Chapter 8
Case Study: The Netherlands

Van Laarhoven (2008) in his strategic logistics advice to the Dutch government explained why collaboration suits the Netherlands so well. The Dutch culture is defined by its internationalism and its focus on collaboration in the small geographical area it covers. This has resulted in the Dutch "polder model."

> This polder model (Dutch: poldermodel) is based on the acclaimed Dutch version of consensus-based economic and social policy making in the 1980s and 1990s. It gets its name from the Dutch word (polder) for tracts of land enclosed by dikes. The polder model has been described as "a pragmatic recognition of pluriformity" and "cooperation despite differences." It is thought that the Dutch politician Ina Brouwer was the first to use the term poldermodel, in her 1990 article "Het socialisme als poldermodel?" (Socialism as polder model?), although it is uncertain whether she coined the term or simply seems to have been the first to write it down. The current Dutch polder model is said to have begun with the Wassenaar Agreement of 1982, when unions, employers, and the government decided on a comprehensive plan to revitalize the economy involving shorter working times and lower wages on the one hand, and more employment on the other. This polder model combined with a neoliberal economic policy of privatization and budget cuts has been held responsible for the Dutch economic miracle of the late 1990s.

The polder model enables successful collaboration among entities with different stakes. This has happened a lot already in important Dutch industries such as agriculture where large and ambitious innovations are developed by close collaboration between companies, knowledge institutes, and the government. In addition, the

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Dutch historic focus on international trade and its multilingualism make it possible to collaborate internationally.

Having funded or otherwise supported over 70 horizontal collaboration projects, both academic and practice oriented, the Netherlands provides a rare and interesting case study on collaboration experiences and the adoption of 4C-like concepts. Despite the multi-million subsidies over the last ten years, an industry-wide adoption of 4C is still not yet happening in the Netherlands, and there is a long-running debate on the correct model for collaboration. Who should take the initiative? What is the ambition level? Across or within industries? etc. In this chapter we will dive deeper into this Dutch case study with the aim to generate learnings for the Dutch and for other (European) countries considering to further stimulate horizontal logistics collaboration to achieve societal goals.

8.1 Early Dutch Collaboration Initiatives

As we have seen in Chap. 5, it took until 2007 before more than four papers per year were published about horizontal collaboration in supply chains. In the Netherlands, however, it was already regarded an important strategic direction for the logistics industry years before. The Dutch Ministry of Traffic and Water Management (2001) wrote that to support the economy, reduce congestion, increase quality of living, and improve safety, the transport sector must be facilitated to bundle their freight flows. In the same report it was also concluded that pricing policy, such as toll per kilometer or a carbon tax, will be essential to reduce CO_2 emissions. Such measures will increase the marginal costs of kilometers driven and can be expected to strengthen the quest for transport efficiency through an increased adoption rate of technological innovations, but also through intensified transport collaboration initiatives. A third relevant recommendation in the report is to increase modal shift from road to rail and waterways. The authors state that this can be accomplished on the supply side through infrastructure investments (e.g., intermodal terminals) and on the demand side through increased bundling of freight flows to reach the critical mass to make multimodal transport a viable option from a cost perspective. Finally, the report mentioned the development of a so-called Logistics Datahub Netherlands (LDN), a large central database maintained by an independent foundation where data on freight flows in the Netherlands would be stored in a harmonized way to facilitate searching for bundling opportunities.

Also, at the start of the millennium, the Dutch government commissioned a study into synergy effect of horizontal collaboration in transport and logistics, called SYLONET (SYnergies in Logistic NETworks). In their end report, Vos et al. (2003) elaborate on horizontal collaboration by defining three types of synergy: operational synergy, coordination synergy, and network synergy. In Fig. 8.1 these three types of synergy are illustrated.

In addition to the synergy definition, two examples from practice are described: “Distrivaart” and “Zoetwaren Distributie Nederland.” Distrivaart was a collaboration between a number of beverage manufacturers using inland shipping instead of trucks

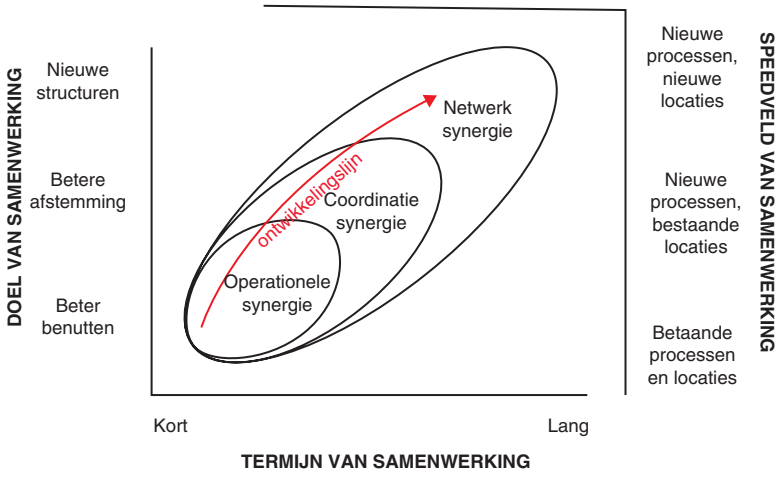

Fig. 8.1 Collaboration types defined by Vos et al. (2003) (In Dutch)

for the distribution to retail distribution centers. "Zoetwaren Distributie Nederland" was a collaboration between several bakeries that jointly outsourced their distribution to one logistic service provider. SYLONET concluded that the specification and measurement of synergies is important, but fair gain sharing is also a prerequisite for successful collaboration. Their advice to develop adequate gain sharing mechanisms was indeed taken up in literature and currently there exists a significant body of literature on this topic (see Sect. 5.6).

Another project worth mentioning is the "Koud" (Dutch for Cold) project in which three prominent shippers (Douwe Egberts, Masterfoods, and Unipro Bakery) started a collaboration. The shippers bundled their flows of frozen products to joint customers such as catering companies, restaurants, and hospitals) to achieve cost reductions and service improvements. In the situation before the collaboration, each shipper operated its own distribution network in which FTL movements went from the factories to the distribution centers of three different LSPs who then distribute the goods. The collaboration project redirected all FTL movements to the distribution center of a single selected LSP who bundled the flows to the same customer or region. The reported savings amounted to 30% of overall transport cost.

8.2 The Top-Sector Logistics (TSL)

To stay competitive in the globalizing economy, in 2012 the first cabinet of Prime Minister Rutte launched the so-called Top-sectors agenda to achieve the following three goals:

1. Have the Netherlands in the top-5 of knowledge economies in the world by 2020.
2. Increase Dutch spending on Research and Development to 2.5% of gross annual product by 2020.

3. Establish the so-called "Top-consortia" for Knowledge and Innovation (TKI) by 2015 where public and private partners together invest for more than € 500 million of which more than 40% is financed by companies.

In the period 2012–2015 the government invested about € 7 billion in nine top-sectors that were selected for their strategic importance for the Dutch economy now and in the future. These nine industry sectors are:

- High tech Systems and Materials
- Life sciences and Health
- Agri and Food
- Water
- Chemistry
- Horticulture
- Creative Industry
- Energy
- **Logistics**

The top-sector agenda aims at collaboration between companies, knowledge institutes, and the government, but also at cross-fertilization between the various top-sectors. For each top-sector, the government is striving for maximum returns from the provided tax incentives, loan guarantee schemes, and direct investments. A large proportion of government loans and grants strategically go to SMEs and research institutes. Together, businesses and researchers have the task to create more innovation, build a stronger economy, and devise solutions for tomorrow's challenges.

The logistics industry is one of the top-sectors selected. With an added value of around € 53 billion per year and more than 600,000 jobs, it is of great importance to the Netherlands. The top-sector Logistics (TSL) supports companies in many other industries as well, since in the Netherlands logistics is responsible for 8–18% of total costs on average.[1] Therefore, efficient logistics processes are key for many companies' competitive position. The TSL has defined an action agenda (see Topteam Logistiek 2011) in which it formulated their strategy for the period 2012–2020. In short, this strategy means that in 2020 the Netherlands must have a leading position in (1) international transport flows, (2) orchestration of (inter) national logistics activities, and (3) innovation and business climate. These strategic goals are translated into twelve concrete action agendas:

- Sustainability
- Neutral Logistics Information Platform (NLIP)
- Synchromodal Transport
- Trade Compliance and Border Management
- City Logistics
- **Cross Chain Control Centers (4C)**

[1] https://top-sectorlogistiek.nl/wat-is-de-top-sector-logistiek/ (In Dutch)

- Service Logistics
- Promotion of the Netherlands abroad
- Simplification of legislation
- Human Capital Agenda
- Supply Chain Finance
- Freight corridors

8.3 The Cross Chain Control Centers (4C) Action Agenda

One of the action programs of the TSL concerns Cross Chain Control Centers (4C). By becoming a global leader in the development and staffing of 4Cs the Netherlands aims to reach a steady position in the top of global logistics. The definition of a 4C was already given on page 8 in Sect. 1.2. For a well-functioning 4C, optimal alignment between individual supply chain entities, in the Netherlands and internationally, is crucial. A 4C can be operated by an independent orchestrator, through distributed orchestration among partners, or even by a designated division of an LSP separated by a Chinese wall from the LSP's other processes. 4Cs can be organized in many different ways, based on different elements of the typology as shown in Sect. 6.3. However, it is organized, the most important goal is to achieve seamless alignment between supply chain actors so that maximum value can be created across these supply chains.

High-quality supply chain orchestration is considered an important competitive value for shippers. It makes the delivery to customers robust against supply chain disruptions, reduces cost levels and time-to-market, increases customer service, and overall improves the value of the product to the end consumer. Given the increasing complexity of logistics following the trends introduced in Chap. 2, it becomes more and more difficult for (individual) shippers to achieve this level of excellence. Capitalizing on the centralized competences and expertise in 4Cs, supply chain orchestration can go beyond the mere coordination of transport flows by also providing services on joint forecasting, (big) data analytics, supply chain financing, etc.

Realizing the strong potential of 4C for the Dutch economy and logistics industry, the TSL has made significant investments in applied research into and applications of 4Cs. In the last ten years (2010–2020), a total estimated[2] subsidy of € 5 million was invested.[3] The underlying idea is that horizontal collaboration is essential to achieve the efficiency improvements that are needed to realize the transport sector's contribution in abating climate change. 4C is a viable attempt to attach a business model to the (theoretical) concept of horizontal collaboration.

[2] Exact numbers are difficult to give since some (research) projects that have the 4C label touch the topic of 4Cs only peripherally.

[3] This amount was spent on the seven 'pure' 4C projects that will be discussed later in this chapter. The total subsidy for the 70+ projects that covered at least some elements of the 4C concept was roughly € 25 million.

The question is justified what this government investment has brought to the Dutch economy. To answer this question, three actions will be taken by TSL. First, the quantitative KPIs of avoided road kilometers and reduced CO_2 emissions will be reported. Second, an inventory will be made of what indirect effects the action has brought to the Dutch economy beyond the boundaries of the actual projects sponsored by TSL. And finally, in this synthesis study, the goal is to evaluate the content of the projects conducted under the 4C action agenda, and formulate lessons learned from the past and recommendations for the future. These lessons for a large part will be based on experiences from the Dutch 4C projects that have been undertaken in the period 2010–2020. These will be discussed in the next section.

8.4 4C Projects

TSL has funded many innovative projects since 2010. In total, over 70 projects in various industry sectors had a 4C label. With the help of TSL those projects that had 4C as their main theme and thereby particularly helped to further develop the concept of 4C were filtered out. These six projects will be briefly summarized in the subsections below, and in Sect. 8.4 some other Dutch projects with interesting insights for 4C will be discussed.

8.4.1 Project 4C4More

The first completed 4C project that was funded by TSL was called 4C4More and was extensively documented in book edited by de Kok et al. (2015). The project was initiated by Unilever and Kuehne Nagel in 2010. At the time, the dominant vision was that horizontal collaboration among LSPs was the best way to substantially lower transport costs: a shipper or retailer should not have a preference about whose truck delivers their goods, just like most people are indifferent about the bank that owns the ATM from which their money is collected. Kuehne Nagel teamed up with colleague LSPs Nabuurs and Bakker in a project supported by ORTEC, TNO and Technical University Eindhoven (TUE).

It was agreed that each LSP would make its own trips from the customer orders received, after which the trip would be uploaded to the ORTEC scheduling engine. This software tool combined trips and vehicles, so that empty mileage would be minimized, truck utilization improved and customer service requirements, e.g. time windows, would be satisfied. Data of a representative period were used for validation.

Given the thin margins in transport, the results of the pilot showed that collaboration between LSPs with a substantial market share in regional Fast-Moving Consumer Goods (FMCG) transport brings important reductions in costs, empty mileage, and overall mileage. On an annual basis, savings amounted to almost € 1,300,000, which easily offsets the investment associated with implementation of

the LSP collaboration, estimated at € 800,000 in total. Furthermore, a 13% reduction in the number of vehicles needed to transport the goods was achieved. Based on these pilot results, the LSPs decided to take further collaboration steps taking into account Dutch and EU competition law (see Sect. 5.7). The perceived implications of this kind of legislation were one of the major factors that eventually stopped the commercial uptake of this collaboration.

In 4C4More, both economies of scale and economies of scope were considered as reasons for creating a 4C. If the competitive position of a company is determined by its ability to exploit economies of scale in (part of) its SCM activities, it seems appropriate to have (1) company-dedicated activities in the case of low economies of scale and (2) a combination with activities of the others in the case of high economies of scale. When economies of scope are concerned, one needs to carefully ensure that company skills can indeed be shared within the consortium. A 4C entity enables the exploitation of economies of both scale and scope: it can manage and execute supply chain activities of multiple companies, whereby its learning curve is steeper (economies of scope) and whereby it can ensure the most efficient use of scarce resources (economies of scale).

As stated, the 4C4More project focused on the FMCG supply chain, where collaboration between shippers, LSPs, and retailers can create financial and societal benefits beyond those created by standard bilateral relationships. These complex relations require more sophisticated software tools and higher skilled SCM professionals. Under appropriate modeling assumptions, decision support tools should produce feasible and "reasonable" solutions that can be further improved by planners in the 4C who sometimes relax binding constraints if appropriate.

Project period: May 2010–August 2015. **Subsidy received**: 1 million euro.

8.4.2 Project 4C4D

An important challenge for the Dutch logistics industry is the question how to improve the quality (e.g. carbon footprint and air quality) and quantity (e.g. transport movements) of the distribution activities of the different physical flows into cities. Indeed, "city distribution" was one of the five key innovation themes reported by Van Laarhoven (2008) that came out of a roundtable discussion with senior representatives from the Dutch industry.

Especially in urban areas, there is a huge potential for bundling of distribution flows that are now fragmented. Although there are first signs of collaboration between LSPs and retailers, recent reviews show that there are hardly any examples of commercially successful and environmentally sustainable collaborative solutions in urban areas within Europe. The 4C4D research project aimed to investigate feasible collaborative supply chain designs, the associated business models and the critical questions of risk and revenue management, specifically in an urban context.

The focus of 4C4D is collaboration in the distribution and orchestration among LSPs and between LSPs and retailers, i.e. the bundling of physical flows into (urban)

areas. Increased collaboration likely leads to innovative distribution concepts that are based on sound business models, while still meeting objectives and restrictions set by municipalities. 4C4D was especially relevant to the Dutch economy because the Netherlands has very densely populated urban areas. Hence, there is a strong sense of urgency among all parties to improve current distribution approaches. These solutions can act as best practices towards comparable areas in Europe.

One of the prominent solutions that are proposed for fragmented deliveries into cities is the use of one or more urban consolidation center (UCCs, see Sect. 3.3). As part of the 4C4D project, research was conducted into the optimal location of a UCC, the impact that such a UCC has on the cost structure in the supply chain, the policy measures available to stimulate UCC usage, the potential that UCCs offer to switch from combustion engines to electric engines, the potential to develop new services out of a UCC, and a number of successful UCC case studies in the Netherlands and other countries.

Despite of the arguable benefits, large-scale UCCs are not quite common yet. Apparently, there are more factors that influence the introduction and use of UCCs. In the project, research was done on the social aspects of UCCs and the often-conflicting interests of urban logistics stakeholders, for example:

- How can (competing) LSPs collaborate horizontally by exchanging freight, and what is a fair outsource price for this?
- What is the value of intelligent transport planning systems for the acceptance of UCCs?
- Can serious games convince stakeholders to pursue the joint goal of having a thriving city by sometimes sacrificing a bit of their individual profit?

Huijink (2016) wrote his PhD thesis as part of the 4C4D project. He analyzed a pricing-based collaboration structure in which companies form a coalition and then outsource orders to each other within this coalition for fixed outsource costs per order. These outsource costs consist of the fee that the other company receives for the delivery plus the costs for the additional inter-depot transport that is required. One of the most important decisions here is how to determine both the inter-depot costs and a fair fee. In this form of horizontal collaboration, the companies remain independent and decide for themselves which orders they outsource. This implies that, to determine the outsource costs that satisfy the preferences of the coalition, one needs to estimate which orders the companies are likely to outsource given the outsource costs. This stochastic process was also studied in the 4C4D project.

Project period: December 2010–December 2015. **Subsidy received**: 706.000 euro.

8.4.3 Project DaVinc3i[4]

The Dutch floriculture sector is globally renowned. The sector has a huge impact on the Dutch economy, being the largest exporter of fresh products in Europe, the third largest exporter in the world with still significant opportunities for further growth. The sector wants to consolidate their position as the main (virtual) floriculture-trading hub in Europe and has therefore initiated the DaVinc3i project. DaVinc3i is the acronym for *Dutch Agricultural Virtualized International Network with Coordination, Consolidation, Collaboration, and Information availability*.[5] The project developed innovative logistics concepts supported by an information platform and collaborative business models. More specifically, the project investigated:

- The functional specifications for potential logistics coordination, consolidation, and collaboration concepts, with special attention for responsive quality driven logistics networks and synchromodal transport management.
- Opportunities for information exchanges and architectures to facilitate the advanced planning and control concepts developed in the project.
- Relevant collaborative business models that work for specific floricultural settings.

Throughout its history, the Dutch floriculture sector has been characterized by intense collaboration between all actors in the network. However, from a supply chain perspective still many logistics flows from source to sink are managed independently, resulting in inefficient transport. Flowers and plants are sourced internationally and might in the future, instead of being transported via the marketplaces in the Netherlands, be directly distributed via a logistics hub network in Europe to regional customers. More logistics collaboration between different actors in the chain, vertical as well as horizontal, may improve the efficiency of processes such as harvesting and transport, and reduce product waste. Key issue is that in a virtualized network, opportunities arise for different network configurations, for different routes and process configurations (e.g., where to assemble and pack), and for transport consolidation.

As part of the DaVinc3i project over 30 projects with business partners have been conducted. Based on those cases Van der Vorst et al. (2016) defined the following lessons learned relating to horizontal collaboration:

- Most chain actors in the floricultural sector are aware of new developments [such as horizontal collaboration] but are waiting to act until it is more urgent.
- Virtualization requires collaboration and synchronization of processes and information in the complete chain network.
- Responsive, high frequent delivery of high-quality cut flowers to the international market requires an international hub network with quality-controlled

[4] Project description based on Van der Vorst et al. (2016)

[5] www.davinc3i.com

logistics principles. The added value of such an international hub network depends on collaboration: it requires high volumes and frequent flows to be cost efficient.
- Due to the advantages of consolidation, supplying to the nearest location is not always the cheapest.
- "One size fits all solutions" for logistics concepts, IT solutions or business models will not work.
- "Trust is nice, control is better": contracts are increasingly required to support collaboration between supply chain partners.

Project period: 2011–2015. **Subsidy received**: 1,034,000 euro.

8.4.4 Project 4C4Chem

A fourth 4C project sponsored by the TSL focused on the chemical industry. This sector is also a major player for the Dutch economy, contributing almost € 20 billion to the balance of trade in 2010 (51% of the total balance of trade goods). From a logistics point of view, the chemical supply chain accounts for about 10% of the transport flows (ton-km) in the Netherlands. Most of these flows are international, 19% by weight of all exported goods are chemicals. However, it is estimated that on average only 60% of load carrying capacity is utilized. This poor performance has several explanations, such as an imbalance between production and consumption areas, empty returns, a short-term focus in optimization and limited flexibility for the carriers to optimally plan shipments. While the first issue (imbalance) is hard to address from a supply chain perspective, the project 4C4Chem addressed the remaining three.

The Dutch chemical industry is not unique in its suboptimal logistics performance. About 10% of transport flows in Europe are caused by the chemical industry and due to large distances, relatively small volumes and sometimes inconvenient connections to preferred transport terminals, the transport efficiency is relatively poor. Therefore, there is a clear potential to increase transport efficiency through collaboration between producers, customers, suppliers, and LSPs to reduce waste in the chemical supply chains.

Horizontal supply chain collaboration in the commodity industry, such as most chemicals, might even have additional potential compared to other products since commodities are considered interchangeable (see Sect. 3.1 on standardization in logistics). Hence, by collaborating horizontally these commodities might be combined, e.g. by allowing the pool to withdraw inventories from any (new) storage facility in the network or bundled during transport.

Within the scope of the competitive situation of the European chemical industry, the project consortium anticipated that logistics capabilities and concepts are particularly relevant for the Dutch chemical industry, putting them in a better position to take full advantage of this. In 4C4Chem three innovative 4C-related approaches

were applied to the supply chain planning process, being improved forecasting and planning of transport needs in the medium-term and improved short-term coordination between off-site and on-site logistics (PLAN), sharing of inventory and railcar resources (COMBINE), and bundling of transport flows (BUNDLE). Together these actions result in a showcase example of a 4C.

In 4C4Chem, relevant decision support models and new operating concepts were developed, evaluated and where applicable tested. In addition, the project partners developed a business model for LSPs to extend services in this sector, allowing the LSP to operate at a higher added value level if certain coordination activities are transferred to the LSP, for instance, on-site logistics.

The chemical industry in the Netherlands does not have a rich track record of knowledge sharing about supply chain operations. Therefore, an important general objective is to use this project to establish a supply chain innovation community for the Dutch chemical industry and its associated logistics services.

Based on the results of four chemical case studies, 4C4Chem designed a business model for an independent "black-box" trustee entity named 4C4Com. 4C4Com enables structural horizontal collaboration between shippers of commodities in Europe. These shippers need to ship a commodity that is not mainly transported via pipeline. The total size of the shipments should be significant, at least initially, and the supply chains of shippers should be compatible. 4C4Com allows shippers to optimize logistic costs and CO_2. It collects information from all individual shippers and optimizes the entire logistics chain. This allows 4C4Com to physically bundle volumes, swap volumes geographically or to combine them by opening shared storage facilities.

Project period: September 2012–December 2015. **Subsidy received**: 448,000 euro.

8.4.5 Project Construction Logistics (CL4C)

The construction industry in the Netherlands is relatively traditional and in most cases there is no structural logistics orchestration around building sites. Therefore, this industry has some catching up to do in the area of 4C, and with that in mind the Construction Logistics 4C (CL4C) project was started. Several 4C concepts were developed and tested at the participating companies in actual projects such as residential, utility, and infrastructure construction sites. Construction-specific factors were combined with urban logistics elements since the most challenging construction projects usually take place in urban areas where people work, live, and recreate.

CL4C ran for five years and its overarching goal was to develop specialized 4Cs for the construction industry. One of the key challenges was to make relevant information from all stakeholders centrally available. Based on gathered planning data of all individual companies a framework for orchestrated management of both information and physical flows was worked out using the Supply Chain Operations

Reference (SCOR) model. This formed the basis for the further development of a 4C for construction logistics in CL4C.

Two prominent pilot projects were executed in Utrecht (project "De Trip"), and in Amsterdam around the construction site of Hotel Amstelkwartier. The communicated goals of the 4Cs in these projects were the following:

1. Fewer transport movements and an improved vehicle load factor.
2. Consolidation of "kitting activities" (work packages).
3. Improvements of the planning and the amount of ordered building materials.
4. Improve the management of waste.
5. Achieve a better consolidated planning of all companies active at or around the building sites.

Several innovative ICT systems to support the 4C were tested. The focus was on the coordination of the planning of individual companies to achieve a broader span of control for the 4C compared to the individually managed processes. The 4C must provide insight in the real-time planning of both construction and logistics activities in the complete supply chain from suppliers of materials to the workmen on the site.

It was concluded in CL4C that the integration of the various individual ICT systems can lead to a significant efficiency increase, but this will only be possible if the systems and processes are extremely user friendly and matched with the education level of the users on the site. Only then an orchestrated planning process can be widely accepted in the industry.

In a follow-up project to CL4C, the lessons learned in the two pilot cases were generalized and applied to the whole Dutch construction logistics industry. It was concluded that collaboration can reduce the number of trips of company vans into city centers towards constructions sides by 50% to 80%.

Project period: November 2013–August 2016. **Subsidy received**: 977,000 euro.

8.4.6 Project Next Level in Logistics Collaboration

Companies experience various barriers that hinder a wide uptake of logistics collaboration, such as not being able to find suitable partners, struggling to have enough mutual trust, and the difficulty of aligning processes and practical difficulties during the implementation phase. In addition, the fear of violating competition law or incompatibility of ICT systems make that logistics collaboration is difficult until position. A consortium of knowledge institutes concluded that there is a need for structured exploration and development of the opportunities for collaboration among larger groups of companies. The project "Next level in logistics collaboration" was carried out based on a shared ambition to overcome each of the above barriers and demonstrate possible steps towards actual logistics collaboration. The project consisted of the following four goals.

- Pilot 1: Bringing carriers and shippers together: bringing logistics together professionals using a Logistic Speed Dating app to find new ones initiate partnerships
- Pilot 2: Responsiveness: sharing information through an open and neutral logistics ecosystem earlier and easier to respond to current demand and available resources
- Pilot 3: Freight exchanges between three or more LSPs
- Knowledge sharing: disseminating the experience gained in the project, enriched with the knowledge from previous initiatives

The "Next level in logistics collaboration" is based on the above three pilots that explore how data exchange via ICT tools can play a role in overcoming the barriers for collaboration. The goal is that based on these experiences other parties can accelerate realization of horizontal collaboration themselves. The project showed that it is wise to primarily focus on increasing efficiency in terms of kilometers driven and CO_2 emissions and only secondarily on showing that collaboration can improve customer service as well.

Project period: January 2016–August 2017. **Subsidy received**: 291,000 euro.

8.4.7 Project COMPOSE

In the COMPOSE project, Tilburg University together with the industry association evofenedex is developed a digital platform where companies can easily get in touch with other to enter strategic logistical collaboration. COMPOSE focused on facilitating collaboration among shippers rather than between LSPs, so on producers and wholesalers that want to have their goods shipped more efficiently. To facilitate horizontal, innovative, and sustainable collaboration at a strategic level, this project takes a different approach than the other projects described in that it combines different kinds of academic knowledge such as:

- **Socio-psychological** knowledge on the do's and don'ts of stimulating collaboration.
- **Legal** knowledge on how to organize collaboration as well as the scope of the collaboration, what data companies should or should not exchange, etc.
- **SCM** knowledge on the logistics pros and cons of collaboration.
- **Econometric** knowledge on the costs and revenues of collaboration and how to share them.

This multi-disciplinary knowledge is gathered on a digital platform where companies can be matched with potential partners after specifying their business profile and supply chain needs. Subsequently, companies can, either independently or together with sector association evofenedex, explore collaboration opportunities in logistics fields such as transport, warehousing, and human resources.

The COMPOSE project pays special attention to "soft" elements of collaboration such as cultural backgrounds, personal fit, etc. The importance of these aspects were also discussed in Sect. 5.3 on Trust and commitment. Socio-psychological insights were used in the development of three tools: a matchmaking tool, a network matching tool, and an order matching document. A "match" between shippers can, for example, occur when the companies face similar challenges or have similar logistics facilities and capacities.

On the level of personal characteristics, in COMPOSE an online system was developed to determine whether two persons interested in collaboration have a match, for example, based on ambitions and personal motives. In addition, a match between companies can only occur if the logistics profiles match as well. To determine the logistics profile, some high-level transport data must be shared through an order "matching document." This multi-step matching process aims at finding combinations of persons and companies that did not know each other before. Such a structured approach is expected to result in better results that the current situation in which matches are commonly based on good fortune and incidental encounters.

An interesting characteristic of COMPOSE is the active involvement of the industry association evofenedex. Such an entity is potentially very suitable to connect potential collaborators. An industry association is non-commercial and independent which creates more trust than in the more common situation in which the collaboration is encouraged by companies that in one way or another have a commercial stake in setting up collaborations. The matchmaking tool is now routinely used by evofenedex to support collaboration among its members.

Project period: October 2016–October 2019. **Subsidy received**: 500,000 euro.

Now that we have the discussed the most important 4C project carried under the TSL research agenda, we are now ready to define some overall lessons learned in the next chapter.