Towards logistics orchestration in the pot plant supply chain network[1]

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Abstract
Currently the Dutch pot plant sector has a dominant international position fulfilling about 44% of European market demand. However, emerging markets positioned at greater distances call for new logistics concepts to allow them to be reached, new marketing channels appear that require increased responsiveness and product diversification, and finally new competitors like Spain and Italy are entering the arena. If no action is taken, the Dutch might loose their renowned international position. What actions should the Dutch pot plant sector take? Can network collaboration or logistics orchestration provide an answer? This paper aims to support the development of logistics orchestration concepts in the pot plant network by presenting literature reviews and developing a typology of orchestration concepts using case studies from different sectors. The paper is concluded with an overview of recommendations regarding design and management of the international supply chain network of the Dutch pot plant sector.

Keywords: Distribution Network, Logistics Orchestration, Horticulture

Introduction

The business in greenhouses is the only Dutch "Diamond" according to Porter (1998); an internationally renowned cluster. It is the world of flowers and pot plants, vegetables and fruit with significant global potency. It is organized in value chains and clusters where many growers, auctions, traders, and transporters are working closely together to supply (inter)national retail markets. We may conclude that the Dutch pot plant sector has a leading position in Europe as logistics service provider; at the moment the Dutch pot plant sector fulfils about 44% of European market demand. However, in spite of the current leading position, there are developments which can harm this strong position in the near future:

- Emerging European markets are positioned at a greater distance calling for new logistics concepts to be reached efficiently and effectively;
- New marketing channels become apparent that require increased responsiveness and product diversification. Market shares are shifting from small florist shops to large construction- and garden centres and retail outlets. Examples are German construction centres that accomplish more direct trading activities with big Dutch producers, and IKEA who is setting up its own supply network.
- A third major development is the shift of production volumes to other countries. New competitors like Spain, Italy and Poland are entering the arena. These countries gain market share very fast, caused by a wide range of supplied products of good quality and low production costs.

Without innovative action, the Dutch might loose their renowned international position. To prevent this from happening and to ensure that a sustainable position is developed in the future, the project

[1] This paper was also presented at the 14th International Annual Euroma Conference, 17-20 June 2007, Ankara, Turkey

FloriLog was established, involving the big flower auctions and trading organizations in The Netherlands. Aim of the project is to stimulate horizontal and vertical cooperation in the pot plant supply chain network (SCN) by developing (inter)national logistics orchestration concepts, that is, effective and efficient consolidated distribution concepts of pot plants to different market segments in which the logistics of the total goods flows is optimised. This is complicated in this sector due to the large number of small independent growers, transporters and traders, and different requirements of diverse marketing channels. This paper evaluates opportunities and bottlenecks for logistics orchestration concepts in the pot plant SCN. The following research questions are addressed:

- What are specific characteristics of the pot plant SCN?
- What needs for logistics management and control can we identify on the level of the SCN?
- How can we typify a logistics orchestration concept?
- What recommendations can we propose regarding the design and implementation of logistics orchestration concepts for the Dutch pot plant SCN?

In the next section we will briefly discuss the structure of the pot plant SCN and main developments its actors are confronted with. Subsequently, based on a literature review, we will elaborate on the concept of logistics orchestration and network design and develop a framework to typify logistics orchestration concepts. Next, we briefly discuss case studies from other sectors using this framework to get insights into orchestration concepts applied elsewhere. The last section will discuss lessons learned and present the main recommendations for logistics orchestration in the pot plant sector. All findings were discussed and validated in the FloriLog project group meetings with sector experts.

Structure and developments of pot plant supply chain network

The Dutch Flower Industry is operating on a global scale with an increasing international turnover. Total export of pot plants in the period 2000-2005 was 1.715 million Euros. For the Dutch the three main markets are Germany (40% market share), UK (52%), and France (33%). Export demand is satisfied by Dutch production and imported products. The import volume of pot plants has grown fast with 30.4% from 29.9 million Euros in 2002 till 39.0 million in 2004. The main sourcing countries currently are Belgium, Germany, Denmark, Spain and Portugal. If we zoom in on different market regions, we signal some differences and trends. In 2005 the total export volume of pot plants to Germany increased by 5%. This growth is mainly caused by the increasing volume share of supermarkets (28% market share), accompanied by a continuous decreasing number of small florist shops. In the UK the pot plants business increased (4%), mainly via supermarkets whose market share increased with 2% to 30% in 2005. Also in the UK we see the rise of construction and garden centres, now accounting for 2% of the market. Finally, also the export to France increased (by 6%). However, although supermarkets win some market share, the main outlet remains here the florist shop. The SCN structure of the Dutch pot planted sector consists of the following links:

- about 1360 Dutch pot plant growers that produce about 500 different sorts of plants on a total area of 1930 hectare (Splinter et al., 2006);
- two main auctions Flora Holland and VBA (who recently announced their full integration). Together they provide trading facilities at six locations in the Netherlands for trading in cut flowers (about 70% of turnover) and pot plants (about 30%);
- about 1200 traders that can be split up into three groups: wholesalers, exporters and importers. Transport between two links is often outsourced to a logistic service provider, who takes care of the transport of pot plants. In some cases these providers execute extra activities like quality control, handling and packaging; and,

- different outlet channels in national and international market places: florist's shop, supermarket, discounters, garden- and construction centre, and market- and street trade.

Changing consumer requirements, new legal restrictions, foreign competitors that penetrate the market with new value propositions, infrastructural problems such as traffic jams, and so on, have stimulated actors in Agri-Food SCNs to innovate their network structure, business processes and products (Van der Vorst et al., 2005). The complexity and dynamism has increased significantly over the years and will increase in years to come. This will result in new actors that enter the playing field, new ways of managing and coordinating processes, and the use of new technologies to support management decision making. Businesses have to respond to the request for value-adding products by delivering a *service concept* (that is a product including all kinds of services such as background information on the product) instead of just a basic product. The search for partners that add value to products is crucial, which means networks are not per se stable; every network is subject to a degree of dynamism, resulting in partner shifts as new objectives are strived for. In general one can state that more collaboration in the pot plant SCN is needed together with differentiated marketing channel approaches to remain competitive in the future. Logistics orchestration might be part of the solution.

Logistics network orchestration

Types of logistics service providers

Logistics outsourcing means an organization uses a logistics service provider (LSP) to carry out an activity which is originally performed in-house (Bolumole, 2001). The role of LSPs has changed since the emergence of the supply chain management (SCM) concept. SCM asserts that organizations along the supply chain need to reconfigure their operations by internal and external cooperation in order to accommodate changing customer requirements. To achieve seamless supply chain operations, organizations are looking for solutions from LSPs. There are different ways to categorize LSPs, for example, according to degree of customization (Delfmann et al. 2002), or by ability of general problem solving and customer adaptation (Hertz and Afredsson 2003). Based on these researches, we distinguish three main types of LSPs (Hsiao and Van der Vorst, 2006):

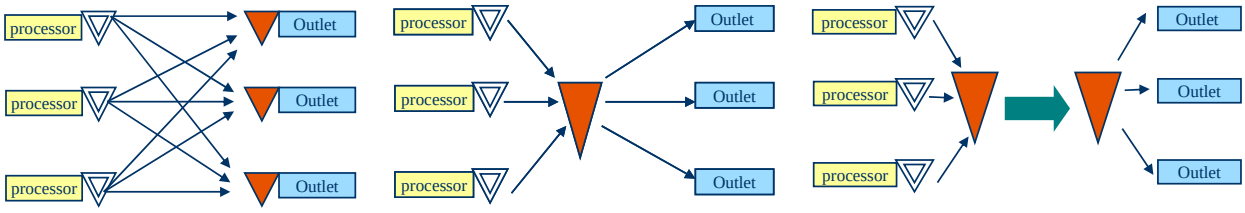
- Standard LSPs (second party logistics; 2PL): companies who provide standard (traditional) services, such as transportation and warehouse-based (Long, 2003). They are highly specialized in their field and do not take over coordination or administrative functions of their customers.
- Integrated LSPs (third party logistics; 3PL): companies that provide value-adding services and also provide at least two standard services, as specified by their customers, without becoming owner of the goods. For example, transportation combined with value-adding activities such as assembly, re-packing and quality control activities.
- Logistics network orchestrator (fourth party logistics; 4PL): a supply chain integrator that assembles and manages resources, capabilities, and technology of its own organization with those of complementary service providers to deliver a comprehensive supply chain solution (Hertz and Afredsson, 2003). In its pure form it is a non-asset based company that outsources logistics activities to standard or integrated LSPs. It provides supply chain planning activities and designs logistics services and logistics systems in accordance with preferences of their clients. Overall, a network orchestrator takes over coordinative and administrative responsibility for their customers, and takes over responsibility for the effectiveness and efficiency of the logistics system of its customer (Delfmann et al., 2002).

The network orchestrator is responsible for configuring the network such that customers and network member preferences are satisfied. Collaborators together carefully plan how capacity

should be created throughout the system, and decide jointly where and in what quantities inventories of various types should exist (Stadtler, 2005). Moreover, they must also decide in advance what actions will be taken when various unplanned events occur. Thus strategic and tactical plans must be created collaboratively to achieve the maximum system effectiveness. These plans describe how the supply chain will respond to variations and uncertainty (Muckstadt et al., 2001). Activities that are executed by a 4PL are all related to obtaining the right information and translate this into activities. Examples of activities executed by a 4PL are: market search, logistic network management, transport sourcing, optimisation, administration, carrier contract negotiation, order handling and invoice management, production, warehousing and distribution, returns management, and analyzing and reporting of KPI's (performance management).

Logistics Network Design

One of the key aspects in our project is the effective and efficient consolidated distribution of pot plants to the different market segments in order to improve logistics performance. Consolidated distribution is required when the volume of the goods to be distributed is smaller than the transport unit size (combining less than truck loads) or when the total travelling distance can be reduced by re-combining full truck loads. Consolidation is often needed when for example the delivery frequency is increased with a resulting decrease in delivery batch size. There are three types of consolidated transportation (Gianni et al., 2004): (1) Temporal consolidation, this means that goods from trucks that have different departing times are consolidated in other transport units (shifting with schedules in time); (2) Facility consolidation, this means that goods which have different destinations are now transported together in a transport unit for (part of) the route; and (3) Product consolidation, this means that goods with different characteristics (e.g. chilled, frozen or pot plants and vegetables) are transported together in one transport unit. The result should be a reduced total number of transport unit kilometres (and thus environmental pollution) that results from a reduced transport distance (by optimal route planning) and/or a reduced number of freights movements (by more full transport unit loads). Consolidated distribution requires therefore a specific network design of sources (departing points), routes and sinks (destinations). Van Duijn and Kreutzbergeer (2006) distinguish a number of critical design variables in the optimisation of distribution networks: distribution unit size (e.g. pallets versus rolling containers), transport mode and unit size (e.g. using short sea transport or increasing truck size, frequency of transport, distribution volume, and distribution network design. Figure 1 typifies three main network designs: (1) Line network, where each distributor has its own transport network to outlets; (2) Hub and spoke network , where each distributor delivers the goods to a central hub where goods are exchanged aiming for specific network destinations; and (3) Collection and distribution network, especially suited for international networks, where each distributor delivers the goods to a central collection hub, goods are consolidated in time, regional destination and product type, and successively transported to a distribution hub, where goods are resorted, recombined and distributed to specific locations.



a. Line network **b. Hub and spoke network** **c. Collection and distribution network**

Figure 1. Overview of three main network designs (reverse triangle = stock point).

Levels of logistics orchestration

Based on the literature on network coordination (e.g. Bijman et al., 2006) we can distinguish three levels of network orchestration, which covers three different types of orchestration. First of all horizontal orchestration, which implies that 'all' logistics activities from or to a (single) company are orchestrated. An example is the coordinated transport of different growers to an auction or the coordinated transport from traders to different outlets. Second, vertical orchestration, which implies that 'all' the logistics activities of multiple stages in a supply chain are centrally orchestrated. For example, the activities from primary producer to end customer, including the in-between located stages. Third, network orchestration, which implies orchestration of activities over multiple suppliers, multiple customers and thus multiple supply chains. It is clear that network complexity greatly influences the opportunities for improved logistics network designs and roles of logistics orchestrators. The next section will discuss logistics orchestration concepts.

A framework to typify logistics orchestration concepts

We will use the "uncertainty framework" and supply chain strategies of Lee (2002), the concept of the Customer Order Decoupling Point (Olhager 2003) and the elements of the Framework for SCN development (Van der Vorst et al., 2005) to develop a framework to typify logistics orchestration concepts. It contains an overview of relevant aspects of an orchestration concept that can be used to analyse and typify a specific business case.

Supply chain strategies

A simple but powerful way to characterize a product when seeking to devise the right supply chain strategy is the "uncertainty framework." This framework specifies two key uncertainties associated with the product—demand and supply uncertainty. Fisher introduced the matching of supply chain strategies to the right level of demand uncertainties of the product. Lee (2002) expanded this framework to include supply uncertainties and identified four supply chain strategies: efficiency, responsiveness, risk-hedging and agility.

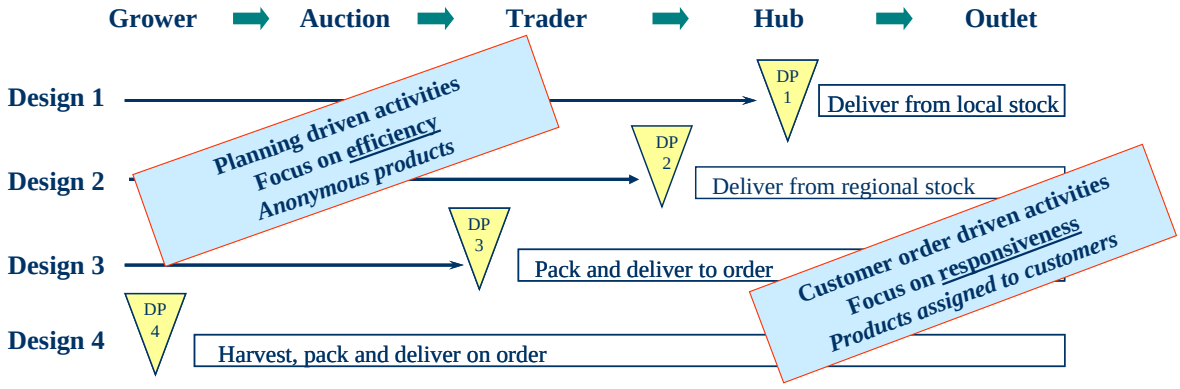


Figure 2. Four network designs with different decoupling points (reversed triangle refers to inventory).

Customer Order Decoupling Point

The CODP separates that part of the organisation whose management decisions are governed by customer orders (*pull process*) from the part of the organisation where plans are made based on forecasted demand (*push process*). Downstream of the CODP (towards the market) the focus is on customer responsiveness (lead time and flexibility). Upstream, towards suppliers, the focus is on efficiency (usually employing large batch sizes). It must be determined where the decoupling point (DP) should be for each product-market combination. Therefore a company can have multiple CODP's as it can serve multiple market segments. The CODP and postponement concepts result in

logistics structures in which a consolidation point is used to perform product differentiation to customer demands. When we link this to logistics network design typology presented in the previous section and translate it to the pot plant sector, four possible chain designs emerge (see Figure 2). In the first two designs standard products are delivered to the customers from local or regional stock. In design 3, potted plants are customised (that is value-adding activities to make the plants customer specific are performed) at the auction, trader or hub and successively delivered to market outlets. Finally, in design 4 the grower has a direct relationship with the final customer and harvests, packs and delivers its products (via traders or transporters) to customer outlets. The auction is bypassed in this network design.

Framework for logistics orchestration

When we combine all elements of logistics orchestration discussed, and place it in the framework for SCN development (comprising the elements mentioned at the left side of Table 1; van der Vorst et al., 2005), we generate a logistics orchestration framework. The framework is used in the next section to analyse orchestration concepts of different case studies.

Table 1. Framework to typify Logistics Orchestration Concepts

Orchestration criteria	**Main references**	**Operationalisation**
Product/market characteristics	Van der Vorst (2000) Lee (2002)	The strategy of a specific supply chain in the network depends on product, supply and market characteristics. What are the main product-market characteristics? What is the level of supply and demand uncertainty?
Supply Chain Strategy	Fisher (1997) Lee (2002)	Related to demand and supply uncertainties of a PMC different supply chain strategies can be distinguished: efficient, responsive, risk-hedging, agile supply chains. What strategies are used in the network?
Network structure	Lambert and Cooper (2000) Gianni et al. (2004)	The network structure refers to actors of the SCN and the type of relationship between the actors. Every chain consists of different links (production, store and sales locations), with its own connections and geographical positions. Is there a line, hub and spoke or collection and distribution network design?
Process management	Olhager (2003); van Hoek (1998)	The extent to which a customer order penetrates the supply chain network, referring to the position of the CODP, whether processes are push or pull driven, and where the point of product differentiation takes place (postponement)?
Information management	Van der Vorst (2000) Stadler (2005)	Information systems (IS) support links in the SCN to take decisions and improve coordination by exchanging information. What information is available for which actor in the network? What kind of IS are required for specific orchestration concepts?
Network organisation	Bijman et al. (2006)	The degree of orchestration indicates the specific part of a logistics network that is orchestrated. Different logistical activities can be orchestrated: transport optimisation, inventory management, invoice management etc. We distinguish three levels: horizontal, vertical or network orchestration. What processes are managed by which actor? And who takes responsibility for realising performance requirements? Is there a logistics orchestrator (4PL)?
Key performance indicators (KPIs)	Hill (1993) Christopher (1998)	What are main KPIs? KPI's can be split up in quantitative (measurable) and qualitative (not measurable) indicators. Examples of quantitative: cost per kilometre, inventory level. Examples of qualitative: service and tracking and tracing. Besides, we distinguish order winners and order qualifiers which are the company competitive factors. Finally, we define the current performance realised in the market place.

Case studies

This framework is used to describe the pot plant SCN and to analyse the orchestration concepts of two different kinds of SCNs. We studied literature and interviewed multiple managers in both cases to identify the main lessons learned. Below the case results are described very briefly.

The Greenery International

The Greenery is a leading company in Europe that provides a complete range of vegetables, fruit and mushrooms to supermarket chains in more than 60 countries in Europe, North America and the Far East throughout the year. The annual turnover is ca. € 1.6 billion with about 1,800 employees. Five years ago The Greenery evaluated its operations and concluded that its services to the market and collection of products and network design could be improved. It reduced the number of DCs from ten to two main hubs in the Netherlands. Nowadays, these hubs account for about 70% of total product flow taking care of storing, sorting, packaging and labelling, and distribution activities. In the past practically all products were marketed using the auction clocks, nowadays the way to the market is *mediation;* the Greenery now matches supply and demand. It facilitates producers to deliver the products in the right packaging material at the right time and location. In 2003 The Greenery took over control of the collection transport and became the network orchestrator in order to cope with inefficiencies in the collection system previously controlled by individual growers. In the distribution network they have partnered with an LSP that consolidates its flows with other product groups, such as dairy and meat products, facilitating an efficient and responsive distribution network. Their delivery reliability has increased as well in time as in quantity. Furthermore, growers can focus on their main task that is the growing of high quality products.

Zara / Miss Etam

The second case deals with the clothing industry; as well Zara (often seen as the most successful company in fashion) as a Dutch representative of this industry with a comparable business model, Miss Etam, were analysed. For brevity we will focus our description on the Zara case. Zara is the flagship of the Spanish retail group Inditex SA contributing about 80% of group sales. Today Zara has nearly 1,200 stores worldwide. One of the main winning formulae of Zara is its supply chain flexibility and responsiveness (Dutta, 2003). Zara can move from identifying a fashion trend to having clothes in its stores within 2-4 weeks (competitors typically have timelines that stretch into 4-12 months). A large design team is very busy throughout the year, identifying prevalent fashion trends, and designing styles to match the trends. This is supported by a sophisticated ICT-system that provides up-to-date (trend) information to people making product and business decisions, and a highly responsive logistics system. Zara's SCN has the following important characteristics, about 80% of Zara's production takes place in Europe, in de direct vicinity of headquarters and half of its production is in owned or closely-controlled facilities. This gives Zara a tremendous amount of flexibility and control but also leads to higher people cost, averaging 17-20 times the costs in Asia. Garments are delivered from two large distribution centres; no inventory of end products is held centrally, and there is hardly any inventory in the stores besides the selling floor. Shipments are dispatched from the distribution centre twice a week (own trucks or airfreight). All items have already been pre-priced and tagged, and most are shipped ready for display in stores at arrival without having to iron them. The need for control at this stage is minimized because shipments are 98.9% accurate with less than 0.5% shrinkage. The relentless and transparent rhythm aligns all players in Zara's supply chain (Ferdows et al., 2004). It guides daily decisions by managers, whose job it is to ensure that nothing hinders the responsiveness of the total system. It reinforces the production of garments in small batches, though larger batches would reduce costs. It validates the company policy of delivering two shipments every week, though less frequent shipment would reduce distribution costs. It justifies transporting products by air and truck, though ships and trains would lower transportation fees. And it provides a rationale for shipping some garments on hangers, though folding them into boxes would reduce the air and truck freight charges.

Comparison of the cases in the framework

Table 2 compares the characteristics of the two cases and the pot plant SCN in the orchestration framework.

Table 2. Cross case comparison in the logistics orchestration framework

	The Greenery	**Zara / Miss Etam**	**The pot plant SCN**
Product-market characteristics	• High demand uncertainty • High supply uncertainty • Product perishability (quality and safety)	• High demand uncertainty • High season market down costs • Low(er) supply uncertainty	• Demand uncertainty still low but might increase due to new market outlets • Medium supply uncertainty
Supply chain strategy	• Efficiency and Agility (with transparency) • Variety and added value (assortment, quality) • Frequent reliable delivery at the lowest cost	• Responsiveness (react rather than predict!) • Low quantities (scarcity), more choice, short lead times	• Varies between market segments: efficiency or responsive and quality focussed. • Short lead times; lowest cost
Network structure	• 2000 national suppliers + global sourcing to reduce uncertainty (100 suppliers) • Focus on retail customers • Two main hubs (new integrated distribution centre in 2008) • National: hub-and-spoke network design	• 80-85% short and medium term suppliers that produce “fashionable” products to order • Sophisticated warehouse(s) and responsive distribution channel • Hub and spoke network design	• 1,360 national suppliers + global sourcing • Multiple outlets: construction and garden centres, supermarkets, flower shops. • Multiple small LSPs (2PL and some 3PL) • Multiple line network designs; little cooperation
Process management	• Daily distribution with short lead times • CODP at (group of) growers or packing station/Distribution centres	• High delivery frequency with short lead times • CODP at suppliers/design ateliers • Differentiated pricing strategy • Quick bake recipe (well mixed ingredients)	• Medium delivery frequency / short lead times • CODP still mainly at exporter company • Discussion on consolidation and inventory points close to the markets
Information management	• Use of sophisticated planning systems and internet • Bottleneck is lack of chain system integration	• ICT is heart of business; integrated system • Intensive data gathering analyses to respond to trends	• Many non-integrated systems; work is done to establish data standardisation and infrastructures.
Network organisation	• Horizontal orchestration to the Greenery distribution centre (collection) • Collection is organised by the Greenery via Dijco – the transport division (partly using own trucks), and annual contracts with transporting companies (outsourced). • Distribution is organised per product market combination (dedicated service networks) • Starting with vertical orchestration to retail	• Full network orchestration using own trucks (Zara) or outsourced transportation (Etam) • Largely vertically integrated with control of production; 50% owned or closely-controlled facilities (Zara) • Transportation is not outsourced due to asset specificity (specific trucks) and competitiveness (Zara) • Dedicated transport schedules	• Only vertical orchestration within the single supply chain; need for horizontal and network orchestration. • No logistic orchestrator for the complete network available; distrust in the sector to outsource distribution. • Distribution needs to be organised per product market combination (dedicated service networks).
KPI’s: order winners	• Reliability, speed and responsiveness • Complete product assortment	• Short time-to-market and delivery lead time • Re-creativity of new clothes (variety, scarcity, freshness, differentiation)	• Total costs, lead time and delivery reliability • Complete product assortment
KPI’s: qualifiers	• Costs and product quality	• Cost and product quality	• Product quality
Performance	• Biggest player in Europe with 5% market share • High delivery reliability	• Biggest growing fashion concern in the world (Zara) versus the Netherlands (Etam) with very low market down costs.	• Still leading position in Europe, but the international competition is growing.

Recommendations to the Dutch pot plant sector

When we evaluate the findings in the case studies, we identify a number of lessons learned that can be translated into recommendations for developments in the pot plant SCN. The case of the Greenery shows that a central coordinated SCN reduces collection costs and improves customer service. Furthermore, it results in the following main recommendations:

- Make sure you have enough volume for consolidation and backhauling purposes. Backhauling is the key to profitability! If your own network volume is too small, try to link up with product groups in other networks, whilst taking care of differences in optimal environmental conditions.
- Work together with other networks to make volume
- Use consolidation points to perform value adding activities (repacking, labelling, sorting) and consolidate goods flows. Preferably, design and manage these centres together with other parties to obtain volume and efficiency. Use the CODP model and typology of network designs to determine the location of consolidation points.
- Evaluate opportunities for alternative transport modes and units to improve network efficiency.
- Effective orchestration of logistics flows requires sophisticated and integrated ICT systems. Make sure you have information standards to enable efficient communication platforms.
- Organise the logistics network in such a way that each actor remains competitive. Do not make LSPs 100% dependent on your business – keep them alert.
- Make use of dedicated partners to organise flexibility in the SCN. It is wise to use a step by step approach to ensure seamless implementation and to gain trust in the relationship. If one does well, from a confidentiality and business perspective, scale up the relationship over time.

Although the clothing cases emphasise fast and flexible design of new clothes, which is impossible in the pot plant SCN, a lot can be learned from the logistics point of view; both deal with perishable products! We identify the following main recommendations:

- Start your reasoning and network design at the market place. Differentiate to market segments and product groups. Like ZARA, have designers who can identify fashion-forward people, the innovators, and identify what plants can be spread to the larger population in different market segments. Try to make volume in those markets by focussing on different market outlets.
- Differentiate your (product and logistics) services to market segments, i.e. set up multiple supply chains in the total network that can fulfil different market requirements. For the pot plant sector we identify florist shops, supermarkets, discounters, garden- and construction centres, and market- and street trade. Use the uncertainty framework and evaluate four supply chain strategies of Lee (2002) for each of these market segments.
- The Dutch are famous for their product innovations and logistics - create scarcity by having a unique and/or large assortment that can not be supplied by competitors.
- Use dedicated schedules (bus services) to international market segments to improve reliability and reduce uncertainty. Go for a persistent and transparent rhythm that aligns all the players.
- Invest in the right software, hardware and people. Sophisticated ICT will enable you to gather market data quickly so you can react to it; furthermore, it will enable you to organise the collection and distribution of goods through the network more efficient and effective. Update the software, hardware and people (education) frequently.

Conclusion

From the literature review and case examples we have distilled a perspective for logistics orchestration concepts in the Dutch pot plant SCN. The cases indicate that vertical cooperation is easier to establish than horizontal cooperation, mainly due to the fact that there is less rivalry amongst potential partners. However, horizontal cooperation could bring a lot of benefits, for

example, different producers could plan their logistics flows together in just one delivery route to similar or different retail outlets located in the same area reducing total costs significantly. Further research aims at evaluating the recommendations to develop responsive and differentiated demand driven pot plants SCN.

Acknowledgements
The research is executed in and sponsored by the Flor-I-Log project of Transforum. The authors would like to thank the interviewed managers of the different cases, for providing us with sufficient information regarding their case description and lessons learned on logistics orchestration.

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