



“Enhanced data management techniques for real time logistics planning and scheduling”

Deliverable D8.5: New/Emerging Logistics Business Models – Release 3

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Executive Summary

LOGISTAR is a Horizon 2020 research project, funded by the European Union (EU). It consists of pan-European partners from academia, and the software industry alongside both shippers and forwarders. The key aim of the project is the development of a 'digital tool' to allow:

- ▶ Effective planning and optimisation of transport operations in the supply chain;
- ▶ Securing horizontal (and vertical) collaboration;
- ▶ Real-time decision-making; and
- ▶ Real-time visualisation for freight transport.

Task 8.3 considers *New Logistics Business Models*. The main purpose of the task is to “analyse the potential future business models for logistics that are likely to emerge up to (say) 2030, then analyse the existing business models that are deployed to facilitate collaboration and the planning and implementation of dynamic transport services.” The task commenced at the outset of the LOGISTAR project with a requirement to produce annual updates.

As part of this task, an initial written report was presented in M6 (D8.3 Release 1 in November 2018). This document provided an overview and description of the main logistics business (supply chain) models that have been adopted by both the retail and manufacturing sectors, with a particular focus on the new models that have emerged over the past 10-15 years to support the development of e-commerce. A review of the use of existing technology for the planning and optimisation of transport operations in the supply chain was also presented.

The first contracted annual update report (D8.4 Release 2) was published in M18 (November 2019). This document examined in more detail collaboration within the logistics sector, identifying potential opportunities for further collaboration where it currently does not exist and where possible market opportunities are likely to exist for the LOGISTAR 'digital tool'. It concluded that while collaboration (active and passive) is already common practice, the LOGISTAR tool could find a significant role in facilitating further collaboration, as follows:

- ▶ Internally within existing large 3PLs, optimising the use of their transport equipment through the consolidation and load-sharing of cargoes from multiple shipper clients in real time;
- ▶ Help facilitate the further sub-contracting of cargoes between 3PLs, providing opportunities to cooperate in order to 'fill' transport capacity in real time.

This document forms the second annual update report (D8.5 Release 3). Building on the information and conclusions contained in the previous two reports, the main purpose of this deliverable is to report on a programme of testing the emerging conclusions from the LOGISTAR project with key players in the logistics market.

No further logistics business models have emerged during the course of the LOGISTAR project, hence there is no update provided in this report on the models themselves. However, the sale of retail goods via e-commerce platforms has continued to grow at pace, particularly during the Covid-19 pandemic.

In early Spring 2020, it was intended that the desk-top conclusions outlined above would be 'market tested' via an interview programme with a number of key commercial operators within the logistics sector. Interviews were to have been conducted on a face-to-face basis in both the UK and mainland Europe throughout Summer and Autumn 2020. However, in March 2020 the Covid-19 pandemic intervened and prevented the market testing exercise from progressing as planned. In addition to lockdowns and a requirement to work from home, supply chains came under significant strain. Due to this and other issues, it was therefore decided to pause the interview programme until operating conditions improved.

During Spring 2021, it was decided given the time constraints of the project that the most appropriate way forward for the market testing exercise was to undertake a series of webinars or on-line events. The purpose of the webinars was to 'market test' the envisaged end product with a range of logistics operators and shippers. These webinars were subsequently held on 21 and 22 April 2021. Despite planning and pre-session publicity, there was a lack of interest and engagement in the webinars, and attendance was poor. Only 10 organisations attended some part of the first Webinar and 4 organisations the second session.

The limited level of feedback from the webinars is summarised as:

1. Some empty running is an inevitable part of logistics operations. This could be for good operational reasons related to the equipment being operated or the commodity being conveyed. Achieving 'zero' empty running is therefore not feasible, and a level of empty running needs to be 'built-in' to operations and accepted as a reality of freight transport. However, any new 'tool' that is able to reduce or minimise empty running, or ensure better vehicle fill (through load sharing) is to be welcomed.
2. 3PLs are actually rather good at optimising vehicle fill and minimising empty running. Large 3PLs have systems and structures in place to ensure that vehicles are re-positioned between clients efficiently and therefore run laden for most of the time (where they are able to do so). The sub-contracting of loads to other 3PLs is also a widely adopted practice. The now common practice of out-sourcing logistics requirements to 3PLs has unwittingly facilitated horizontal collaboration between shippers (who are often competitors), and as a result their goods will at some point in the supply chain end up being handled by the common logistics operator and share the same logistics capacity. The ability to reduce or minimise empty running or ensure better vehicle fill is therefore not a particularly pressing matter, albeit operators are always seeking new more efficient operating methods.
3. It is a 'crowded market' and there already are a multitude of digital/software tools available which aim to support more efficient load planning across transport operations. The LOGISTAR digital tool will therefore need to differentiate itself in the market place if it is to succeed.

However, three aspects of the LOGISTAR digital tool may provide it with the unique selling point (USP) that will allow it to differentiate itself in the market place. These are:

- ▶ It will plan loads (and re-plan loads) in real time and across multiple operators. Many existing software packages are effectively 'plan then execute' in nature (i.e. it then relies on human interventions post-planning when responses are needed to changing events, such as delays due to congestion) and they only operate internally to a 3PL. LOGISTAR, in

contrast, will link-up multiple transport operators, effectively co-ordinating their transport/load planning functions so that cargo loads and transport capacity will be continually 'matched' in real time on an 'operator neutral' basis;

- ▶ It will have an intermodal component, incorporating rail and road modes. Existing load planning systems are almost exclusively road-based software; and
- ▶ It will have an AI predictive function, allowing potential interventions to be 'forecast' and consequently loads to be re-planned in response.

1. Introduction

LOGISTAR is a Horizon 2020 research project, funded by the European Union (EU). It consists of pan-European partners from academia and the software industry alongside both shippers and forwarders. The key aim of the project is the development of a ‘digital tool’ to allow:

- ▶ Effective planning and optimisation of transport operations in the supply chain;
- ▶ Securing horizontal (and vertical) collaboration;
- ▶ Real-time decision-making; and
- ▶ Real-time visualisation for freight transport.

The main objective of LOGISTAR is:

“To allow effective planning and optimising of transport operations in the supply chain by taking advantage of horizontal collaboration, relying on the increasingly real-time available data gathered from the interconnected environment. For this, a real-time decision making tool and a real-time visualization tool of freight transport will be developed, with the purpose of delivering information and services to the various agents involved in the supply chain, i.e. freight transport operators, their clients, industries and other stakeholders such as warehouse or infrastructure managers.”

Within this main objective are a set of specific ones related to 3 distinct project areas:

PROJECT AREA	SPECIFIC OBJECTIVES
Real-time decision making tool for planning of logistics operations	To <i>increase by 10% the load factors of freight vehicles</i> derived from the optimization techniques applied to freight deliveries planning.
	To <i>shorten by 10% the delivery routes</i> thanks to applying planning of optimal routes relying on synchronomodality, being continuously updated in case of disruption.
	To <i>increase the reliability and efficiency of logistics services</i> by predicting events and incidents affecting the supply chain and by providing alternative routes in real-time to these disruptions.
	To <i>facilitate the management of logistic operations</i> by providing real-time supply chain visibility through dashboards not only displaying information but also showing deviations, alerts or recommendations to take actions.
Real-time information on synchronomodal transport	To <i>increase the visibility of the delivery</i> derived from the use of sensors to monitor the goods shipped and boosting to share logistic data&information among agents.
Rest of the Implementation of the project	To <i>promote the sharing of open data in the logistics sector</i> by promoting the benefits of collaboration and Big Data analytics across stakeholders.
	To <i>enable new market opportunities</i> on the logistic information services sector, by developing new business models focused on data and high value service delivery, and exploring concepts such as “sharing” rather than “owning” transport assets. The policy and legal dimension will also be studied.

Task 8.3 considers *New Logistics Business Models*. The main purpose of the task is to “analyse the potential future business models for logistics that are likely to emerge up to (say) 2030, then analyse the existing business models that are deployed to facilitate collaboration and the planning and implementation of dynamic transport services.” The task commenced at the outset of the LOGISTAR project with a requirement to produce annual updates.

As part of this task, an initial written report was presented in M6 (D8.3 Release 1 in November 2018). This document:

- ▶ Provided an overview and description of the main logistics business (supply chain) models that have been adopted by both the retail and manufacturing sectors, identifying the key commercial players involved at the various stages of the supply chain. A particular focus was placed on the new models that have emerged over the past 10-15 years to support the development of e-commerce; and
- ▶ Presented a review of the use of existing technology for the planning and optimisation of transport operations in the supply chain.

The first contracted annual update report (D8.4 Release 2) was published in M18 (November 2019). This document:

- ▶ Examined in more detail some of the flows/links within the main logistics business models, the key commercial players involved and how they operate;
- ▶ Considered collaboration in the logistics sector, in particular the extent to which the key players in the logistics industry already collaborate, either combining loads to maximise vehicle fill or re-positioning empty transport capacity thereby ensuring HGVs run laden most of the time;
- ▶ Identified the potential opportunities for further collaboration where it currently does not exist; and
- ▶ Identified where the potential market opportunities are likely to exist for the LOGISTAR ‘digital tool’, effectively forming the starting ‘input’ for the *exploitation and implementation* plan.

The contents of both reports were derived from the authors’ extensive knowledge of the logistics sector, informed by some primary desktop research. The analysis presented included a number of ‘case studies’.

This document forms the second annual update report (D8.5 Release 3). Building on the information and conclusions contained in the previous two reports, the main purpose of this deliverable is to report on a programme of testing the emerging conclusions from the LOGISTAR project with key players in the logistics market.

Separately, but related to and informing Task 8.3, the authors have also presented (D1.5) in M12 (May 2019) and D1.6 in M24 (May 2020). These detailed the legal and regulatory position with respect to collaboration (Horizontal and Vertical) within the logistics sector.

2. Summary of Research and Findings to Date

2.1 Logistics Business Models

The November 2018 D8.3 initial report identified seven main logistics business (supply chain) models that have been adopted by both the retail and manufacturing sectors, as follows:

1. E-Commerce Supply Chain 1;
2. E-Commerce Supply Chain 2;
3. Bricks & Mortar plus E-Commerce from Store Retailer;
4. Shared User Networks;
5. Basic Supplier to Retailer;
6. Flow Diagram – Retail Factory Gate Collections; and
7. Consolidating Supplies.

The flow diagrams in Annex 1 provide a visual description of the models (in terms of the flows of goods between the various stages of the supply chains). Models 1 and 2 plus the E-commerce ‘add-on’ in Model 3 effectively form the ‘new’ logistics business (supply chain) models that have emerged over the past 10-15 years. These have been driven principally by the growth of retail goods being sold via e-commerce platforms alongside other factors such as the liberalisation of parcel and courier networks in the EU. The remainder are the more established business models of logistics supply chains.

It should be noted that they are ‘models’ of logistics supply chains; they provide a simplified description of reality in order to assist in explaining how companies organise the movement of goods from producers/suppliers to the end-user, as well as the key commercial players involved. These models are not intended to be a perfect ‘fit’ with an individual organisation’s actual supply chain, though examples of companies which have broadly adopted each model were given in the initial report. It may be the case that an individual company’s supply chain could be an amalgamation of two or more models, or they may have adopted more than one model for different parts of their businesses. For example, a retailer’s ‘direct to home’ E-commerce operation might reflect Model 2, which is operated alongside its established network of retail outlets broadly following Model 3.

No further logistics business models have emerged during the course of the LOGISTAR project, hence there is no update provided in this report on the models themselves. However, the sale of retail goods via e-commerce platforms has continued to grow at pace, particularly during the Covid-19 pandemic. As a result, supply chains serving this part of the logistics sector have become more established in the market and continue to grow in importance. Section 3 following therefore provides a short overview of the development of the e-commerce retail sector.

2.2 Collaboration

Two forms of commercial collaboration have previously been identified, namely:

- ▶ Vertical collaboration; and
- ▶ Horizontal collaboration.

The concept of *vertical collaboration* covers the process whereby companies enter into commercial relationships with other companies operating at different levels of trade in order to get their goods or services to market. In a vertical relationship, the product or output of one business is the input for another. Manufacturers supplying goods to retailers is an example of vertical collaboration. In the logistics sector, vertical collaboration is already commonplace and essentially covers the out-sourcing (by manufacturers, suppliers and retailers) of transport and other logistics functions (e.g. warehousing and inventory management) to specialist operators known as third party logistics providers (3PLs). It can also cover the leasing of transport equipment and renting warehouse floor space capacity.

Where companies operating at the same level of production or distribution in a market form any kind of commercial agreement it is defined as *horizontal collaboration*. In the logistics sector, at the operational level horizontal collaboration effectively covers agreements to share transport and/or warehouse storage capacity (though data sharing, purchasing arrangements and R&D can also be included). There are effectively three basic forms of this collaboration:

- ▶ Where two or more cargo owners (e.g. manufacturers or suppliers) agree to share a single storage facility (such as a distribution warehouse) to store their respective products;
- ▶ Where a transport operator (3PL) agrees to convey cargo on behalf of another transport operator (for an appropriate fee) in order to fill empty capacity; and
- ▶ Where a transport operator agrees to convey cargo on behalf of another transport operator (for an appropriate fee) in order to fill what would otherwise be partially laden capacity.

Horizontal collaboration arrangements are generally entered into as a means of increasing efficiency/productivity, thereby reducing operating costs per unit moved (potentially through economies of scale). Such collaboration often arises through formal agreement between two or more shippers/3PLs to share or jointly use their logistics capacity, which may be long-term regular/frequent arrangements (agreement by contract) or undertaken on an ad-hoc basis when required (most likely at pre-agreed rates). This could be termed 'active collaboration' in that the shippers/3PLs concerned will actively seek out collaborators and subsequently enter into collaborative partnerships in order to gain the economic efficiencies. Active collaboration often comes about through the commercial knowledge or personal contacts of logistics industry professionals, though in some cases it may be through the use of so called 'freight exchanges' (where loads or empty transport capacity is advertised for 'sale') or by an 'accident of geography'.

2.3 Logistics Providers

In some cases, shippers (manufacturers and retailers) will undertake to deliver their goods to the next stage in the supply chain themselves, using their own transport equipment and infrastructure, employing their own drivers and management systems etc. (including related logistics functions such as storage). These are often referred to as '*own account*' operations. The initial report from November 2018 (D8.3) explains why some companies will undertake these functions in-house.

However, it is now common practice for retailers and manufacturers to out-source much of their transport and other logistics functions to specialist service providers (vertical collaboration). These are known as *third party logistics operators or 3PLs*. The second update report (D8.4) provides some background to 3PLs, the services offered and the rationale behind the out-sourcing of logistics services to 3PLs.

At the simplest level, a 3PL will only undertake road haulage or rail freight operations. The 'classic 3PL' will provide road haulage operations integrated with warehouse and distribution centre management services. At the other end of the scale, a large multi-national 3PL will provide the full range of logistics functions. Some 3PLs can also be sector, commodity or activity focused. For example, the main parcel couriers focus on moving small individual consignments for multiple shippers (often e-commerce retailers), while the so called 'palletline' (groupage) operators specialise in moving pallet-load quantities for shippers via hub and spoke networks.

In some cases, a shipper could have dedicated transport capacity provided by the 3PL i.e. vehicles assigned to that shipper by the 3PL and only moving goods for that shipper. There are often good operational reasons for this; goods vehicles will often need to reposition back to distribution centres with empty roll cages/pallets, returned stock or waste packaging, meaning there is no opportunity to utilise that transport capacity for other shippers i.e. that part of a 3PL's fleet being unable to participate in collaboration. This is often the case for supply chains serving multiple retail outlets (Model 3). Dedicated transport may also be serving warehouse capacity dedicated to a particular shipper. Again there are often good operational reasons, such as the warehouse being equipped to only handle a particular commodity.

However, it is common place for 3PLs to seek to optimise the use of their storage infrastructure and transport equipment. This is undertaken by storing several customers' products in one warehouse location. Where appropriate, transport fleets are 'pooled' so that they are able to perform load-sharing, multi-drop and backload operations for different retailer or manufacturer clients (a process that could be termed 'internal collaboration'). Effectively, a 3PL's HGV fleet is considered to be a shared resource which can be positioned to serve multiple clients of that 3PL.

Also, 3PLs actively collaborate by sub-contracting cargo to one another ('active' horizontal collaboration), thereby reducing empty running or ensuring vehicle fill. It is important to note that this collaboration can take place between different divisions of the same wider organisation (a single 3PL) where these divisions more or less operate as de facto different companies.

In this respect, collaboration is often coincidental rather than by design. This is because multiple shippers (often competitors) will contract with the same 3PL, and as a result their

goods will at some point in the supply chain end up being handled by the common logistics operator and share the same logistics capacity (storage and/or transport). This could be termed 'passive' or 'accidental' collaboration, in that shippers do not directly set out to collaborate with other shippers (including both competitors and complementary companies). Goods from multiple shippers may also pass through the same warehouse capacity.

In practice, therefore, 3PLs have unwittingly facilitated horizontal collaboration between shippers. Horizontal collaboration is therefore already common practice within the logistics sector. By their nature, therefore, 3PLs are a shared logistics resource, allowing both active and passive horizontal collaboration between multiple shippers.

2.4 Market Opportunities

The previous (D8.4) report therefore concluded that while collaboration (active and passive) is already common practice, the LOGISTAR tool could find a significant role in facilitating further collaboration, as follows:

- ▶ Internally within existing large 3PLs, optimising the use of their transport equipment through the consolidation and load-sharing of cargoes from multiple shipper clients in real time;
- ▶ Help facilitate the further sub-contracting of cargoes between 3PLs, providing opportunities to cooperate in order to 'fill' transport capacity in real time.

The previous report also examined in detail some of the individual flows/links within the main logistics supply chain models that have been adopted by both the retail and manufacturing sectors and subsequently where there are likely to be opportunities for the LOGISTAR tool. It was concluded that these include:

- ▶ Flows of goods from manufacturers and suppliers to retailer NDCs and RDCs; and
- ▶ Flows of goods from retailer NDCs to RDCs or 'Cross Dock' facilities.

It was intended that these 'desk top' conclusions would form the basis of a 'market testing' interview programme for the LOGISTAR tool with a number of key market operators in the first half of 2020. Section 4 further below reports on progress with this market testing exercise.

3. Growth of E-Commerce

As alluded to above, supply chains serving e-commerce have become more established in the market and continue to grow in importance. In particular, the recent significant growth in the volume of retail goods sold via e-commerce platforms, generally at the expense of goods sold via traditional ‘bricks and mortar’ outlets, is a key economic driver impacting on the logistics industry and their supply chain models. Two sets of data can demonstrate this trend.

Firstly, the table below, derived from *Eurostat*, shows the percentage of adult individuals making at least one e-commerce purchase within a three month period, from 2010 to 2019 (last year of data availability). The results are shown from the EU as a whole plus a number of selected countries.

Table 1: Percentage of Individuals Making One E-Commerce Purchase in Three Months

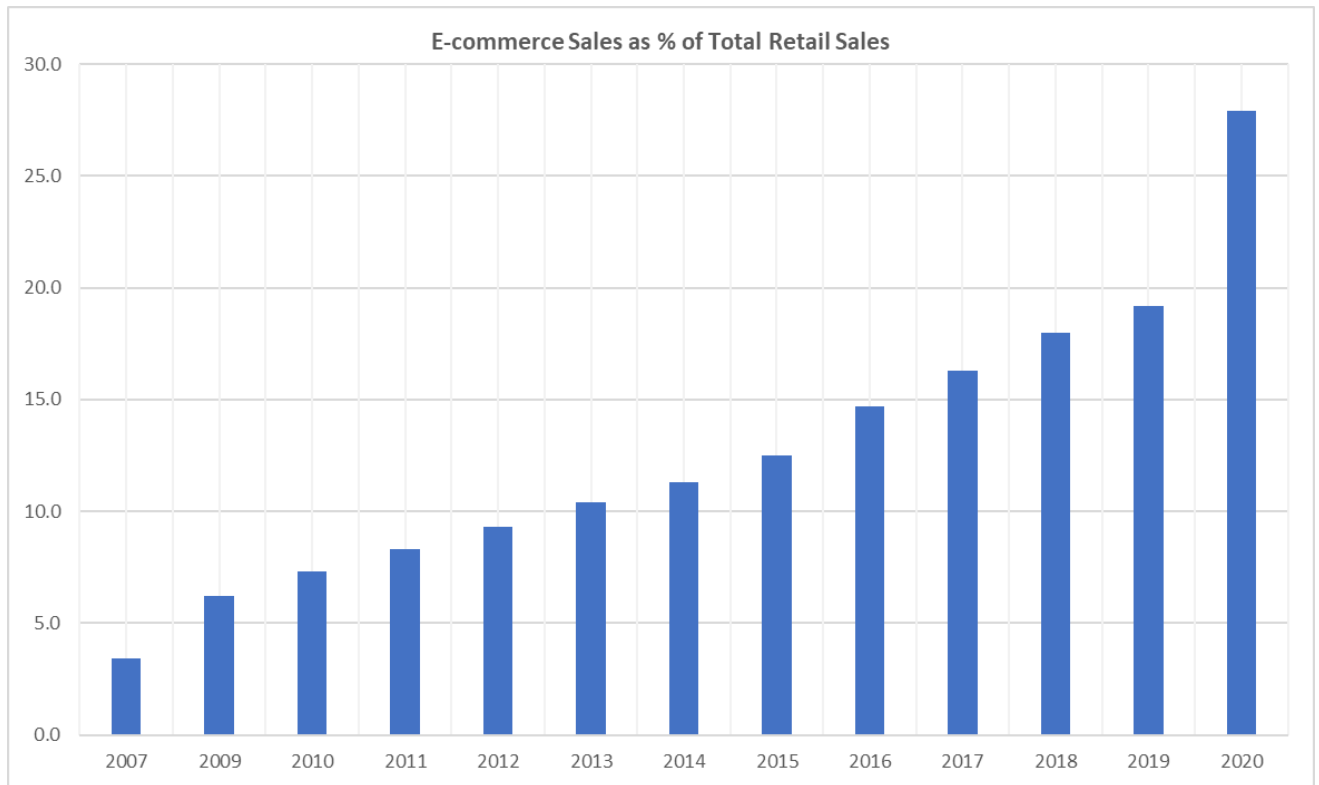
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
EU	31	33	35	38	41	43	45	48	50	53
<i>Selected</i>										
UK	60	64	64	71	72	75	78	78	77	80
Denmark	54	57	60	65	66	67	71	69	73	74
Germany	48	54	55	60	61	64	64	66	68	71
Netherlands	52	53	52	55	59	59	63	68	70	70
Ireland	28	34	35	37	43	44	41	44	52	59
France	40	40	42	44	49	49	52	54	55	58
Spain	17	19	22	23	28	32	35	40	43	47

Source: Eurostat

For the EU as a whole, 53% of individuals made at least one e-commerce purchase in a three month period during 2019, increasing from 31% in 2010. The largest e-commerce retail market in 2019 was the UK, with 80% of individuals making at least one e-commerce purchase within a three month period. Denmark, Germany and the Netherlands all recorded figures above 70%. In contrast, only 47% of individuals in Spain made at least one e-commerce purchase within three months, albeit this had grown sharply from 17% in 2010.

The second data set, focusing on the UK, tracks the value of e-commerce sales as a percentage of total retail sales since 2007. This is shown in the graph below (source: UK Office of National Statistics).

Figure 1: UK E-Commerce Retail Sales as Percentage of Total Retail Sales (by Value)



Source: UK ONS.

Around 28% of all retail sales in 2020 were undertaken via e-commerce; they were below 4% in 2007. The Covid-19 pandemic has resulted in a significantly large growth rate from 2019 to 2020 (increasing from 19.2% to 27.9%), as many non-essential retail outlets were closed between March and July. E-commerce sales peaked at 33% of total sales during this period. However, once physical trading resumed the data indicates that this fell back to around 27% of all sales, suggesting that a large part of the switch to on-line sales did not to return to traditional ‘bricks and mortar’ retail.

To corroborate this data, the UK’s Office for Communication (Ofcom) publishes data on parcel volumes handled by the main courier/mail companies on an annual basis. Parcel volumes in the UK increased from 1.7 billion items in 2016 to 2.3 billion items in 2020, growth of 35% over 5 years.

4. Testing Conclusions with the Market

As explained above, the previous annual update report (D8.5) reached a number of conclusions with regards to the potential applications and market opportunities for the LOGISTAR digital tool. In particular, the likely type of operators and the individual flows/links within the main logistics supply chain models where LOGISTAR could have commercial applications were identified.

In early Spring 2020, it was intended that these desk-top conclusions would be ‘market tested’ via an interview programme with a number of key commercial operators within the logistics sector. Interviews were to have been conducted on a face-to-face basis in both the UK and mainland Europe throughout Summer and Autumn 2020. Around 30 target companies were identified and a semi-structured interview agenda prepared (to guide the questions and discussion). The interviews were to cover, amongst other topics, the following:

- ▶ Describing the LOGISTAR tool and its intended functionality and applications;
- ▶ The interviewees’ market sector and commodities handled;
- ▶ Types of transport equipment operated and modes utilised;
- ▶ Current operating practices, including the interviewees’ use of load planning software;
- ▶ Whether the market sectors and flows identified in the desk-top research are correct; and
- ▶ The systems and management processes currently utilised to fill partially laden/empty transport capacity and potential use of the LOGISTAR digital tool (e.g. internal collaboration, use of sub-contractors etc.).

In March 2020, the Covid-19 pandemic intervened. The requirement to ‘work from home where possible’ was introduced in the UK and varying degrees of lockdowns were introduced across Europe. Travel other than for essential reasons was also prohibited. More importantly, supply chains came under significant strain (in terms of the ability to supply and re-stock goods in a timely manner). A combination of product shortages (some factories and production facilities had closed for Covid-19 safety reasons), panic buying of consumer goods/food stuffs and a reduction in workforce numbers (either through sickness or a requirement to self-isolate) were the key factors.

Consequently, even though video conferencing (e.g. *Teams*) could have been utilised to commence the interviews, it was considered appropriate to pause the programme for a short while until the supply chain issues had resolved themselves. Essentially, the interview programme relied on the goodwill of managers being able to set-aside time to speak to a researcher (on matters not directly related to their day-to-day operations), and given the difficult operating conditions it was unlikely that such time would have been made available.

By late Summer 2020, operating conditions had improved as the Covid-19 transmission rates fell. It was therefore felt appropriate to commence an initial batch of interviews. E-mail invites (with an information pack) were consequently sent out to 10 UK-based operators seeking interviews via *Teams/Zoom* etc.. In total, one positive reply was received from a large 3PL and an interview was subsequently conducted. However, there was a lack of response or interest from the other companies invited to participate, despite a series of reminders being sent.

By the late Autumn 2020, much of Europe was back in some form of lockdown as Covid-19 infection rates had increased again. Supply chains also came under pressure for a second time in the run up to the Christmas holiday season; in addition to the afore-mentioned issues, some borders were closed with HGVs only allowed to pass once drivers had provided a negative Covid-19 test. These problems were compounded by the end of the Brexit transition period, as many manufacturers and retailers engaged in a stock piling exercise ahead of a possible 'no-deal' exit from the EU Single Market and Customs Union (potential introduction of tariffs etc.). It was therefore deemed appropriate to pause further activity in the interview programme once again for a few months.

During Spring 2021, it was decided given the time constraints of the project that the most appropriate way forward for the market testing exercise was to undertake a series of webinars or on-line events. The purpose of the webinars was to 'market test' the envisaged end product with a range of logistics operators and shippers. A number of the project partners agreed to participate in the webinars and present a series of short papers on the LOGISTAR digital 'tool', describing its intended application and functionality. Views would then be sought on the overall commercial/operational requirement for the LOGISTAR tool, its intended applications by sector and whether it adds any commercial benefits over existing collaboration processes. The views gained could have helped shape the development of the new digital tool. In many respects it was similar to a classic 'market testing' exercise that are undertaken when a new product is being developed, albeit that it is a digital rather than physical product (i.e. it tests the overall 'need' for the product being developed and specifics concerning the design and functionality of the 'prototype').

The webinars were planned to last for up to 90 minutes and were based on the following agenda:

- ▶ Welcome and introductions
- ▶ Overview of the LOGISTAR 'digital tool' – what will it do? (MDST)
- ▶ LOGISTAR – progress and research undertaken to date (Preston Solutions)
- ▶ LOGISTAR – applications in intermodal (Codognotto)
- ▶ LOGISTAR – how the technology will work (Software AG)
- ▶ Questions, Discussion, Feedback

The Webinars were publicised in the UK to the members of a number of Trade Bodies (Road Haulage Association, UK Logistics, Rail Freight Group and the Institute of Grocery Distribution) and to key contacts of project partner Ahlers. Project partner Deusto provided a registration service and the technology to host the webinars, which were subsequently held on 21 and 22 April 2021.

Despite this planning, there was a lack of interest and engagement in the webinars, and attendance was poor. Only 10 organisations attended some part of the first Webinar and 4 organisations the second session.

Observations and Feedback

The lack of engagement and interest from the commercial operators, both in the initial round of interview invites during Autumn 2020 and the Webinars, is possibly explained by combination of the following:

1. Webinar/video conferencing fatigue – the mass switch to conducting meetings and events ‘on-line’ at the start of the Covid-19 pandemic was initially embraced by many employees. It certainly allowed many businesses to keep functioning to a degree of normality, and a significant number of employees welcomed the opportunity to avoid travel to/from meetings. Working has changed significantly during the pandemic, with frequent *Teams/Zoom* meetings spread throughout a working day becoming a regular feature for many.

However, as the pandemic has continued, many have become weary of constantly moving between multiple virtual meetings and events across the working day (the novelty factor of participating in video meetings has now worn-off). For many they have now become a distraction or barrier to efficient working (the ease of setting up such meetings has potentially lead to a *Teams/Zoom* ‘over-load’) and a number of companies have begun to operate so called ‘Zoom-free’ days where no video calls are permitted. Many employees also miss the interaction of attending a live event (networking and socialising). Managers are therefore being particularly strict about which on-line events to attend and participate, with priority being given to meetings which are essential to the functioning of their businesses. The LOGISTAR webinars probably fell into this category and were not viewed as a priority for many operators.

2. Guiding businesses through the Covid-19 pandemic has become the main priority for operational managers. Adhering to Covid-secure working practices and other operational challenges has often meant that work time is less productive or takes up more time than was previously the case. This has limited or even eliminated the (goodwill) time that managers have been able to devote to other non-operational activities at present, such as participating in research projects like LOGISTAR.

3. Empty or partially laden running and lack of collaboration opportunities is perhaps not the major issue many outside the logistics industry think it is. As discussed above and in the previous update report, outsourcing logistics functions to 3PLs and collaboration within and between operators has become common practice within the sector. Multiple shippers (often competitors) will contract with the same 3PL, and as a result their goods will at some point in the supply chain end up being handled by the common logistics operator and share the same logistics capacity. Large 3PLs have systems and structures in place to ensure that vehicles are re-positioned between clients efficiently and therefore run laden for most of the time (where they are able to do so). The sub-contracting of loads to other 3PLs is also a widely adopted practice. In the UK, the level of HGV empty running has remained around 27-29% of all HGV-km for the past couple of decades, suggesting that only within those operations where it is not possible to re-position and collect backloads (e.g. petrochemicals) are HGVs running empty on a regular basis and over substantial distances.

The limited level of feedback from the 3PL interview and the webinars is summarised below.

1. Some empty running is an inevitable part of logistics operations. This could be for good operational reasons related to the equipment being operated or the commodity being conveyed. As suggested above, petrochemical tankers can only be re-loaded with petrochemical products, meaning that HGVs following a delivery have to re-position empty back to the product origin or loading point. Food-grade equipment, such as milk tankers or bulk-tippers conveying grain, often need to be washed before being re-loaded. Again, empty running is inherent to such operations. On long-distance and international routes, trade imbalances often result in transport equipment having to re-position empty as the cargo simply does not exist to collect. Achieving 'zero' empty running is therefore not feasible, and a level of empty running needs to be 'built-in' to operations and accepted as a reality of freight transport. Despite this position, any new 'tool' that is able to reduce or minimise empty running, or ensure better vehicle fill (through load sharing) is to be welcomed.

2. As alluded to already above and in the previous update report (D8.4), 3PLs are actually rather good at optimising vehicle fill and minimising empty running. Transport fleets are 'pooled' so that they are able to perform load-sharing, multi-drop and backload operations for different retailer or manufacturer clients. Large 3PLs have systems and structures in place to ensure that vehicles are re-positioned between clients efficiently and therefore run laden for most of the time (where they are able to do so). The sub-contracting of loads to other 3PLs is also a widely adopted practice. The now common practice of out-sourcing logistics requirements to 3PLs has unwittingly facilitated horizontal collaboration between shippers (who are often competitors), and as a result their goods will at some point in the supply chain end up being handled by the common logistics operator and share the same logistics capacity.

The ability to reduce or minimise empty running or ensure better vehicle fill is therefore not a particularly pressing matter, albeit operators are always seeking new more efficient operating methods. Effectively, this is a consequence of the open competitive market that 3PLs operate in. The sector as a whole is characterised as being highly competitive and with relatively low profit margins when compared with other sectors. Maximising vehicle fill and reducing empty running are therefore a necessity for profitability. Open competitive markets generally ensure efficient operations and this is almost certainly the case for 3PLs.

3. It is a 'crowded market' and there already are a multitude of digital/software tools available which aim to support more efficient load planning across transport operations. Some of these have been described in the initial report (D8.3). The LOGISTAR digital tool will therefore need to differentiate itself in the market place if it is to succeed.

However, participants noted that three aspects of the LOGISTAR digital tool may provide it with the unique selling point (USP) that will allow it to differentiate itself in the market place. These are:

- ▶ It will plan loads (and re-plan loads) in real time and across multiple operators. Many existing software packages are effectively 'plan then execute' in nature (i.e. it then relies on human interventions post-planning when responses are needed to changing events, such as delays due to congestion) and they only operate internally to a 3PL. LOGISTAR, in contrast, is not intended to be another load planning software tool or online 'freight

exchanges'. Instead, it will link-up multiple transport operators, effectively co-ordinating their transport/load planning functions so that cargo loads and transport capacity will be continually 'matched' in real time on an 'operator neutral' basis (i.e. to both in-house fleets and/or those of third parties), timely delivery to contractual requirements and cost being the key determining factors rather than fleet ownership;

- ▶ It will have an intermodal component, incorporating rail and road modes. Existing load planning systems are almost exclusively road-based software; and
- ▶ It will have an AI predictive function, allowing potential interventions to be 'forecast' and consequently loads to be re-planned in response.

It is also worth noting, albeit this was not specifically identified by the webinar participants, that the LOGISAR tool is not intended to replace existing load planning systems operated by 3PLs and shippers using their own transport equipment. LOGISAR is intended to work alongside existing systems, so that it takes ALL real time orders from multiple companies and not just those loads identified as 'inefficient', so it can fully optimise routes. This allows for different collaborations to occur on different days. Previous collaborations have relied on constant flows from historic regular volumes. LOGISTAR will link-up multiple transport operators, effectively co-ordinating their transport/load planning functions so that cargo loads and transport capacity will be continually 'matched' in real time on an 'operator neutral' basis (i.e. to both in-house fleets and/or those of third parties), timely delivery to contractual requirements and cost being the key determining factors rather than fleet ownership.

5. Conclusions

The previous (D8.4) report concluded that collaboration (active and passive) is already common practice within the logistics sector. This position has arisen through the widespread out-sourcing of logistics functions to 3PLs. However, the LOGISTAR tool could find a significant role in facilitating further collaboration, as follows:

- ▶ Internally within existing large 3PLs, optimising the use of their transport equipment through the consolidation and load-sharing of cargoes from multiple shipper clients in real time;
- ▶ Help facilitate the further sub-contracting of cargoes between 3PLs, providing opportunities to cooperate in order to 'fill' transport capacity in real time.

The previous report also examined in detail some of the individual flows/links within the main logistics supply chain models that have been adopted by both the retail and manufacturing sectors and subsequently where there are likely to be opportunities for the LOGISTAR tool. It was concluded that these include:

- ▶ Flows of goods from manufacturers and suppliers to retailer NDCs and RDCs; and
- ▶ Flows of goods from retailer NDCs to RDCs or 'Cross Dock' facilities.

In early Spring 2020, it was intended that these desk-top conclusions would be 'market tested' via an interview programme with a number of key commercial operators within the logistics sector. Interviews were to have been conducted on a face-to-face basis in both the UK and mainland Europe throughout Summer and Autumn 2020. Unfortunately, the Covid-19 pandemic intervened and prevented the market testing exercise from progressing as planned.

Instead, it was decided given the time constraints of the project that the most appropriate way forward for the market testing exercise was to undertake a series of Webinars or on-line events. The purpose of the Webinars was to 'market test' the envisaged end product with a range of logistics operators and shippers. These took place during April 2021. Despite being poorly attended (for the reasons outlined above), some limited feedback was gained. Overall, the following conclusions can be drawn:

1. Collaboration within the logistics sector is common place and 3PLs already have systems in place that manages to optimise vehicle fill and reduce empty running. The ability to minimise empty running or ensure better vehicle fill is not therefore a particularly pressing matter, albeit operators are always seeking new more efficient operating methods. Any new 'tool' that is able to achieve this is therefore to be welcomed.

There already are a multitude of digital support tools available which aim to support more efficient load planning across transport operations. However, the following four factors should allow the LOGISTAR tool to differentiate itself in the market place:

- ▶ It will plan loads (and re-plan loads) in real time and across multiple operators. It therefore has added commercial benefits beyond existing load planning software tools or online ‘freight exchanges’;
- ▶ It will have an intermodal component, incorporating rail and road modes;
- ▶ It will have an AI predictive function;
- ▶ It will work alongside (rather than replacing) existing systems.

Although this was not mentioned specifically by the participants, it is also possible that the LOGISTAR tool will provide visibility to shippers and receivers on how they can reduce greenhouse gas emissions from freight transport movements for which they are responsible. The tool could provide the owners of the cargo (rather than the 3PLs who are operating in a highly competitive environment) with the opportunity to allow their own fleets (if they have own account operations) or their 3PLs to focus on minimising carbon emissions. This could be achieved via the LOGISTAR tool by seeking to minimise HGV kilometres and empty running, even at the expense of some additional cost and longer door-to-door transit times. This would allow shippers and receivers to meet their wider Corporate Social Responsibility objectives in relation to climate change, which are increasingly being required both by consumers and investors.

List of Abbreviations and Acronyms

EU	European Union
RDC	Regional Distribution Centre
NDC	National Distribution Centre
HGV	Heavy Goods Vehicle
MGV	Medium-sized Goods Vehicle
LGV	Light Goods Vehicle
3PL	Third Party Logistics provider
4PL	Fourth Party Logistics provider
R&D	Research and Development
B2C	Business to Consumer
C2C	Consumer to Consumer
B2B	Business to Business
BIFT	Birmingham International Freight Terminal
DIRFT	Daventry International Rail Freight Terminal
DRS	Direct Rail Services
DB	Deutsche Bahn
CFC	Customer Fulfilment Centre

Annex 1: Logistics Business Models

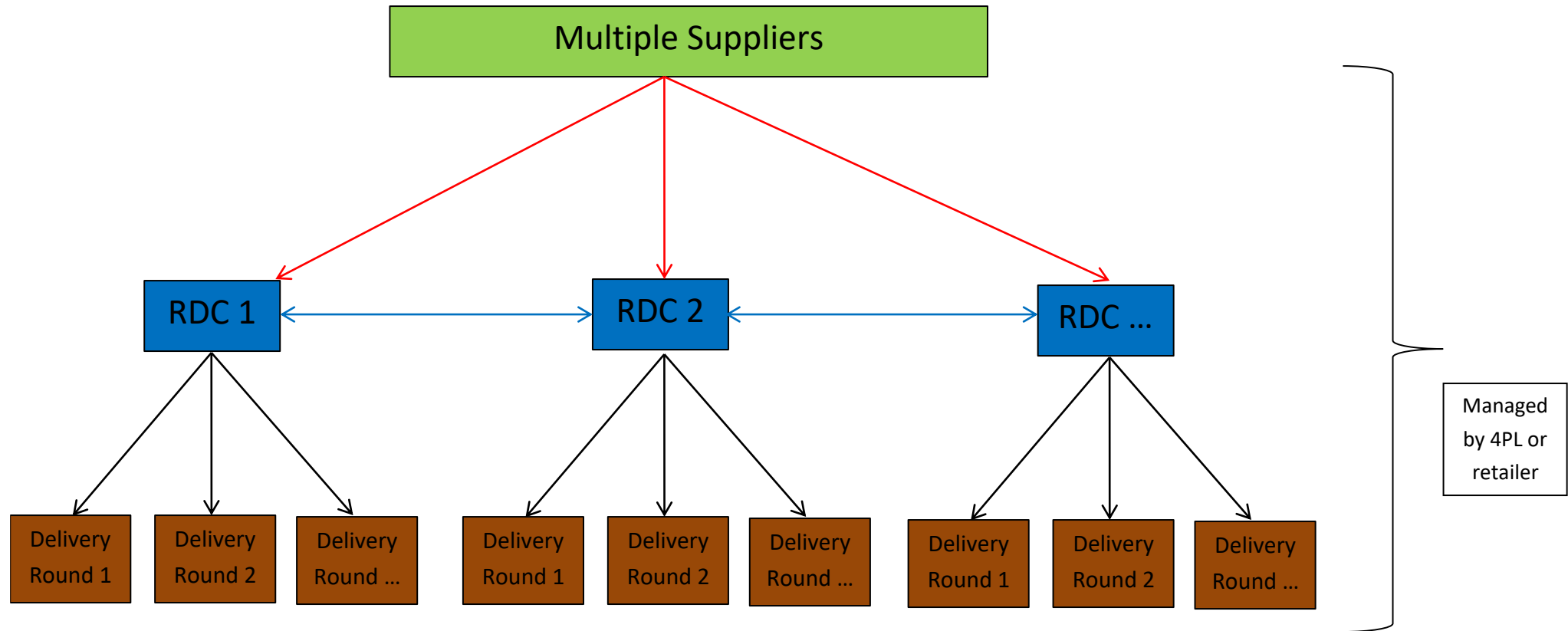


Figure A 1: Flow Diagram – E-Commerce Supply Chain 1

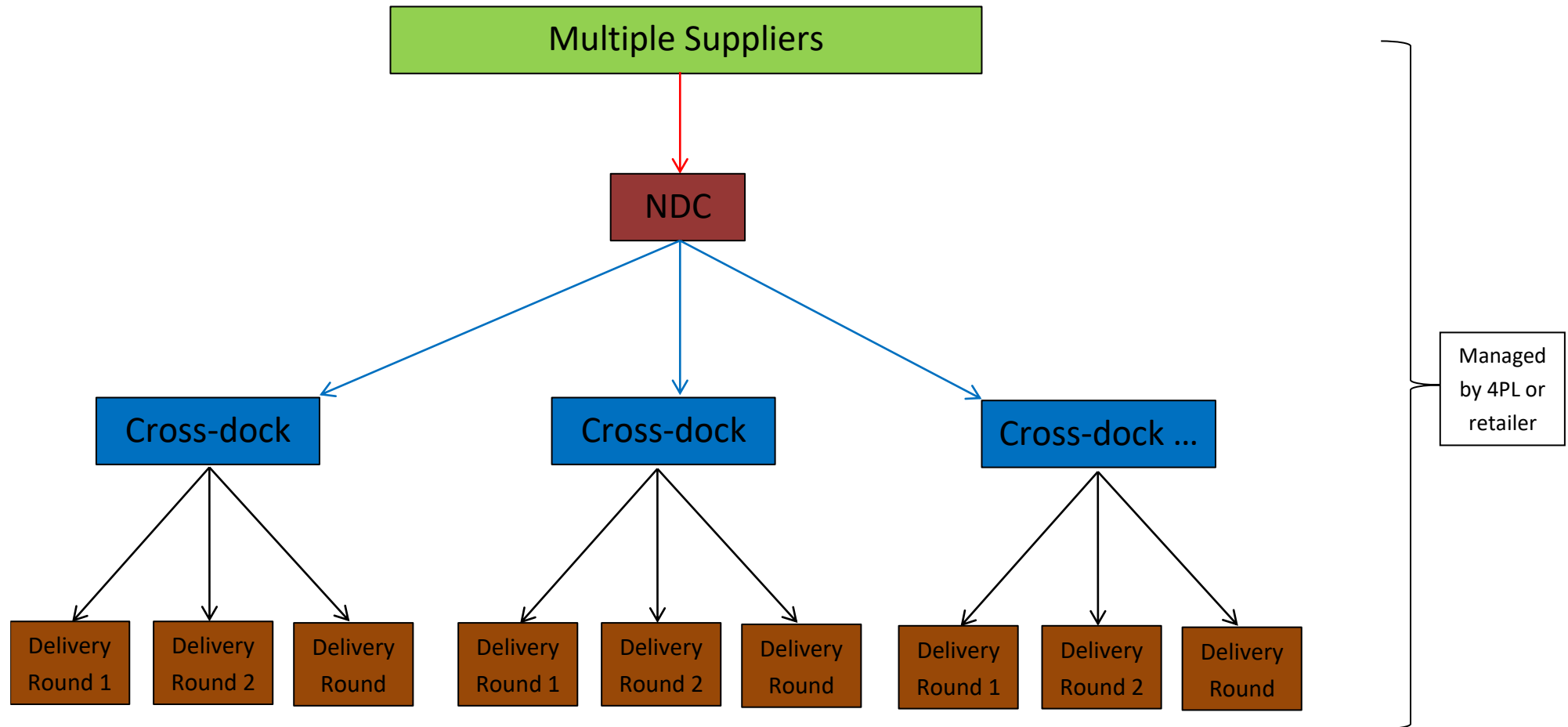


Figure A 2: Flow Diagram – E-Commerce Supply Chain 2

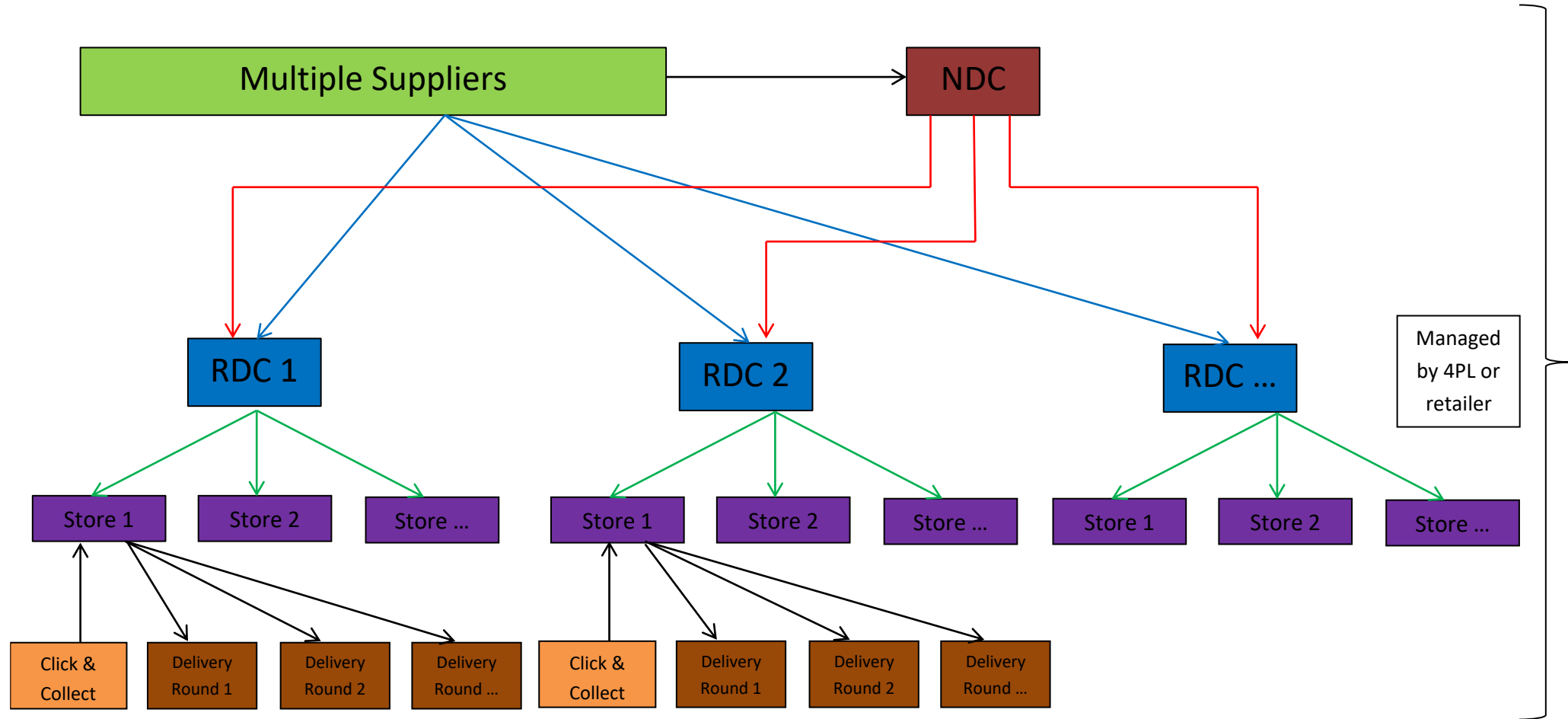


Figure A 3: Flow Diagram – Bricks & Mortar plus E-Commerce from Store Retailer

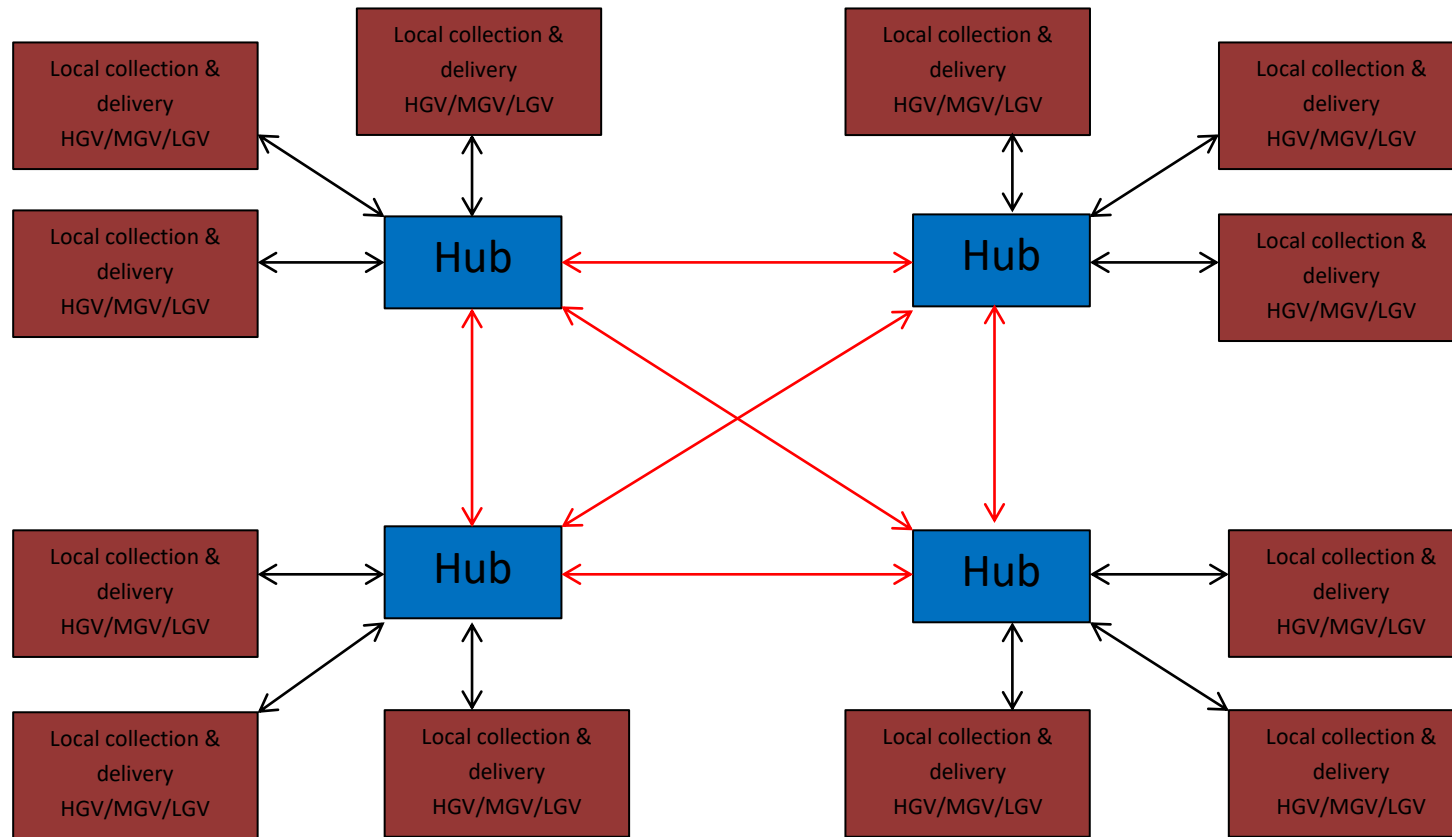


Figure A 4: Flow Diagram – Shared User Networks

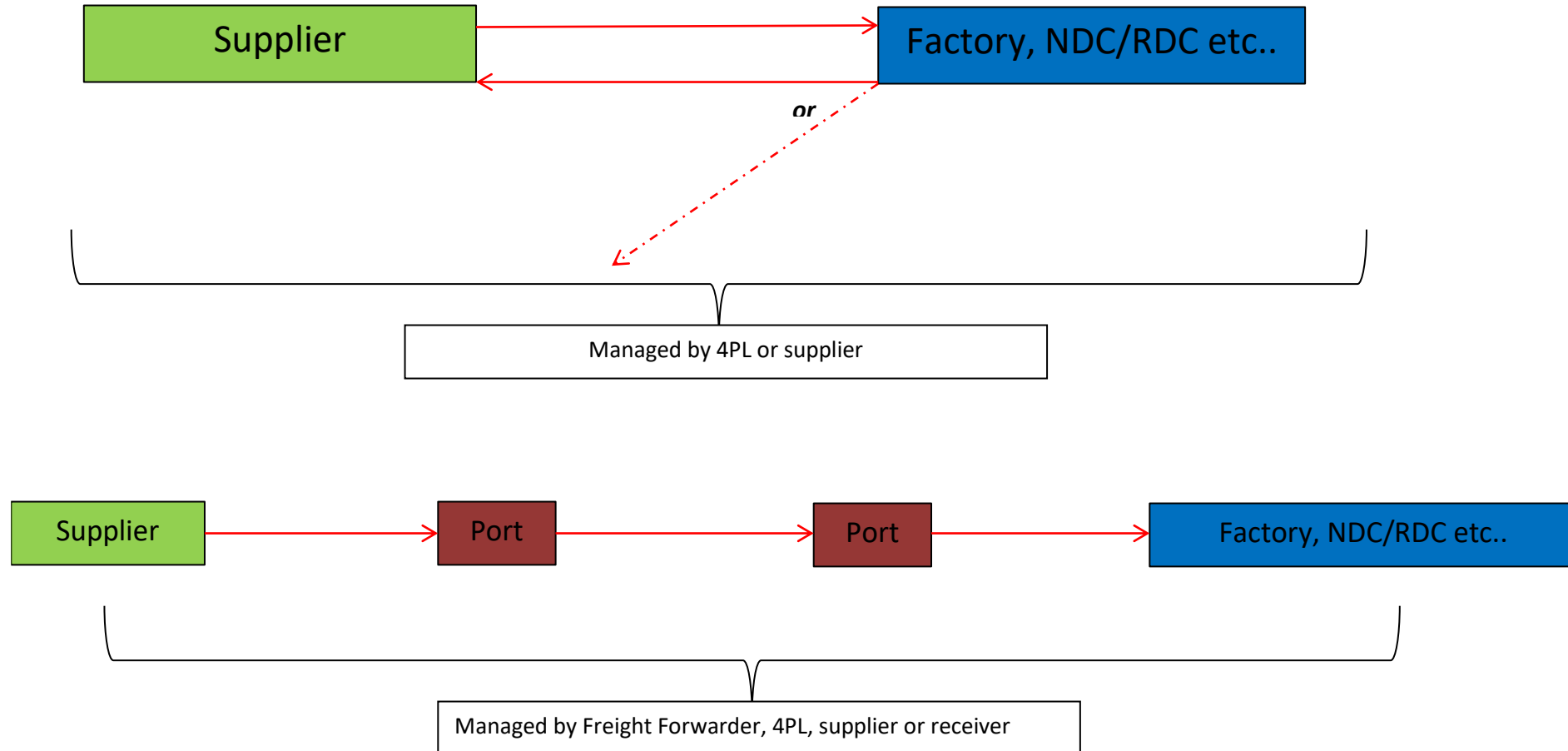


Figure A 5: Flow Diagram – Basic Supplier to Retailer

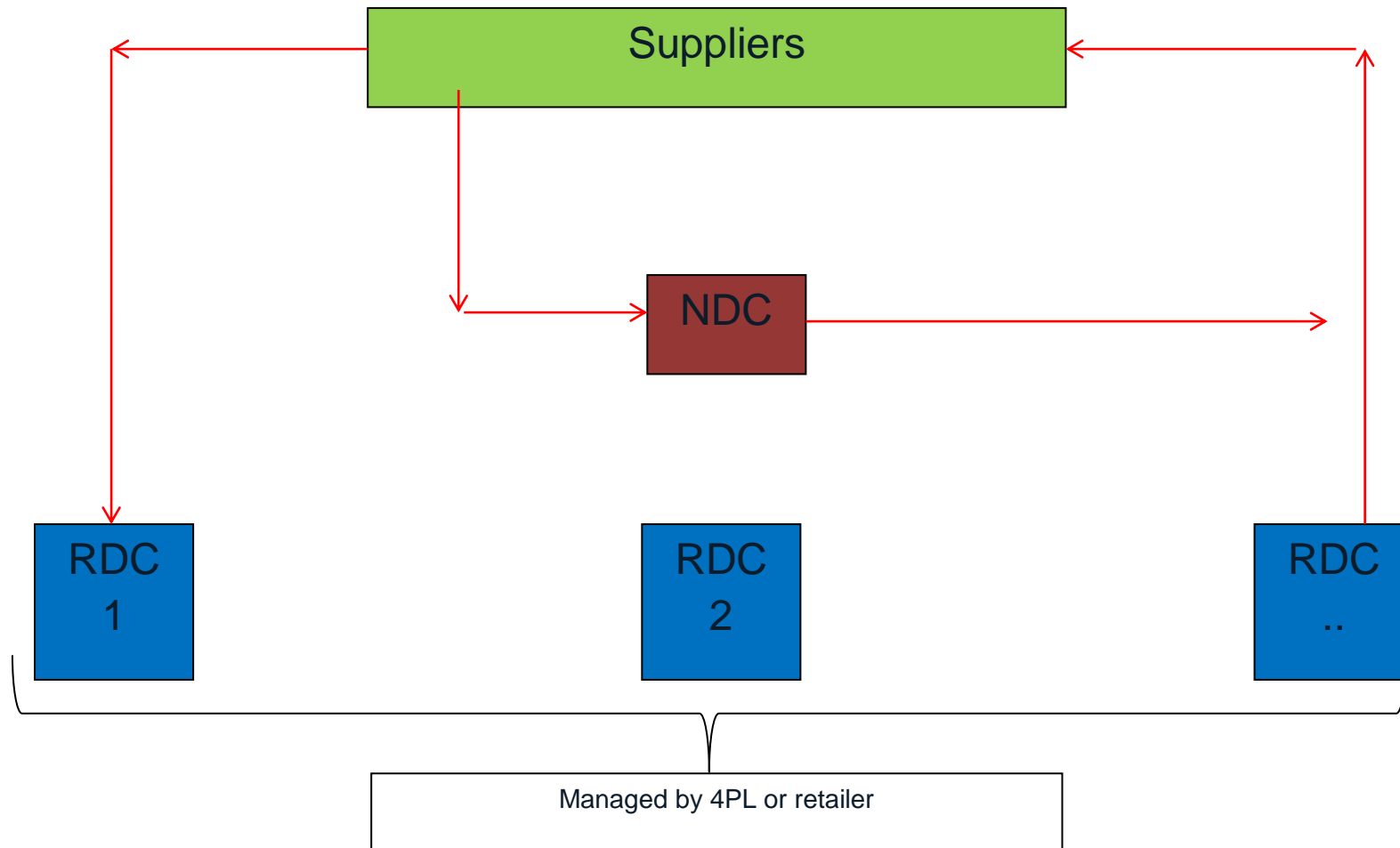


Figure A 6 Flow Diagram – Retail Factory Gate Collections

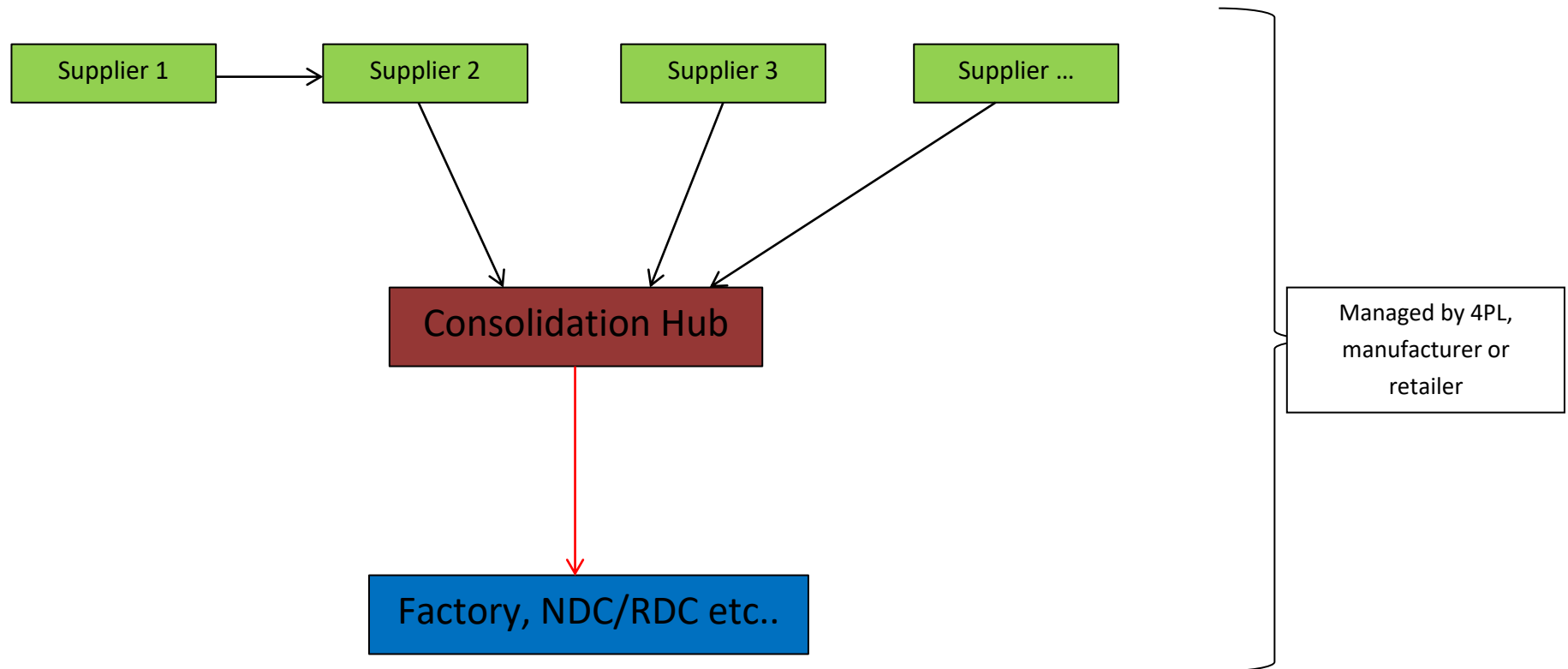


Figure A 7 Flow Diagram – Consolidating Supplies