

D4.4: Smaller pilot case in market conditions

Status: October 2017 - Month 32

PROJECT INFORMATION	
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NEXTRUST PILOT CASE INFORMATION	
Title	Pilot 4.2 Capacity sharing for replenishment of e-commerce pick-up points in a retail environment
Pilot Case Category	4
Pilot Leader	André Céron Dreamland NV andre.ceron@dreamland.be
Participant overview	<i>Shippers: Dreamland NV, Dreambaby NV, Collishop</i> <i>Carriers: Bubble Post, Dockx Group</i> <i>Trustee: Tri-Vizor, Pastu Consult</i> <i>IT support:</i> <i>Other: Vlerick Business School</i>
Freight flows	Geographical scope: Belgium Flows in scope: Quantities of pilot case: Characteristics: Industry: E-commerce
TEN-T corridor	NA
3-step Methodology: Status	Subpilot small parcels: preparation Subpilot large parcels: conclusion
<i>Identification (1st step)</i>	Subpilot small parcels: May 2016 – September 2016 Subpilot larger parcels: May 2016 – September 2016
<i>Preparation (2nd step)</i>	Subpilot small parcels: October 2016 – present Subpilot larger parcels: October 2016 – March 2017
<i>Operation (3rd step)</i>	Subpilot small parcels: October 2016 – present Subpilot larger parcels: April 2017 – November 2017
Expected impact	No estimate available yet
<i>Reduction of GHG emissions</i>	No estimate available yet

PROJECT INFORMATION	
<i>Reduction of trips</i>	No estimate available yet
<i>Reduction of/shifted TKM</i>	No estimate available yet
<i>Increase in load factor (%)</i>	No estimate available yet
Exploitation: <i>Scalability</i>	- Colruyt Group is dedicated to achieving collaborations to make the last mile of both small parcels and large ones more sustainable. - With regards to large parcels we have started working together with Tri-Vizor in order to find 'ideal partners'. The result of this data analysis will help us to actively approach possible partner companies with a proposal for participation in the network based on the NexTrust framework. - With regards to small parcels, the situation is different. During the pilot case, bpost took over our main partner Bubble Post. We are monitoring this closely and will evaluate how we can use the learnings from the NexTrust pilot project during a possible follow-up project in collaboration with bpost or others. - Colruyt Group wants to keep looking for ways to make the last mile more sustainable, not only within the context of NexTrust and related follow-up steps, but also through other initiatives, such as the joint research project which we recently started in collaboration with the Vrije Universiteit Brussel.

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Executive Summary

The goal of this pilot case is to test how a decoupled supply chain for e-com deliveries can lead to a more sustainable last mile delivery. Colruyt Group will further decouple its supply chain for deliveries of large and small parcels by working with a selection of dedicated partners for each channel. Both on the level of the shippers as on the level of the 3PLs, horizontal collaboration will be considered.

A pre-study looking into the future of green e-logistics in Flanders and coordinated by the Flanders Institute of Logistics (VIL) delivered some important preliminary learnings.

- Especially the last mile for home deliveries of online orders, both for large and for small parcels, is costly and characterized by low vehicle fill rates.
- Customers are willing to accept a delivery time exceeding express delivery times (e.g. same day, 24h) in 80% of the cases, but a selection of big e-tailers further narrow delivery time windows and fuel a ‘last mile speed race’
- Customers expect to be delivered at home, outside of working hours, and they prefer pick-up points less
- Customers in Flanders are **not willing to pay more** for a sustainable delivery method

Therefore Colruyt Group chose to fine-tune the pilot case scope and to focus on the delivery of non-food products by Dreamland and Dreambaby, specialized in non-food products.

In order to realise a more sustainable last mile delivery, the to-be state targeted with this pilot case can be split into 3 main parts: a shared bundling network for large parcel deliveries, a modal shift to green city e-logistics for small parcel deliveries, and a sensitivising experiment to explore the opportunities of nudging in order to promote a green last mile delivery option.

During the execution of this pilot case Colruyt Group has been confronted with some significant challenges. Those challenges forced Colruyt Group to revise and redo, but more importantly they provided the pilot participants with a substantial amount of lessons learnt. Some of them are listed below:

- Given the fact that ecommerce is highly competitive and externalities such as the impact on the environment are not reflected in retail prices, scalability of a business case is crucial in order to realise a sustainable last mile in an economical viable way. It is suggested that the

government will possibly have to step in and create an appropriate framework to conduct experiments which are economically justifiable.

- It is crucial that potential partners have IT-systems that offer possibilities for synchronisation with external systems. High IT adjustments costs have proven to be a significant barrier for the successful implementation of a cooperation model.
- Potential partners collaborating in an innovative pilot case such as this one, should share the same goals and values. The importance of such a common ground cannot be underestimated.

1. Introduction

1.1 NexTrust Project Overview

NEXTRUST objective is to increase efficiency and sustainability in logistics by developing interconnected trusted collaborative networks along the entire supply chain. These trusted networks, built horizontally and vertically, will fully integrate shippers, LSPs and intermodal operators as equal partners. To reach a high level of sustainability, we will not only bundle freight volumes, but shift them off the road to intermodal rail and waterway. NEXTRUST will build these trusted networks ideally bottom up, with like-minded partners, adding multiple layers of transport flows that have been de-coupled and then re-connected more effectively along the supply chain. We will develop C-ITS cloud based smart visibility software to support the re-engineering of the networks, improving real-time utilization of transport assets. NEXTRUST will focus on research activities that create stickiness for collaboration in the market, validated through pilot cases in live conditions. The action engages major shippers as partners (Beiersdorf, Borealis, Colruyt, Delhaize, KC, Mondelez, Panasonic, Philips, Unilever) owning freight volumes well over 1.000.000 annual truck movements across Europe, plus SME shippers and LSPs with a track record in ICT innovation. The pilot cases cover the entire scope of the call and cover a broad cross section of entire supply chain (from raw material to end consumers) for multiple industries. The creation and validation of trusted collaborative networks will be market oriented and implemented at an accelerated rate for high impact. We expect our pilot cases to reduce deliveries by 20%-40% and with modal shift to reduce GHG emissions by 40%-70%. Load factors will increase by 50%-60% given our emphasis on back-load/modal shift initiatives. NEXTRUST will achieve a high impact with improved asset utilization and logistics cost efficiency, creating a sustainable, competitive arena for European logistics that will be an inspirational example for the market.

1.2 Goal and Objective of the Pilot Case

The goal of this pilot case is to test how a decoupled supply chain for e-com deliveries can lead to a more sustainable last mile delivery. Colruyt Group will further decouple its supply chain for deliveries of large and small parcels by working with a selection of dedicated partners for each channel. Both on the level of the shippers as on the level of the 3PLs, horizontal collaboration will be considered.

By bundling the flows for large parcels with Dockx Group, the amount of trips can be decreased and load factors can be increased. At the same time, a platform can be set up for bulk deliveries which

can be expanded to other companies in a later stage. As an extra synergy, asset utilisation can be increased by making better work of the existing network.

For small parcel city deliveries, Colruyt Group will make a shift to Bubble Post, a fully-green city logistics company. In doing so, the last mile for small parcels can be made almost GHG neutral, without impacting the cost for the end-customer. At the same time, an experiment will be set up to test how we can change the dynamics between customer and e-tailer by sensitivising customers to move to more sustainable last mile ordering. A schematic overview of the pilot is given below in Figure 1.

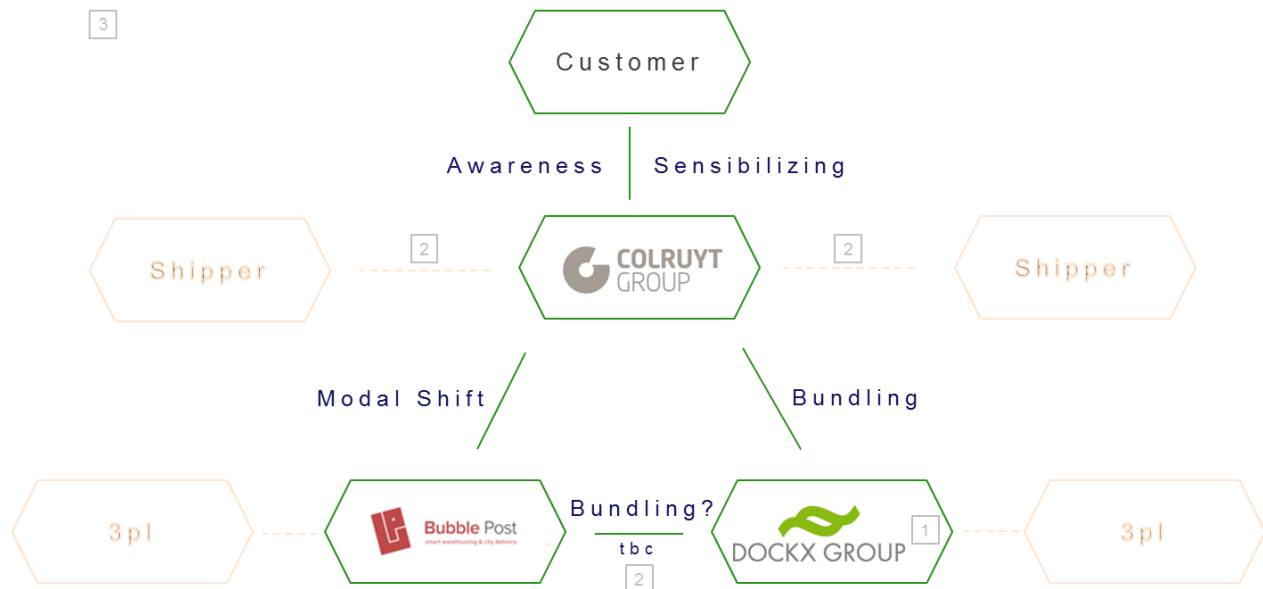


Figure 1 Pilot 4.2 Visualization

Table 1 Overview of goals pilot category 1.4

Pilots	Pilot Category	Goal of trusted collaborative network
4.2	An E-Green pre-study by VIL revealed that the biggest challenges are located in the non-food pillar of Colruyt Group's e-commerce activities. Especially those last mile home deliveries of non-food products, both for large and for small parcels, are costly and characterised by low vehicle fill rates. Therefore a reorientation of the scope and goal from Collect&Go as a whole was necessary. In order to	The goal of this pilot case is to test how a decoupled supply chain for e-com deliveries can lead to a more sustainable last mile delivery. Colruyt Group will further decouple its supply chain for deliveries of large and small parcels by working with a selection of dedicated partners for each channel. Both on the level of the shippers as on the level of the 3PLs, horizontal collaboration will be considered.

	realize a higher impact regarding to the last mile of home deliveries of the e-commerce activities of non-food products, we have opted for the incorporation of the companies Dreamland and Dreambaby, each specialized in non-food products, in this project.	
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2. Involved Partners in the Pilot

Below, an overview is given of the partners and their roles.

Table 2 Partners involved in pilot category 1.4

Pilot Number	Shipper	LSP	Retailer	Trustees	Other
4.2					
Large parcels	Colruyt Group	Dockx Group	Dreamland, Dreambaby, Collishop (Colruyt Group)	Tri-Vizor, Pastu Consult	VIL, Vlerick Business School
Small parcels	Colruyt Group	Bubble Post	Dreamland, Dreambaby, Collishop (Colruyt Group)	Tri-Vizor, Pastu Consult	VIL, Vlerick Business School

Pilot (task) Coordinator: Colruyt Group

Colruyt Group: About 80 years ago, Colruyt, a family business from Lembeek, West Flanders, took its first steps. Today, this small business has evolved into a business group: Colruyt Group. A flourishing retailer with numerous retail formulas operational in 4 countries. Initially, Colruyt served as the mother company for all new group entities (DreamLand, DreamBaby, OKay, Bio-Planet...). However, as these entities evolved into full-fledged business, they felt the need to take matters into their own hands. Colruyt no longer is their basic support, but a parallel business. Today, Colruyt Group refers to a family of equal sister companies. The focus of each Colruyt Group employee is on gaining and maintaining our clients' trust. Everything we do, we do to answer to our customers' needs in a sustainable fashion. If or when those needs change, we immediately analyse how we can adapt to these changes responsibly and in the easiest possible way. By offering various retail formulas to our clients in accordance with their living environment, location, family situation, etc. we aim to offer them solutions which aren't only economical, but also allow us to make a meaningful ecological and social contribution. Sustainability is part of Colruyt Group's DNA. By ensuring a sustainable human resources policy, generating renewable energy and providing a more sustainable product range, we hope to make a difference.

Collishop: Collishop is a shop and web shop which has been part of the Colruyt Group for more than 30 years. It hosts more than 20 000 products for the whole family. On top of our promotions, we always guarantee the best prices in all product ranges. Terrace & Garden, House & Bedroom, Kitchen & Dining Room, Electronics, Gaming & Multimedia, Animals, Beauty & Health, Household, Storage

and Travel. Most clients collect their reserved product(s) in a Colruyt, OKay or Dreamland shop. Some choose home delivery. There are temporary showrooms with seasonal product ranges, too.

Dreamland: This family and seasonal retail chain offers a wide, diverse product range: from (outdoor) toys, multimedia and gifts to school equipment, workout accessories, children's bedrooms and decoration. Dreamland inspires children between 0 and 14 years old as well as their parents, family and friends, and encourages them to play together. Dreamland closely monitors market trends in order to offer the newest licenses and brands. On top of an extended shop network, it includes a large established web shop. Customers can order their articles online and collect them at a Dreamland, Colruyt, Collect&Go or OKay collection point, or choose home delivery. A best price guarantee is applicable in the shops as well as the web shop of this family and seasonal retail chain.

Dreambaby: The company helps future and young parents to take on their new role as parents confidently. As a retail chain specialised in baby products, Dreamland's distinctive features are its service, personal advice and coaching style. Dreambaby offers a complete, high-quality range of products for babies between 0 to 24 months old at economical prices. Dreambee, its own brand, is an important asset. One of its leading initiatives is its birth list, which customers can create and manage online as well as offline. They can pick up their selected products at Colruyt, OKay and Dreamland, or choose home delivery. Their family and friends can order products in the shops or online, too.

The following NexTrust consortium partners also participate in this pilot:

- Vlerick Business School
- GS1 Belgilux
- TRI-VIZOR
- Pastu Consult
- Kneppelhout & Korthals

Other Pilot Case partners:

VIL (<http://vil.be/en/>): Flemish Institute for Logistics. A NFP-organisation doing hands-on research on innovations in logistics and supply chain. The government has appointed VIL as the point of contact for the logistic sector. The goal of VIL is to create an added social and economic value for a variety of business. VIL was the lead of the pre-NexTrust study that brought the opportunities within this pilot to light.

Dockx Group (<http://www.dockx-group.be/en/>): Belgian innovative service provider that ensures logistical mobility solutions for individuals as well as business requirements. Dockx Group consist of several businesses which offer high-quality, integrated, personalised solutions in the following lines of business: vehicle rental, national and international relocations, logistics, shipping, customs, road transport, railway transport, sea and air freight, and delivery, receipt and collection of goods. Dockx Group owns a network of 18 Service Shops at strategic locations across Belgium. In the pilot we focus on the regions of Antwerp, Ghent and Brussels, where Dockx Group delivers large parcels at home.

Bubble Post (<http://bubblepost.eu/>): Belgian green city delivery company on a mission to make the last mile distribution more sustainable at the same cost. Bubble Post is operational in more than 13 Belgian cities. Bubble Post has 8 regional warehouses across Belgium, which allows them to efficiently bundle parcels of various suppliers and allocate them to efficiently calculated routes. These warehouses are located in the cities' outskirts in order to limit urban pollution caused by flows of goods. Bubble Post organises ecological deliveries within the city centre using sustainable transportation: electrical vehicles, cargo bikes and refrigerated trucks operating on natural gas. Bubble Post. Our collaboration with Bubble Post would cover all Belgian cities where Bubble Post is operational (Ostend, Bruges, Ghent, Sint-Niklaas, Kortrijk, Antwerp, Mechelen, Brussels, Leuven, Namur, Charleroi, Hasselt and Liège). Smaller parcels would be transported from their e-com distribution centre to Bubble Post's central warehouse in Brussels. In August 2017, Bubble Post was acquired by bpost, the Belgian national postal provider.

3. Description of ‘as-is’ Situation and Process

General

The role of e-commerce is increasing, and this evolution is not expected to change the next-coming years. It is also difficult to predict what will be the share of e-commerce once this channel reaches maturity. Consequently, the pressure on mobility, and especially the impact on our ecological and social footprint, will increase. This has urged Colruyt Group to rethink its current e-delivery network, and to move to a more sustainable business model, both from an ecologic, social and economic point of view.

The Collect&Go network consists of e-commerce activities of Colruyt Group and encompasses both food and non-food products. The results of an E-Green pre-study by VIL show that the biggest challenges are located in the non-food pillar of Colruyt Group’s e-commerce activities (Dreamland and Dreambaby)¹. For those products, customers can opt for a delivery to one of the many pick-up points (Collect&Go, Colruyt Group stores) or for a home delivery. Especially those last mile home deliveries of non-food products, both for large and for small parcels, are costly and characterised by low vehicle fill rates. Refining the scope and goal from Collect&Go as a whole to the last mile of home deliveries of the e-commerce activities of non-food products via Dreamland and Dreambaby enables Colruyt to realise a higher impact in the operation phase.

Currently, large parcels & small parcels are treated differently, with the former being delivered by Colruyt’s own fleet, and the latter outsourced to Bpost (Belgian postal provider). The pre-study by VIL looked at customers’ delivery requirements for e-commerce as well as possible scenarios to make this logistics more scalable and sustainable, both from and to DC as well as the last mile.

When ordering online, people get to choose between several delivery options. The options depend on the size of the products and respond to differences in customer’s preferences.

For smaller parcels (< 30 kg or packaging < 1.5 m), customers can either opt for a home delivery or they can collect their purchases in one of the many pick-up points, i.e. Colruyt Group stores

¹ See page 17 for the most important findings of this pre-study

(Dreamland, Dreambaby, Colruyt, Okay, Bio-Planet...) and Collect&Go pick-up points. Concerning home deliveries, customers can choose for a home delivery on weekdays or weekends. Depending on the choice made, different shipping rates are applied. There delivery lead time is 3 days after ordering. **Large parcels** (> 30 kg or packaging > 1.5 m) are always delivered at home. For some products, the supplier is responsible for the shipping. The other products are shipped by Colruyt Group and delivered at home during weekdays or weekends. The differentiation of shipping rates applies here as well. The lead time is +3 days.

An analysis of the actual delivery choices customers made and of the corresponding flows reveals that 90% of the orders are collected from a pick-up point. 6% of the total orders consist of home deliveries of small parcels and 4% are home deliveries of large parcels, as visualised below in figure 2.

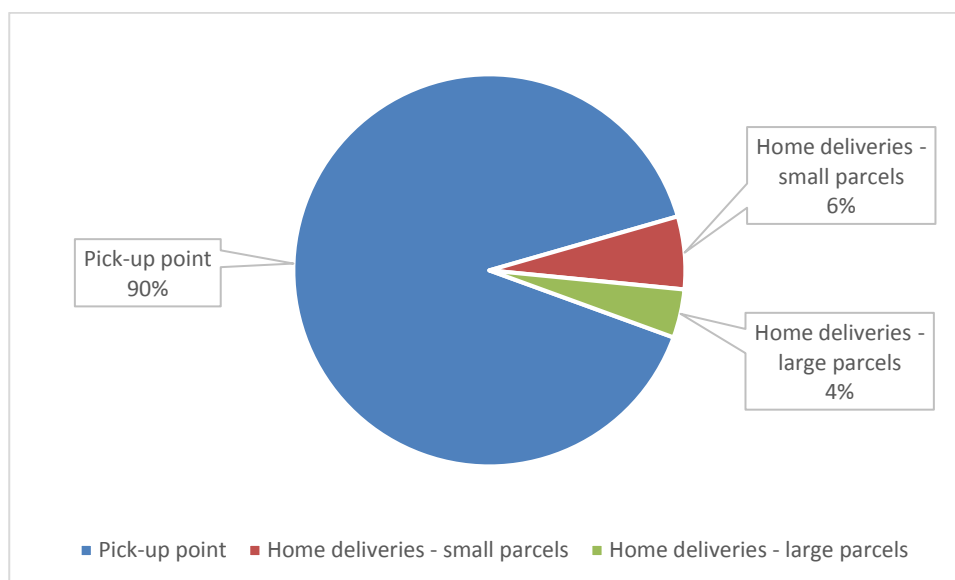


Figure 2 Preferred choice for last mile delivery @ non-food Colruyt Group

Home deliveries large goods

Home deliveries of large parcels are organized by Dreamland, Dreambaby and Collishop from a shared e-com distribution centre in Pommeroeul, close to the border with France. The DC of Pommeroeul is supplied via a shuttle service from the centrally located DC of Hellebroek (Halle).

10 vans or trucks are used daily to deliver a total of 30,000 parcels a year, their average load factor varies between 25 and 40%. Each delivery consists on average of 1.2 parcels. Up to 25% of goods require a two-man delivery.

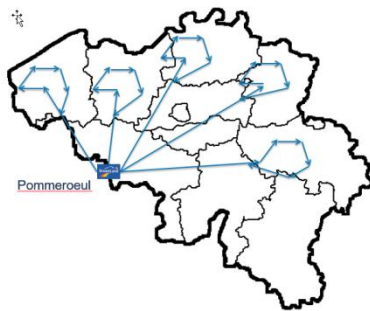


Figure 3 AS IS home deliveries large parcels

Home deliveries small parcels

Dreamland, Dreambaby and Collishop make use of the Bpost services (Belgian postal provider) for home deliveries of small parcels. Bpost collects all parcels at DC Hellebroek where the picking of orders takes place, on average 80.000 parcels annually. DC Hellebroek is resupplied by DC Laekebeek (Beersel). In case orders include both large and small parcels, the latter will be added to the former and shipped together. Therefore the small parcels are also shuttled from DC Hellebroek to DC Pommeroeul. However, these combined orders are only a very small percentage of total orders.

4. Description of ‘to-be’ situation

The to-be state targeted with this pilot case can be split into 3 main parts, cfr. figure 1: a shared bundling network for large parcel deliveries, a modal shift to green city e-logistics for small parcel deliveries, and a sensitivising project to experiment how we can make more customers choose for green last mile delivery.

4.1 Large parcel deliveries

- For the large parcel deliveries, a collaboration and bundling network is considered by Dockx Group which will bundle shipments from Colruyt Group’s central non-food e-DC with other retailers, and shuttle them overnight to the Dockx Regional DCs. From these RDCs, the goods can then be shipped via a local milk run, ensuring higher load factors and less trips. The VIL study included a GHG calculation tool, showing preliminary potential GHG savings between 18 & 56%, depending on the bundling scenario chosen. This will also allow Dockx to use its current fleet of vans & trucks more efficiently, and can increase asset utilisation without growing their fleet. This way, there can be peer learnings with the Fiege pilot 4.1.

- In terms of last mile delivery, bundled local rounds departing from and arriving at the regional service shops of Dockx Group can be set up. By leveraging Dockx Group's highly-varied fleet, the most suitable truck/van can be used for each delivery, ensuring better fill rates and lower-emission trucks/van where possible.
- At the same time, this would lead to an open network set-up, allowing other companies to join this bundling activity to further increase load factors and asset utilisation, and reducing the overall sector GHG emissions. At end of October 2017, first talks with other companies were held, but no NDAs and finalized commitments are in place yet.

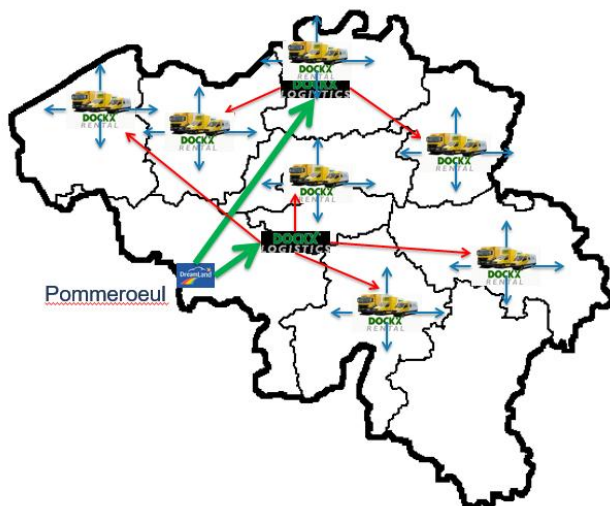


Figure 4 TO BE home deliveries large parcels

4.2 Small(er) parcel deliveries

For the smaller parcel deliveries, a bundling collaboration will be set up with Bubble Post. Their fleet consists of (e-)bikes and CNG vehicles, making their last-mile deliveries practically GHG-neutral. This modal shift from the typical LSP trucks to GHG-neutral distribution has immense GHG-savings potential.

4.3 Sensibilizing customers

Given this more sustainable last mile delivery mode may have an impact on the delivery times (extra cross docking necessary), an interesting study element could be to monitor whether customers are willing to shift their online buying behaviour to a more sustainable, but sometimes longer delivery delay – at the same cost though. At present, the following key insights have already been gathered:

- Finding 1: due to developments in the market (rat race towards faster and free deliveries, driven by the actions of a handful of large online retailers), the customer lacks awareness of the costs (financial, environmental) of the logistics behind their order.
- Finding 2: we do not know whether the customer is willing to adapt his choices when he/she gains insight in the environmental impact of his/her delivery method.

It can be interesting to monitor whether customers can be incentivised or sensibilised by tracking their ordering process online. Together with Vlerick Business School, Colruyt Group is currently looking into whether and how certain experiments can be set up in order to ‘push’ customers to more green deliveries, in a way that we can track the impact of each experiment’s design. The goal is to arrive at an insight of how to make customers more aware of the environmental impact of their delivery choice, and to check whether they can be urged to the more sustainable alternative in an ethical manner.

Some elements that will be looked at, include whether we can positively incentivise customers to opt for the most sustainable delivery method by

- Informing the customer of the environmental impact of the different alternatives;
- Suggesting to the customer the most sustainable option;
- Provide the customer with other incentives (such as sustainability points, a “trading stamp book”,...)

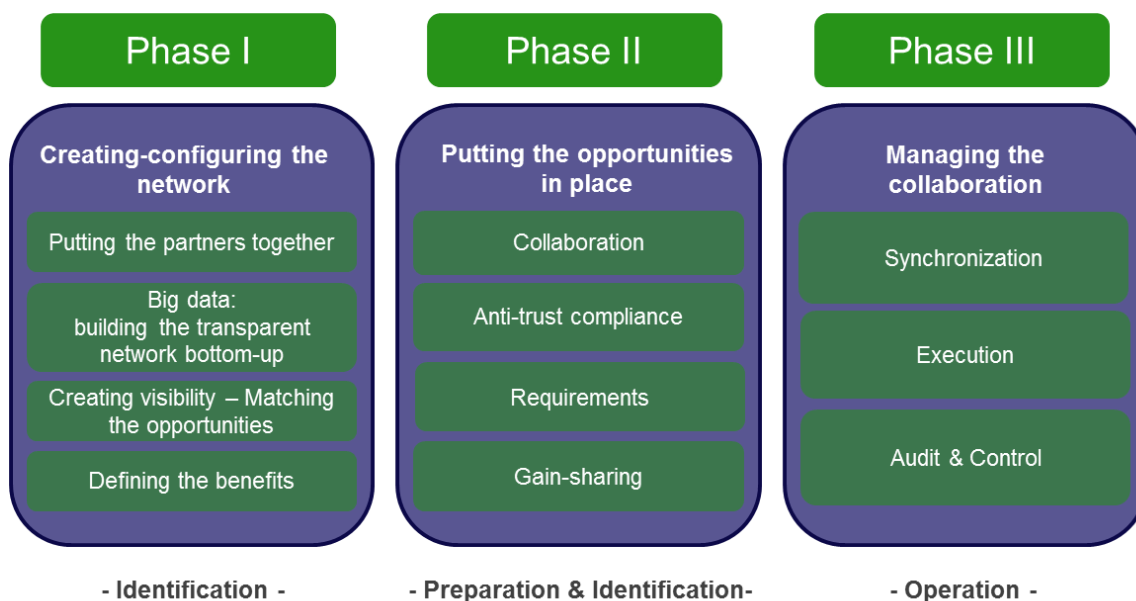
The following potential actions have already been identified:

- Test different formats of messages informing the customer on the environmental impact of his/her choices and measure the effectiveness of the formats
- Determine the most sustainable delivery methods based on several variables such as the customer’s location, time between order and delivery, type of parcel,...
- Test different incentives
- Analyze customer’s choices with/without these sensibilising measures and calculate the realized impact (CO2-savings, savings # km’s,...)

5. Application of 3-step Methodology, task carried out & deviations from GA

5.1 Project life cycle & current activities

At current, the large parcel delivery is in operations phase, where the results from a first small-scale pilot in Antwerp are under review. For the small parcel pilot, the identification phase was successfully completed, but the operations phase has temporarily halted due to the acquisition of the LSP by the Belgian national post office.



After a period of active observation and learning from the pilot case 4.1 with Fiege, pilot case 4.2 entered the identification phase. During this phase the project scope will be further refined, based on the learnings from pilot 4.1. and a pre-study executed by VIL (The Flanders Institute of Logistics).

5.1.1 Identification Phase – putting the partners together

Colruyt Group was involved in pilot case 4.1 as an active observer. This status allowed Colruyt Group to learn from the (intermediate) results of pilot 4.1 in order to fine-tune the scope of pilot case 4.2. Both the market analysis and the service and product design of pilot case 4.1. turned out to be very relevant. The findings of pilot 4.1. helped Colruyt Group in prioritising the subjects to be further examined in the pre-study for pilot 4.2, such as the importance of same day delivery and delivery windows not overlapping with office hours.

A pre-study was coordinated by VIL, the Flanders Institute of Logistics and a group of companies, looking into the future of e-green logistics in Flanders. Survey research with experienced e-shoppers also examined the customers' delivery requirements. Simultaneously, an algorithm-driven scenario simulation was done to test how e-commerce logistics could be made more scaleable & sustainable. Member companies of this pre-study are listed below in figure Consortium members pre-study by VIL.

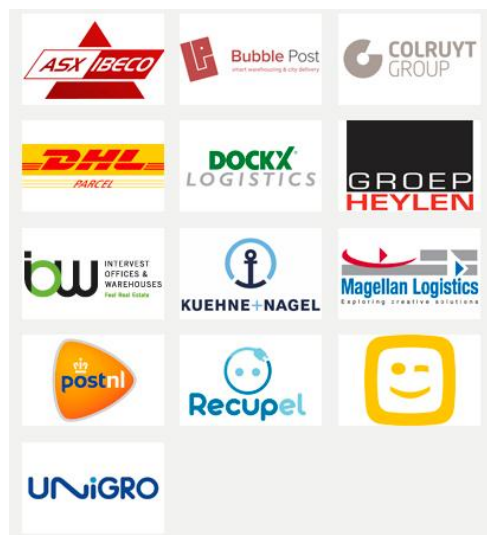


Figure 5 Consortium members pre-study by VIL

The most important results of the pre-study are:

1. **The customers' delivery requirements for e-commerce:** Out of the E-green VIL pre-study a strange paradox appeared: while customers accept that most of the time (80%) a delivery time exceeds express delivery (e.g. same day, 24h), the e-tailers enforce their "last mile speed

race”, constantly trying to deliver faster. As a result, pressure on the supply chain increases, with a devastating impact on the ecological, social and economic sustainability. Alarming is the fact that the customer is not made aware, and is not made receptive for a change as a consequence.

2. A second learning from the pre-study, was the **importance of home deliveries**; customers expect to be delivered at home, outside of working hours, and they prefer pick-up points less. When looking at the Colruyt Group e-business delivery channels though, this seems less important for the customer base: 90% of Colruyt Group’s e-business orders are picked up at a pick-up point. This can be explained by the fact that customers need to pass by one of these pick-up points in any case when they do their day-to-day shopping.
3. A third relevant insight from the study was that customers in Flanders are **not willing to pay more** for a sustainable delivery method. This stressed the importance that the modal shift to green logistic alternatives should be able to compete with the current 3PL business models in the market.

A first simulation and calculation of this pilot case showed potential GHG savings of 18-56%, depending on the scenario chosen in the large parcel bundling case.

Several partners of the pre-study were interested in continuing the cooperation. Colruyt Group acted as coordinator and preliminary meetings were held to explain the NexTrust project to the potential project partners and to define the scope of pilot case 4.2. Vlerick Business School helped the project team in matching it with the NexTrust protocol and its KPIs. 3 partners have confirmed their participation to the NexTrust pilot 4.2 as a result: VIL, Dockx Group and Bubble Post.

5.1.2 Preparation and identification phase

After identifying the various partners, we were able to start looking for the best possible future network. With the collaboration of these partners and Vlerick Business School, we developed a network which seemed feasible for all parties involved.

Initially, we wanted to transport large as well as small parcels in a bundled shipment from the joint distribution centres of Collishop, Dreambaby and Dreamland to our 3 partners. However, this was not possible because the order picking times of large parcels and small ones couldn’t be synchronised.

Small parcels for next-day-delivery are collected at 10 pm, however, large parcels must be collected earlier, during the afternoon preceding the delivery day. That is why it was decided to analyse large and small parcels separately.

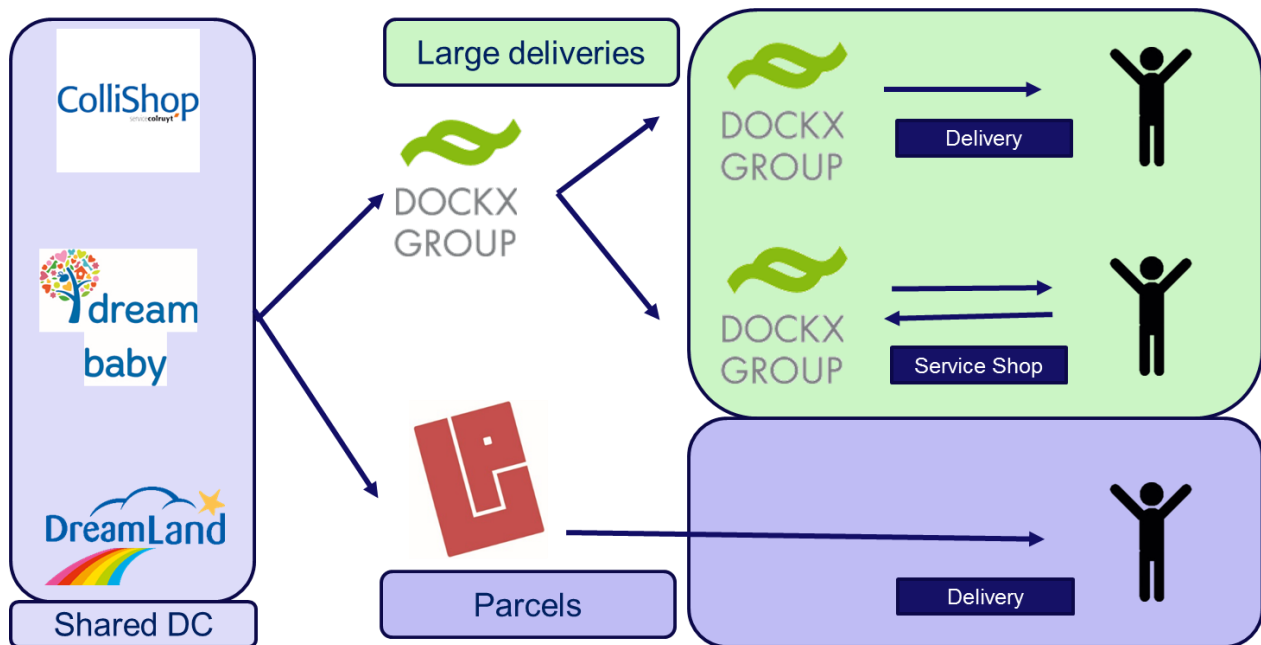


Figure 6 Schematic overview of pilot case 4.2

Therefore, we must distinguish between small and large parcels during the following phases.

5.1.3 Large Parcels – Identification and Preparation phase

Anti-trust compliance

During the different pilot case phases everything was done in compliance with the anti-trust regulations through various measures, such as the inclusion of a Trustee during the project meetings, the disclosure of confidentiality statements during each presentation and, where possible, separate meetings with our different partners to prevent the exchange of commercially sensitive information. Together with our consortium partner Kneppelhout & Korthals, we analysed if the information exchange between Colruyt Group's subpartners (Dreamland, Dreambaby and ColliShop) complied with the anti-trust regulations.

Requirements

The requirements can be split into 3 components:

1. IT
2. Financial
3. Logistic flow

To guarantee a smooth logistic flow, the supply chain processes of Colruyt Group and Dockx Group have to be aligned. Relevant questions concerning this topic include: When will the articles be collected? When will Dockx Group deliver these articles? In which truck will we load our parcels? How will we organise the return flow?

With regards to the necessary IT adjustments, we must ensure that Dockx Group can easily handle our articles, barcodes, article lists, itineraries, etc. back end as well as front end. On the website it should be clear to our customers that they have the option to collect their article in a Dockx Group service shop.

Financially, agreements should be struck regarding the cost per drop, the cost per return...

Initially, we wanted to bundle our parcels in collaboration with different shippers. However, during the preparatory phases, it was revealed that this would require various cost-intensive, time-consuming adjustments, which is why we chose to test the platform via internal bundling as a first step. Colruyt Group's non-food activities consist of 3 businesses: Dreamland, Dreambaby and Collishop. These 3 businesses share an e-DC, an internal bundling system which allows for cost-efficient network testing before being shared with other shippers.

Since Dockx Group uses Service Shops, we took advantage of the pilot project to include them. Service Shops would give Colruyt Group customers placing an order on the Collishop, Dreamland or Dreambaby website the option to collect their order at a Dockx Group Service Shop. Plus, it would allow the client to rent a moving van at Dockx Group to transport the goods home and/or arrange additional moves, which is not only a clear added value for Colruyt Group customers, but also allows Dockx Group to make better use of its Service Shops.

5.1.4 Large Parcels – Operation

Synchronization

The non-food business of Colruyt Group had to modify its supply chain processes to be able to work together with Dockx Group. Upon evaluation of both processes we defined the optimal collection moment which is feasible for both parties and allows us to meet customer needs. We didn't only discuss the logistic flow, but also reviewed customer contact, return method, invoicing, price, etc. to define the most efficient way to deliver large parcels to our customers.

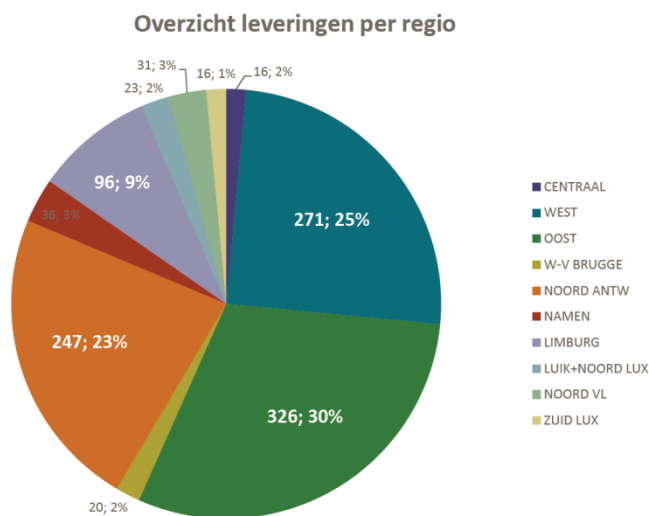


Figure 7 Large parcels overview of deliveries per region

Execution

Between 04/04/2017 and 09/05/2017 a total of 66 journeys took place, which is equivalent to 2 journeys per day except during the period from 12 April to 15 April, when 4 freights were transported. During this period, 1082 parcels were delivered to customers, translating into an average of 16 customers per journey. Colruyt Group loaded parcels for two journeys in one of Dockx Group's truck in its distribution centre in Pommeroeul. After, Dockx Group drove the truck from Pommeroeul to its warehouse in Wilrijk. In the warehouse, Dock Group then further split the itineraries. Dockx Group was responsible for the itineraries and delivered the large parcels to our customers. This setting was not yet optimal as there were freight transport options available in collaboration with other companies. In this case, Dockx took an itinerary established by Colruyt Group.

Audit & Control

After a month of testing we evaluated the tests together with Dockx Group to discuss improvements and adjustments. The collaboration costs were compared to the costs incurred by Colruyt Group should we have done the end customer deliveries ourselves.

During the test phase, Dockx Group delivered the articles at home in the region of Antwerp with dedicated itineraries for Colruyt Group. These dedicated itineraries required minimal IT adjustments. Dockx Group followed the itinerary generated via our optimal itinerary planner.

The test phase revealed that it is 30% more expensive to outsource home delivery of large articles to Dockx Group compared to our current situation in which we do it ourselves. This cost difference is significant, especially in e-commerce, which is a very competitive sector. Furthermore, the added costs don't include the extra journey required to transport the goods from Colruyt Group's warehouse to the Dockx Group one. The pilot wasn't extensive enough to factor out this difference through parcel bundling. An extension of the geographical area in which Dockx Group operates for Colruyt Group wouldn't result in the needed costs reductions. Therefore, we decided to not put this concept into practice for the time being. Further steps are detailed in the exploitation section.

The large parcel pilot project hence revealed that the scale wasn't big enough to fill the cost gap between as-is and to-be, which eliminated the need for further implementation. Further analysis was required to find synergies with third parties. That is why we called upon the support of consortium partner Tri-Vizor. Based on an analysis of our data, Tri-Vizor would advise us regarding the parameters defining our ideal shipping partner for parcel bundling.

After this analysis, Tri-visor provided the following insights:

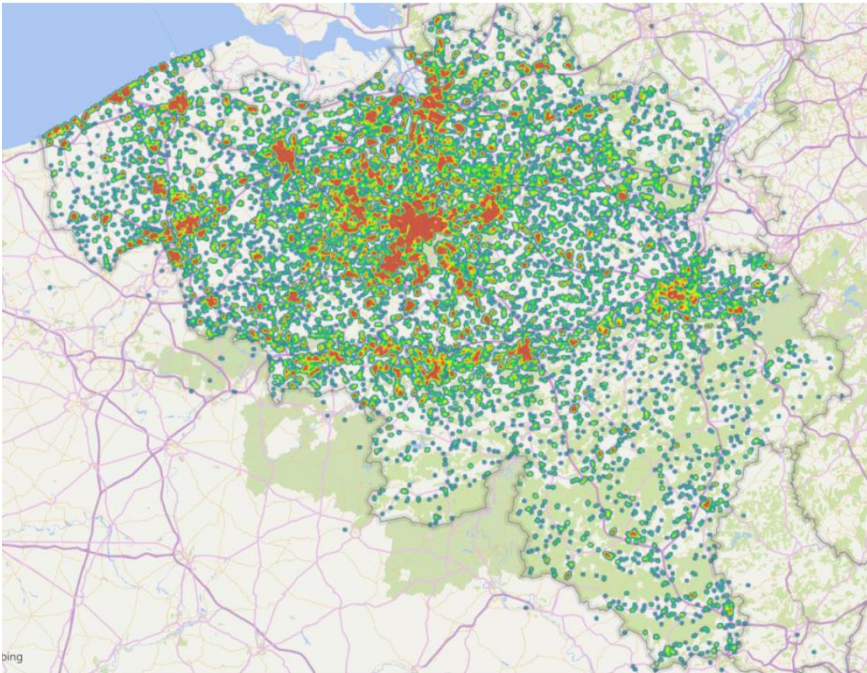


Figure 8 Drop density home delivery large parcels

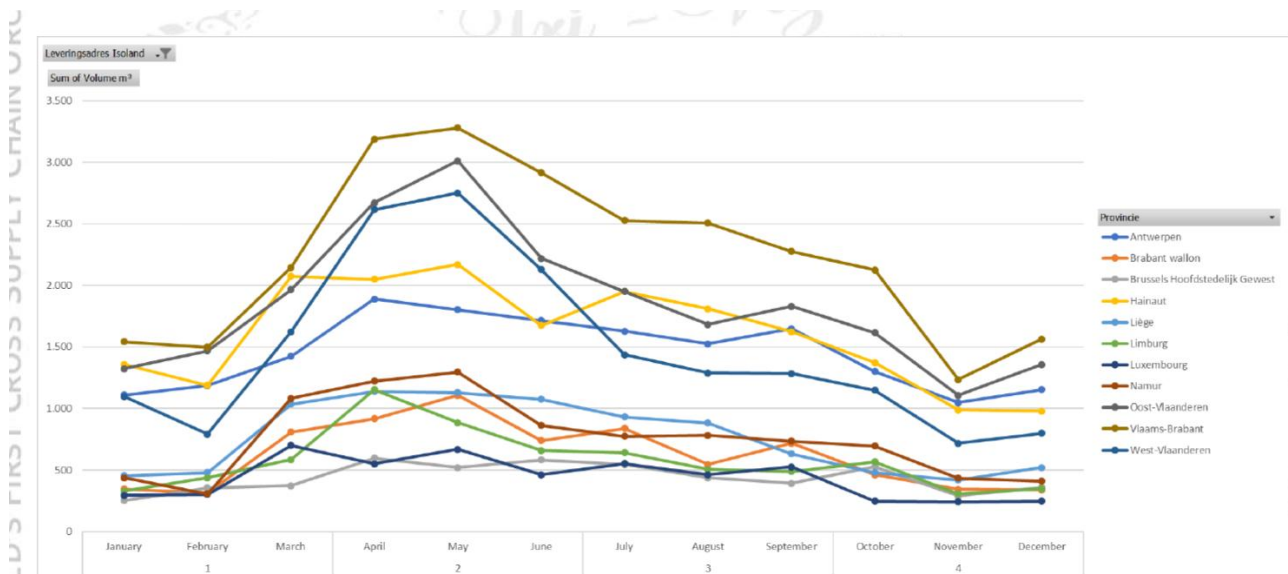


Figure 9 Volume per month home delivery large parcels

The dataset analysis of large parcel home delivery by Colruyt Group's non-food businesses revealed that our current drop cost could be reduced by 20%. These findings are based on a hypothetical collaboration with a partner who has the same patterns as Colruyt Group (same type of clients, deliveries, density...) which would allow us to double our volume.

Table 3 provides additional insights into Tri-Vizor's analysis method. This example is based on a delivery located a one-hour drive away from the central warehouse. The effective milk run is 7 hours. Taking into account the drop time, the driving distance and the driving speed in the milk run, this translates to 9,6 drops per milk run against a (fictional) cost of 62,20 EUR. Collaborating with a similar shipper, the volume would be doubled, and the driving distance reduced. We could then organise 2 smaller milk runs, reducing the distance between drops. This would allow us to realise 12,2 drops per milk run on average, reducing the (fictional) costs per drop to 49,00 EUR. This is a cost reduction of 21,2%. The other examples show a similar result. The profits are always about 20%.

Table 3 Potential gain calculation (fictional)

Totaal shift	Heen	Terug	Milkrun	Drops	Droptijd	Rijafstand	Rijsnelheid	Kost/drop	Gain
hr	hr	hr	hr	#	hr	km	km/u	€	
9,00	1,00	1,00	7,00	9,63	0,17	25,00	40,00	€ 62,30	-
9,00	1,00	1,00	7,00	12,23	0,17	17,68	40,00	€ 49,07	21,2%
9,00	0,00	0,00	9,00	12,16	0,17	25,00	40,00	€ 49,35	-
9,00	0,00	0,00	9,00	15,51	0,17	17,68	40,00	€ 38,67	21,6%
9,00	2,00	2,00	5,00	7,11	0,17	25,00	40,00	€ 84,44	-
9,00	2,00	2,00	5,00	8,94	0,17	17,68	40,00	€ 67,10	20,5%

5.1.5 Small Parcels – Identification and Preparation phase

Anti-trust compliance

During the different phases of this pilot case everything was done in compliance with the anti-trust regulations through various measures, such as the inclusion of a Trustee during the project meetings, the disclosure of confidentiality statements during each presentation and, where possible, separate meetings with our different partners to prevent the exchange of commercially sensitive information. Together with our consortium partner Kneppelhout & Korthals we analysed if the information exchange between Colruyt Group's subpartners (Dreamland, Dreambaby and Collishop) complied with the anti-trust regulations.

Requirements

We can split up the requirements in 3 components:

1. IT
2. Financial
3. Logistic flow

In order to guarantee a smooth logistic flow, the supply chain processes of Colruyt Group and Bubble Post have to be aligned. Relevant questions concerning this topic include: When will the articles be collected? How will the transport between the distribution centres of Colruyt Group and Bubble Post be organised? Which service should Bubble Post offer us timing-wise? How will we organise the return flow?

With regards to the necessary IT adjustments, we must ensure that Bubble Post can easily handle our articles, barcodes, article lists, itineraries, etc. back end as well as front end. On the website it should be clear to our customers that home delivery via bpost or Bubble Post is an option. Once the customer has chosen Bubble Post, certain IT adjustments should be made to put the delivery on a different track as opposed to the ‘normal’ deliveries via bpost. These parcels would also have to be labelled differently. Colruyt Group Services’s Business Processes & Systems (BP&S) department identified which adjustments are needed and which ones aren’t.

With regards to the financial component, we should mention that this was still being discussed. Colruyt Group would have to charge an extra cost because Bubble Post’s parcel delivery service is about 30% more expensive than bpost’s. Together with Bubble Post we looked for the ideal price taking into account ecological as well as economic factors.

For the experimental part of this subpilot project we investigated which triggers could push our customers to choose sustainably delivery over regular delivery. Together with Vlerick Business School and Bubble Post we analysed the possibilities. Figure 10 shows the desired state which includes the use of e-spot to trigger our customers. Based on a nudging experiment we would use 5 different methods triggering the choice for sustainable delivery. Customers who live in a postal code area within Bubble Post’s delivery zone would randomly be allocated 1 defined nudging scenario.

- The first option is the standard scenario which is used as a reference case. In this case, customers choose between bpost and Bubble Post without being nudged.
- In the second scenario, customers are informed that choosing sustainable delivery has a positive impact on our living environment.

- In the third scenario, the box for delivery via Bubble Post is already ticked, which means that customers must take action if they wish to select regular bpost delivery.
- In the fourth scenario, we guide customers towards sustainable delivery by providing related facts, i.e. by letting them know how high the reduction in CO₂ emissions would be if they would choose Bubble Post.
- In the fifth and last scenario, which is developed within NexTrust, a testimonial is used. Another customer recommends delivery via Bubble Post.

Some of the options excluded after a series of workshops are: a reward in exchange for a green delivery, a fear factor (ex.: ‘The amount of people with lung diseases is higher in cities because of transportation’). The benchmark option (ex. ‘1000 people before you have chosen delivery via Bubble Post’) wasn’t withheld because this is an experiment wherein we start from scratch.

We wanted to conduct this experiment in the Dreambaby webshop because we believed that the target public of Dreambaby - future and young mothers - could be particularly susceptible to these issues and could hence be convinced more easily. However, the yearly number of parcels delivered by Dreambaby in Bubble Post’s operational area is (too) low. Furthermore, we can’t conduct the experiment for an entire year. That is why it was advisable to apply the experiment to multiple Colruyt Group businesses. We selected three non-food businesses, Dreamland, Dreambaby and Collishop, to conduct the experiment.



Figure 10 Nudging experiment E-spot

5.1.6 Small Parcels – Operation

The start of the operational phase was scheduled for January 2018. In order to implement the necessary IT adjustments, it was crucial to task Colruyt Group's IT department with this assignment at the beginning of September at the latest. A kick-off session was planned, however, at the beginning of August we were informed about the acquisition agreement between Bubble Post and bpost, current market leader in Belgium and LSP for Colruyt Group. Bubble Post would join the bpost group in the future. At that point in time, our contact persons at Bubble Post were unable to predict the implications of the agreement. For instance, they couldn't guarantee us that the pilot project would be prioritised as it would have been within Bubble Post as an alone-standing company. However, what really concerned us was the fact that it wasn't clear which IT platform would be used in the future and when exactly there would be more clarity regarding this issue. It was therefore possible that the planned IT adjustments would have become useless after a couple months.

At current, due to the acquisition of Bubblepost by bpost, the experiment has been put on hold until more clarity can be given about both LSP's position within the experiment. Furthermore, the high uncertainty triggered by this acquisition would jeopardise our continuity towards our customers. Given the strict NexTrust deadlines, we believe that the operation phase will not be realised within the framework of the project. Our alternative future steps are detailed in the exploitation section.

5.2 Deviations from the Grant Agreement

*** Colruyt Group Non Food instead of Collishop**

Initially, we planned to focus on the Colruyt Group Collect & Go network with regards to bundling opportunities. The Collect&Go network consist of e-commerce activities of Colruyt Group and encompasses both food and non-food products.

The results of an E-Green pre-study by VIL show that the biggest challenges are located in the non-food pillar of Colruyt Group's e-commerce activities (Dreamland and Dreambaby). For those products, customers can opt for a delivery to one of the many pick-up points (Collect&Go, Colruyt Group stores) or for a home delivery. Especially those last mile home deliveries of non-food products, both for large and for small parcels, are costly and characterised by low vehicle fill rates. Refining the scope and goal from Collect&Go as a whole to the last mile of home deliveries of the e-commerce activities of non-food products via Dreamland and Dreambaby enables Colruyt Group to realise a higher impact in the operation phase.

5.3 Overview of project meetings, relevant calls & workshops

Date	Location (or mention "call")	Attendees
2-3/06/2015	TX Logistic (Troisdorf)	Kick-off meeting consortium
27-28/09/2016	Wenzel Logistics (Graz)	Consortium Meeting
10/03/2017	Vlerick (Gent)	Tom Van Steendam (Vlerick) André Ceron (Colruyt Group) Steve Demol (Colruyt Group) Livine Maerschallck (Colruyt Group) Niels Van Couter (Colruyt Group) Mario De Bruyn (Dockx Group) Nick Rau (Bubble Post)
07/04/2017	Vlerick (Gent)	Tom Van Steendam (Vlerick) Livine Maerschallck (Colruyt Group) Niels Van Couter (Colruyt Group) Mario De Bruyn (Dockx Group) Nick Rau (Bubble Post)
04/05/2017	Vlerick (Brussel)	WP4 status meeting
21/08/2017	Colruyt Group	WP4 status meeting

		Niels Van Couter (Colruyt Group) Livine Maerschallck (Colruyt Group) André Ceron (Colruyt Group) Dominique Fink (Fiege Logistik) Axel Niessner (Fiege Logistik) Roman Strand (GS1 Germany) Niko Oertel (Kneppelhout Korthals) Ady Van Nieuwenhuizen (Kneppelhout Korthals) Jikke Biermasz (Kneppelhout Korthals) Jasper Huysmans (TRI-VIZOR NV) Marc Braun (TX Logistics) Sebastian Ruckes (TX Logistics) Prof. Dr. Robert Boute (Vlerick Business School) Tom Van Steendam (Vlerick Business School) Prof. Dr. W.E.H. Dullaert (VU University Amsterdam)
26-27/09/2017	Mondelez (Bratislava)	Consortium Meeting

6. Expected Impact

Given the status of the pilot projects, we are unable to give correct numbers regarding the impact of the new collaborations.

7. Lessons Learnt

- Scalability.

Since Bubble Post doesn't have the same geographical distribution as bpost, the price negotiation process is hindered. Bpost is operational throughout the whole of Belgium whilst Bubble Post's activities are limited to 15 cities in Belgium, which means that Bubble Post can only deliver 6% of all small parcels to our customers' homes.

Furthermore, small parcel home delivery constitutes a small part of the total volume of Colruyt Group's non-food businesses. However, in order to conduct a scientifically significant experiment, we need sufficient data.

Scalability played a part in the subpilot project with Dockx Group, too. We have established that the scale needs to be large enough to reach a similar price in a possible collaboration. A bigger scale results in a more efficient and, by extension, cheaper process, but in order to accomplish this, multiple shippers must agree to service our network, allowing us to increase our bundling capacity.

- **€ in an e-commerce**

The market conditions of an e-commerce business present a challenge. The margins are low and there is a lot of competition. The costs of collaborations with Dockx Group and Bubble Post are about 30% higher compared to our current situation. When you add the necessary IT infrastructure investments to that, the result is an extra cost which can't be supported, not even during a pilot phase of limited duration. Transferring the costs onto our customers isn't an option either, because, given the strong market competition, they will simply move onto another retailer.

Colruyt Group believes that a lot of initiatives focusing on ecological last mile delivery will be halted because of financial implications. External factors such as the cost of the environmental impact of traditional home delivery are not reflected in the retail prices. On the contrary, we are seeing a trend towards faster and free deliveries influenced by big market players. Consumers are often not yet aware of the ecological and social impact of this evolution. If they want to make it possible for companies in our sector to conduct experiments which are economically justifiable, the government will possibly have to step in and create an appropriate framework.

- **Customer**

We are dealing with a B2C business. Often, home deliveries are the customers' only direct contact with the retailer. They therefore have a direct impact on customer satisfaction. Internal research confirms that smooth deliveries play a role in defining our customers' opinion about their purchases. This means that we can't experiment with alternatives without a solid framework, guaranteeing the continuity of our services.

- **Force majeure**

This should go without saying, but within a project the possibility of force majeure should be taken into account. During the small parcels subpilot project, for example, it was an obvious factor. We could never have foreseen bpost's acquisition of Bubble Post yet it had an

important impact on our project. The acquisition didn't only jeopardise the continuity of our collaboration, but also triggered the early discontinuation of the project caused by uncertainty regarding the need for IT investments.

- **IT**

Colruyt Group is currently experimenting a transformation phase. In time, our current closed systems will be replaced with systems which offer more possibilities for synchronisation with external systems. However, this type of transformation takes years. These pilot cases have demonstrated that there is a real need to organise our IT activities differently in the future. Currently, changing logistic providers is nearly impossible given the high IT adjustments costs.

- **Very valuable mentality**

The collaboration with Bubble Post and Dockx Group went very well. When all project partners share the same goals and values, the alignment and negotiation processes run very smoothly. We find it important to share common ground, in particular with regards to innovation projects such as NexTrust.

- **Supply Chain**

The lay-out of the supply chain is a very important aspect. There is a lot to take into account. For instance, when will the information be transferred between the shippers and the 3 PLs and when will the parcels themselves be transported? Synchronising this between 1 shipper and 1 LSP is a challenge. Adding shippers is adding complexity to the synchronisation process. Synchronising these processes implies a certain investment which can be a very real obstacle to possible collaborations, and even more so when we take the related IT implications into account.

8. Further Research, Next Steps & Exploitation

Colruyt Group is dedicated to achieving collaborations to make the last mile of both small parcels and large ones more sustainable.

With regards to large parcels we have started working together with Tri-Vizor in order to find 'ideal partners'. The result of this data analysis will help us to actively approach possible partner companies with a proposal for participation in the network based on the NexTrust framework.

Within this framework we recently reinitiated contact with our existing Ikea contacts. The coming months a follow-up meeting will be held to evaluate concrete opportunities for last mile collaboration. Colruyt Group will ask the coordination teams if a trustee of the NexTrust consortium should be present during this meeting.

With regards to small parcels, the situation is different. We will have to wait and see how Bubble Post evolves within bpost. We are monitoring this closely and will evaluate how we can use the learnings from the NexTrust pilot project during a possible follow-up project in collaboration with bpost.

Colruyt Group wants to keep looking for ways to make the last mile more sustainable, not only within the context of NexTrust and related follow-up steps, but also through other initiatives, such as the joint research project which we recently started in collaboration with the Vrije Universiteit Brussel.