-effective intermodal community that is attractive for all members. The use of standardized CO³ tools and knowledge will make it easier in the future for shippers and LSP’s to make a ‘mental shift’ and reduce the throughput time to set up a collaborative logistics project.

- The preparation time for setting up a collaboration case between multiple shippers can be quite long and a lot of dedication and energy is required from all community members. For this test case, the initial steps were taken by the end of 2011 and the first collaborative shipment was loaded more than 1 year later, on the 15th of January 2013, extending into an agreed pilot duration of 3 months until April 2013. The subsequent phase-out and evaluation took another 3 months.

- One of the most important missing elements in this test case is a sufficient level of “critical mass” needed to reach a cost-effective collaborative solution with high enough transport volumes and shipping frequency. This critical mass, with a considerably higher number of loads or extra shippers, is necessary in this case to reduce the overall transport costs through the reduction of empty kilometers in Spain, and to improve the customer service for all shippers through a higher shipping frequency and responsiveness. It turns out that critical volumes are hard to bring together in the context of a temporary test project.

- The transport volumes of shippers can fluctuate strongly depending on market evolutions, seasonal effects and other relevant factors. The fact that their transport volumes may be variable, makes it difficult for shippers to dedicate a certain minimum volume to the community. As a result, shippers tend to be careful before joining a collaborative community if the bundled trade lane volumes have a relatively high level of uncertainty. Problems arise when for example a shipper with a large southbound volume in the community is forced to reduce its initially dedicated volume due to a drop in customer demand. This can have a negative effect on the stability of the community and the profitability of other shippers.

- Each company should fit in the shipper community and this fit is largely dependent on the transport profile of an organization. For example, demand patterns in the FMCG sector can be more volatile than stable intercompany flows between 2 healthcare manufacturing plants. Also, healthcare shippers may have other quality criteria then shippers in other sectors. These are factors the neutral trustee should take into consideration when designing a balanced and stable community.

- Last-minute volume and delivery date changes are hard to deal with in intermodal transport, which means that strict lead time requirements make it necessary to include a back-up road solution in
the community setup. On the other hand, adding additional volume and more shippers to the community would allow higher efficiency and planning flexibility.

- Although the cost impact was slightly negative due to an excess of empty kilometers in Spain, the CO₂ savings were in line with expectations and showed a very encouraging final result of 32% lower emissions. This is mainly thanks to the maximal use of intermodal transport during the pilot and the minimization of empty truck running in Spain, when compared with the overall distance of the Belgium-Spain roundtrips.

- Although it was not really a big problem to reach a verbal agreement with the community members to actively collaborate and start up a test project, an initially proposed letter of intent (a lighter form of the CO³ multilateral contract template) that was intended to be signed as a token of commitment, was never signed. This was caused by a high degree of caution on behalf of the legal departments from the involved companies, who needed some time to investigate and understand the legal aspects of the horizontal collaboration concept thoroughly. In this respect, it is concluded that the CO³ consortium still has some ‘evangelization work’ to do towards legal and general management stakeholders. This matter is foreseen to be tackled by CO³ as of Q4 2013 through e.g. specialized workshops.

### 2.4.2. Future outlook

This test case proves that it is possible for a neutral trustee to set up a multi-party coalition for balanced, intermodal closed loop shipping. As such, the publication of this report is intended to promote this concept in the market and to trigger the necessary mental shift with relevant market actors.

This test also demonstrates that intermodal horizontal collaboration still is counterintuitive and difficult to grasp for a number of LSP’s. The concept of a shipper community centered around a neutral trustee clearly does not fit within the business model of some traditional transport providers. The CO³ Consortium has the intention to keep informing the LSP market about horizontal collaboration and about the closed loop/roundtrip concept. The Consortium wants to trigger a mental shift by highlighting the positive aspects that this concept can offer for transport providers (e.g. higher asset utilization and operational margins; long term volume commitment; less annual pressure on tariffs). It is encouraging in that respect that both Corneel Geerts and Transfennica, the test case LSP’s, immediately understood the concept and its advantages. Both transport providers were very open to embrace the concept and demonstrated a great deal of goodwill to help maximize the performance of the total collaborative community.

Given these findings, it is concluded that it should be perfectly possible in the future to set up multiple instances of stable, profitable intermodal roundtrip communities which are based on the principles of transparent horizontal collaboration. Such communities are expected to offer sustainable and long-term benefits for both the participating shippers and the supporting LSP’s.
3. Legal aspects (viewpoint provided by Kneppelhout & Korthals Advocaten)

In this section the legal aspects of this test case will be discussed with some remarks and recommendations.

The collaboration between the shippers was a test case which was went live between the months January-April 2013. The preparations were started in January 2012 with around six shippers as potentials candidates for the collaboration, ending with an operational multiparty collaboration between four shippers.

For the duration of the operational test period the legal relations between the shippers and between the shippers and the trustee (TRI-VIZOR) were not laid down in written contracts. No use was made of the legal framework for horizontal collaboration in the supply chain developed by the CO³ consortium, at least not in writing. The parties did instead make oral arrangements about their proposed collaboration. The carriers were involved as from the start, in the initial meetings during which the proposed collaboration was discussed.

The parties involved have indicated that in case the collaboration would have been continued after the operational test period, they would have considered to further formalize their legal relationships in writing.

The importance of written agreements for collaboration

An observation is that shippers who consider to enter into a horizontal collaboration, in particular when it ‘only’ concerns a test case, often are cautious to lay down the collaboration in written contracts. With this, they often do not realize that under most legal systems oral arrangements also result in an agreement. In other words, oral arrangements are not without obligations. The CO³ consortium however advises for many reasons in the end to formalize horizontal collaborations through written agreements. Written contracts can facilitate and guarantee a smooth working of the collaboration between the shippers by identifying and clearing away potential (legal) obstacles and providing quick and clear solutions to remaining problems. Legal contracts can provide legal certainty and also legal uniformity. Multiple parties are involved in a horizontal collaboration and there are different contracts (collaboration between the shippers, the relationship between the shippers and the trustee and the transport contracts with the carrier(s)). In view of a smooth working of the collaboration it is important that all parties more or less commit to the same legal regime. It is for example advisable to make choices about the national law that applies (additionally) to the different contracts and the national court that will have competence with respect to possible disputes.

A solid legal framework with involvement of legal departments

In this Belgian/Spanish test case it appeared difficult to come to entering into written contracts because of internal “latency” between the logistic and the legal departments of the four shippers. The reason the collaboration was successful for the duration of the test case was due the fact that there was mutual trust between the logistics departments of the parties. The efforts of the trustee TRI-VIZOR have attributed to this trust. Trust seems to be an essential condition for success. The CO³ consortium is however of the opinion that trust in the end is not enough. The presumption is that in the long run a solid legal framework, laid down in written contracts, could be essential to keep the trust alive.

The test case at the same time made clear that apart from logistic/commercial departments, also legal departments of the organizations of the shippers play an important role. Horizontal collaboration in the supply chain is unusual and innovative. From a legal perspective people often have cold feet. It is therefore advisable to coordinate and synchronize commercial and legal operational processes and to inform and involve in-house counsels and/or external legal advisors as from the very start of the preparation phase.

Characterization of the legal relationships

The executed test case was a collaboration with international aspects. Although the principal places of business of the four shippers, the neutral trustee TRI-VIZOR as well as the contractual carriers were established in Belgium, branch offices in Spain were involved and of course the route, which covered transports from Belgium to Spain as well as from Spain to Belgium, crossed borders.
Below we will make some remarks about the characterization of the different contracts involved in the collaboration as well as the international/national legal regime that applies to that contract. Within the CO³ project a distinction is made between three different contractual relationships involved in a horizontal collaboration in the supply chain. This is not only for the purpose of making an analysis; the consortium has developed contracts for each type of contract.

**Three different contractual relationships**

- **Collaboration agreement between the shippers**

  First there is the multiparty contract between the mutual shippers. In this case the four shippers have not laid down their arrangements in written contracts. However, that does not mean that they have not entered into a contractual relationship for the duration of the test case. As a rule, oral arrangements are also binding. It is only more difficult to establish what parties have agreed upon, especially in case it would appear later that there is disagreement about what parties orally agreed. Since there is no written contract it is not sure how the shippers have characterized their mutual legal relationship. We assume however that the legal relationship between the shippers is a collaboration agreement sui generis, of an obligatory character only. We assume that Belgian law applies, since the principal places of business of all four shippers are established in Belgian and these establishments took the lead in the initial meetings where the test case was discussed.

- **Agreement between the shippers and the trustee**

  Again, this agreement is a multiparty agreement. All shippers are party to this agreement on an individual basis since the collaboration between the mutual shippers has an obligatory nature only. The shippers do not set up a separate company. The trustee TRI-VIZOR carried out different logistic activities in favor and for the account of the shippers. Some of these activities have a factual nature; others qualify as legal acts. The contractual relationship between the shippers and the trustee has not been laid down in writing but qualifies as an agreement for professional services and partially might qualify as a mandate agreement. The fact that the trustee negotiated with the carriers on behalf of the shippers gives rise to the question whether the agreement can also be partially qualified as forwarding contract. It depends on the definition of a forwarding contract in the national law that applies to the contract. In this case we assume Belgian law applies to this contract since the service provider TRI-VIZOR is established in Belgium.

  To facilitate the administrative side of the collaboration, TRI-VIZOR acted as paymaster and has received invoices from the main carrier which are made out in its own name. The invoices were paid by TRI-VIZOR itself. TRI-VIZOR subsequently charged the identical amount of the freight invoices to the various shippers involved. At first sight, this construction may cause confusion from a legal perspective. Since the carrier sends an invoice to the trustee made out in the name of the trustee, one could question whether the trustee has become a party to the transport contract it has concluded on behalf of the shippers, as is the case when a freight forwarding enters into a carriage contract on behalf of its principle in its own name. Of course it will not be the intention that a trustee as TRI-VIZOR will become the contracting other party of the carrier. Considering the fact that the name of the shippers – and not the name of the trustee - is mentioned on every CMR waybill, we assume that in practice parties do not have to expect that this will easily lead to confusion. However, it is a point of attention. The CO³ consortium advises to precisely define the role of the trustee as factual link between shippers and the carriers and to lay down this role in writing in the different contracts.

- **Carriage contracts between shippers and carrier**

  The carriage contracts were entered into in a direct contractual relationship between the individual shippers and the main carrier, Corneel Geerts from Belgium. Considering the fact that Corneel Geerts is established in Belgium and the fact that the transport routes began or ended in Belgium, it has to be presumed that Belgian law applies additionally to the transport contracts. The question to the international transport regime that applies to the transport contracts is however far more relevant. Again, a framework carriage contract is lacking. It is therefore not laid out in writing what the shippers
and Corneel Geerts agreed upon precisely. De facto, the transport from Spain to Belgium or vice versa most of the times had an intermodal character. Due to the fact that some shippers in the community perceived the rail connections in south-west France to be unreliable, the choice was made to carry the goods by road and short-sea. The goods travelled by road to the port of Bilbao respectively Zeebrugge, to continue short-sea which was carried out by a subcontractor carrier at the instruction of the main carrier (Corneel-Geerts) and to end with a road transport leg from the port of Zeebrugge respectively Bilbao to the delivery address. Corneel Geerts as main carrier contracted Transfennica which took care of the short-sea part in its own name. Therefore no legal relationship came into wording between the shippers and this subcarrier. The fact that transport by rail was an option gives the impression that Corneel Geerts was free to choose the modality. That suggests that parties did not agree to carry by road, but concluded multimodal transport agreements. That means that it has to be evaluated on the basis of the national transport law that applies to the multimodal transport agreement which part of the transport is covered by which convention or national transport law. In this respect it has to be noted again that fact that written agreements are lacking, does not contribute to legal certainty. As far as the short-sea part actually existed of so-called roll-on-roll-off carriage (goods are not unloaded from the vehicle which is used for the road transport, but the whole trailer is transported over the short-sea part of the transport route), it is clear which international regime applies. In such case the short-sea part is absorbed by the road transport part and the CMR Convention applies to both parts.

**Transport damages and incidents**

During the test period some transport damages and other incidents occurred, such as rain damage to cargo packaging as a result of a defective tarpaulin, damage to a short sea vessel as a result of bad weather and delays caused by closed mountain passes due to heavy snowfall. However, the relationships between the shippers did not come under pressure as a result of these transport damages and other incidents.

**Conclusion from a legal perspective**

Although the written legal framework developed by the CO³ consortium has not been used in this test case and although for the moment the collaboration will not be continued due to lack of critical mass, we can draw lessons from the snags this test case has revealed, also from a legal perspective. Furthermore, the test case has confirmed some basic impressions and beliefs of the CO³ consortium, such as the elementary role trust plays in horizontal collaboration projects and the fact that it is of importance to align and synchronize logistics, commercial and legal processes.
4. Gain sharing (viewpoint provided by Argusi)

This test case focusses primarily on the viability of collaborative short sea transport of full trailer loads between Belgium and Spain. In this section we discuss how the question of fair gain sharing can be approached in this CO³ case study. The scope is the complete door-to-door transport from logistics facilities of four companies in Belgium (Baxter, Eternit, Ontex and Colruyt) to the pick-up or drop locations of the same 4 companies in Spain (Eternit, Baxter, Colruyt and Ontex), and vice versa.

As in any gain sharing exercise, we will compare the individual costs of the involved companies when collaborating to the cost incurred by these companies when they would not collaborate. Specific to this situation is the element of modal shift. This makes that the base case (i.e., no collaboration) is based on unimodal direct road transport between Belgium and Spain, while the collaborative situation mostly consists of a three step road - short sea - road sequence. The picture below illustrates the various stages of the multimodal transport chain between Belgium and Spain.

![Diagram of the transport chain between Belgium and Spain](image)

**FIGURE 17: GAIN SHARING IN THE VARIOUS STAGES OF THE MULTIMODAL TRANSPORT CHAIN**

Gain sharing as approached by the CO³ project is only useful if the costs under collaboration are different from the standalone costs (i.e., without collaboration). Wherever this is not the case, the collaboration cost is simply the sum of the standalone costs, and synergy is not present. In this case, this is true for two of the three stages of the collaborative supply chain. The short sea part operated by Transfennica is charged by a pre-agreed fixed rate per trailer, so there are no scale effects from collaboration. Also, on the Belgian road segment, all companies are only charged a fixed tariff for the average distance that the (FTL) trailers are transported from the companies to Zeebrugge and back. Backloads are not charged, since the logistics service provider Corneel Geerts has a customer base that is large enough to make sure that empty kilometers of the tractor units will almost always be avoided.

If we wish to compare the collaboration costs (via road-short sea-road) to the stand-alone costs (road only), the only segment that we have to dive deeper in is the road part between the port of Bilbao and the locations of the test companies in Spain, and vice versa.
The companies have in Spain multiple pick-up/drop locations that have a much higher geographical spread than the Belgian locations of the shippers, with empty distances between drop-off and pick-up locations reaching almost 550 kilometers in the worst case. As is shown on the map below, 4 Spanish pick-up/drop-off points are located very close to each other. It is obvious that maximal synergy can be created when a northbound shipment originating from one of the four cities in this ‘cluster’ can be combined with a southbound shipment from Belgium to one of these cities. In such a case there are almost no empty kilometers to be charged. If this combination cannot be made or when a combination is made with Sabinanigo, Valladolid, Portillo or Valverde, then there is barely any synergy (or the synergy becomes negative), because in that case there is no backload available and the empty kilometers have to be paid. This is also caused by the facts that the Corneel Geerts customer network in Spain is less dense than in Belgium and that the industrial activity in the northwest of Spain is more dispersed than in Belgium.

Based on the data of the test case for roughly two months and 47 shipments, the cost elements that are taken into account are the following:

- Road transport costs in Belgium: no collaboration advantages due to dense network of Corneel Geerts;
- Short sea ferry costs: no collaboration advantages due to fixed price per trailer;
- Trailer rent: no collaboration advantages;
- Road transport costs in Spain: collaboration brings benefits by reducing empty kilometers and synchronizing vehicle movements.

In addition, we know the standalone (=baseline) cost levels of direct road transport from Belgium to Spain and vice versa. The synergy is this case is determined by the difference between the sum of the standalone costs of all 47 shipments and the sum of the collaborative costs for these same shipments via short-sea. The overall synergy during the pilot period is -3%: the collaborative short-sea transport concept turned out to be on average 3% more expensive than the total cost for direct road transport. Just like positive gains, also these negative gains can be allocated to the collaborating companies using the Shapley value (see Cruijssen, 2012, CO³ position paper on the operational framework).
The Shapley value is additive, which means that the overall gain sharing can be safely reduced to the sum of the gain sharing results per individual days, or in this case the individual sailings of the short sea vessel of Transfennica.

This is convenient, because on any given sailing there were no more than two shippers combined. This means that the Shapley value can be simplified to splitting the (negative) benefits into two equal shares (fifty-fifty).

Because of confidentiality reasons, the exact cost level per shipper cannot be published here.

In this test case, there were significant differences in both the transport size (monthly volume) and location of the Spanish pick-up/drop-off points of the 4 participating shippers. As a final remark, the question can be raised whether these differences should be taken into account when using the Shapley method for calculating the fair gain sharing.

Firstly, as concerns the high number of empty kilometers that need to be driven by Corneel Geerts to serve the shippers with “faraway” Spanish pick-up/drop locations, those will only need to be paid in the roundtrips where these particular shippers are part of the roundtrip coalition. These roundtrip coalitions are less efficient and will generate more transport costs than the roundtrips where the combined Spanish locations are located more closely together. As such, the Shapley value will allocate a larger portion of the total transport costs to the shippers who have facilities in remote regions. While this is perfectly justifiable based on the facts, the question can be asked whether a shipper should be ‘penalized’ for the locations of his physical facilities when he becomes a member of a transport community. These locations are known in advance to the other community members, so it could perhaps be negotiable to ‘spread out’ the empty kilometers across all shippers. In addition, it should be the responsibility of the neutral trustee in the preparation phase of the project to bring together shippers who have maximal geographical fit, i.e. who generate minimal empty kilometers. This of course requires that the trustee has a vast amount of knowledge and visibility of transport networks and logistics facilities across Europe.

Secondly, as concerns the fact that 2 shippers in the test case have structurally much higher transport volumes than the other 2, this should not be a factor in the Shapley gain sharing calculation. Shapley assumes that shippers are rewarded relative to the synergy they help create, and not relative to their size. For example, if a big shipper has a rigid transportation schedule and wants to ship a lot of loads on dates which cannot be combined with other community members, his synergy contribution will be close to zero. At the same time, a small shipper who has a limited amount of loads but is willing to be flexible and shift them in time to make combinations possible, will contribute a lot of synergy and Shapley will reward him as such. One aspect that could be taken into consideration for high volume shippers, is that their individual cost level and transport purchasing power can be assumed to be quite strong. This will create indirect benefits for smaller shippers who join the coalition. In theory, this difference in purchasing power between big and small shippers could be used as a calculation parameter in the Shapley value or as a gain sharing negotiation factor between the parties. As such, big players in a horizontal collaboration could try to ‘sell their volume power’ while small players could try to ‘sell their flexibility’ to each other. The elaboration of this aspect is out of scope for the CO³ project. However, in case the coalition members do agree to use an ‘adjusted’ Shapley gain sharing method, it is important to always recalculate the stability of the resulting coalition.
5. Conclusion

This document describes the creation and management of an orchestrated horizontal community for collaborative intermodal transport between 4 shippers (Baxter, Colruyt, Eternit and Ontex) and 2 logistics service providers (Corneel Geerts Transport and Transfennica) under the guidance of a neutral trustee (TRI-VIZOR).

This test case has been developed as the 2\textsuperscript{nd} applied example in the context of the EU-financed project ‘Collaborative Concepts for Co-modality’ or CO\textsuperscript{2} (www.co3-project.eu). Conform the standard methodology promoted by the CO\textsuperscript{3} consortium, TRI-VIZOR applied a 3-phased approach to set up the case:

- Phase 1: identification of compatible shippers and transport flows
- Phase 2: preparation of a collaborative concept and business case
- Phase 3: operational implementation and management

It was confirmed that this methodology delivers good results and provides the collaborating companies with a clear and logical roadmap.

Based on the overlap between the shipper networks, Full Truck Load transportation on the corridor between Belgium and the northwest of Spain was selected as scope of the test project. It was demonstrated that by bringing together the right shippers, a stable and balanced roundtrip volume could be isolated with sufficient critical mass to enable simultaneous improvements in logistics cost, service level and sustainability.

From the 6 shippers that were initially planning to join the test case, 2 dropped out during the preparation phase and 4 went ahead as planned. Supported by TRI-VIZOR, this shipper community organized a collaborative tender to source joint transport capacity. Finding suitable Logistics Service Providers with the right mindset to support horizontal collaboration proved to be rather challenging, but not impossible. This indicates that a “mental shift” remains not only needed on the side of the shippers, but also on the side of the service providers. The CO\textsuperscript{3} Consortium will continue to work on this.

The collaborative approach lowered the threshold for the individual shippers to apply intermodal transport, in this case short sea shipping. Corneel Geerts Transport and Transfennica offered a strong bundled service offering in this respect and “walked the talk” when it came to supporting this test case of horizontal collaboration. There were benefits on both sides: in exchange for a stable and balanced intermodal volume, it would have been possible for Transfennica to increase the weekly number of sailings from 2 to 3, this considerably increasing the service level for the shipper community. All shippers were satisfied with the quality and reliability of short sea transport.

The test case went live in January 2013 and finished in April 2013. During this period, the community successfully synchronized and shipped back and forth more than 60 FTL loads between Belgium and Spain. Collecting and synchronizing the orders of the shipper community in real-time was essential for the success of this transport collaboration. Deploying a suitable and neutral ICT platform, in this case the TRI-VIZOR “Cross Supply Chain Cockpit\textsuperscript{®}”, was a critical success factor to make this possible. This platform also supported and simplified the administrative and financial management of the transport bookings, including invoicing and gain sharing. Of course, shifting loads in time can only happen with permission from the shippers. They will decide the degrees of freedom and as such also the potential savings that the neutral trustee can realize for the community.

Although the realized carbon footprint savings of the community were very substantial with a CO\textsubscript{2} reduction by more than 30\%, the expected cost savings did not materialize. Instead, there was a slight total cost increase of ca. 3\%, which made the collaborative solution more or less cost neutral. This was mainly due to the lack of critical volume committed to the test case, in part caused by one of the participating shippers dropping out of the project at the very last minute. This increased the average empty distance between the drop-off and pick-up locations in Spain and thus the overall cost of road transport for the community.
Assuming a higher critical mass of FTL roundtrip volumes in the community, the test case could have been profitable. The business case did not take into account the effects of the upcoming French road tax, which would add an additional cost saving for the shippers for every intermodal freight movement.

The test case confirmed that two essential building blocks need to be in place to ensure the long-term stability and scalability of high-volume horizontal collaboration. These are an anti-trust compliant multilateral legal framework and a fair method for dividing costs and benefits between the community members. The CO³ Consortium recommends to use the Shapley value for gain sharing, because it is the only solution that is “always correct”. Both the legal framework and the Shapley value deserve continued promotion, dissemination and support to become known and accepted as best practices in the European market.

As foreseen, this test case was paused for evaluation and documentation in May 2013. However, both the participating shippers and Logistics Service Providers expressed an interest to further explore and apply horizontal collaboration in the future. It is therefore possible to reactivate the community in case sufficient additional participants and volumes can be found on the Belgium – northwest Spain corridor. Interested parties who have potentially compatible volumes are invited to contact the CO³ project office.

In conclusion, this test case demonstrates that neutrally orchestrated horizontal communities for synchronized and balanced intermodal transport can work very successfully. They can create a high degree of efficiency, effectiveness and sustainability in the transport market, on the conditions that a sufficient level of critical mass can be brought together and the community is supported by the right methodology, tools and technology.
References


Cruijssen, 2012, CO³ position paper on the operational framework, www.co3-project.eu