Method and tool support for the pilot projects:  
A CO3 position paper

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EXECUTIVE SUMMARY

The EU-funded project ‘Collaboration Concepts for Co-modality’, or CO3 in short, is a project that aimed to develop, professionalize and disseminate information on the business strategy of logistics collaboration in Europe. The goal of the project was to deliver a concrete contribution to increasing load factors, reducing empty movements and stimulate co-modality, through collaboration between industry partners, thereby reducing transport externalities such as greenhouse gas emissions and costs. Really showing the concept and great effects of the horizontal collaboration cases developed within the CO3 project has been a breakthrough in the acceptance of the industry. The belief in horizontal collaboration being one of the most promising solutions in the battle towards higher efficiency, effectiveness and sustainability is growing at big industry players.

This paper provides an overview of the toolbox and business models for horizontal collaboration developed within the CO3 project. With the development of five horizontal collaborations in pilot studies the CO3 toolbox has been applied in practice.

The developed toolbox consists of the CO3 advocated tools for a fair gain sharing mechanism, a structured development process, a neutral trustee and an online game-application of the tools:

- The Shapley value:
  Using the Shapley value ensures fairness of gain sharing and stability of the collaboration. The Shapley value distributes costs and rewards to the collaboration participants based on the added value that each participant has in the collaboration.

- A legal framework:
  Since logistics collaboration under CO3 has horizontal and vertical aspects, it can only be covered by several multiparty agreements. A legal framework consisting of three model agreements has been developed: a collaboration agreement between the shippers, a model service agreement between the shippers and the trustee, and a skeleton carriage contract between the shippers and the logistics service provider.

- A neutral trustee:
  A neutral trustee manages the cooperation between the participants of a collaboration, makes sure the maximum benefit is achieved within the collaboration, and takes away concerns regarding competition law since confidential data is not (in)directly shared with (actual or potential) competitors. The trustee tasks are divided in online activities (operational tasks) and offline activities (supporting role). It is advised to divide the two tasks over two separate legal entities.

- The CO3 calculator:
  The CO3 calculator is an online application consisting of three modules: a collaboration and co-modality example (http://88.32.124.84/CO3/scenario.aspx?scenid=4), a Shapley calculator which can calculate the gain sharing for up to eight shippers (http://88.32.124.84/CO3/SharingCalculator.aspx), and a trustee game making (future) actors in horizontal collaboration familiar with the tools and the possible outcomes (http://88.32.124.86/CO3).

Five pilot projects have been executed and evaluated within the CO3 project. When possible the usage of CO3 tools in each of the phases of the CO3 methodology for horizontal collaboration development (identification, preparation and operational phases) have been evaluated.

- The first case concerns a road partnership between two shippers. In this case the CO3 advocated Shapley value and the legal framework have not been used. There was a split in the offline trustee tasks (external company) and online trustee tasks (shippers themselves with their joint logistics service provider). The actual cost savings were double digit percentage savings.
- The second case deals with a multimodal partnership of multiple shippers. The Shapley value was tested for this case. The legal framework was not used but a letter of intent was signed by the participants. The CO3 advocated split in online and offline trustee tasks was not followed; one neutral trustee took care of both tasks. Actual CO2 emissions were reduced with 32% during the pilot.
- A horizontal partnership for the daily distribution of groceries and FMCG is the third case. The selected gain sharing rule, equal profit method, quite closely resembles the CO3 advocated Shapley value in this case. Formal contracts have been established on all three levels of the CO3 advocated legal framework. The online and offline tasks of the neutral trustee were divided over three organisations in this case (one taking care of the offline tasks and two taking care of the online tasks).
- The fourth case concerns a horizontal partnership for warehousing and value added logistics. After adding a third shipper to the collaboration the Shapley value will be implemented. A traditional service contract with some additional collaboration clauses was signed between both shippers and the logistics service provider. Also in this case the online and offline tasks of the neutral trustee were divided over three organisations (one taking care of the online tasks and two taking care of the offline tasks). During the first audit cost savings of 10–15% were realised.
- The last case is a case developed independently of the CO3 project by Procter & Gamble (P&G) but with extensive use of the tools and learnings of the CO3 project. The case concerns a horizontal multimodal collaboration between two shippers. The Shapley value has been used for gain sharing. The internal legal departments have settled the legal challenges. P&G has acted as a trustee. Double digit percentage gains were accomplished.

Next to the case studies the role of ICT as a critical success factor in horizontal collaboration was analysed. ICT has turned out to play an important role in all three phases of the CO3 methodology for horizontal collaboration development (identification, preparation and operational phases). The added value of ICT was also shown in the five pilot studies.

Finally, the developed legal framework was validated in practice by evaluating the experiences from the pilot studies and by executing interviews with the legal departments of various High Level Industry Board-members and other market participants. In addition, the legal framework and the model agreements, which are all developed under Dutch law, have been evaluated against the legal systems of six other relevant jurisdictions (Belgium, France, Spain, Italy, Germany and United Kingdom) by legal specialists (final concluding report under construction – expected to be published September 2014).

Several conclusions can be drawn from this paper:

- The pilot studies show that horizontal collaboration resulted in double digit percentage gains in three cases. Besides, CO2 emissions up to 30% have been accomplished by horizontal collaboration.
- General critical success factors throughout all phases of the CO3 methodology for horizontal collaboration development are trust between partners, the presence of people with a belief in the concept at all participants and the use of ICT.
- The practical use and value of the Shapley value for gain sharing was demonstrated in one pilot project; the gain sharing was perceived as fair by the participants and the Shapley value offered a base for a stable collaboration.
- It is sometimes complicated to catch horizontal collaboration in contracts; legal difficulties should be considered as challenges and should not be a reason for the parties to ignore the legal part. In fact, it stresses the importance of making clear arrangements and subsequently laying those arrangements down in written contracts.
- There appears to be a lot of deep-rooted prejudices and misunderstandings when it comes to legal. Parties often do not realize that as soon as oral arrangements are made or working together starts on the basis of implicit arrangements (and expectations) only, there already is an agreement in place. Obviously,
written contracts are preferable to oral or implicit arrangements because they provide legal certainty and proof of the arrangements and intentions, especially in a more complex collaboration.

- Legal departments should be involved in the development of horizontal collaborations from an early stage (identification phase) so they can contribute in a constructive way and coordinate commercial and legal processes within the company.
- The use of a neutral trustee was seen as a critical success factor by participants of all pilot studies.
- The division of online (operational) and offline (supporting) trustee tasks over two organisations offers neutrality and stability advantages. Besides, it contributes to the governance of a collaboration with respect to competition law, in case of a collaboration between competitors.
- The CO3 calculator adds value by showing insight in the potential of horizontal collaboration and the calculation of the Shapley value to possible collaboration participants.
- The developed trustee game within the CO3 calculator can have a role in promoting the concept of horizontal collaboration and the CO3 advocated tools.
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1. **INTRODUCTION**

1.1 **THE CO3 PROJECT**

The EU-funded project ‘Collaboration Concepts for Co-modality’, or CO3 in short, is a project that aimed to develop, professionalize and disseminate information on the business strategy of logistics collaboration in Europe. The goal of the project was to deliver a concrete contribution to increasing load factors, reducing empty movements and stimulate co-modality, through collaboration between industry partners, thereby reducing transport externalities such as greenhouse gas emissions and costs. The project coordinated studies and expert group exchanges and has built on existing methodologies to develop legal and operational frameworks for collaboration via freight flow bundling in Europe. Furthermore, the project consortium of knowledge institutes and industry partners came up with joint business models for logistics collaboration. The developed tools, technologies and business models have been applied and validated in the market via pilot studies. Finally, the CO3 consortium has promoted and facilitated matchmaking and knowledge-sharing through conferences and practical workshops to transfer knowledge and increase the market acceptance of collaboration.

The core of the CO3 project is what 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 companies wanting to collaborate and finally the actual test cases for collaboration.

![Figure 1: The CO3 applied research cycle](image)

1.2 **TOOLBOX**

In the CO3 project an operational framework (Cruijssen, 2012) and a legal framework (Biermasz, 2012) have been developed. The key messages to come to a successful horizontal collaboration presented in the frameworks are the need for a fair gain sharing mechanism, a structured development process and a neutral trustee. The advocated tools for these key messages are the use of the Shapley value for fair gain sharing, the use of a legal framework in the development process, and the use of a neutral trustee for both online and offline activities. The tools have played an important role in supporting the pilot cases executed within the CO3 project. The case studies provide good settings to apply and validate the advocated tools. An online application, the CO3 calculator, has been developed to make (future) actors in horizontal collaboration familiar with the tools and the possible outcomes ([http://88.32.124.84/CO3/scenario.aspx?scenId=4](http://88.32.124.84/CO3/scenario.aspx?scenId=4)), ([http://88.32.124.84/CO3/SharingCalculator.aspx](http://88.32.124.84/CO3/SharingCalculator.aspx)) and ([http://88.32.124.86/CO3](http://88.32.124.86/CO3)).
1.3 **BUSINESS MODELS**

Important characteristics of business models have been gathered by literature research and interviews (Palmer at al., 2012). The base of a good collaboration is formed by trust among the partners and the availability of the right resources. Having an economic and operational fit for example (compatible vehicles, complementary delivery area and sizes of loads, compatible products and service level) is the next step. The strategic fit (similar business objectives) between collaborators is the next very important level, as is the cultural fit.

A business model to create horizontal collaboration has been developed. The business model consists of three phases. The initial stage is the identification phase, in which compatible shippers and transport flows are identified. The second phase is the preparation phase. Within this phase a collaborative business concept and the business case are prepared. The third and last phase is the operation phase, which covers the operational implementation and management activities.

![Diagram of business model phases](image)

*Figure 2: Business model horizontal cooperation*

1.4 **PILOT PROJECTS**

Within the CO3 project four case studies setting up different types of horizontal collaboration, an evaluation of the role of ICT within horizontal collaboration, and a validation of the legal framework through interviews have been executed. Following the applied research cycle, in all pilot projects the developed toolbox and business model have been used, although sometimes in a slightly modified manner due to case study specifics.

1.5 **OUTLINE PAPER**

This position paper aims to describe the advocated tools, the business models, and the practical use of this toolbox within four pilot projects executed within the CO3 project.

The advocated tools in the toolbox will be discussed in the next chapter. Chapter three describes all pilot projects that have been executed within the CO3 project. Firstly, the four case studies are described as is an additional case developed by Procter & Gamble (P&G). An overview of the tools from the toolbox that have been used is provided per phase of the business model. Each case study subchapter is concluded with a discussion. Hereafter, the results of the evaluation of the role of ICT and the validation of the legal framework are discussed. The last chapter in the paper consists of the conclusions that can be drawn from the earlier chapters.
2. TOOLBOX

In the CO3 project an operational framework (Cruijssen, 2012) and a legal framework (Biermasz, 2012) have been developed. The key messages to come to a successful horizontal collaboration presented in the frameworks are the need for a fair gain sharing mechanism, a structured development process and a neutral trustee. The advocated tools for these key messages are described in this chapter. An online application, the CO3 calculator (http://88.32.124.86/CO3), which has been developed to make (future) actors in horizontal collaboration familiar with the tools and the possible outcomes (Genta and Cruijssen, 2013), is also described in this chapter.

2.1 SHAPLEY VALUE

The two main elements of gain sharing are fairness and stability. Literature and business research have shown that it is crucial for the success of the collaboration to have a fair gaining mechanism in place that is received as fair by all members of the collaboration. A fair gain sharing mechanism is a prerequisite for a collaboration’s stability since many horizontal collaboration initiatives have been stopped due to mistrust about the applied allocation rule (Cruijssen, 2012).

The Shapley value (Shapley, 1953) provides a way to fairly distribute the costs and rewards to a number of participants in a collaboration with unequal contributions to the coalition. The distribution is done based on the added value that each participant has in the collaboration. Using the Shapley value ensures that each participant gains as much or more from the collaboration as it would have when acting individually.

The Shapley value is the only solution concept that satisfies all five fairness properties that are useful in the context of horizontal logistics collaboration (Shapley, 1953).

1) Efficiency: no value is lost since the Shapley value ensures that the total value of the collaboration is distributed among the participants;
2) Symmetry: when two participants create the same additional value to the collaboration they will receive the same share of the total value;
3) Dummy: participants that do not contribute anything to the collaboration except their individual value receive exactly their individual value as the final share of the total value;
4) Strong monotonicity: the payoff of a participant will increase if all of the participant’s marginal contributions increase;
5) Individual rationality: all participants will be better off in the collaboration than alone.

These properties are very relevant in practice, which makes the Shapley value a very attractive allocation method to use.

2.2 LEGAL FRAMEWORK

Contracts are useful since they provide legal certainty, facilitate a smooth working of the collaboration, create uniformity, and provide proof of the intentions and arrangements of the parties involved. Important aspects that need to be covered by the contracts are cost and gain sharing, rules with respect to volume variation, entry and exit clauses, competition law aspects and a liability regime. Given the fact that most horizontal collaborations have an international character, it is also important to implement rules with respect to the applicable law and jurisdiction.

Since logistics collaborations under CO3 have horizontal and vertical aspects, it can only be covered by several multiparty agreements. A legal framework existing of three model agreements has been developed (Biermasz,
The legal framework is supplemented with two reports, one focussing on the competition law aspects (Biermasz et al., 2014) and one focussing on the international private law and international transport law aspects (multimodality) (Biermasz and Louws, 2014). The purpose is to use this framework of model agreements as an objective tool to facilitate real life collaboration(s) (projects), although in practice customization on a case-by-case basis will always stay necessary.

There are three model contracts in the legal framework. Firstly, a collaboration agreement between the shippers is needed. This collaboration has a contractual nature only. The shippers do not enter into a joint venture or constitute a separate entity. Secondly, since the CO3 consortium advocates the use of a neutral, independent and trusted third party (the trustee) to facilitate the collaboration between the shippers, an additional contractual layer is needed: the model service agreement between the shippers and this trustee. All shippers will enter into this multiparty agreement on an individual basis. Thirdly, a (skeleton) carriage contract between the shippers and the logistics service provider(s) is needed. Each shipper enters into a separate carriage contract with the logistics service provider. As shown in figure 3 the trustee is not a party to this skeleton carriage contract.

![Figure 3: Overall picture legal framework](image)

The model agreements have been developed under Dutch law. Legal specialists in other relevant jurisdictions (Belgium, France, Germany, Italy, Spain and United Kingdom) have checked the legal framework and the two additional reports against their own national legal systems and reported on the similarities and possible differences (final concluding report under construction – expected to be published September 2014).

2.3 Neutral Trustee

Because of the complexity of a collaboration between several shippers and logistics service providers, a trustee is needed to manage the relations between the participants, to make sure that the maximum benefit is achieved within the collaboration and to take away concerns regarding competition law. The trustee is responsible for collecting and analysing data and for the management of the collaboration of a number of different shippers, logistics service providers and / or horizontal communities (Cruijssen, 2012). This way, confidential data of shippers does not have to be shared directly among (actual or potential) competitors to be able to calculate the possible synergy of a collaboration.

The trustee typically performs two types of collaboration support, which are called online and offline activities. The online activities are the responsibility for the harmonious organization of daily planning processes, transport activities and operations making the trustee an actual actor in the horizontal community. The offline activities are not part of daily operations, but include all activities that come with an external, supporting role. Since there are two separate tasks, it is possible to divide the trustee function over two separate legal entities, which enables the option of employing two different business models for the two functions, e.g. a percentage fee of the synergy savings for the online services and a consultancy basis for the offline services.
The main, never to compromise, keywords for as well the online as the offline functions of a trustee, which distinguishes the trustee from a 4PL, are neutrality, transparency and safeguarded confidentiality of data provided (Cruijssen, 2012).

2.4 THE CO3 CALCULATOR

To make (future) actors familiar with the advocated tools for horizontal collaboration an online application called CO3 calculator has been developed. The CO3 calculator consists of three modules. Firstly, there is a collaboration and co-modality example where the user can assess the synergy of different sets of collaborations (http://88.32.124.84/CO3/scenario.aspx?scenId=4). Secondly, a Shapley calculator is provided, which offers users a tool to calculate the gain sharing for up to eight shippers with an implementation plan graph (http://88.32.124.84/CO3/SharingCalculator.aspx). The last tool is a trustee game, in which the user can act as a trustee and set up the best coalition possible from a set of ten shippers (http://88.32.124.86/CO3).

Each turn the coalition stability and synergy will be calculated based on the chosen action of the player (the trustee). Possible actions are adding shipper to or removing participants from the coalition, increasing the coalition stability by investing in the gain sharing rule or a legal framework, buying advice from an external party on which shipper would be the best addition to the current consortium, or leaving the collaboration as it is. The trustee game provides a fun and interactive way of making shippers familiar with horizontal collaboration and showing them the possible results.
3. PILOT PROJECTS

This chapter provides a detailed description of the pilot projects that have been executed within the CO3 project. The tools that have been used are described and a discussion is given.

3.1 ROAD PARTNERSHIP BETWEEN TWO SHIPPERS

The first test case concerns the bundling of the road transport flows between two shippers: manufacturing companies JSP and Hammerwerk. JSP is a multinational company specialized in innovative lightweight plastic applications, mainly for the automotive, packaging and consumer goods industry. Their supply chain managers were early believers and adopters of horizontal collaboration and very active in finding possible partners to collaborate with. Hammerwerk is a German manufacturer of advanced metal components for the automotive and aviation industry. HS Line, a locally based transport service provider in the Czech Republic, was selected as the joint logistics service provider. Tri-Vizor, a Belgium company specialized in horizontal collaboration, has acted as a neutral trustee in the process of creating this horizontal collaboration.

The manufacturing companies have manufacturing plants located next to each other in Cheb, Czech Republic and one of their delivery addresses in the state of Baden-Württemberg in the south-east of Germany. They formed a horizontal collaboration for the co-loading of their products from the Czech Republic to south-east Germany. It turned out the actual cost savings were double digit percentage savings, accomplished by co-loading and intelligently bundling the freight flows of the companies (Verstrepen and Jacobs, 2012).

3.1.1 GAIN SHARING

Being the CO3 advocated gain sharing rule, the Shapley value rule was considered for fair gain sharing in this collaboration. If only two shippers form a collaboration, the Shapley value will result in a fifty percent gain share for both shippers. This sharing method was not perceived as fair by the coalition members since there would be a three times bigger gain for JSP due to big difference in original individual transportation costs. Therefore, the consortium decided to take the same percentage of cost savings for both shippers as a sharing mechanism.

3.1.2 LEGAL FRAMEWORK

The fact that JSP and Hammerwerk are not competitors is comfortable from a competition law point of view. In the cooperation it was decided not to lay down the collaboration in a collaboration agreement due to the relative plainness of the collaboration; it concerned a simple co-loading. Although JSP and Hammerwerk did not enter into a formal contract, they did make an initial plan which was laid down in a non-disclosure agreement (NDA).

3.1.3 TRUSTEE

In the identification phase, the first phase of the CO3 methodology for horizontal collaboration development, Tri-Vizor acted as a neutral trustee performing offline activities such as collecting and analysing high level flow volumes of both shippers and building trust between the participants.

Tri-Vizor also performed the offline trustee tasks in the second phase of the CO3 methodology, the preparation phase. After more detailed freight flow and cost data were provided to Tri-Vizor, they calculated financial (transport cost savings) and sustainability gains (savings in carbon emissions). Two pilot shipments were
organized to validate the possible savings of ‘smart bundling’ (pro-active shipping date synchronization and volume optimization) and to test the operational feasibility (load securing, weight balance, safety in the truck) of co-loading products with such diverse characteristics. Since these pilot shipments turned out to be successful, the disbelief and scepticism still existing in the operational departments of both companies was taken away.

Also in the final phase, the operation phase, the offline trustee role was executed by Tri-Vizor. They facilitated the process of finding a suitable shared logistics service provider. Tri-Vizor also mediated in the selection of an appropriate gain sharing mechanism. Being the offline trustee Tri-Vizor streamlined all operational processes of both shippers and documented these in a flowchart of the daily collaboration process. Finally, the following up and evaluation of the collaboration will be done regularly by Tri-Vizor.

The online trustee tasks in the operational phase (day-to-day operational planning and synchronization) are being handled by the logistics departments of the manufacturing sites of both shippers, in close contact with the destination sites and the logistics service provider HS Line.

3.1.4 Discussion

One of the virtues of this case is that it concerns a simple and therefore easily replicable example of horizontal collaboration. This test case showed that people are a crucial element in setting up successful horizontal collaboration; one or more ‘collaboration champions’ in the management teams of at least one of the shippers are needed to be able to succeed. The neutral trustee role has proven to be useful in the process of convincing people in all participating companies since he has no stake in any of the participants’ organizations. The CO3 calculator would have been a useful tool in the process of convincing all stakeholders.

The role of the neutral trustee also proved to be of an added value in providing thorough and objective data analyses and calculating greenhouse gas emission gains and cost reduction possibilities. One can say the trustee function was divided over two separate organizations because the CO3 advocated split in offline and online activities was made: the offline function was fulfilled by Tri-Vizor and the (minimum) online function was executed by the shippers themselves in close cooperation with the logistics service provider. This split turned out to work well in this horizontal collaboration.

This collaboration demonstrated great trust between the collaboration parties supported by the trustee. However, remarks can be made with respect to the lack of written agreements. Parties who do not enter into written contracts must realize that they also have a contract when they ‘only’ make oral or implicit arrangements. It worked out fine so far in this case, but in general it is advised to have written contracts in place.

Making the horizontal collaboration stable and sustainable is a difficult job. A neutral trustee can assist in this process. In this case, two choices were made that can possibly negatively influence the stability of the collaboration. Firstly, due to a big difference in the original transport tariffs of both shippers the Shapley value scenario was perceived as unfair and the choice has been made not to use the advocated CO3 tool of the Shapley value for the gain sharing. Secondly, due to the relative plainness of the collaboration, the limited freight flow volume of this collaboration and the fact that the Czech Republic is not a core jurisdiction for the CO3 consortium, the decision has been made not to implement the advocated CO3 legal framework. The following up and evaluation will show whether these decisions influence the stability of the collaboration.

3.2 Multimodal Partnership Between Multiple Shippers
The second test case concerns the creation of a horizontal coalition for collaborative intermodal transport between four shippers (Baxter, Colruyt, Eternit and Ontex) and two logistics service providers (Corneel Geerts Transport and Transfennica). Baxter is a global healthcare company that already starting collaboration in 2011, so can be seen an early adaptor of the horizontal collaboration concept. The activities of Colruyt encompass mainly retail, wholesale and food services. Eternit, a brand of the Etex Group, manufactures and sells building materials and solutions. Ontex International produces hygienic disposables for the private label sector. Corneel Geerts Transport is a Belgian logistics service provider specialized in long distance road transport and with experience in organizing multimodal transport. Transfennica is a Dutch owned short-sea shipping company. Lastly, Tri-Vizor, a Belgium company specialized in horizontal collaboration, took the role of neutral trustee in the process of creating this horizontal collaboration, executing both offline and online tasks.

All shippers involved are transporting between Belgium and the northwest of Spain. They formed a horizontal collaboration to create a multimodal (road – short sea – road) closed loop shipping corridor between Belgium and Spain. Upfront calculations showed that overall potential collaboration savings of more than 3% would be realized. The CO2 savings would be over 40%. Unfortunately, a last-minute unexpected drop of volume impacted this number negatively so a negative synergy was experienced during the pilot (3% cost increase for the collaboration). Actual CO2 emissions were reduced with 32% during the pilot (Jacobs et al., 2013).

3.2.1 Gain Sharing

Transportation in this project includes the two-way transport between the logistic facilities of the four shippers in Belgium and the pick-up / drop locations of these same four shippers in Spain. Before the collaboration all four shippers were using direct road transport for these shipments. In the collaboration a road – short sea – road mode is used for the door-to-door transport. Looking at the multimodal model (road – short sea – road transport), the cost of transporting alone are the same as transporting within the collaboration for two parts of the transport: the short sea part (fixed rate per trailer) and the Belgium road segment (fixed tariff for the average distance of full truck loads to Zeebrugge and back – no charges for backloads due to the dense network of the logistics service provider). The road transport in Spain is the part were synergy can be accomplished. The pick-up / drop locations in Spain have a high geographical spread with empty distances reaching up to almost 550 kilometres. Besides, the network of the logistics service provider is less dense in Spain than in Belgium. Since there is no backload available from the far away locations, the empty kilometres need to be paid. This negatively influences the synergy of the collaboration.

The synergy in this project is determined by the difference between the individual costs of the four shippers without collaboration (road transport only) and the collaboration costs (road – short sea – road transport). The overall synergy turned out to be -3%. The Shapley value can be used to fairly allocate the gains over the partners in a collaboration, also in case of negative gains. The Shapley value is additive, which means that the overall gain sharing can be safely interpreted as the sum of the gain sharing results per individual sailing of the short sea vessel. This is convenient since no more than two shippers were combined on any sailing within this project and the Shapley value can be simplified to splitting the (negative) benefits into two equal shares (fifty – fifty) (Jacobs et al., 2013).

3.2.2 Legal Framework

In this test case, the legal relations between the shippers and between the shippers and the trustee were oral arrangements only. The parties did draw up a letter of intent (LOI) in which they committed to a certain volume. Baxter, Colruyt, Eternit and Ontex are not competitors, which is favourable from a competition law point of view. The parties chose to have an operational test before involving legal. The project ended after the test phase because of the lack of the volumes needed and the postponement of the French Ecotaxe Poids
Lourds. The collaboration participants agreed however to consider and discuss further formalization of their relations if the collaboration would continue after the operational test period.

As the CO3 project group advocates, carriage contracts between the individual shippers and the main carrier, Corneel Geerts Transport, were in place. Transfennica was subcontracted for the short-sea leg.

3.2.3 Trustee

In the first phase of the CO3 methodology for horizontal collaboration development, the identification phase, Tri-Vizor acted as an offline trustee. Acting as such Tri-Vizor identified a shortlist of companies with structural flows between Belgium and Spain. After a first meeting, the willing companies provided more detailed transport flow data so Tri-Vizor was able to start executing a more detailed volume analysis and calculating network synergy, resulting in six selected shippers.

In the preparation phase, Tri-Vizor again had the role of offline trustee. The six selected shippers provided all relevant and detailed data needed to evaluate the potential of different collaboration scenarios and come up with a solid business case. Tri-Vizor’s calculations showed a lack of southbound volume from Spain to Belgium, which is why Tri-Vizor searched for an extra partner with northbound volumes (Colruyt). Tri-Vizor evaluated an intermodal approach since a 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 all collaboration partners. Tri-Vizor organized a Request for Proposal to help selecting the most adequate logistics service providers to organize the transport. Corneel Geerts Transport was selected for the operational execution in partnership with short-sea operator Transfennica. Unfortunately, internal resistance and a full truck load requirement within the collaboration made three shippers step out of the collaboration in this phase, one of them just before go-life of the pilot.

Tri-Vizor had the role of both online and offline trustee in the operation phase. The online responsibilities included receiving the transport orders from the shippers, real-time synchronizing and balancing of the transport movements in both directions and making the operational planning to forward to the logistics service provider. These tasks were executed using a control tower system. Incident solving and management of the administrative and financial flows were also tasks of the online trustee Tri-Vizor, in cooperation with the logistics service provider. The offline tasks were coordinating the evaluation after the test period.

3.2.4 Discussion

Although the advocated CO3 way of working is dividing the online and offline responsibilities over two companies, one company was responsible for both the online and offline trustee tasks in this case. The role of a neutral trustee in all three phases was experienced as essential and value-adding by the shippers as well as the logistics service providers. Critical success factors mentioned by shippers and logistics service providers were the established trust and transparency on all levels and modified operational processes to align with the shared collaboration operational process flow. The availability of a logistics control tower and a specialized planning unit have been experienced as critical success factors by the trustee. Establishing a multimodal horizontal collaboration turned out to require a high degree of effort and skills. The CO3 calculator would have been a great support in providing insight and trust in the concept of horizontal collaboration at the shippers.

Coming to a verbal agreement within the collaboration was not a problem. Signing the proposed letter of intent however, took long because of a high degree of caution by the legal departments of the participants. A legal lesson learned is that, while it is understandable from a practical point of view, written contracts should be preferred above oral and implicit arrangements, because they provide legal certainty and proof of the
arrangements and intentions et cetera, especially in a more complex collaboration. This case showed that it is important to involve also legal departments of the shippers from the beginning when starting a horizontal collaboration. The CO3 advocated legal framework can provide support here. It provides legal certainty and uniformity and can guarantee a smooth way of working of the collaboration by clearing away potential legal obstacles. This was an international case, since transport lanes crossed borders and parties from different countries were involved. It would have been advisable for the parties to take aspects of international private law into account, especially because this was a case of multimodal carriage. The collaboration was successful thanks to the mutual trust between the logistics departments of the participants. However, the insufficient transport volumes (mainly caused by the economic crisis in Spain) and the fact that the pick-up and drop addresses in Spain are quite far away from each other caused a negative synergy. Legal agreements about minimum volumes and including an exit clause would have prevented the sudden drop of volume (and synergy).

The Shapley value is the CO3 advocated tool for fair gain sharing. This tool can be used in this particular pilot as well. A question that can be raised is whether it would be fairer to add two factors to the Shapley value in this case taking into account the significant differences in both transport size and location of the Spanish pick-up / drop points of the shippers. Firstly, one can argue to take the difference in purchasing power into account as a gain sharing factor since the high volume shippers provide indirect benefits for smaller shippers due to their individual cost level and purchasing power. Secondly, one can argue to divide the empty kilometre costs over all participants instead of only to the shippers with locations that are further away since all locations are known upfront by all participants. It is the role of the trustee to mediate in making this call and to find shippers who have a maximal geographic fit (minimum empty kilometres). Everything can be renegotiated as long as the stability remains intact. The effects on stability of the collaboration always need to be checked upfront.

### 3.3 Horizontal Partnership for the Daily Distribution of Groceries and FMCG

In the third test case a horizontal collaboration has been created between four FMCG shippers and a logistics service provider. Mars Petcare France is a multinational manufacturer of petcare products. They have their head office in Orléans and were early believers of the horizontal collaboration concept. United Biscuits is a multinational producer of biscuits. Saupiquet is a French specialist in canned tuna products, also active in Germany. Wrigley is a multinational manufacturer of gum products. The shared logistics service provider is Norbert Dentressangle, a multinational logistics service provider specialized in warehousing and road transport. Lastly, IPS Europe, a French company offering logistic services, and GOLS, a French company offering automated logistic tools, took the role of neutral trustees in the process of creating this horizontal collaboration, both executing online tasks only. Mars, being the initiator of the collaboration, took care of the offline tasks.

French retailers require full truck load deliveries from their retailers to their warehouses. The horizontal collaboration was set up to be able to fulfil this requirement. All four shippers have factories across Europe. Within this collaboration they started shipping their products into a shared warehouse in Orléans, which is operated by the shared logistics service provider Norbert Dentressangle. All shippers are responsible for the inventory levels at the retailer’s warehouses since they work with vendor managed inventory. This enables daily shipping of collaborative full truck loads to the retailer's warehouses in France from the shared warehouse by the shared logistics service provider (Guinouet at al., 2012).

#### 3.3.1 Gain Sharing

The gain sharing rule that was selected is the principle of equal profit margins. The collaboration chose this rule so each shipper would have a similar saving percentage. Analysis showed that the results of using the principle
of equal profit margins almost equals the results of using the Shapley value for gain sharing in this case. The selected principle resulted in a stable situation for the collaboration. However, the stability will continuously have to be checked especially when the collaboration composition changes.

3.3.2 Legal Framework
In this test case, formal written contracts have been applied between the individual shippers and the logistics service provider, and between the individual shippers and the trustee. An exit clause is included in the contracts. The shippers in this case are (partially) considered to be competitors, because they are active in the same market and serve the same customers. Therefore, a point of special interest was the compliance with competition law. A LOI has been signed between the shippers, in which they laid down their intentions. To make sure the sensitive data of one shipper would not be identifiable to other shippers, the trustee acted as a ‘Chinese wall’ between the shippers.

3.3.3 Trustee
In the first phase of the CO3 methodology for horizontal collaboration development, the identification phase, Mars acted as a neutral trustee performing offline tasks. Since it was a customer that started enforcing companies to deliver full trucks only, the collaboration consisted of strongly committed companies that want the collaboration to work and last, which was a very strong base to start with.

In the preparation phase, Mars again performed the offline trustee tasks. They communicated with the logistics service providers in the process of selecting a shared logistics service provider. Two shippers started with hiring a shared logistics service provider and opening a shared warehouse together. After the first shipments were carried out, two more shippers entered the horizontal collaboration.

In the operational phase, ISP Europe and GOLS have taken care of the online tasks of the trustee. The online tasks consist of the synchronization of orders and shipments (ISP Europe) and the coordination of the logistics service provider (GOLS). The offline responsibilities were taking care of a fair gain sharing and cost allocation, executed by Mars.

3.3.4 Discussion
The drive and willingness of the shippers was a main success factor in this case study. This horizontal collaboration has a high synergy potential due to the facts that the shippers use a shared warehouse, have the same delivery addresses and have the possibility to always combine into full truck loads thanks to the vendor managed inventory principle applied. The role of the neutral trustee was proved to be important throughout the process, but in this case mainly in the operational phase taking care of a fair gain sharing (offline tasks) and cost allocation and synchronizing the orders and shipments and communicating with Norbert Dentressangle (online tasks). The online and offline tasks were divided over three organisations in this case. Mars, being the initiator of this collaboration, took care of the offline tasks. The online tasks are executed by two neutral companies.

Formal contracts have been established on all three levels of the CO3 advocated legal framework: between the shippers, between the individual shippers and the logistics service provider, and between the individual shippers and the trustee. The use of these formal contracts including exit clauses increased the stability of the collaboration.
3.4 Horizontal Partnership for Warehousing and Value Added Logistics

The fourth test case includes the creation and management of a horizontal collaboration in fresh and chilled (2-4°C) retail distribution between two FMCG shippers and a logistics service provider. Nestlé is a leading nutrition, health and wellness company active in 130 countries. PepsiCo is one of the world’s leading food and beverage companies active in more than 200 countries. The shared logistics service provider is STEF, a European company that is specialized in temperature controlled logistics. Two organisations acted as neutral offline trustees in this case. The Belilux Association of Branded products Manufacturers (BABM), an organisation that strives to build the optimal climate for A-brands in the FMCG industry to deliver value and choice to customers, started to explore possible logistics synergies in five Belgian networks for fresh and chilled goods. After a selection procedure BABM decided to collaborate with Tri-Vizor, a Belgium company specialized in horizontal collaboration, for the further offline trustee tasks. STEF took care of the online trustee tasks.

Since many FMCG shippers transport to the same distribution centres of their customers, horizontal collaboration seems promising in this industry. Manufacturers of fresh and chilled food products are often dealing with less than full truck loads in order to avoid expiration. BABM received a request from one of its members to explore possible synergies in this specific industry. This resulted in a horizontal collaboration in which the two shippers ship their product into a shared warehouse operated by the shared logistics service provider STEF. From here, STEF consolidates orders if the order date and ship-to address is identical for both shippers. During the first audit cost savings of 10–15% were realised (Jacobs at al., 2014).

This case study has been awarded with the ‘CO3 Award for Horizontal Collaboration’ at the final conference of the CO3 project.

3.4.1 Gain Sharing

The Shapley value rule was considered for fair gain sharing in this collaboration, as this is the CO3 advocated gain sharing rule. If only two shippers form a collaboration, the Shapley value will result in a fifty percent gain share for both shippers. Since there is a significant difference in the volumes shipped and the difference in network density, combinations are possible for 90% of the volume of one shipper and only 50% of volume of the other shipper. Therefore, the shippers decided to apply gain sharing based on the STEF pallet price structure, e.g. divide the synergy based on the pallet share in the joint delivery. Both shippers do however see the added value of the Shapley value based gain sharing, so in case a third shipper is added they will implement this gain sharing rule instead.

3.4.2 Legal Framework

Since Nestlé and PepsiCo are competitors, their collaboration in logistics is facing the antitrust laws prohibiting direct information sharing between competitors or even indirect information exchange through a third party (meaning the information goes from competitor A to competitor B through a third party C, the so called ‘hub-and-spoke’ practice). From the beginning, PepsiCo and Nestlé were anxious for the implications of competition law. However, the legal experts that were called in by the parties (BABM) estimated the risk of violating this
law as relatively small since non-competing product groups were in scope. In order to make sure Nestlé and PepsiCo did not see any specific relevant price or volume information from each other, additional legal firewalls were put in place. During the collaboration both external (BABM) and internal legal experts were called in as soon as Nestlé or PepsiCo addressed potential concerns relating to competition law.

In this case, individual contracts between the logistics service provider and both shippers have been signed. Certain rights and obligations of the horizontal collaboration partners were included in these contracts. A formal written contract between the shippers was not achieved because many mental and technical barriers were in the way.

3.4.3 TRUSTEE
In the identification phase, the first phase of the CO3 methodology for horizontal collaboration development, two offline trustees were working on this case. Firstly, BABM started to explore the possible synergy between five fresh and chilled shippers. Hereafter, BABM asks Tri-Vizor to collaborate for the further exploration and quantification of this collaboration. To build trust within the community several face to face meetings were organized by the two trustees together. After signing a NDA, the trustee gathered detailed logistic flow data from the five shippers for analysis. All data went from the shippers through the legal counsel of BABM to Tri-Vizor and the other way around to ensure confidentiality and compliance with the antitrust law. One of the shippers stepped out of the process at this point (for reasons other than antitrust concerns).

The two neutral offline trustees continued to work together in the second phase, the preparation phase. A solid and stable business case was made with the help of a software simulation package by the trustee. Potential synergies and carbon footprints were calculated using a representative sample of three weeks of actual order lines of the shippers. The synergy of the current situation without collaboration, a collaboration without synchronization and a collaboration with synchronization (active bundling) was calculated. Again all data went through the legal counsel of BABM before sending it through to the shippers or Tri-Vizor. One other shipper had to step out of the process at this point.

In the last phase, the operation phase, the two companies again acted as neutral offline trustees. A joint Request for Proposal was submitted for shared warehousing, co-packing and transportation. In this last phase, another shipper stepped out of the collaboration process so only Nestlé and PepsiCo were left. Logistics service provider STEF was selected because they are strong believers and supporters of horizontal collaboration who are willing to apply transparent gain sharing principles in invoicing and to attract new partners into the collaboration. Besides, they are able to provide the required quality, capacity and infrastructure, and have a good location of their warehouse in Brussels. STEF acted as the online trustee, being responsible for the management of the administrative and financial flows and the ad hoc load synchronization. Tri-Vizor will periodically perform audits to make sure that the agreed gain sharing principles are respected in the invoicing process.

3.4.4 DISCUSSION
Key success factors were trust and openness towards the concept of horizontal collaboration and mutuality at all participants, commitment of the logistics management teams, good people management and the presence of solid and neutral project management. One of the key enablers for synergy is the presence of standardized and open ICT systems (e.g. WMS, TSM). Although double digit gains were accomplished in both cost and CO2 reduction, this collaboration has more gain potential. Three shippers dropped out during the establishment of the collaboration due to various reasons. Additional transport volume in the collaboration would enable more synergy. Besides, delivery synchronization has a lot of synergy potential.
Three companies acted as trustees in this case, two being responsible for the offline tasks (BABM and Tri-Vizor, both working on a consultancy contract) and one being responsible for the online tasks (STEF). Since this case was sensitive in the light of competition and antitrust laws, the preparation phase was relatively long and labour intensive. The presence of a second neutral trustee proved valuable in this case. The frequent reassurance by the BABM legal counsel and face-to-face meetings organised by the two trustees together increased the level of trust between the shippers. The perceived added value of the neutral trustee in this case was mainly in the matchmaking, auditing and control, gain sharing calculation, joint tender support, and antitrust protection.

A traditional service contract with some additional collaboration clauses was signed between both individual shippers and the logistics service provider STEF. No multilateral collaboration contract was signed. A legal expert was included in the collaboration, checking all data being send through from shippers to trustee and the other way around. This involvement of a legal expert acting as an adviser during the collaboration turned out to work well.

The collaboration is still active one and a half year after starting the operation phase. STEF is actively looking for a third shipper to join the collaboration so more synergy can be reached. Hereafter, the CO3 advocated Shapley value rule for gain sharing will be implemented, which will increase the stability of the collaboration.

3.5 INTERMODAL PARTNERSHIP BETWEEN TWO SHIPPERS WITH DOMINANT SHIPPER

This case was developed by P&G as an internal demonstration case of the high potential of horizontal collaboration independently of the CO3 project (Barbarino, 2014). Despite this independency, the CO3 framework and leanings have been used extensively. Specifically, the application of the Shapley value represented a real breakthrough to the realization of the pilot. Furthermore, while P&G played the trustee function in this case, it is acknowledged that any further scaling will require a neutral trustee.

The essence of this case is very similar to the road partnership between two shippers. The shippers in this case are P&G and Tupperware, two consumer goods manufacturing companies. Tupperware manufactures plastic boxes, a product with a volume limited truck fill. P&G produces a variety of products. For this case the focus is on detergents, a product with a weight limited truck fill.

Both companies have manufacturing plants located in Belgium. After matching lanes a 98% overlap was found on the lane supplying the Greek market. While Tupperware transport was road transport only, P&G’s main line to Greece was an intermodal transport line with extensive use of 45 foot containers (truck and train). After starting the horizontal collaboration all direct truck shipments of Tupperware were eliminated. Instead, Tupperware cases were send to the P&G Distribution Centre in Mechelen. Here, the Tupperware cases were top loaded on the detergents pallets and transported to Greece using the P&G 45 foot containers. This way, the empty volume on top of the detergents pallets was utilized. Even after all the required manipulation the net cost savings were still double digit percentages. The operation is now entering its second year of life.

This case won the audience award for ‘Best Logistic Innovation of Belgium’ for 2014 and was presented at the CO3 final general assembly (see appendix I).

3.5.1 GAIN SHARING

In the P&G Tupperware collaboration all the savings are with Tupperware (since all their dedicated services to Greece were eliminated) and all the extra manipulation costs are with P&G. Any ‘simple’, ‘heuristic’ or ‘pragmatic’ rule of cost sharing (e.g. each shipper keeps its respective savings) would have failed miserably in
this case as the ‘operational’ asymmetries are substantial. Yet overall, the collaboration generates huge gains. The Shapley value for the collaboration of two partners is a fifty-fifty division of the gains). In this case the net savings were calculated as the total gross gains realized by Tupperware minus the extra costs incurred by P&G.

3.5.2 Legal Framework
The fact that P&G and Tupperware are not competitors made both companies comfortable from a competition law point of view. As gain sharing in this case requires a real passage of money from Tupperware to P&G, a formula had to be found to perform this legally without P&G being regarded as a Transport Service Provider to Tupperware. It was agreed that P&G would purchase transport (in this case intermodal transport) on behalf of the two companies and then ‘pass on’ Tupperware related costs to Tupperware as a ‘cost pass on invoice’. As both companies have their EU headquarters in Switzerland this agreement was perfected under the Swiss commercial law. Also an asymmetrical ‘open book’ approach was adopted. While Tupperware had to reveal the costs of the eliminated transport services, no such disclosure was required on P&G side as there was no change. Therefore, the P&G transport costs were not necessary in the gain sharing calculations. However, P&G had to estimate and disclose the extra manipulation costs.

3.5.3 Trustee
While Tri Vizor suggested the identification of possible synergies between P&G and Tupperware, this case was developed by P&G on its own. P&G hereby also performed the role of offline and online trustee. To build trust with Tupperware the first shipments trials were performed ‘on good faith’ without a binding contract and with no passage of money. Since these pilot shipments turned out to be successful, Tupperware management reserves were quickly removed.

3.5.4 Discussion
One of the characteristics of this case is the move of Tupperware from their ‘fast’ truck services to the slower P&G intermodal lane. However, in this case the apparent lowering of average speed had no negative effect on the Tupperware service levels. In fact, the Tupperware service levels even increased since P&G ships to Greece with a much higher frequency (daily departures) than Tupperware did (two services per week). Therefore, the longer transit time of two days is totally compensated by the continuous flow.

This case looks simple, but actually it represents one of the most complete and sophisticated forms of collaboration. It involves lanes, loads, a shift to an intermodal solution, truck fill (container fill actually) optimization and even collaborative pallets. A collaborative pallet is a fairly new concept even within P&G itself. Needless to say the companies’ information systems are completely inadequate to handle the case and manual overrides had to be realized to put the collaboration into operations. However, having solved all other barriers now systems are truly the problem left to solve. Often people assume that collaboration does not happen because systems do not allow it. The CO3 project showed that a lot of other problems have to be solved ahead of the system problems and this case demonstrates it fully.

While a neutral trustee was not used, both companies have agreed that any further scaling will need the involvement of a neutral trustee since this can simplify the negotiation phase and also help to resolve any operational issues fairly. P&G has launched a large spectrum study for the creation of the capability functions of an adequate trustee, also thanks to the co-funding provided by the ‘TEN-T’ program for the creation of a sustainable core network of transport corridors via the project ‘Swiftly Green’.
3.6 Evaluation of the Role of ICT as a Critical Success Factor in Horizontal Collaboration

ICT has an important role in all three phases of the CO3 methodology for horizontal collaboration development. The added value of ICT was also shown in the four pilot studies. In the identification phase the neutral trustee identifies companies and networks that are open for horizontal collaboration and collects and analyses structural freight flow data of these companies. ICT can support in this phase by automated freight flow data visualization, ‘Big data’ analytical capability and matchmaking (Bogen and Verstrepen, 2013). This use has been demonstrated in the pilot studies.

The neutral trustee helps the candidate participants in building profitable business cases and in quantifying the benefits of the collaboration scenarios in the preparation phase. This is done from three perspectives: efficiency (logistics cost savings), sustainability (reduction in greenhouse gas emissions), and effectiveness (service level improvement). The added value of ICT in this phase is in several decision support tools that help evaluating the logistics synergy potential and applying fair gain sharing mechanisms (Shapley value) (Bogen and Verstrepen, 2013). In all pilot studies ICT has been used in order to do the calculations.

In the last phase, the operational phase, the actions and shipments of the collaborating partners are coordinated and synchronized real-time by the neutral trustee. ICT provides support in this phase by a collaborative control tower and various social network tools to facilitate the collaboration communication process (Bogen and Verstrepen, 2013). Also in this phase, the pilot studies have shown the importance of ICT. In the case of the multimodal collaboration, the availability of a control tower was even rated as one of the success factors.

3.7 Validation of the Legal Framework

The validation of the legal framework was done by evaluating the experiences from the pilot studies and by executing interviews with several horizontal collaboration practitioners.

The legal framework and the milestone plan, which sets out in phases what legal aspects should be discussed and addressed as can be seen in figure 4, have been subject of the validation. Before companies enter into horizontal collaborations, a preliminary phase takes place.

Comparing to a ‘dating bureau’ the horizontal collaboration starts with matchmaking activities. In the preliminary matchmaking phase concrete collaboration partners are not yet in the picture. A shipper who considers to ask a matchmaking service (company) to chart his bundle potential and maybe to compare his data to the data of other shippers who have done or are about to do the same, should make arrangements with this service provider with respect to confidentiality and data ownership et cetera. Two or more actors get involved and in order to match their profiles confidentiality and data disclosure arrangements need to be covered.

In the preliminary phase the potential participants to a horizontal collaboration (project) lay a foundation for a long term legal relationship which has to be based on mutual trust. Especially in the more complex forms of collaboration often substantial investments will have to be made to analyse whether there are possibilities to bundle freight flows and if so, subsequently to synchronize these flows. It is obvious that parties which make clear arrangements with respect to this pre-contractual phase of research and negotiation reduce the chance of raising false expectations.
In the ‘in love’ phase trade lanes and partners are selected. This is shown obviously in all pilot studies. The selection of partners was done after the trade lane selection in the multimodal collaboration (where the choice for the transport corridor between Belgium and Spain was selected because of the challenges and large synergy potential) and the horizontal collaboration in the FMCG (where the trade lanes were defined from the shared warehouse to the retailer’s distribution centres). In the Czech road partnership of JSP and Hammerwerk the selection process was done the other way around. After finding a suitable partner, the most interesting trade lane was selected. Trust turned out to be of utmost importance in all case studies and was often mentioned and experienced as a critical success factor. Needless to say that it is hard to catch trust between parties in a contract. One cannot oblige a party to trust another party. However, if parties have trust and want to keep this trust alive in the long run, contracts can play an important role.

Parties can give structure to the ‘engaged’ phase by laying down the arrangements with respect to this phase in writing for example in a LOI. Consideration can for example be given to aspects as the division of research and other initial costs, competition law, confidentiality, what happens if the negotiations break down, and when parties will be deemed to have concluded a contract. It is also important to realize that although this seems inherently contradictory, negotiations about a cooperation contract itself can sometimes develop in such a way that it becomes the main obstacle for the actual realization of the proposed collaboration. In particular within large companies there normally is a distinction between the commercial and legal departments and these business units do not necessary speak the same language. In general, it is advisable to coordinate commercial and legal processes and involve or at least inform legal experts in an early stage. After all, there is a multiplicity of legal aspects which need to be arranged. When parties do not discuss potential legal hurdles in time, those might temper the initial enthusiasm and trust, which are so essential to success, later. A LOI was only signed in the horizontal collaboration in the FMCG industry, and prepared (but not signed by all partners) in the Spanish intermodal test case. In all other case studies only oral agreements were made.

After the engagement phase, in which the CO3-project group also advises proposed participants to have their collaboration evaluated by a competition law expert on the concrete merits of the case and take care of the fact that the responsible case managers receive a competition law training, parties sign the agreement(s) and start to work within the ‘married’ phase. Again, this actual signing of agreements was only done in the horizontal collaboration in the FMCG industry.

3.7.1 Interviews
During the interviews held with various High Level Industry Board-members and other market participants, the relevant legal aspects of horizontal collaboration in the supply chain have been discussed as well as issues as management and coordination of commercial and legal processes. Spoke persons (of the legal departments) of two shippers, one trustee and two logistics service providers have been interviewed at the time of writing.
The interviews covered general issues such as entering into contracts, the role of legal departments in the success of horizontal collaboration (projects), the pre-contractual phase, (European) competition law, the role of the trustee and the developed legal structure. The questionnaire (see appendix II) served as a guide for the participants and also to facilitate comparison between the interviews. Participants gave their view on the legal framework using the questionnaire as a basis. Since the questionnaire was not limitative and the interview had an open character (not all questions were discussed in all interviews), the feedback reflects an outline description of the actual interview (see appendix III).

The main conclusions of the interviews with the shippers are that they would not go into a horizontal collaboration with direct competitors. The shippers already use or are open to use model contracts. Model contract will always need to be tailored to the situation of each specific case. A special point of interest is that the use of model contracts bears the risk of indolence in it. Market participants need to evaluate their own concrete situation and ask themselves the question if and to what extent the model can be used.

The involvement of the neutral trustee is seen as valuable, not only to manage the collaboration but from a legal perspective as well. The interviewees feel the trustee reduces the competition law risks, since the shippers do not have to share information (in)directly with each other. Again attention should be paid to the risk of indolence here; even though a neutral trustee is involved, the shippers have to stay alert.

The interviewed trustee recognized the importance of multilateral contracts already some years ago since the company was already involved in horizontal collaboration (projects) back then. The early involvement of legal experts is seen as important. However, since people often act differently in practice, this is not always done.

The main feedback of the logistics service providers is that the term ‘contract’ is perceived as too formal. The modal contracts are seen as useful if they are made accessible / easily understandable for all collaboration participants. A (short) initial contract period is seen as a risk since it takes time to setup and operate a horizontal collaboration. The logistics service providers see the importance of early legal involvement. An issue they face is that the negotiation power is often at the shippers’ side, not at the logistics service providers’ side. The tough competition between logistics service providers and the lacking of long-term carriage contracts that would enable them to forecast, makes it more difficult for logistics service providers to adopt a positive attitude towards horizontal collaboration between shippers in the supply chain and to provide a constructive contribution to new developments.
4. CONCLUSIONS

This paper provides an overview of the toolbox and business model for horizontal collaboration as developed within the CO3 project. Five horizontal collaboration case studies are described, as are the evaluation of the role of ICT and the validation of the legal framework in practice. With the development of four horizontal collaborations in case studies the CO3 toolbox has been applied in practice. This way, the CO3 applied research cycle was closed and the learnings are put into practice.

Critical success factors mentioned in each pilot study are trust between partners and a belief in the concept of horizontal collaboration. People can make a difference in the success of a horizontal collaboration, especially in the identification and preparation phases. Besides, ICT is mentioned as a critical success factor. It has a big influence in all three phases of the CO3 methodology for horizontal collaboration development.

Although the Shapley value rule was not used in most pilot projects, the practical use and value of this tool was demonstrated in the pilot project concerning the horizontal collaboration within the FMCG industry (in a bit deviating form) and in the intermodal partnership with a dominant shipper. The gain sharing was perceived as fair by the participants and the Shapley value offered a base for a stable collaboration. The participants of the warehousing and value added logistics pilot project were convinced to start using the Shapley value rule after submitting a third shipper to the collaboration.

It is complicated to catch horizontal collaboration in contracts in a good way. The legal difficulties should be considered as challenges and should not be a reason for the parties to ignore the legal part. In fact, the difficulties stress the importance of making clear arrangements and subsequently laying those arrangements down in written contracts. There appear to be a lot of deep-rooted prejudices and misunderstandings when it comes to legal. Parties often do not realize that as soon as oral arrangements are made or working together starts on the basis of implicit arrangements (and expectations) only, there already is an agreement in place. Obviously, written contracts are preferable to oral or implicit arrangements because they provide legal certainty and proof of the arrangements and intentions, especially in a more complex collaboration.

By executing interviews the legal framework has been validated by shippers, logistics service providers and a trustee. Unfortunately, the legal framework was only applied in the case study regarding the horizontal collaboration in the FMCG industry. The other case studies were too small, the legal departments of the participants had too many questions and doubts (in general, not about the CO3 legal framework) or it was just one bridge too far because of mental and technical barriers. A very important lesson learned is that also the legal departments should be involved from an early stage (identification phase) in the information sharing sessions with possible participants in horizontal collaborations. Another lesson learned is that commercial and legal departments need to communicate with each other in a fair and understandable way. If legal departments understand the commercial drivers of the company and if commercial people understand the importance of giving horizontal collaboration a solid legal basis, they can develop trust in the concept of horizontal collaboration and legal issues can be addressed in a proper way and in time. The attitude of the legal specialists within companies and their understanding of commercial processes seems to be important in this regard. Logistics service providers express that due to the high competitiveness of the transport market and the fact that shippers (already) have the negotiation power, it is difficult for them to adopt a positive attitude towards horizontal collaboration between shippers in the supply chain. There is a need for long-term transport contracts; such contracts would make it easier for logistics service providers to contribute in a constructive way.

The use of a neutral trustee was regarded as value adding and even as critical success factor by the participants in all case studies. The neutral trustee was used in the four CO3 case studies as was the division in online and offline activities. In the intermodal partnership with a dominant shipper the importance of using a neutral trustee was acknowledged and a neutral trustee will be used for any further steps. In the case studies
concerning the road partnership, the warehousing and value added logistics and the daily distribution of groceries and FMCG the online and offline tasks were divided over two different organizations. In the other pilot project one organization was responsible for both online and offline activities. Although both options proved to work well, separation of online and offline tasks offers stability advantages since the ongoing online tasks can be dealt with by the neutral shared logistics service provider keeping him an active and committed member of the collaboration. Besides, it also contributes to the legal part of the collaboration in case of a collaboration between competitors.

The CO3 calculator has not been used in the pilot projects. However, it would have added value to the tools that were used. The collaboration and co-modality example can be used as a first insight for possible participants to see the potential of horizontal collaboration. The Shapley calculator can be of very practical use for the trustee in explaining the Shapley value and calculating this. This might help in convincing collaboration participants in their choice for this stable fair gain sharing rule. Finally, the trustee game in the CO3 calculator can provide support in informing possible participants about horizontal collaboration in an interactive way, and convincing them with actually showing them the potential gains that can be reached when collaborating. Furthermore, the trustee game can have a big role in promoting the concept of horizontal collaboration in general, e.g. in conferences.
LITERATURE

Barbarino, S. (2014) Presentation P&G – Tupperware: Horizontal collaboration in the supply chain


Bogen, M. and Verstrepen, S. (2013) Added value of ICT in logistics horizontal collaboration: identifying the need for an integrated approach

CO3 Calculator module collaboration and co-modality example (2013) http://88.32.124.84/CO3/scenario.aspx?scenId=4


CO3 Calculator module Trustee Game on Horizontal Collaboration (2014) http://88.32.124.86/CO3


Best Practices
An example from P&G and Tupperware

Driving sustainability through horizontal supply chain collaboration

Koen Muylaert – Lieven Stoffers
May 2014
Industry situation

Compelling need for change

Agenda

✔ Industry situation & why collaboration make sense
✔ P&G - Tupperware case study
✔ Horizontal collaboration process
✔ Way forward...
Introduction – Industry situation compelling need for change

* EU data

Why collaboration makes sense

Collaboration with external companies is KEY to go BEYOND our internal efficiencies.
Background

• Both Tupperware and P&G have a manufacturing sites and DC’s in Belgium

• Both companies ship significant volume to Greece

• Product characteristics of both companies are opposites – Heavy vs. Light

P&G – Tupperware
A case study of horizontal collaboration
Situation before

2 shippers
2 separate supply chains
Similar lanes (corridors)

Comparing the flows

<table>
<thead>
<tr>
<th></th>
<th>Tupperware</th>
<th>P&amp;G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sending site</td>
<td>Arlet, Belgium</td>
<td>Mechelen, Belgium</td>
</tr>
<tr>
<td>Receiving site</td>
<td>Thiva, Greece (100km from Athens)</td>
<td>Athens, Greece</td>
</tr>
<tr>
<td>Mode</td>
<td>Road</td>
<td>Intermodal</td>
</tr>
<tr>
<td>Equipment type</td>
<td>120m³ combi-trailers</td>
<td>45ft containers</td>
</tr>
<tr>
<td>Loads per year</td>
<td>~80</td>
<td>~300</td>
</tr>
<tr>
<td>Transit time</td>
<td>3-5 days</td>
<td>6-7 days</td>
</tr>
<tr>
<td>Frequency</td>
<td>1x week</td>
<td>3x week</td>
</tr>
<tr>
<td>Loading method</td>
<td>Bulk</td>
<td>Palletized</td>
</tr>
<tr>
<td>Load preparation</td>
<td>~27 man hours</td>
<td>~1 man hour</td>
</tr>
<tr>
<td>Volume utilization</td>
<td>~85%</td>
<td>~50%</td>
</tr>
<tr>
<td>Weight utilization</td>
<td>~30%</td>
<td>~95%</td>
</tr>
</tbody>
</table>
Common flows – 98% overlap

Optimizing internally
Situation after

2 collaborative shippers
Joint intermodal corridor
P&G managed X-Dock

The best of both worlds
Project results & benefits

Saved
150,000 truck-km
by taking trucks off the road

Cube & Weight Fill improvement
55% $\rightarrow$ 85%
by heavy & light mixing

Moving to
Intermodal
solutions for partner

>200 Tons
CO$_2$ reduction

Collaborative Savings
~17% Cost saving
on total lane costs

Consolidation process
TINA Intermodal Network - collaboration

Using established intermodal networks to drive sustainability through scale and frequency
Way forward...

- Solo
- 1 Company optimization
- P&G Supply Chain
- Tupperware Supply Chain
- In Partnership
  - Tupperware + P&G
- Expand partnership
- Multi-lane collaboration
- Multi Party collaboration
  - 3+ partners (CO3 framework)
- Future Market Place
  - 10-30+ partners
APPENDIX II INTERVIEWS VALIDATION LEGAL FRAMEWORK

As preparation on the actual interview the participants have received additional information consisting of the basic legal report (Biermasz, 2012), a PowerPoint presentation and a questionnaire. The following questions were listed in the questionnaire:

1. Assume that your company would consider entering into a horizontal collaboration project. Can you describe the procedures followed by your company from the pre-contractual phase to the signing of the project? What will be discussed during the pre-contractual stage? Would a LOI and / or NDA be needed? Which department would take care of the negotiations? And when will the legal department normally be involved?

2. Does your company make use of model agreements and / or standard contractual provisions? If so, is it possible under special circumstances to derogate from standard practices in view of customization? Who would decide on that? What kind of conditions are always crucial for your company and absolutely would need to be implemented in every agreement? And under which law will your contracts be enforced? Would you consider contracting under the law of another jurisdiction?

3. Does your company have specialist knowledge in the field of contract law, (European) competition law, transport law and / or international private law? Would your legal department be able to make the contracts that could serve as a basis for horizontal collaboration in the supply chain itself or would you consider to call in external legal experts to advice on such contracts?

4. What is your opinion about the legal framework for horizontal collaboration in the supply chain the CO3-project has developed (i.e. the legal structure with three model agreements)? Which contractual stipulations are of fundamental importance in your opinion (i.e. gain sharing, entry/exit rules, confidentially et cetera)?

5. What steps need to be taken to provide horizontal collaboration between shippers in the supply chain with the necessary safeguards to avoid competition law risks?

6. What is your opinion regarding the involvement and the role of the trustee? What tasks should the trustee have?

7. Do you have additional remarks, recommendations and / or other items that need to be addressed?
APPENDIX III FEEDBACK RESPONDENTS VALIDATION LEGAL FRAMEWORK

The names of the companies interviewed will remain confidential. The answers given do not necessarily reflect the company’s opinion or policy. The answers given during the interviews reflect the opinions of the relevant senior (in-house) counsel / employee based on his / her professional experience.

A; Feedback shippers

_**Shipper 1**  Our company would never collaborate with (direct) competitors...

In the pre-contractual phase this shippers prefers a Non Disclosure Agreement (NDA) instead of a Letter of Intent (LOI). In a NDA parties can also include everything that is needed for a collaboration such as their intentions, data exchange and commercial aspects. Assume that parties negotiate about the drafting and signing of a LOI and that for some reason - after a long period - this LOI is not executed. In such a case parties would suffer costs in exchange for nothing.

This company makes use of standard contracts. The procedure from the pre-contractual phase until entering into contracts is regulated in guidelines. Also for future tenders the company makes use of special guidelines. It might be difficult if the proposed participants to a collaboration all have and want to use their own guidelines. This has to result in a compromise and a ‘give and take’ attitude during the negotiations.

The cooperation between the legal and commercial departments within this company works well. The cooperation depends mainly on the person involved: experience determines to a certain extent whether or not a person is capable of identifying relevant legal questions. An in-house lawyer plays a more facilitating role in cases in which the business strategy is important. External lawyers have a different approach and can probably focus more on the legal issues.

In the early start of a collaboration a geographical division and disclosure of general information regarding the destination of the company’s freight flows needs to be made. If the matchmaking is positive this company starts to bundle freight lanes. Within this company there is an additional ‘challenge’ with respect to the information disclosure to the trustee. This company would have to ask permission from its logistics service provider before sharing any information, even on a confidential basis, with a third party, including a trustee. This requires an additional administrative action.

This company is already involved in horizontal collaboration. Within these projects the role of the trustee has been (partly) fulfilled by an own control tower. Actually, the division that is fulfilling the trustee role solely acts as a freight forwarder. In order to avoid competition law risks this company never works together with (direct) competitors. Any prospective collaboration case has to be evaluated by its competition law division.

The following specific remarks were made:

- As a consequence of the complicated international structure of this company, standard contracts are concluded on the upper level. If the lower level decides to change something in the standard contracts, these alterations also have to be implemented in the upper level of the company. However, standard contracts can be used in national cases.
- Because of the structure of the company it is not possible to commit to any volumes and therefore also not to any penalty clauses in contracts in case volumes on a trade lane would drop down.
- A provision on the IT-security of the databank in which the data of shippers is collected should be described (in the contract between the shippers and in the contract between the shippers and the trustee).
• Concerning the invoice this company consults an external auditor. In the CO3-project invoicing takes place afterwards.
• For practical reasons this company feels that it could not make use of the third model contract (the skeleton carriage contract between the shippers and the logistic service provider). It would be better for this company to make a separate clause in the horizontal agreement between the shippers. In this separate clause parties could agree to make individual carriage contracts with the logistics service provider(s).
• In addition to the contracts the company advises that the parties in a collaboration would draw up a document in which references and concepts are included to provide explanation and in order to avoid misunderstandings and interpretation differences.

Shipper 2  

*Standardization must not lead to laziness and indolence...*

The cooperation between the commercial and legal people within companies depends to a large extent on the visibility and experience of the legal people involved. To a certain extent in-house legal counsels must take responsibility for good relationships. In the pre-contractual phase a LOI or a NDA is sufficient for commercial people.

The interviewee expresses the opinion that it is very clear that (in)direct competitors will not work together, in particular within oligopolistic markets with a high competitive character and few large players. Even before competition law aspects would come up for discussion within such businesses, the fact that it is simply not done to work together with a competitor would prevent collaboration. Meanwhile, providing information with respect to freight flows in order to investigate whether there is a bundle potential with a non-competitor, can simply be governed by a NDA.

One possible trend concerned the interviewee. The introduction of the independent and neutral trustee is advantageous from the point of view of competition law. However, by sharing the strategic information only with the trustee, parties might think that everything is dealt with after that. The concern of the interviewee is that parties stop thinking for themselves because they will assume that they are on the safe side. After all, they have called in a trustee and they might have the idea that the trustee takes care of everything.

The same risk lies to some extent in the availability and use of model agreements. Models can be very useful as a starting point for deliberations. However, models must be used by the right persons, and standardization must not lead to laziness and indolence. Models are only models and have to be tailored to the concrete situation, taking into account the relevant facts, circumstances and arrangements. Theory does not exist in practice. Within large companies, especially, this can be an issue because the legal department can only be involved in a percentage of the cases due to capacity reasons.

B; Feedback Trustee  

*The involvement of a neutral trustee helps avoiding competition law risks*

Tri-Vizor (TRV) is a neutral offline / online trustee and facilitator of horizontal collaboration and as such does not enter into horizontal collaborations itself. TRV mainly works with shippers. In practice, TRV finds the preparation phase mostly characterized by an ‘informal’ mode of working between logistics professionals. TRV encourages the signature of a LOI / Memorandum of Understanding (MoU) between the shippers at some point in order to formalize their relationship and commitment. In practice however, the agreement to proceed with operational phase is often only written down in e-mails between the supply chain managers. It is rare that legal gets involved upfront and most logistics professionals are hesitant to involve them. An exception is made when the collaboration is between direct competitors; in this case the logistics people will not move before
their legal counsel gives a green light (e.g. in the PepsiCo – Nestlé case). The same goes for a number of companies in the ‘CO3 Bratislava Group’, e.g. Mondelez, Unilever and Heineken who are very attentive to legal aspects such as NDA’s et cetera. In general, typical departments involved in the collaboration negotiation besides logistics are procurement and legal, although legal always stays in the background.

Since 2011, TRV runs a number of ‘online orchestrated’ communities in commercial exploitation or in pilot test phase, e.g. Baxter / UCB, Baxter / Donaldson, and Baxter / Carglass. These communities operate based on a standard multilateral contract between shippers - TRV – logistics service providers (note: these contracts are proprietary documents developed at their own expense and are not available to CO3). The CO3 ‘multilateral legal framework’ has actually been based on generic input and suggestions TRV gave to the consortium based on their practical experience as neutral orchestrator between 2008 and 2011. Also the term ‘neutral trustee’ has been suggested by TRV; the very useful nuance ‘online / offline’ has been added by Argusl. TRV’s contracts as neutral orchestrator typically are under Belgian law, but TRV is flexible to work with other legal systems upon request. The contracts of TRV consist of a generic part plus an addendum per bundled lane. Typical elements include selected carriers, cost and gain sharing, service levels, liability (which remains with the carriers), et cetera.

TRV is of course not a law firm but has developed a good understanding of transport law over the past years. Multilateral contracts of TRV have been developed between 2009 and 2011 with input from several attorneys and legal experts, as well as with frequent input from the legal counsels of Baxter and UCB.

The introduction and general acceptance of a new role in the European logistics market, i.e. that of neutral trustee (offline of online), avoids competition law risks. This role should be different from the role of logistics service providers, 4PL’s / LLP’s and traditional freight forwarders.

C; Feedback logistics service providers (LSP’s)

LSP 1  Call it an understanding of arrangements...

The moment lawyers are involved in a commercial deal is normally too late, because shippers (and LSP’s) want to close the deal and their idea is this could probably not be reached with lawyers at the table. Nevertheless, this company agrees with the CO3 project group that legal specialists should be involved in an earlier stage.

The legal framework and three model legal agreements which have been developed are rather theoretical in this shipper’s opinion. In this company’s opinion contracts bear the risk of preventing collaboration rather than assisting it.

In practice it seems that the word ‘contract’ often scares off market participants. However, after explaining that a contract is not more than a set of arrangements between parties, the interviewees agreed that shippers who collaborate horizontally, are well-advised to make their arrangements explicit and write those down to prevent the risk of misunderstandings. The interviewees feel that the notion ‘contract’ calls up negative sentiments; in that respect ‘list of arrangements’ would be a good alternative.

The company has individual contracts with the shippers and there is no formal contract between the shippers that collaborate. Normally, it is this company’s opinion that shippers at the most write down the intentions of their horizontal collaboration into a gentlemen’s agreement.

According to this shipper the unstable flows in the supply chain are a point of special interest in respect of contracts. If shippers and LSP’s decide to make and sign a formal contract in which they do not incorporate the necessary flexibility, they might need to hold a meeting every three months because of the constant changing flows in logistics.
The structure existing of three model agreements as developed within the CO3-project could work out in practice, provided that the framework is easy accessible. By accessibility this company means that it should be as simple as possible. An e-mail or a letter from the senior level of the company stating that the company wants to collaborate or participate in an innovative project suffices. However, in case of investments a formal contract might be useful and even necessary. The term ‘contract’ covers more than only written formal paperwork.

The interviewees expressed a positive view towards the trustee as an independent third party within a horizontal collaboration.

Gain sharing can be achieved by a calculation of a third party or by direct contact with a 3PL. The problem might be that if one shipper brings in a large volume he also might demand more benefits. The gain sharing should be based on mutual benefits.

In general, this LSP asks for an anti-trust advice in advance, for example with respect to the disclosure of sensitive data. In practice, this LSP notices that shippers have the negotiating power in logistics. It might be good to write a provision in a gentlemen’s agreement or a LOI that competition law aspects have been taken into consideration. The only information that will be exchanged is the quantity of the goods and their destination; prices should be left out.

According to this LSP the procedure followed to enter into a collaboration contract will in most cases be as follows. The starting point is an analysis in which the LSP identifies the volume and characteristics of the goods involved. If there is a match and bundle potential, this LSP writes down the characteristics of the data, such as what data can be exchanged and what needs to be kept confidential, the period of time in which the data must be saved, the goals to be achieved, et cetera. If the collaboration will then get the green light, this LSP works out how it will actually work in practice. During this stage information about invoices and payment terms will come into play and several questions will be discussed, such as:

• How do we deal with situations if there is not enough volume?
• What will be the effect of it?
• What happens in case of late delivery?
• What are the characteristics of the pallets (blue, red et cetera)?
• What are the characteristics of the products involved? Is there a contamination risk?

The collaboration can start when these issues have been addressed in a proper way. After a while the collaboration continues if it is beneficial to everyone. Nobody wants to stick to a certain period of time. Only in case investments are to be made, the agreement has a more formal character.

LSP 2  Ships have the negotiation power in the logistics...

The interviewee had three remarks with respect to the legal framework:

• Firstly, logistics is a constantly moving and innovative market. Since CO3 started, plenty of innovative concepts of horizontal collaboration have been developed.
• Secondly, in the supply chain a lot of new functions have been developed, like control towers, auditors who manage the invoicing flow, et cetera. While this company confirms the workability of the function of the trustee, it thinks it will be difficult to catch the role of the trustee in a legal contract. This LSP thinks that present-day logistics service providers perform the role of the trustee, sometimes with the help of subcontractors to guarantee the neutrality. By doing so, LSP’s have achieved much efficiency, particularly as a result of the outsourcing of invoicing flows.
• Thirdly, the company is convinced of the fact that a horizontal collaboration will not work if parties only commit to a short period of time. If parties agree to collaborate for two years it is not possible to ‘map’ the mutual logistic processes and to build up trust between the parties and thus stimulate efficiency. This LSP enters into a contract for - at least - five years.

The objects of the CO3-project are endorsed. However, for logistics service providers horizontal collaboration by shippers can causes multiple difficulties:

• LSP’s encounter difficulties because of the fact that, in general, shippers have the negotiating power in the collaboration. The LSP has a more limited role. The LSP shall, in practice, never collaborate with other LSP’s.
• The great difficulty for LSP’s is that the competition struggle is many times higher and stronger comparing to the competition amongst shippers. As a result, a lot of LSP’s are mistrustful and have fear and uncertainty with respect to horizontal collaboration. The logistic market is simply too competitive and the margins are very small.
• This LSP expressed the need for long term carriage contracts on which LSP’s can base building on relationships with shippers, service levels and adopting a constructive attitude.