The Dutch Flower Cluster Case is being developed by the Nyenrode Strategy Center of the Nyenrode Business Universiteit in cooperation with the Dutch Flower Auction in Aalsmeer. Please note that this is a concept version of this case. Feel free to use this case and discuss it with your students. Please note that this case has not yet been registrated.

Nyenrode Strategy Center 2008
The Dutch Flower Cluster

The Netherlands is a small, densely populated country in northern Europe, bordered by Germany, Belgium and the North Sea. Much of the country’s surface lies below sea level and throughout history the coastal areas have witnessed many floods. However, these neighboring waters and its strategic location at the North Sea allowed the Netherlands to become a sea-faring nation and involve itself in trade. Especially in the 17th Century, the Dutch ‘Golden Age’, merchants sailed the world’s oceans, and cities like Amsterdam were among the main logistics, trade and financial centers of Europe.

Even today, the Netherlands is still well-known for innovative logistics and international trade. The port of Rotterdam, one of the largest in the world, and Amsterdam Schiphol Airport are important hubs for import and export.

Flowers and plants are major Dutch export products. Dutch exports of floricultural products (cut flowers, pot plants, and propagation material) are the most important category and in 2004 represented a sales turnover of 4,873 million euros, contributing more than 20% to the national trade surplus and accounting for 55 to 60% of global sales in such products. In fact, since 1980, the world import market for flowers and flower-related products has grown more than 5-fold and the Dutch cluster has played a dominant role in the worldwide flower trade ever since its early beginnings. This in spite of the fact that the Netherlands has never enjoyed an ideal climate for horticulture.

Historical Development of the Cluster

Flower cultivation in the Netherlands started with a single tulip bulb. Although now closely associated with the Dutch national image, the tulip originated from Turkey and was first imported to the Netherlands around the year 1570. In the late 16th century, French-born Carolus Clusius founded a botanical garden at the University of Leiden. In 1593, he planted his first tulip bulbs for academic purposes. After two thefts from his garden in which numerous bulbs were stolen, the tulip started spreading across the local region. The sandy coastal grounds proved fertile soil for flower cultivation and the popularity of tulips rose quickly.

Soon thereafter, between 1610 and 1637, this ‘fashion’ resulted in an unprecedented speculative trade in tulip bulbs. At its height, when tulip bulbs were considered a form of currency, the ‘Semper Augustus’ variety traded at an equivalent of € 13,630 for three bulbs. In comparison, a merchant’s house on the Amsterdam canals at the time cost an equivalent of around € 4,545. Tulip bulbs were also distributed by pharmacists, who attributed therapeutic qualities to them. The first exports of tulip bulbs took place at the start of the 17th century.
The French Revolution of the late 18th Century changed social conditions in Europe making flowers and plants attainable for larger sections of society. Due to this increased demand - commercial cultivation which was first concentrated mainly around Haarlem gradually expanded southward towards Leiden. The area came to be known as the Bulb Region. In the 19th Century, the area spread further, first towards Overveen and Bloemendaal and later to Hillegom, Lisse and Noordwijk. During the first half of the 20th Century, because of lower ground prices compared to the original area, cultivation and export companies started activities in two new areas: Anna Paulownapolder and Noord-Oostpolder (see Exhibit 1).

By the turn of the century, greenhouses, which had started to appear in basic forms around 1850, had evolved into sheds constructed entirely from glass and were heated with natural gas – an innovation that boosted yields significantly, whilst the constant, regulated and warm environment that they provided, made it possible to cultivate plants and flowers normally found in warmer regions. In fact, the period from the beginning of the 20th century to the 1960’s saw a cluster continually focused on the improvement of yields, product quality and the development and introduction of new products. The cluster was active in creating organizations self-governing its own activities in order to maintain high quality standards. For instance, in 1923 the bulb growers and trader associations established the BKD (the Flowerbulb Inspection Service) as a voluntary service inspecting phytosanitary problems being experienced at the time with Narcissus flowers shipped to the USA. Later inspection became regulated by law and the organization’s laboratory was charged with testing for all known viruses. To ensure independency, its chairman was appointed by the Ministry of Agriculture.

The continuing growth and development of the cluster saw the Dutch Horticultural Council (Nederlandse Tuinbouwraad; NTR) established in 1908 while attempts to counter the growing power of middlemen also saw two auctions (Bloemenlust and Centrale Aalsmeerse Veiling) established by grower cooperatives at the beginning of the 20th century. The initial auctions took place in 2 separate cafes, the first at the end of 1911 and the second a month later. Both were established in Aalsmeer, at the heart of the historical production area, and were successful right from the beginning. Their locations were amidst ubiquitous canals and waterways, with flowers being delivered by boat and bicycles while a railway provided merchants with an easy means of transport between Aalsmeer and Amsterdam.

Historically, the Dutch auctions had always been supplied with locally grown products and they initially supplied only local markets. Germany, France, the UK, Scandinavia and Russia were amongst the first importers of Dutch flowers. The Aalsmeer auctions were serviced by a cooperative transport company called Bloemenexpresse up to the 1960’s. Trucking and Logistics had become an important part of the cluster, with the European markets being served by a growing number of trucks carrying cut flowers. The Dutch transport and logistics industry association (Transport en Logistiek Nederland; TLN) had a special sector for cut flower transport (Verenigde Sierteeltvervoerders; VSV) with about 60 certified member companies. Together they provided an estimated 750,000 transports containing ornamental floricultural products annually. With the steeply rising exports and internationalization during the 1960s Amsterdam’s Schiphol Airport which was located near the auction site started to play a significant role as a logistics center. Many major export companies had permanent establishments at or near the auction sites and the auctions worked in close co-operation with airliners. The cargo division of KLM Royal Dutch Airlines also operated a dispatch facility at the Aalsmeer Flower Auction. Although high speed passenger trains ran between most major European cities, historically it was legally prohibited to transport both cargo and passengers in the same train. Because of this, shipping flowers by conditioned cargo trucks was still the most profitable means of transportation within a range of 2,000 kilometers. Destinations beyond that range were served by air transport.

The growing economic importance of the cluster encouraged the Dutch government to play an increasingly important role in helping it to grow and maintain its high quality standards. To these ends, in the 1960’s the government repealed constraints to breeding and cultivation techniques that
had inhibited further productivity growth and in 1966 it ended voluntary participation in inspection programs by introducing legislation regulating plant and seed health and quality.

By 2005, most floricultural products were grown in glass greenhouses with a total service area under glass of 5,713 hectares (see Exhibit 2). This made the Netherlands the world’s most densely covered greenhouse horticulture area. In the same year, despite the economic downturn, higher energy prices and increasing competition, exports of cut flowers and pot plants reached all time highs.\textsuperscript{vii} Besides flowers and plants, the Netherlands was the world leader in developing and supplying floriculture propagation material. Companies bred, propagated and traded seeds, cuttings, young plants, tissue cultures and bulbs. Within the total exports these propagation materials displayed the largest growth.

The flower cluster was an important pillar of the Dutch economy. Within agriculture, horticulture (i.e. flowers and trees) represented a significant share of 41%, of which two-thirds came from floriculture. With a total of about 10,000 companies cultivating flowers and plants, \textsuperscript{vii} the cluster created an estimated half a million full-time jobs both directly and indirectly. \textsuperscript{viii}

**Structure of the Modern Day Cluster**

The Dutch floricultural cluster has grown to become an internationally oriented, innovative and knowledge-intensive business. The cluster incorporates the full value chain from breeding to retailing as shown in the figure 1.

![Figure 1: Flower value chain](image)

The cluster also consists of a variety of specialized organizations ranging from dedicated research institutes to logistics organisations. These are all intricately involved in the value chain activities and are summarised in figure 2.

![Figure 2: Cluster map](image)
The chain is characterized by horizontal concentration and scale enlargement, vertical cooperation and chain integration, internationalization and changes in production systems and technology. Breeders, auctions and traders compete in their own interest and cooperate for the common benefit of the cluster, creating a dynamic interplay within the chain. A fuller description of the cluster elements and how they have developed over time can be found in Appendix 1, but a brief description is given in figure 3.

<table>
<thead>
<tr>
<th>Cluster element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breeders</td>
<td>The Dutch cluster posses world-class plant breeding organizations allowing the cluster to continually market new varieties, many of which were highly desirable but technically difficult to achieve.</td>
</tr>
<tr>
<td>Propagators</td>
<td>After a new variety is created, it has to be multiplied for commercial use. This task is often carried out by license holders who propagate the seeds and cuttings and pay a fee to the breeder owning the patent.</td>
</tr>
<tr>
<td>Growers</td>
<td>Most Dutch grown flowers were cultivated in glass houses. However the vast majority of the total production area (23,520 hectares or 80%) was taken up with companies involved in outdoor bulb production.</td>
</tr>
<tr>
<td>Auctions</td>
<td>The Dutch flower auctions have always been cooperative structures, owned by the growers of the auctioned products. The central position that the auctions occupie in the value chain afforded it access to valuable market information and gave it an ideal position to recommend future strategic directions for its growers and the cluster as a whole.</td>
</tr>
<tr>
<td>Wholesale</td>
<td>In 2004, there were about 1100 exporters of floricultural products, of which 864 were exporters of cut flowers and 53 were involved in the trade of propagation materials (see Exhibit 3). Many belonged to the VGB which promoted members’ interests and negotiated terms of trade and auction policies at each auction.</td>
</tr>
<tr>
<td>Retail</td>
<td>Most of the flowers that were traded in the Netherlands were destined for export, with European destinations accounting for around 80% of total sales.</td>
</tr>
<tr>
<td>Logistics</td>
<td>On a daily basis, around 50 million stems of cut flowers, 5 million pot plants and another couple of million young plants, cuttings and seeds were traded through the Dutch cluster network. With the globalization of the trade, efficient and effective logistics had become even more critical.</td>
</tr>
<tr>
<td>Tourism</td>
<td>Especially in spring, when bulb fields were covered with flowers, the cluster attracted many foreign tourists who visited the auctions or flower exhibitions.</td>
</tr>
<tr>
<td>Institutions</td>
<td>Many institutions (i.e. semi-governmental organizations, scientific institutes) contribute to the position and reputation of the cluster, nationally as well as internationally. They serve a wide range of purposes within the cluster varying from facilitating innovation to setting common standards for the industry.</td>
</tr>
<tr>
<td>Government policy</td>
<td>Government policies and legislation influence the cluster in such cases as urban planning, sustainable production and market structure policies.</td>
</tr>
</tbody>
</table>

**Figure 3** Brief description of cluster elements.

*The corner stone role of the flower auctions*

The Dutch flower auctions have always played a corner stone role within the Dutch cluster. As stated above (figure 3) the auctions are owned by the growers of the auctioned products. More than 60 percent of the international traded flowers and plants go through the Dutch auctions. Every day the VBA flower auction (responsible for 95 percent of all flower trading in the Netherlands) 43,2 million flowers and 4,8 million plants are being sold at the VBA flower auction. Because cut flowers are a fresh product with high demands for the quality and speed of the trading process, accurate coordination of the entire value chain is of major importance. Growers have to be secured of a market
where they can sell their fresh products and retailers are in need of a high volume and variety of supplies. In that perspective the flower auctions play a crucial coordinating role, not only by providing a trading center, but also by making the latest market information accessible for each participant within the cluster and in supervising the quality and quality standards of the products that go through the auctions. Furthermore the auctions have a big impact on the innovative force of the Dutch cluster by making long term investments in infrastructure, ICT and product experiments.

Development of a global sub-cluster structure

The cut-flower industry is highly international with locations spread across all continents and with many of the lower cost producing regions being close to the equator. Figure 4 highlights many important flower producing regions and also points out key logistical infrastructure elements such as international flower auctions (red stars) and regional logistical hubs (black diamonds).

![Figure 4](image-url) International footprint of cut flower industry

The main importing countries were Kenya, Israel (Palestine), Zimbabwe and Spain. Ecuador, India, South Africa, Zambia, Tanzania, Denmark, France, Italy, Kenya and Columbia were also major importers whilst China’s Yunnan Province was one of the fastest growing production regions in the World. Most of these countries enjoyed more favourable climatic and labour cost conditions than those of the Netherlands and these factor advantages helped them to increase their overall market share of cut-flower production from less than 10% in 1980 to over 30% by 2002. Emerging producer countries were largely located over 3 continents: Latin-Amerika, Afrika and Asia.

Dutch growers and propagators, recognizing the potential threat from overseas imports and the potential cost advantages of relocating some of their production facilities to cheaper and sunnier locations, were amongst the first foreign investors to set up facilities in Africa and South America. They continue to expand their international operations to this day, leveraging the knowledge and IP gained from their presence in the Dutch cluster to build very efficient operations abroad. In doing so, they have been relocating an important part of their value chain to foreign locations. Indeed, a significant proportion of flowers being imported into the Netherlands today from African countries such as Kenya and Ethiopia are grown in plantations owned by Dutch growers. The movement of Dutch growers into foreign countries is facilitated by organizations within the cluster such as LTO Nederland which organizes study trips to various countries so that growers can see for themselves the benefits of growing in these countries. Their move has also been facilitated by other parts of the cluster. These include other Dutch growers who have set up ready made greenhouse facilities in these foreign countries which can be leased by growers wanting to make the move abroad. The availability
of greenhouses with all the necessary facilities and permits in place has made it easier for growers to set up operations abroad and has encouraged Dutch growers to take this step. The auction houses too have aided the move by making logistical and cold storage facilities available to growers in these countries and thus aiding their selling efforts. The increasing geographical spread of Dutch flower growers has allowed them to manage their flower portfolios more effectively. They have been able to organize their production such that sun loving flowers are now predominantly grown in warmer countries, whilst those which favor more specific conditions or cooler climates are grown in the Netherlands where these conditions are better met. Lower priced but high volume varieties, which were becoming uneconomical to grow in the Netherlands have also been moved to lower cost countries allowing the core Dutch cluster to move up the value chain and focus on higher value products. Growing from various international locations has also allowed Dutch growers to more easily produce and sell flowers over longer periods of the year. By growing flowers in both Northern and southern hemisphere countries they can deliver fresh flowers to the auctions outside of the normal Dutch flower season and thus increase sales and reduce seasonality. Indeed, to ensure year round production, Dutch growers have gone as far as having tulip and lily bulb production facilities in New Zealand.

During this process of internationalization, Dutch growers have built networks of production locations. They have played a central role in developing sub-clusters in these foreign countries by encouraging the movement of various value chain elements such as breeders and propagators to move with them, as well as suppliers and infrastructure providers to support their growing operations in these countries. This has resulted in the formation of fully formed clusters in these countries:

**Latin-America**

In Latin America, Colombia and Ecuador were the largest suppliers of cut flowers to North America. Other countries such as Guatemala, Mexico, Costa Rica and Peru also exported flowers. Especially since 1991, when the Andean Trade Preferences Act (ATPA) granted tariff-free exports to the US of over 6,000 products including flowers from countries such as Peru, Ecuador, Colombia and Bolivia, the cut flower trade had flourished. The ATPA trade program promoted sustainable alternatives to drug cultivation and trafficking in those countries. Because of its success, the program was renewed and expanded by the United States’ Trade Act of 2002. Indeed since its establishment in 1965 the Colombian cut flower industry had grown to become The World’s second largest flower cluster directly employing over 83000 people by 2005 and generating export revenues of over $680m (see Exhibit 7). Of these exports over 65% were destined for the USA. Ecuador was a later entrant into the flower industry, having started to develop in 1983. Like Colombia, Ecuador possesses ideal factor conditions such as weather and relatively cheap labor. In just over 20 years it has grown to become the third largest cut flower industry in the world. Though 75% of its exports are to the USA, the cluster suffers a cost disadvantage in terms of exporting to the US compared to Colombia and has increased exports of higher value varieties to European markets in recent years.

The Andean region was also one of the fastest growing Internet markets in the world, and flower exporters were taking advantage of the World Wide Web to gain direct access to foreign markets.

**Africa**

Located relatively close to the equator, many Eastern and Southern African countries enjoyed a climate that was favorable to flower cultivation. These countries could take advantage of regular day length and moderate day to night temperature differences. This was especially beneficial when cultivating delicate flower types such as roses and carnations. Benefiting from climate and cost advantages, and enjoying trade agreements with the EU in recent years, many African countries have emerged as producers and exporters of cut flowers. The main exporting countries were Kenya, Zimbabwe, Ivory Coast, and Cameroon. In recent times, Ethiopia has also started to grow as a flower exporter, with very strong support from its government encouraging investment in the cut flower industry through measures such as awarding five-year tax holidays, duty-free import of machinery, cheap land leasing and increased governmental
infrastructure spending. In fact, from earnings of just $20 million in 2006, the country hopes to be within the top 3 global exporters of flowers within 3 years. Kenya is continent’s most mature and largest producer and exporter of cut flowers. Indeed it accounts for 25% of all flower imports into the EU, with a third of its flower exports destined for UK supermarkets. The industry was composed of about 150 farms which were mainly foreign owned, contributed about 8% of the country’s export earnings in 2003. Zimbabwe was relatively new in the international floricultural business with only 350 hectares of roses and 450 hectares of proteas under production in 2001. Despite the political uncertainty within the country flower exports has become the country’s second largest export product after tobacco. With export earnings of $66 million, the flower industry accounted for up to 4.5% of Zimbabwe’s GDP in 2000 and was forecast to grow by some 15% annually.

The cluster in Kenya has shown signs of deepening in recent years, with the formation of various institutes for increasing flower quality and environmental standards as well as improving working conditions. With the influence of Dutch growers in these clusters, together with the importance of accessing European export markets through the Dutch auctions, many of the growers had also adopted the Dutch initiated international certification program, the Milieu Project Siertheelt (MPS). This program aimed to reduce the environmental impact of the floricultural sector.

Asia

China’s Yunnan province enjoyed a temperate climate with small differences between the seasons and abundant sources of water from its many fresh water lakes. In the early 1990’s China started exploiting these favorable growing conditions and in little over a decade, Yunnan has emerged as an important flower cultivator, producing half of China’s flowers and with supportive policies from the Chinese government, Yunnan is developing into a major player in the cut flowers market.

The area around the province’s capital Kunming has become a major commercial and logistics center for the flower industry. The city is home to a number of (technical) universities, one of which focused on agriculture. In 1997 a flower auction was built in the city which took many of its cues from the Dutch Auctions. The strategic plan would see the auction serve as the principal marketing, sales and distribution channel for the industry. The cluster was also focused on maintaining quality assurance throughout the chain, learning from and seeking advice from outside bodies.

By 2003, total international exports exceeded the target set for 2010. Despite this impressive growth, in 2005 still only a modest 5% of Yunnan’s flowers were exported, mainly to Japan, South Korea and Thailand. Export growth had been held back by limited knowledge of intellectual property issues with regard to flower varieties and logistical limitations such as no direct flights from Kunming International Airport to international flower trade centers. However, many of these logistical problems were being addressed and export sales had grown more than 3 fold between 1999 and 2003 to US$30 million. The cluster had ambitions to grow exports to USD 200 million by 2010 and to become second only to the Netherlands in terms of size within 10-15 years.

India too is a major producing country in the region and it boasts one of the regions largest flower markets in Delhi. However, while weather conditions may be ideal for flower growing, India’s cut flower industry suffers a disadvantage with regards to its logistical infrastructure when compared to other regions. Lack of sufficient cold-storage space and dedicated flower transport infrastructure has led to quality issues becoming a problem and this in turn has held back exports.

Changing role of the Dutch cluster

Although the Dutch cluster has relocated the main part of their production facilities to locations outside the Netherlands, the power of cluster in the international flower arena keeps on growing. By developing geographically dispersed sub-clusters the Dutch growers have reduced the risk of the Dutch cluster losing its competitiveness to international producers. Crucially however, growers continue to benefit from having access to the main Dutch cluster which has far greater depth and continues to provide them with a complete range of services and products that they need for their operations abroad. Whilst these geographical sub-clusters possess many of the necessary cluster elements for day to day operations, they continue to be dependent on the Dutch cluster for some
specialized services and particularly for access to international customers through the flower auctions, who in turn provide them with the logistical infrastructure and market intelligence they need to operate efficiently.

These international sub-clusters have enabled the Dutch to maintain their competitiveness whilst also allowing them to increase overall production and profitability. It has increased the internationalization of the Dutch cluster so that while much of the increase in sales through the Dutch auctions is coming from foreign locations, a significant proportion of this foreign produce is being grown by Dutch growers from their operations abroad. Indeed, the international sub-cluster model employed by Dutch growers (see Exhibit 8) has redefined the business landscape and has helped to limit any significant damage to the health and profitability of the Dutch flower industry from lower cost foreign production.

Next to their international impact, the Dutch cluster in itself keeps on developing and innovating in all elements of their value chain by focussing on the constant improvement of infrastructural facilities and service delivery. Furthermore the Dutch cluster continues to provide much of the intellectual property on which innovations in the international business and new flower varieties depend. It also continues to develop the latest technologies which are taken up by the growers, breeders and propagators and provides specialized financial services to Dutch growers in these countries. In doing so, the Dutch cluster keeps on being the leading cluster of the international flower industry. From being one of the leading production clusters, the Dutch flower cluster has grown to be the international core cluster for trading, product development, setting quality standards, IP and infrastructural innovations.

**Changing international flower arena: key change-drivers**

Although the Dutch cluster with the VBA flower auction as the primary director of the cluster, has maintained to be a pioneer and principal player in the industry, the cluster faced a growing number of challenges from various sources both internal and external which could jeopardize its leading position.

**Changing market dynamics**

The Dutch flower auctions were experiencing rapid growth in demand for flowers. EU expansion from 15 to 25 countries in 2004 and Russia’s rising wealth were both helping to fuel increased demand for cut flowers within Europe. In addition to rapid increases in the size of its markets the Dutch cluster was also seeing a change in demands patterns and the dynamics of the market. In particular, buyers were demanding that products were delivered faster and just in time. They were increasingly unwilling to carry stocks and take the risks associated with them. Flower tastes varied markedly across regions, making demand very localized and average order sizes going through the VBA had fallen to around €100 in 2006, and this figure was continuing to fall. This was placing increasing demands on both the selling and logistical systems.

**Changing logistical demands and evolution of flower trading**

Buyers were also demanding more finished products (i.e. bouquets which were already packaged and ready to sell). This trend for more finished products such as bouquets as apposed to simple cut flower stems has been exploited by the Dutch cluster to gain a further competitive advantage. Packaged flower assortments attract significantly higher prices at auction than the individual cut flowers that compose them, and so selling bouquets can increase profitability hugely. However, because bouquets are expensive to transport from abroad due the space they require whilst in transit, they are mostly arranged and packaged in the Netherlands and then sold across Europe via the auctions. Particularly in assorted variety bouquets, the Netherlands dominates the market due to the ready availability of a wide range of flower varieties from the auctions. The market demand for bouquets has allowed the Dutch cluster to move up the value chain, appropriating more value from selling flowers than their overseas competitors. Thus the central location of the Netherlands, being relatively close to all its major European markets is a natural advantage that is helping the Dutch flower cluster secure its long-term sustainability.
Other logistical challenges to the cluster’s profitability came from possible future changes to transportation technologies. In 2005, the VBA together with a number of research organizations such as the Wageningen University and Research Centre conducted pilot schemes where flowers were shipped in sealed sea containers. They found that when these sealed containers were cooled to less than one Celsius, had oxygen levels reduced to less than one percent and had ethylene traps added, the freshness of the flowers was preserved even over long transport periods. In many cases the quality of the products on reaching their destination by sea was superior to the same products when carried by air (see Exhibit 9). Sea transport was considered a potentially attractive alternative to air freight, since it was about 25-30% cheaper and more environmentally friendly. xxvii However a change to using sea freight for transportation would potentially have a huge effect on the business model the cluster had used for decades and would affect its profitability. Carriage by sea would effectively mean that flowers no longer had to be handled like fresh products, as they could be kept ‘fresh’ for extended periods and so would not lose about 15% of their value per day as had been the rule in the industry. Flowers from far overseas could also be transported more cheaply than by flying – potentially making overseas producers more competitive on price with their European/African rivals. Migration of this technology to trucks would mean that the radius over which flowers could be most cost effectively transported by road to their destination would also be significantly extended thus changing the optimal balance of logistical assets required.

Because of these developments of transportation technologies, space would not be at such a premium. Bouquets can be transported overseas from more distant locations directly to their markets in Europe, reducing the location advantage that the Netherlands held in this respect, and allowing foreign producers to benefit from the higher value capture that ready made bouquets afforded - something that the Netherlands had increasingly benefited from.

**Increasing international competition from foreign producers**

International direct sourcing and purchasing has grown rapidly in recent years, aided by the increased availability of internet selling and auction technologies. The development of unified coding systems has allowed buyers to purchase flowers without having to see them beforehand because the elaborate coding system could provide sufficient detail about the nature and quality level of the products. These developments could effectively eliminate the need for flowers to go through an auction house altogether. Indeed large retailers and exporters were increasingly sourcing their products through direct channels outside of the Dutch auctions. It was expected that direct sales to retail stores and supermarkets would increase from about 30% in 2005 to over 50% by 2010. xxviii

**High production costs in the Netherlands**

One of the most notable challenges for the Dutch Cluster and the VBA Flower Auction was the growth of international competition from lower cost countries. This was not a new phenomenon as flower cultivation had increasingly become more international since the early 1990’s. Competition from international flower auctions (such as China’s Kunming flower auction) was also growing. These allowed buyers to source their products from various regions without going through the Dutch auctions. As these international auction houses gained in volume, they could potentially become more cost efficient than those of the Netherlands, thus attracting buyers and growers away from the Dutch auctions. This would be highly damaging to the Dutch growers who had made huge investments in the auction infrastructure in the Netherlands.

**Increasing regulation and environmental concerns**

Further, the cut-flower industry had become increasingly subjected to regulatory and legislative pressures, largely owing to societal concerns over the negative environmental effects caused by the industry. Concerns ranged from the fuel usage in greenhouses and chemical usage in plant growing to water usage in areas which suffered from shortages and carbon dioxide emissions in an industry where increasingly international sourcing meant increased air transport.

Given these challenges, the Dutch cluster was faced with important decisions about its future bases of competitiveness in the World cut-flower market. Strategic decisions had to be made on how it
would compete in the future. Being the corner stone of the Dutch cluster the VBA flower auction plays a enormous role in reorganizing and repositioning the cluster in the international market. The major challenges the cluster faced in 2007 and the key strategic measures that were in place to deal with them are summarized in table 1.

<table>
<thead>
<tr>
<th>Major Challenges</th>
<th>Key strategic approaches</th>
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</thead>
<tbody>
<tr>
<td>Changing market dynamics</td>
<td>Innovate product and service offerings to meet changing market demands.</td>
</tr>
<tr>
<td>Changing logistical demands and evolution of flower trading.</td>
<td>Improve logistical capabilities and develop a international network of logistical hubs.</td>
</tr>
<tr>
<td>Increasing international competition from foreign producers</td>
<td>Allow international members into the Dutch auctions and work to be competitive with international producers.</td>
</tr>
<tr>
<td>High production costs in the Netherlands</td>
<td>Develop sub-clusters in low cost countries to reduce production costs.</td>
</tr>
<tr>
<td>Increasing regulation and environmental concerns</td>
<td>Develop and deliver quality standards which are ahead of expectations.</td>
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Table 1  Major Challenges and key strategic approaches

Their main strategic reaction to the increase of international competition and other challenges has been to disconnect the main logistical, financial and trade processes. Through this new strategic approach seemingly threatening challenges become change-drivers at three different levels:

**Logistical change-driver**

To meet the heterogeneous and increasingly challenging demands of pan-European consumers the logistical capabilities available within the cluster had to be upgraded through heavy investment to improve logistical models, systems and infrastructure. This had resulted in the cluster having the most advanced logistics capabilities of any flower cluster in the world. The innovations to transportation methods opens new possibilities of more cost efficient and environmentally friendly flower imports and more efficient direct selling and delivery from growers to customers worldwide. Sea transport could also make other regional markets in Asia and North America more accessible to the Dutch cluster, potentially hugely increasing its customer base.

**Financial change-driver**

Although the international auction houses in low-cost countries formed a threat to the Dutch auction house, the Dutch cluster has been able to successfully leverage its importance in the worldwide flower market. They ensured that a growing proportion of overseas production passed through its auction houses en route to international customers (see Exhibit 6). Indeed, whilst imports were expected to rise from their current €650 million to €1.4 billion by 2025, Dutch exports were also expected to double to €9 billion during this time. Also, the Dutch auctions needed to become even more cost efficient by reducing transaction costs. The most effective way to this was by increasing sales volumes. Any failure to become more cost efficient could result in losing market share to other international auctions and the direct sales market. To increase volumes, the VBA allowed foreign growers to become full members of the auction since 2006, thus securing increased supplies from these regions. In October 2006, the VBA announced that it was to merge with FloraHolland and so create the largest flower auction and market in the world, effectively controlling 95% of the European flower trade through auctions.

**Trade change-driver**

In changing their trading process the VBA tackled two issues: the seasonality of the Dutch selling volumes and increasing regulation and environmental concerns. In recent times the VBA had experienced shifts of between 1 and 3% per year in the proportion of imported products sold through their auctions vis-à-vis those produced inside the Netherlands. By 2006, about 25% of the flowers going through the auctions were imported into the Netherlands. Though this increase in imported flowers could be viewed as a threat to the Dutch cluster, it also enabled the Dutch auctions to reduce seasonality in their selling volumes and offer a full range of flowers all year round to their
clients. The longer term strategy of the VBA would be to bring other European flower selling vehicles into the Dutch system, making the Netherlands the only major hub for flower trading in the region. The auction’s strategy also involved developing an increasingly strong presence in the direct (non-auction clock) sales market which had shown rapid expansion in recent years and would otherwise pose a long term threat to the volume advantage that the VBA possessed. Allowing international members into the Dutch cluster created a bigger importance in the development of certification standards to ensure the quality of their products and processes. Government regulations and environmental concerns made the cluster focus on quality norms. Through the use of research organizations working in partnership with various cluster elements, the cluster has developed certification standards which tend to be in excess of any government regulations but which remain achievable by the cluster’s members. For example, in 1990 the MPS (Milieu Project Sierteelt) certification system was developed within the cluster to regulate chemical pesticide usage in flower growing. The system has evolved and now has standards for energy efficiency, carbon dioxide usage, employee treatment, quality controls and others. These standards continually evolve so that they meet or exceed governmental and consumer expectations and they allow the Dutch auctions and the cluster to certify higher quality standards to demanding customers than the standards certified by competitors. These standards are commonly a result of collaborative research programs which are to this day initiated and coordinated by organizations such as the VBA and FloraHolland who have the most up to date information on arising consumer preference trends.

Setting the new strategic agenda

As a result of the disconnection of their main logistical, financial and trading processes it becomes more and more important for the VBA flower auction to focus on the development of specialized sub-hubs or sub-clusters and the linkages between those sub-clusters. By disconnecting their main processes the flower auction enables other participants of the international flower trade market to gain ground in the industry, hereby increasing the competitive power of external parties within the Dutch cluster and focusing on the cooperating with these same parties. By doing so the VBA flower auction in the meanwhile increases his position as a highly international connected market and knowledge center with continually growing competitive power. It is exactly this balance between cooperation, the synergies and linkages between cluster members and strong competition what drives the productivity and innovative power of clusters.

The exchange of logistical and intellectual facilities creates a set of sub-clusters, competing for selling and developing their products on one hand, but forming an international platform of cooperating clusters as well (see Appendix 2). The linkages between these sub-clusters each have their specific function in connecting different flower hubs. Figure 6 shows the different type of linkages between the clusters.

<table>
<thead>
<tr>
<th>Cluster linkages</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance</td>
<td>• Sub-clusters provide lower cost production facilities for high volume varieties;</td>
</tr>
<tr>
<td></td>
<td>• Sub-clusters depend on the Dutch auction houses for access to international customers;</td>
</tr>
<tr>
<td>Infrastructure/logistic</td>
<td>• The auction houses of the leading cluster provide special services, specialized financial services, logistical and cold-storage facilities in sub-clusters;</td>
</tr>
<tr>
<td></td>
<td>• Production in sub-clusters has reduced the seasonality of the Dutch flower season and increased sales throughout the year;</td>
</tr>
<tr>
<td>Innovation/technologies</td>
<td>• Innovations in the industry and new flower varieties depend on the intellectual property of the leading cluster;</td>
</tr>
<tr>
<td></td>
<td>• Sub-cluster growers, breeders and propagators take up latest technologies developed by Dutch cluster;</td>
</tr>
<tr>
<td>Intellectual property</td>
<td>• Dutch organizations as LTO Nederland organize study trips to promote benefits for growing abroad to other growers;</td>
</tr>
</tbody>
</table>
Leading cluster growers leverage knowledge and intellectual property to build efficient operations abroad; Dutch auction houses provide sub-clusters with market intelligence;

**Legislation**
- Dutch growers build ready made greenhouses in different countries to lease to other foreign growers, providing not only facilities but local permits as well;

**Ownership/ Governance**
- Sub-cluster plantations are owned by Dutch growers;
- Dutch growers lease ready made greenhouses in sub-clusters to Dutch or other foreign growers;

**Social Networks**
- Dutch growers have encouraged other value chain elements, such as breeders, propagators, suppliers and infrastructure providers to move to foreign sub-clusters as well;

**Trade**
- The Dutch flower auction does not only contain their own auction house but also provides the facilities to other auction houses hereby expanding their market range to customers;

**Figure 6** Types and examples of cluster linkages

So even though the Dutch flower auction and the Dutch cluster seems to be more powerful than ever it remains important to keep on investing in competition and cooperation, in a market where demands are continually changing, technologies develop beyond expectations and at the same time return on (mainly logistical and infrastructural) investments has to be secured.

Perhaps more than anyone else in the cluster, Dirk Hogervorst, one of the chief directors of the VBA flower auction, is aware of the magnitude of the challenges as well as the opportunities that increasing internationalization and changes to market dynamics might bring to the cluster. In his position as one of the leading directors of the VBA, he is not only responsible for increasing the competitiveness and success of the auction house, but also responsible for helping to guide and coordinate the actions of its grower members in order for them to be more profitable in the long term.

But at a time of growing uncertainty and rate of change, setting a strategy for the long term direction of the cluster was fraught with risks and difficulties, but was as important as ever. The long term success of the growers and the auction were thus intertwined and the crucial question was whether the cluster could make the right decisions in order to secure long term success?

The current strategic focus of the VBA flower auction is aimed at further internationalization of the cluster and the establishment of a worldwide ‘network’ of logistical hubs and linkages in order to facilitate the efforts of growers in selling their produce from their diverse growing locations. The network of flower collection and transshipment hubs will also give the cluster stronger regional presence around the world, maximizing its logistical efficiency and allowing it to expand sales to markets outside Europe. The logistical hub network would allow the cluster to more greatly benefit from changes in shipping and direct selling.

End 2007 Dirk Hogervorst was looking out of the window of the flower auction and was thinking about some of his recent conversations with other key leaders in the flower cluster, reflecting on all the recent changes and strategic agenda: We can be very proud of what we have accomplished so far, we will most likely be allowed to merge the VBA and FloraHolland into the worlds largest flower auction. The cornerstone role of the Dutch auctions will be strengthened. This merging process will take a lot of management attention and energy. Are we doing the right things and are we doing them quickly enough, and are there key points that we are missing?
Exhibit 1
Geographic expansion of commercial flower cultivation; original location and additional sites

Exhibit 2
Dutch production area of cut flowers and plants
Source: Productschap Tuinbouw

<table>
<thead>
<tr>
<th>Year</th>
<th>1990</th>
<th>2000</th>
<th>2002</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textbf{Area in hectares}</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under glass;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cut flowers</td>
<td>3593</td>
<td>3727</td>
<td>3578</td>
<td>3401</td>
</tr>
<tr>
<td>Pot plants</td>
<td>984</td>
<td>1261</td>
<td>1272</td>
<td>1340</td>
</tr>
<tr>
<td>Other (including propagation materials)</td>
<td>564</td>
<td>939</td>
<td>974</td>
<td>936</td>
</tr>
<tr>
<td>\textbf{Total floricultural production area under glass}</td>
<td>5140</td>
<td>5927</td>
<td>5824</td>
<td>5713</td>
</tr>
<tr>
<td>Outdoors;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floricultural products</td>
<td>2103</td>
<td>2552</td>
<td>2684</td>
<td>2528</td>
</tr>
<tr>
<td>Flower bulbs</td>
<td>16319</td>
<td>22513</td>
<td>24221</td>
<td>23520</td>
</tr>
<tr>
<td>\textbf{Total outdoor flower production area}</td>
<td>18422</td>
<td>25065</td>
<td>26905</td>
<td>26048</td>
</tr>
</tbody>
</table>

Exhibit 3
Number of companies
Source: Productschap Tuinbouw

<table>
<thead>
<tr>
<th>Company type</th>
<th>2000</th>
<th>2002</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textbf{Growers}</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floricultural products under glass</td>
<td>6575</td>
<td>5796</td>
<td>5347</td>
</tr>
<tr>
<td>Floricultural products outdoor</td>
<td>2251</td>
<td>1955</td>
<td>1823</td>
</tr>
<tr>
<td>Flower bulbs</td>
<td>2710</td>
<td>2574</td>
<td>2357</td>
</tr>
<tr>
<td>Exporters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floricultural products</td>
<td>1218</td>
<td>1115</td>
<td>1132</td>
</tr>
<tr>
<td>Flower bulbs</td>
<td>325</td>
<td>276</td>
<td>241</td>
</tr>
<tr>
<td>Retail</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Florists/shops</td>
<td>5784</td>
<td>5060</td>
<td>4957</td>
</tr>
<tr>
<td>Market and street sales</td>
<td>1652</td>
<td>1564</td>
<td>1468</td>
</tr>
<tr>
<td>Garden centers</td>
<td>1091</td>
<td>1011</td>
<td>984</td>
</tr>
</tbody>
</table>
Exhibit 4

Flower trade chain

Exhibit 5

Most important customers of floricultural products

Source: Productschap Tuinbouw

Sales of floricultural products in millions of Euros

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Germany</td>
<td>584</td>
<td>1020</td>
<td>1509</td>
<td>1512</td>
<td>1571</td>
</tr>
<tr>
<td>2</td>
<td>United Kingdom</td>
<td>31</td>
<td>244</td>
<td>585</td>
<td>729</td>
<td>797</td>
</tr>
<tr>
<td>3</td>
<td>France</td>
<td>93</td>
<td>348</td>
<td>579</td>
<td>606</td>
<td>655</td>
</tr>
<tr>
<td>4</td>
<td>Italy</td>
<td>17</td>
<td>162</td>
<td>235</td>
<td>281</td>
<td>333</td>
</tr>
<tr>
<td>5</td>
<td>Belgium</td>
<td>24</td>
<td>54</td>
<td>144</td>
<td>164</td>
<td>190</td>
</tr>
<tr>
<td>6</td>
<td>Denmark</td>
<td>11</td>
<td>55</td>
<td>98</td>
<td>107</td>
<td>138</td>
</tr>
<tr>
<td>7</td>
<td>Austria</td>
<td>29</td>
<td>74</td>
<td>118</td>
<td>127</td>
<td>135</td>
</tr>
<tr>
<td>8</td>
<td>Switzerland</td>
<td>33</td>
<td>90</td>
<td>124</td>
<td>141</td>
<td>126</td>
</tr>
<tr>
<td>9</td>
<td>USA</td>
<td>7</td>
<td>69</td>
<td>139</td>
<td>143</td>
<td>101</td>
</tr>
<tr>
<td>10</td>
<td>Spain</td>
<td>4</td>
<td>38</td>
<td>54</td>
<td>72</td>
<td>97</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>47</td>
<td>202</td>
<td>603</td>
<td>687</td>
<td>730</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>880</td>
<td>2356</td>
<td>4188</td>
<td>4569</td>
<td>4873</td>
</tr>
</tbody>
</table>
Exhibit 6
Auction sales of imported flowers (in millions of Euros)
Source: VBN annual reports 2002, 2003, 2004; HBAG

<table>
<thead>
<tr>
<th>Importing Country</th>
<th>2000</th>
<th>2002</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenya</td>
<td>114</td>
<td>149</td>
<td>189</td>
</tr>
<tr>
<td>Israel</td>
<td>162</td>
<td>133</td>
<td>111</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>64</td>
<td>67</td>
<td>41</td>
</tr>
<tr>
<td>Ecuador</td>
<td>13</td>
<td>22</td>
<td>28</td>
</tr>
<tr>
<td>Spain</td>
<td>26</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>Uganda</td>
<td>-</td>
<td>-</td>
<td>17</td>
</tr>
<tr>
<td>Other</td>
<td>74</td>
<td>96</td>
<td>94</td>
</tr>
<tr>
<td>Total</td>
<td>453</td>
<td>482</td>
<td>481</td>
</tr>
</tbody>
</table>

Exhibit 7
Colombian exports
Source: http://www.asocolflores.org/

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004 (E)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$580,591,105</td>
<td>$610,296,990</td>
<td>$672,667,723</td>
<td>$681,396,497</td>
<td>$704,000,000</td>
</tr>
</tbody>
</table>

Exhibit 8
Dutch flower cluster incorporating international sub-clusters.
Exhibit 9
Tulips which arrived by sea container (right) compared to tulips which were airflown (left).
Source: http://www.ec-pack.nl/Projects-FlowersBySea.htm
Appendix 1

Breeders

Breeding has long been a dynamic industry. Firstly, mergers and acquisitions made the industry more concentrated and international. Secondly, competitive positions were increasingly determined by technological and scientific know-how. Although the Dutch cluster was world-class, competitive pressures were increasing. xxx

Creating successful new varieties of flowers was often a lengthy, difficult and expensive process. Breeding companies tried to improve flower and plant characteristics on various dimensions over generations by repeated reproduction. Reproduction techniques included generative breeding where 2 parent plants were involved and vegetative breeding where cuttings were taken from a single parent plant, creating a natural ‘clone’ of that parent. To protect their intellectual capital on developing new varieties and the substantial investment required breeding companies were able to legally register and thus protect new varieties through special institutions.

In recent decades, DNA technology has revolutionized breeding techniques. Biological markers made it possible to identify genes and thereby determine whether a plant would possess certain traits or not. Genetic modification allowed breeders to insert, delete or modify individual genes; creating new varieties with desired traits without having to eliminate unwanted characteristics.

Although the initial goal of these technologies had been to increase yields and resistance against disease, over the years focus shifted towards other traits and characteristics. Specific varieties were cultivated in order to meet the requirements of various parties involved in the cluster. Flowers were engineered to require lower quantities of pesticide, energy, fertilizer and water, thus providing improved efficiency to growers and reducing environmental pressures. Growers demanded materials that performed ever better on such dimensions as germination power, yield, sowability, health and uniformity of the young plants. Product quality and uniformity both improved marketability and logistical handling, while greater diversity of varieties afforded consumers greater choice and made targeting of specific customer segments possible. xxxi

Propagators

Propagators carry out the task of multiplying seeds and cuttings created by breeders and growing young plants for sale to growers. Since this is a labor-intensive process in which only few tasks can be mechanized, production of cuttings has increasingly shifted to Africa and Latin-America.

Propagation materials have to meet stringent criteria to be allowed onto the Dutch market. Various institutions such as the Netherlands Inspection Service for Horticulture and the Flowerbulb Inspection Service (the BKD) govern the market and certify a cultivar’s origins, its purity, and that it is free of diseases and weeds. xxxii

Growers

Most Dutch flowers were cultivated under glass. The quality of flowers cultivated in a greenhouse environment was generally much higher compared to their open field counterparts.

Scale enlargement and horizontal concentration had caused the number of companies involved in flower cultivation to fall over the years as too had the total area used for production. Several companies went out of business or were taken over and many shifted some of their production to emerging locations abroad.

Disease control was an important issue in flower cultivation, not only to secure a company’s production yields, but also to be able to access export markets. In most countries, imports were tested for biological hazards such as diseases and compliance with environmental certifications. Since the import of cut flowers was subject to strict regulation concerning plant health and environmental standards, quality assurance and certification played a large role in the international flower trade.
Although propagators had developed varieties that were less susceptible to germs and diseases, flower beds still needed to be sprayed regularly with chemicals and the effect of flower cultivation on the natural environment was an increasingly important issue for the industry.

Milieu Project Siererteelt (MPS) was an international certification program originally initiated in the Netherlands by the grower owned auctions, educators and researchers, aimed at reducing the environmental impact of the floriculture sector and improving the sector’s image. Participants in the program allowed products to be assessed on the basis of their environmental sustainability, quality, and corporate social responsibility performance. When standards were met, these products would be MPS certified. The program was adopted by the Dutch flower auctions and it soon became the international certification standard.

The consumption of energy was another major theme in the cluster. Flower growers relied heavily on natural gas to heat and light their greenhouses, accounting for 10% of total Dutch gas consumption. Energy contributed 15 to 20% of flower growers’ operational costs. In recent years, rising energy prices put increasing pressure on growers, but it also gave rise to initiatives to limit the influence of these effects. Consequently, flowers were engineered with smaller energy requirements. An energy buyer association was established by the Organization for Agriculture and Horticulture LTO and Rabobank, a Dutch cooperative bank which is quickly becoming a major player in the industry. However, despite joint buying initiatives and programs to improve energy efficiency by 65% in 2010 relative to 1980, energy costs remained substantial.

An ambitious plan was presented to the Dutch government in 2003 to develop a new type of greenhouse that would capture energy instead of using it. Using innovative heat transfer equipment (FiWiHex) and insulated underground storage, summer heat could be captured and used in winter. A pilot project combining the efforts of companies, scientists and technical pioneers had proven feasible. Since the new greenhouse was a closed system, it provided additional benefits such as reusability of condensation water, improved CO₂ efficiency and better protection against diseases. However, any transition to this new type of greenhouse would take the cluster many years.

With higher costs of production and market prices going down due to increased global competition, the average profit margin for growers was thin.

Auctions

In the Dutch auction system, prices started at an initial value and kept dropping until a buyer stopped the clock to signify an acceptable price. This resulted in sales prices that were generally higher than in other supply/demand systems, which was again in the growers’ interest. It provided a very effective and efficient price-setting system: the auction rooms of the Aalsmeer Flower Auction processed an average of 37,000 transactions per day in 2004. The clock provided growers with a number of advantages from early on including a very clear view of up to the minute price trends and market tastes. It allowed growers to change their varieties to keep pace with these changes and also allowed them to specialize on growing, removing the need to negotiate on prices with buyers. The auctions, acting in the interests of their growers would supply market information on a regular basis as well as information and advice on industry trends to help growers make better informed decisions.

Although most sales were still effected under the auction clock, developments in electronic commerce had meant that about 50% of all plants were now sold directly by growers to traders. This concerned mostly long-term contract transactions. For cut flowers, 90% of the trading was done through the auction clock, but direct trading was becoming more important and was expected to grow, especially with respect to the more commoditized varieties.

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1 Named after the auctions of tulip bulbs in the 17th century, the ‘Dutch auction’ system is based on a pricing system devised by Nobel prize winning economist William Vickrey.
Starting early in the morning, within a couple of hours flowers were inspected for quality, auctioned and delivered to buyers or sent on their way to almost every country in the world. By nine a.m. trading was usually over. By physically bringing together supply and demand at one location, the flower auctions also performed an important ‘bulk-breaking’ function: large lots were sold and divided into smaller lots. Because of their fundamentally important role in the cluster, the auctions were involved in many cluster-related initiatives, especially regarding logistics and certification.

There were four Dutch flower auctions at the turn of the 21st century: Aalsmeer Flower Auction (VBA), FloraHolland Flower Auction, Oost-Nederland Flower Auction and Vleuten Flower Auction with combined sales revenues of 3.6 million euros in 2003. Covering the two main floriculture regions, VBA was located in the Aalsmeer region, whereas FloraHolland had its main activities in the Westland.

The VBA was formed in 1968 from the merger of the two auctions Bloemenlust and Centrale Aalsmeerse Veiling, which had been established in Aalsmeer at the beginning of the 20th century. One of the first measures of the VBA board was opening the auction facilities to foreign supply under certain conditions.

With its 10 million square feet (100 hectares) surface area, it was the largest commercial building in the world. Its two main halls – separated by a road – were linked by an innovative logistics system. This automated system transported stacking trolleys with flowers from the auction area to the 523 shipping docks along air rails totaling 16 kilometers in length. In 2004, 130,000 trolleys were used to dispatch all the auctioned products. By 2005, the VBA operated 13 auction clocks bringing together 7,000 national and international growers and 1,300 wholesalers and exporters. An average of 19 million flowers and 2 million plants changed hands every day.

FloraHolland was founded in 2002, also by a merger between two auctions, whose origins dated back to the Westland in the early 20th century. The first locations were mainly focused on fruits, vegetables and bulb flowers such as tulips with other flowers being introduced soon after. Because growers started cultivating flowers instead of vegetables, flowers soon became the only traded product. In 1971, small numbers of foreign flowers started to be sold through the auction clock at the Naaldwijk site.

Since 1972, FloraHolland has run an Intermediary Office, offering direct sales services (i.e. separately from the clocks) between growers and dealers in the Netherlands as well as other countries. It concerned itself with futures and day trade, mainly of plants and this now generated more than 25% of its revenues, a number expected to increase further in the future.

Equaling the Aalsmeer Flower Auction in size, its locations accounted for more than half of the Dutch trade in flowers and plants. With export-oriented auctions in Naaldwijk and Rijnsburg as well as regional auctions at 3 other sites, it operated a total of 26 auction clocks. Each site either focused on different customers (exporters, retailers) or different types of products (plants, flowers types).

The Dutch Association of Flower Auctions (VBN) (an industry association coordinating common activities and themes including product quality, logistics, market information, lobbying, legal issues and communication) represented the flower auctions. Among its aims were developing new horticulture areas and improving the overall competitiveness of the cluster including its logistics.

For example, products traded at the auctions were assigned a VBN product code that guided financial and logistical processing, stating size, weight and other characteristics. In recent years the Linnaeus project was initiated to transform the old 5-digit coding system to a 7-digit version which would be able to provide the increased product information needed to support the increasing trend of
remote buying and allow for an increase in overall efficiency and product range through a standardized system of information exchange.

Communication and information technology played a critical role in the cluster. Electronic systems were used for communications, transactions, accessing market information, production monitoring, registration and control. These systems had been used since the early 1990s and facilitated electronic banking, order processing, supplying market information, weather forecasting, registering environmental performance and remote monitoring and control of greenhouse systems. In general, the cluster was characterized by a high willingness to incorporate new technologies. xlviii

Technological developments have also been directed towards improving electronic commerce facilities. For example, VBA allowed buyers to see the next day’s auction supply and later, facilitated remote buying through a real-time virtual auction clock. Flower Access offered a system for individual florists and garden centers to buy directly from growers at fixed prices.

Recognizing that transactions between growers and traders were increasingly done outside the auction clock, FlorEcom (a joint venture of the VBA, FloraHolland and the VGB) was established in 1999 to develop and coordinate standards and systems for electronic commerce. The system offered parties such as supermarket chains or large exporters the possibility to trade directly with growers. Growers published their supply on this virtual market and negotiated a transaction price. In 2005, FlorEcom was mostly used for pot plants. It also developed EDI standards and procedures that not only supported sales transactions but also better facilitated logistical processing. This provided a more standardized processing system for orders between parties and the ability for traders to track and trace their shipments, and so estimate the time of arrival more reliably. slx

**Wholesale**

The Association of Wholesale Trade in Horticultural Products (VGB) was involved in many initiatives within the industry and cluster focused on logistics, market information and communication technology and quality control. It also represented the wholesale industry in various cluster institutions and negotiated with government on issues such as collective labor agreements for the industry. 1 It developed the Florimark quality program to ensure full and reliable product information from growers to the auctions and traders.

In association with the Flowers and Plants branch of the Dutch Agricultural Wholesale Board (HBAG), the VGB also published the trade journal for the flower wholesale industry.

HBAG was financed by companies in the industry. The Flowers and Plants branch was an organization that provided market information and knowledge to the industry, and operated as a mediating party between cluster organizations. It provided industry data and helped collect those through the promotion of ICT applications. It was involved in influencing government policy and also provided training and advice aimed at improving management quality and knowledge transfer. All Dutch wholesale companies were registered with HBAG. li

**Tourism**

From their early beginnings, the auctions have always opened their doors to visitors. Open on weekdays, the auction process could best be seen before 9 a.m. Although VBA didn’t even have an actual visitor policy other than a guided tour through the auction hall, in recent years, the auction attracted about 125,000 tourists a year, many of them from abroad. They were able to see with their own eyes what it meant to handle, trade and ship millions of flowers a day. Plans were being developed to create a visitor center at the auction site, making the auction a commercial tourist attraction.

In 1949, the mayor of the town of Lisse together with ten leading bulb-growers conceived the idea of a permanent annual open-air flower exhibition at the Keukenhof estate, emphasizing the

\footnote{The Association of Dutch Wholesale in Floricultural Products (VGB)}
importance of Lisse to the flower industry. Over the years, the number of bulb-growing companies taking part grew from 10 to more than 90 but Keukenhof’s character remained unchanged: every year the site exhibited the best and most beautiful flowers in the Netherlands. The site attracted 600,000 to 700,000 visitors a year. The great majority of those were foreign tourists. Keukenhof had become one of the best-known attractions in the country and one of the most photographed sights in the world.\footnote{i}

**Institutions**

*LTO Nederland*, the Dutch Organization for Agriculture and Horticulture, had historically promoted the social and economic interests of farmers and growers as well as a sustainable agricultural and horticultural industry. More recently LTO stimulated initiatives that contributed to this goal by improving management and marketing skills as well as increasing the use of sustainable cultivation practices. It was a coordinating organization, encompassing sixteen industrial organizations.

Established in 1908, the Dutch Horticultural Council (*Nederlandse Tuinbouwraad; NTR*) was one of the oldest horticultural organizations still active in the Netherlands and comprised a variety of organizations involved in horticulture.\footnote{iii} It represented the collective interests of growers, auctions and traders in the flower, plant, tree and bulb industries. The Council’s aims were to promote the Dutch horticultural sector’s image within and outside the Netherlands and to support the sale of horticultural products. As part of these efforts it organized the Floriade world horticultural exhibitions which took place every 10 years.\footnote{iv}

*Productschappen Tuinbouw (PT)* were collaborative organizations that united companies involved in producing the same product. They were governed and financed by the firms themselves. Although their role was to perform certain public tasks, the government was involved only in overseeing their activities. Comprising the entire chain from raw material to finished product – producers, industry, wholesale and retail – their activities were aimed both at the common interest of the parties involved and the general interest of society. Decisions taken by the productschappen were generally binding for the entire chain. The PT’s long term goal was to improve the global competitive position of Dutch horticulture, through lobbying, trade promotion, phytosanitary and quality control, stimulating corporate social responsibility, fundamental and applied research, market information and research, and global promotion and industry PR.

*Plant Research International* at the University of Wageningen was a scientifically renowned research institute specialized in agrosystems innovations, biodiversity, breeding, bio-interactions, plant health, biometry, and bioscience. Besides doing fundamental research in these areas, the institute offered a range of products for all of the activities in the chain including pheromone lures to catch harmful insects, biological markers for breeding, software algorithms and methods for reducing herbicide use.\footnote{v}

*Plantum NL* was established in 2001 from a merger of three industry associations representing vegetative breeding (CIOPORA), propagating and growing (NVP), and (licensed) seed producing and trading (NVZP). Later that year, the section of the Association of Dutch Wholesalers in Floricultural Products (VGB) that was active in propagating and growing of floricultural products joined Plantum NL. The association represented around 500 members and focused on breeding, propagating and growing of horticultural plant material, with two branches (ornamental breeding and ornamental propagation) devoted to floriculture.

*The Flower Council of Holland (Bloemenbureau Holland; BBH)* promoted and marketed floricultural products worldwide and was financed by the sector’s members.\footnote{vi} Its activities (e.g. market analysis, sales promotion, training and support and advertising) benefited the cut flower, plant and propagation materials industries and were aimed at all sectors involved in sales, ranging from local florists to wholesalers and exporters. It also participated in most international trade fairs.
and ran international satellite offices in important flower markets such as Germany, France, Italy and the United Kingdom.

**Government policy**

Government policies have had many effects on the cluster. For instance, in 1966, in support of growing international trade and exports, legislation regarding plant and seed health and quality ended voluntary participation in inspection programs. The Agriculture Quality Act of 1980 brought the cluster in line with EU legislation and included obligatory registration and inspection especially of flower-bulb growers.

In the 1990s, government policy was aligned with that of the EU to set up a system of EU plant passports. At the EU-level, the Directive on Phytosanitary Aspects and the Directive on Trade of Propagation Material were important regulatory bodies making policies that affected the cluster.

National government influenced the cluster with urban planning, sustainable production and market structure policies. Urban planning policies had a particularly direct influence. By appointing five ‘green-port’ regions dedicated to ornamental flower cultivation in their 2004 Ruimte en Mobiliteit policy, the national government underlined the importance of the cluster to the Dutch economy. Besides this, the Dutch Innovation platform, initiated by the national government in 2003 to develop proposals for strengthening Dutch competitiveness, identified the Flowers and Food cluster as one of ten main clusters in the Dutch economy, especially considering the economic power and innovativeness of breeders, propagators and cut flower cultivators. In the area of sustainable production, government influence was decreasing and more private initiatives were developed to coordinate this area. Certification programs were developed by parties cooperating across the chain. 2004 saw the integration of the MPS and Florimark certification programs. Although certification was initially seen as a production issue, an increasingly chain oriented perspective was taken in each aspect of the trade.

**Appendix 2**
References

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iv

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