

Florensis: More Catholic than the Pope?

Case study on Master level

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Abstract

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Introduction

May 10 2021, Zwijndrecht, The Netherlands. Alexander van der Bijl mused on yesterday's board meeting. Somehow it didn't sit well with him. The sustainability report 2020 (See Exhibit 1) was discussed and received in good order. The tone and tenor of this report were clear. Florensis is doing everything in her power to make this world a better place:

“We strive to act responsibly in all we do. We care about the impact of our operations on the environment and on the societies and communities where we produce and source our materials from...”

That is what Florensis does. That's why every day after his daily run Van der Bijl likes to go to the Langeweg Florensis head office. And secretly he likes to get up a little earlier to travel to the Kenya branch. It is precisely there, that everything breathes sustainability, prosperity and above all well-being. Especially the positive energy of employees and the surrounding nature give Van der Bijl that extra something, which makes him even more committed to Florensis. The attention for charities during the annual Fancy Fair; but also the annual Flower Trials event with national and international fame on the Langeweg. It exudes an atmosphere of entrepreneurship and love for Florensis' green product that is getting greener by the day. Being green, staying green and becoming greener (See Exhibit 2) as a company that produces green...

That, however, is not the core of his musings. Van der Bijl wonders whether Florensis can become even greener. Or should he accept the limits of current business system or does that make no sense? His head is spinning... How and should Florensis become a greener company than currently is the case?

Yesterday this has been debated for a long time in the board...

Alexander van der Bijl

As CFO of Florensis - an innovative and fourth-generation family business (see Exhibit 3) - Van der Bijl knows that there is no reason to complain: sales are great (See Exhibit 4). Van der Bijl worked for PricewaterhouseCoopers for fifteen years. After two years of financial management at the Cargo Division of Vos Logistics, he transferred to Florensis. In addition to his position as CFO, Van der Bijl is a supervisor and supervisory director at organizations in his own sector and at social organizations. “You have to fill your days a bit,” he smiles modestly. “I get all the space I need for this personally and professionally. I find it very relevant to transfer my knowledge and skills to the social field.”

Florensis Young Plants

Florensis started more than 75 years ago¹² as a typical product oriented company³ providing the best quality seeds to various professional growers. In the subsequent years the product assortment was widened with the production and sales of young plants⁴. Customer relationship (management) was in these days the normal way of doing business. No one talked about it, the term was not even invented. Traditionally the customer was king. Not a lot of (higher) education was necessary, ‘farmer’s wisdom’ was enough. Since then a lot has changed. Running a company like Florensis nowadays requires more than farmer’s wisdom. Higher education capabilities are required. From a local company in Zwijndrecht, Florensis has

¹ Florensis' expansion Widely: https://issuu.com/florensis/docs/jubileummagazine_04.1_eng

² Everything Changes: https://issuu.com/florensis/docs/jubileummagazine_04.2_eng

³ <https://www.mbaskool.com/business-concepts/marketing-and-strategy-terms/8381-product-orientation.html>

⁴ <https://aggie-horticulture.tamu.edu/ornamental/a-reference-guide-to-plant-care-handling-and-merchandising/propagating-foilage-flowering-plants/>

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evolved into a major global player in the floricultural industry⁵. It has grown into a company with production and breeding locations in the Netherlands, Germany, Portugal, Kenya and Ethiopia. Producing more than a billion young plants in 4,000 different varieties coming from seed, cuttings and tissue culture. And supplying them to 8,000 professional growers in fifty countries. Florensis employs more than two thousand employees worldwide.

Besides the provision of an excellent, broad and extremely competitive assortment of young bedding plants (See Exhibit 5), Florensis more and more transformed into a full service provider for a wide range of professional growers⁶. From rather small- to the really big (European) companies e.g. Emsflower⁷, Kwekerij Baas⁸ and Endhoven⁹ (See Exhibit 6). They grow these young plants to offer them to the European retail sector (See Exhibit 7). Almost 25% of all sold plants in Europe are originally coming from Florensis Zwijndrecht.

European Retailers

Europe consists of more than 447 million people living in 48 states¹⁰. Their wealth varies greatly, but overall the poorest of these states still rank well above the world average of GDP per capita and general living standards. Therefore, Europe is often named the most important retail region worldwide. As can be expected, the biggest retail companies in Europe are located in the well-established western countries and the vast majority operate in the food sector. When taking a look at the top 10 retailers with regards to revenue, you will find that 5 of them are German, 3 are French and 2 are from the United Kingdom.

The indisputable number one is the German Schwarz-Gruppe (owner of Lidl), with a turnover of €113 billion. They are followed by the Metro Group, Tesco and Carrefour, who all reported a yearly revenue exceeding €50 billion¹¹. Ikea, Euronics and online retailers such as Amazon and Otto are examples of companies outside the food sector with revenue comparable to the food merchants named above. The online retailing has experienced the highest growth in sales in the recent years, with an annual increase of up to 40% for Amazon alone. Even though this growth will almost certainly slowdown in the coming years, Amazon is expected to double its turnover in 3 to 4 years. This would mean that they will surpass the Schwarz-Gruppe as the biggest retailer in Europe by 2021 (See Exhibit 8).

Lidl, Aldi and Ikea are typical retailers where the Florensis products eventually will be offered to many European consumers.

Consumers

Typical Florensis consumers like to work in the garden in spring. To make this garden quickly beautiful and colorful these consumers look for bedding plants¹² (see Exhibit 5) After the long rainy and cold winter these bedding plants garden generate the long awaited summer feelings. It is especially these needs and wants that the Florensis plants fulfill. Segmentation has never been a major issue in the industry. Simply bedding plants for everybody and in particular for shopping consumers and garden owners. There are however indications that the needs of consumers are changing. The bedding plant industry needs to transition quickly from producing to marketing plants. Micro-segmentation should result in products targeted to the specific needs of specific groups of people. For example, promoting eggplant to ethnic groups that use

⁵ [Global Floriculture Market size to grow USD 15.20 bn by 2025. It is projected to exhibit a CAGR of 4% during the forecast period. The "YOY \(year-over-year\) growth rate for 2021 is estimated at 6.71%" by the end of 2025](#)

⁶ https://en.wikipedia.org/wiki/Floral_industry

⁷ <http://www.emsflower.nl/>

⁸ <http://www.kwekerijbaas.nl/>

⁹ <https://www.endhoven.nl/>

¹⁰ https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Population_and_population_change_statistics

¹¹ <https://www.retail-index.com/Countries.aspx>

¹² https://www.aces.edu/wp-content/uploads/2019/12/ANR-0184_Annual-Bedding-Plants_12022019.pdf

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this vegetable in their cultural cuisine. Growers and retailers should do a better job of finding out what consumers want and to satisfying those needs with creating priority lists towards new product development departments¹³¹⁴. People might start looking for plants that have an isolation effect on roofs from an energy saving perspective. Also questions might pop up as far as it comes to the sustainability of the produce. These questions could consumers also raise about bedding-plants.

Locations Florensis

Florensis has sales offices in the Netherlands (Hendrik-Ido-Ambacht), Belgium (Sint-Amands), Germany (Weeze), Italy (Lazzate), Poland (Warsaw) and Switzerland (Thun). Through agents, Florensis supplies young plants (plugs), propagated from seed and cuttings, all over the world. Florensis has special production locations for the production of unrooted cuttings and seeds. These locations in Ethiopia, Kenya and Portugal are essential for maintaining the very highest level of quality. The production of young plants takes place in the Netherlands Zwijndrecht. Recently a new production location has been opened in Dinteloord (See Exhibit 9).

Product Range

Florensis offers professional (European) growers an unrivaled range of annuals, perennials, potted plants, primroses and pansies in more than 3,000 different flowers and plant varieties. All these varieties, in dazzling color variations, are produced at the highest possible level of quality and grown using highly innovative and sustainable methods (N.B.: Florensis also supplies young plants to growers for the production of cut flowers via Florensis Cut Flowers in Rijssenhout, the Netherlands). A different group of professional growers is targeted for this purpose.

Business & Operating Model

Over the last 75 years Florensis progressed through the various stages of the business lifecycle¹⁵. Their attention and focus gradually changed over the years: from a product orientated company¹⁶ (See Exhibit 10) towards a company with more focus on the relationship with its customers, predominately the professional growers of various plants and cut flowers. This customer intimacy strategy made Florensis a successful multinational company. Later, during the 90ties, lean and mean, effective and efficient operations became the focus. Margins were getting thinner as the power of the (large) retailers increased. Florensis became the large global player as it is now. A focus on operational excellence strategy was and is seen as a key factor to that success.

Flower industry in the Netherlands

The flower market is a dynamic, fast-growing global industry, defined by three major components: growers¹⁷, wholesalers and retailers (See Exhibit 11). The Netherlands is an important producer for cut flowers, as well as a key importer from developing countries. Besides being one of the market leaders for cut flowers, the Netherlands is also a main trade hub, especially in the area of Aalsmeer. The country's logistic position within Europe, as well as established international trade ties within the flower industry, make the Netherlands Europe's core for the flower market. Every year roughly 1,200 to 1,500 new flowers and plants are bred and cultivated by growers. New types of cut flowers contributed massively to the flower industry. However, during the last decade the number of flower growing companies in

¹³ <https://lgrmag.com/article/consumer-buying-habits/>

¹⁴ Reflections on the Bedding Plants Industry (2009):

https://www.greenhousemag.com/article/gm_1209_commentary_nona_koivula_bedding_plants/

¹⁵ <https://www.entrepreneur.com/article/271290>

¹⁶ <https://www.reference.com/business-finance/examples-production-orientated-companies-ed1b5685d301f30>

¹⁷ Growers includes companies active in plant breeding and seed technology

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the Netherlands decreased year by year. In 2007 there were roughly 2,100 growers, compared to approximately a 920 in 2017. This development can also be seen among bulb growing companies. The Netherlands had to deal with a loss of approximately 310 bulb growing companies between 2007 and 2017. A decrease in the number of growing companies in the country reflected the development of competition in the form of other emerging markets¹⁸. Countries like Ecuador, Colombia, Kenya and Ethiopia are making their mark on growing flowers, and are seen as big players in the market. They are among the leading live trees, plants and flowers suppliers to the Netherlands, Kenya being the number two import country, with an import value of roughly 345 million euros in 2018. The leading export markets for Dutch floriculture are European, with Germany, UK and France among the top three countries importing flowers from the Netherlands. The value of live trees, plants and flowers exported from the Netherlands increased rapidly by roughly 2.9 billion euros between 2008 and 2018. As mentioned earlier, the Netherlands is known for its main hub for cut flowers. Royal Flora Holland, one of the largest auction companies in the world, saw the Rose sales volume amount to approximately 3.3 billion, whereas the Tulip reached a sales volume of roughly 1.26 billion in 2019. The rise of developing countries as flower growers and the shift of wholesalers towards these countries is a challenge for the flower growing market in the Netherlands as well as the local economy. However, developments in e-commerce could result in a positive impact on the Dutch flower growing market, with the opportunity to complete direct sales with the consumer instead of using an intermediary such as a wholesaler and / or retailer (See Exhibit 11).

Global Floriculture Statistics

The World Floriculture Industry: Dynamics of Production and Markets

With the continuous development of greenhouse technology, and advances in plant biotechnology, transportation conditions, and marketing strategies, floriculture has reached a historical maximum hub of activity and competitiveness (See Exhibit 12A, B and C). The Netherlands, United States and Japan are the three most important global producers and consumers of floricultural products. As a result, three essential floriculture centers have formed: Europe-Africa, America, and Asia-Pacific. In the market chain, auctions and tele/Internet flower auctions as major marketing strategies play an increasing important role in the floriculture industry. Moreover, rare insights into some of the rationale behind consumer-driven floriculture markets, especially in Japan, which, together with China, may easily be the new global market floricultural trend-setters¹⁹. The floral industry is a highly dynamic business. The characteristics of varieties, the origin of production, production technologies, markets and retailing systems as well as individual products are all undergoing continuous change²⁰, while challenging the adaptive capacity of the actors involved. In a slowly but steadily growing world market, new developing country exporters are increasing market share at the expense of existing producers. These producers try to remain ahead by increasing productivity and through diversification and innovation. Kenya, Ecuador and Zimbabwe, the rapidly rising exporters of the last decade, have become established suppliers to their ambitious new competitors including China, India, The Republic of Korea, Malaysia, Malawi, Mexico, Palestine, Peru, South Africa and Zambia²¹. Valentine's Day is the global flower industry's Christmas – the biggest day of the year - when millions of people all over the world buy flowers or plants for their loved ones. But plants and flowers are popular gifts and ornaments year round – and not just on February 14. How else would you account for the 50 euros a year Germans splash out on flowers on a per-capita basis, in addition to the nearly 30 euros they spend annually on plants? Check for detailed information the *INTERNATIONAL STATISTICS*

¹⁸ It is important to know that the majority of the export of many emerging countries has been realized by Dutch growers that moved to these countries in the 90ties from the Netherlands. So even that export is in a way of 'Dutch Origin'.

¹⁹ <https://www.researchgate.net/publication/283348233>

²⁰ <https://www.bbc.com/future/feature/made-on-earth/the-new-roots-of-the-flower-trade/>

²¹ <https://www.degruyter.com/downloadpdf/books/9783110426403/9783110426403.2/9783110426403.2.pdf>

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*FLOWERS AND PLANTS 2020*²² compiled by Sabine Hübner Centre for Business Management in Horticulture and Applied Research Leibniz University Hanover, Germany.

The worldwide market for Flower and Ornamental Plants

The worldwide market for Flower and Ornamental Plants (those that are grown for the primary purpose of being sold as cut flowers, houseplants and in landscape design) is expected to grow roughly 6.3% over the next five years, reaching \$57.4 Billion USD in 2024, up from \$42.4 Billion USD in 2019. The Netherlands retains a key role in the global trade of cut flowers accounting for over 40% of all global export volume. As of 2019, Kenya has grown to become the world's 3rd largest exporter of fresh cut-flowers supplying close to 40% of all flower sales today in Europe²³.

Strategic Issues

The beauty of a family business is that it always keeps an eye on the continuity of the business. For a family business nothing is more important than long-term continuity and harmony. A good balance between family and business interests is essential²⁴. In any case, the focus is on the long term²⁵. How can Florensis ensure that the fifth and sixth generations and the numerous employees can still enjoy the benefits of this beautiful company. The Calvinist and Christian roots of Florensis ensured from the outset that the human factor was central and key. Without this people orientation quality production would not have been possible and without production no product and no customers could enjoy that beautiful living and green product. The call for a greener company when it comes to production and products becomes louder and louder. And is heard. Although the fourth generation is currently active at Florensis and the fact that there is no doubt about Florensis' ambition to act responsibly in everything they do (See Exhibit 1) major challenges ahead are piling up according to Van der Bijl. They might even prevent Florensis realizing its great mission to become greener in the future.

1. Chemicalization

Plant growth regulators are being used by the commercial growers of ornamental plants as a part of cultural practice. This practice is attractive from an operational and profit perspective but has consequences for the environment.

Role of Chemistry in Agriculture

The basic need of human being is food. It is the agriculture only which fulfils this need for the entire population of the world. Plants are called producers as they synthesize their own food using Photosynthesis from air and water from soil utilizing sunlight as source of energy by a process known as photosynthesis. The rest of the food chain consists of consumers only. The practice of producing crops and livestock from the natural resources of the earth is called Agriculture. Modern agriculture includes agronomy, horticulture, animal husbandry²⁶, dairying, soil chemistry, etc. Chemistry deals with compounds, both organic and inorganic, and agriculture deals with the production of organic products using both organic and inorganic inputs. Thus Chemistry forms an integral part of agriculture from molecular to organ level. It plays a role from the basics of photosynthesis to the utilization of agricultural produce. The advancements in this practice is only because of active research carried out in chemistry and then its applications to cause the land to produce more abundantly and at the same time to protect it from deterioration and misuse.

The Impact of Floricultural Industry on the Environment in Ethiopia

²² https://aiph.riweb.dev/wp-content/uploads/yearbook/2020/SYB_2020.pdf

²³ <https://www.petalrepublic.com/floristry-and-floriculture-statistics/>

²⁴ <https://www.bdo.nl/en-gb/industries/family-businesses>

²⁵ <https://www2.deloitte.com/content/dam/Deloitte/lu/Documents/strategy/lu-family-business-survey-2019.pdf?nc=1>

²⁶ the care, cultivation, and breeding of crops and animals

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Floriculture is one of the booming sectors in Ethiopia and a good way of generating income for both the owners and the government. Besides this, different environmentalists complain about the industry because the industry uses too many pesticides and chemical fertilizers which damage the environment. Environmental implication of floriculture involved the intensive use of water as well as soil, the water, and air pollution because of its intensive and toxic chemical usage and waste disposal system of the industries. The flower industry uses, 90% of groundwater resources. As planting media 40% uses soil bed, hydroponics 30% and the rest 30% also used both planting media. The waste is discharged directly to the water body by 30% of the farm, and 40% are a drain to the land. The land use change is also visible, 30% of the farm is established on local farmer's area, and 40% are established on state farm area, and the rest 30% is established by removing the swampy area.

Adding supplemental carbon dioxide in indoor facilities

Light is one of the most important factors in the propagation of young plants. Speeding up growth with more light will increase capital expenditures to buy LED fixtures along with the increased cost for electricity. Growers may be able to increase plant growth by keeping the same level of light, but increasing the level of carbon dioxide. Adding supplemental carbon dioxide in an indoor facility is very affordable. If a grower's main concern is the cost of the electricity and light fixtures, adding carbon dioxide may be able to overcome that issue. If growers' main objective is to finish the plants faster, they may not be concerned about paying for supplemental light and carbon dioxide if that allows them to produce three more crop cycles a year. The plants could be pushed to develop their roots faster by adding supplemental carbon dioxide. By adding carbon dioxide, the propagation time is shortened.

2. Robotization

Florensis currently uses 24 robots in their production process. All their picking, sorting and cutting used to be done manually. But with good labour being scarce, now, over 1500 seedlings are planted by the Robovision²⁷ specialised robots. These robots are never tired and produce quality results. These fully automated machines recognizes, picks and pots plant cuttings. Whereas in the past many people could find a job at the Langeweg nowadays most manual and repetitive labor is automated. Except at the Kenia facilities. There much work is still manual. Many people in the area are depending of the work that is needed to harvest cuttings to be transported to the Netherlands. Should this work also be robotized? How far should Florensis go to automate the operations?

Robots in the Workplace: a Threat to or Opportunity for Meaningful Work?

The concept of meaningful work has recently received increased attention in philosophy and other disciplines. However, the impact of the increasing robotization of the workplace on meaningful work has received very little attention so far. Doing work that is meaningful leads to higher job satisfaction and increased worker well-being, and some argue for a right to access to meaningful work.

3. Geneticization

New plant genetic modification techniques, referred to as 'gene editing' or 'genome editing', have evolved rapidly in recent years, allowing much faster and more precise results than conventional plant-breeding techniques. They are seen as a promising innovative field for the agri-food industry, offering great technical potential. There is, however, considerable debate as to how these new techniques should be regulated, and whether some or all of them should fall within the scope of EU legislation on genetically modified organisms (GMOs). This EU

²⁷ <https://youtu.be/zxWD8HMj2Co>

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legislation causes a dilemma for Florensis as genetic material from Ball falls under US law that allows GMO's.

Role of Genetic Engineering in Horticultural Crop Improvement

Biotechnology has offered tremendous scope and potential to conventional methods of crop improvement, crop protection, crop quality management and other horticultural traits. Biotechnology extends tremendous opportunities in fruit production by providing new genotypes for breeding purpose, supply of healthy and disease free planting material, improvement in fruit quality, enhancing shelf-life, availability of biopesticides, biofertilizers, etc. Integration of specially desired traits through genetic engineering has been possible in some horticultural crops. Recent advancements in molecular biology and genetic transformation have made it possible to identify, isolate and transfer desirable genes from any living organism to plants. The introduction or enhancement of desirable traits is traditionally done by breeding. This is time consuming and also not very precise. On the other hand, genetic engineering creates plants with specific changes in the background of a proven cultivar without disturbing their genetic constitution. Expression of undesirable genes can be blocked by the application of antisense gene technology and RNAi technology²⁸. Genetic transformation provides the means for modifying horticultural traits in various horticultural crops without altering their phenotype. Biotechnological interventions that could increase the efficiency of horticultural crop improvement are essential to generate plants with several desirable traits.

4. Localization

An important innovation task for the Dutch business community is to better meet customer demands and consumer wishes. One trend is the growing demand within Europe for locally produced and thus marketed food. As a result, the traditional export of greenhouse vegetables from the Netherlands is coming under pressure²⁹. Although this trend typically impacts the horticulture industry Florensis needs to take into account that this consumer behavior will effect also their floriculture operating model.

Local for local trend and the Horticulture

Urban horticulture is not expected to replace traditional dominant food systems in feeding the world. But it can cover the growing demands of locally available, nutritious, sustainable and fresh produce in urban areas. The Greenhouse Horticulture and Flower Bulbs Business Unit of Wageningen University & Research is working on a decision support framework for cultivation system, crops and production planning of urban growing.

5. Disintermediation

Disintermediation is a trend which has been triggered by the world wide rise of online sales possibilities. The middle men is more and more cut out. Recent Corona pandemic served as a catalyst and boosted online sales even more. In the past within the floriculture industry this has decreased the power of the auctions within the value chain. Florensis is very active as far as on-line communication concerns. Sofar however mostly busines to busines. Direct sales to consumers is not yet on the agenda. Internet of Things is another trend that will have impact on the value chain. Here the focus is on information as to what and where product are in the value chain.

Innovative Logistics Concepts in the Floriculture Sector

Today most flowers physically pass through the auction houses on their fixed routes from (inter)national growers to (inter)national customers. Physical presence is necessary to allow

²⁸ a biological process in which RNA molecules are involved in sequence-specific suppression of gene expression by double-stranded RNA, through translation or transcriptional repression

²⁹ <https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/kennisonline/Local-for-local-glasgroente.htm>

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for physical inspection, quality control and break-bulk activities. Several developments, such as new markets in Eastern Europe and increased virtualization, stimulate the chain to become an efficient floricultural³⁰ hub-network, in which cut flowers, plants and other products are delivered to customers taking different (direct) routes and using different logistics concepts. The Dutch sector aims to (continue to) be the (virtual) floricultural trading hub of Europe, and has therefore completed a project called DAVINC3I. The Internet of Things enables a floriculture chain in which the quality of products is continuously monitored, adjusted, planned and optimized on the basis of virtual objects. This virtualization makes it possible to offer consumers better quality, chains can be organized more efficiently and sustainably through better cooperation, new forms of added value and new distribution strategies can be created³¹.

The Future of Floriculture Logistics

Trends and developments in and around the floriculture market as consolidation of transport, shift in customer demand. Analysis in combination with a relationship analysis results in two solution directions that include a lot of other trends and developments and could be feasible to implement before 2025. Those two solution directions are a virtual storage and a hub-network and are elaborated into conceptual designs. These designs operate on different levels and could be combined for a future logistic design. In this final design, storage hubs and transit hubs will deal with physical products with a focus on storage of goods for just in time delivery and consolidation. The virtual storage is represented in a commercial and transportation platform. On the commercial platform products can be sold at any time and place in the world even if they are not physically located in a storage. The transportation platform will take care of consolidation of product flows and the assignment of transport orders to logistics providers. The combination of those two conceptual designs with inclusion of the described trends is expected to be feasible before 2025, however, the implementation in this complex floriculture market will take a lot of effort and trust from all stakeholders.

6. Energy Reduction

There are no public calculations to find out how much energy it takes to grow a plant. But according to Greenhouse Horticulture Netherlands, the cultivation of bedding plants is seen as 'energy-extensive cultivation'. The temperature in greenhouses is kept between 14 and 20 degrees, also in the cold months of January, February and March. Wageningen University & Research already stated that Dutch Greenhouse Horticulture would not achieve the CO₂ targets agreed with the Ministry of Agriculture, Nature and Food Quality in 2020. (Google Translate). This energy-extensiveness caused many growers and producers of small plant to invest heavily in energy management.

Greenhouse horticulture: a vision on energy and climate for 2030

Reducing energy demand is always relevant:

- new cultivation methods such as 'Het Nieuwe Telen';
- high-saving greenhouses, where various techniques are applied, such as energy-saving glazing and screens;
- economical lighting.

Renewable energy becomes attractive:

- geothermal energy (provided that sustainable CO₂ supply is possible in the long run);
- solar PV on outbuildings and reservoirs;
- wind turbines (if space is available).

In addition, all energy carriers will become more sustainable in the coming decades, in other words, gradually emitting less CO₂ per GJ. Energy costs per GJ will rise, but there

³⁰ The cultivation of flowering and ornamental plants

³¹ <https://www.wur.nl/nl/show/DaVinc3i-1.htm>

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will be for electricity also times come when the market price will be very low, flexibility is attractive to some gardeners.

Alternative CO₂ supply is necessary:

- the use of gas (now natural gas, later green gas) will decrease sharply so that sustainably produced CO₂ must be supplied

Greenhouse Energy Management by Using Building Energy Simulation

Simulation programs like TRNSYS³² have great potential for agricultural buildings energy simulation along with the renewable energy resources and energy saving techniques.

Horticulture can play pioneering role in CO₂ reduction

As an example Anthura – a company specialized in Orchids and Anthurium - is connected to the Rotterdam heating network of the RoCa and can hence use the residual heat of the RoCa power plant. The RoCa residual heat fulfils now about 20% of the total heat demand. It is expected that in the coming years increasingly more suppliers of heat will appear; think, for example, of a residual heat supply from the port of Rotterdam, the waste-disposal organization of Rotterdam, but also geothermal heat.

³² a simulation program primarily used in the fields of renewable energy engineering and building simulation for passive as well as active solar design. TRNSYS is a commercial software package developed at the University of Wisconsin. The ECASA project (2019-1-DE01-KA203-005037) is financed by Union funds (ERASMUS+). But the content of this document only reflects the views of the authors, and the European Commission cannot be held responsible for any use which may be made of the information contained therein.

Epilogue

Years before the climate was such a major issue as it is today, Florensis was already active minimizing pesticides and fertilizers. Florensis has been and is concerned about planet and people. The way Florensis deals with its employees in Kenia and Ethiopia is exemplary³³. Still Van der Bijl feels that the above discussed developments in the floriculture industry and current worldwide trends³⁴ create issues that definitely will have an impact on the sustainability ambition of Florensis (See Exhibit 13). These issues have to be addressed in case Florensis wants to become greener.

To Van der Bijl an obstacle could be the current business- and operating model. Margins are thin and might become even thinner in the future as customer power (fueled by green activist groups) and as a consequence the retailer power, will only increase. More scale advantages are hard to find. Green strategies usually come with a cost and can only be compensated by more sales and production. But this will have another and negative impact causing additional sustainability issues. Less green instead of a greener Florensis? This is however seen from an operational excellence perspective... what about the other perspectives of Treacy and Wiersma³⁵? Does that offer ideas and options for an even greener future of Florensis?

Van der Bijl looks behind him in his bookshelf for his collection Harvard Business Review copies (See Exhibit 14A). Could Florensis move to Stage 3? Will that perspective provide Florensis with options to make the company greener and in mean time solve risen issues³⁶? How? To start all over again? Product orientation? New sustainable product development³⁷ (See Exhibit 14B)? What does this mean for Florensis?

Suddenly he feels a burst of energy. He has an idea... He opens his laptop: "*Florensis towards a greener future*" he types as a heading on the first Power Point sheet...

³³ <https://www.florensis.com/en-gb/about/sustainability7>

³⁴ <https://www.theguardian.com/global-development-professionals-network/2017/apr/14/six-megatrends-that-could-alter-the-course-of-sustainable-development>

³⁵ <https://hbr.org/1993/01/customer-intimacy-and-other-value-disciplines>

³⁶ Sustainable product innovation and changing consumer behavior: Sustainability affordances as triggers of adoption and usage - <https://onlinelibrary-wiley-com.ezproxy.hro.nl/doi/epdf/10.1002/bse.2793>

³⁷ <https://web-a-ebsohost-com.ezproxy.hro.nl/ehost/pdfviewer/pdfviewer?vid=1&sid=75e8ded1-aba0-4af1-865e-955dcfb104a6%40sessionmgr4008>

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EXHIBIT 1: SUSTAINABILITY REPORT 2020

Thinking and acting sustainably – Florensis Sustainability report 2020



Our sustainable mission

We strive to act responsibly in all we do. We care about the impact of our operations on the environment and on the societies and communities where we produce and source our materials from.

Our sustainability goals

End of 2019 we gained our goal of reducing the use of environmentally harmful crop protectants by 50 percent, set for the period 2015-2019. The various staff efforts, investment in improvements and the application of innovations led to a reduction of even 75 percent.

Beginning of 2020 we formulated two concrete sustainability goals for 2025. Moreover, as company we want to help achieve the United Nations Sustainable Development Goals (SDG's).



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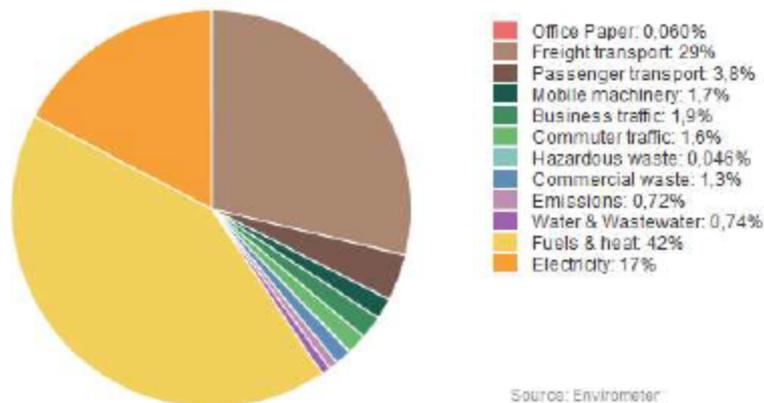
General activity overview 2020

- Sustainability management brought into place with Sustainability Steering Committee and Experts
- Overview made of existing Florensis initiatives/projects including SDG impact
- Definitions of our two concrete Sustainability Goals are renewed
- Florensis CO2 footprint per location and Florensis total is calculated for 2019 (as basis)
- Research on living wages Kenya was done: where does Florensis stand?
- Policy sponsoring & donations updated, and Charity Committee was set up
- Much more communicated on sustainability topics via Newsletters, social media, website

Florensis CO2 footprint 2019 – total company

Components	per 1000 produced product units	Total company
Fuels & heat	8.13 kg CO2	15,793 tonnes CO2
Electricity	5.33 kg CO2	10,353 tonnes CO2
Freight transport	4.07 kg CO2	7,905 tonnes CO2
Passenger transport	0.50 kg CO2	960 tonnes CO2
Business traffic	0.36 kg CO2	693 tonnes CO2
Emissions	0.33 kg CO2	636 tonnes CO2
Commuter traffic	0.29 kg CO2	553 tonnes CO2
Mobile machinery	0.17 kg CO2	324 tonnes CO2
Water & Wastewater	0.05 kg CO2	94 tonnes CO2
Office paper	0.01 kg CO2	15 tonnes CO2
Total gross CO2 emissions	19.20 kg CO2	37,165 tonnes CO2

Calculated footprint results are preliminary due to some differences which will be sorted out in 2021.
In total we compensated for 161 tonnes CO₂ (0.08 kg/1000 units), which is excluded from the results.



Florensis CO2 footprint per production location

Components	per 1000 produced product units	Total company
Florensis Abyssinia	29.8 kg CO2	1,239 tonnes CO2
Florensis Cut Flowers	26.0 kg CO2	8,543 tonnes CO2
Florensis Kenya	21.1 kg CO2	1,980 tonnes CO2
Florensis Ethiopia	20.1 kg CO2	2,755 tonnes CO2
Florensis BV (HIA + ext. locations)	17.7 kg CO2	21,980 tonnes CO2
Florensis Portugal	7.4 kg CO2	680 tonnes CO2

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Our contribution to the 6 selected SDG's



- Florensis Ethiopia sponsored the 135 kids in the Herman Hamer Centre for orphans and vulnerable children with a festive event including a nice meal, shoes and education material.
- Florensis Abyssinia sponsored 50 families with food to get them through the difficult corona time.
- Florensis Kenya launched in January a personalized lactation room for its female employees, enabling access to all resources and information required for breastfeeding. In total 16 ladies used the facility in 2020. We partnered with the local ngo CAMFEB who quarterly trained our expectant and lactating employees.
- With the Florensis Fancy Fair hanging baskets sales action, we have donated 4000 reusable facemasks from Wildlife Works to various schools around Florensis Kenya
- Florensis Kenya helped 200 households in Naivasha providing sanitizing equipment, face masks and 1000 kgs of maize flour and beans



- Florensis in H.I.-Ambacht donated various young plants deliveries to schools as education material



- Florensis Cut Flowers gave 4 female employees a permanent contract.
- Together with the Women's Association in Ethiopia a group of women were given the chance to earn their own income. They extended the production and sales at the Injera bakery of the OVC centre and started up the coffee house in Jogo forest.



- Florensis Abyssinia (Ethiopia) installed two hand wash stations in the neighbouring town Ejersa and daily sponsored soap.

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- Florensis Abyssinia realized a drinking water tap on the other site of the new highway.
- All our production locations kept the MPS-A certification level (highest level). Breeding location Quedlinburg started with the MPS registration in 2020 and ended with level MPS-B.
- During the year most of our plant material from finished trials at Florensis HIA is donated to local nursing/senior homes and charity organizations
- Florensis Portugal purchased new recyclable plastic bags as stock
- Florensis Ethiopia inaugurated a constructed wetland as last step of our complete sustainable water management system. This enables us to (re)use our wastewater sustainably and efficiently.
- Florensis Kenya integrated waste management systems and recycling of irrigation water.
- Project of developing improved transport boxes for the cuttings from Kenya and Ethiopia, for less CO2 footprint emission and better recycling process. To be tested and implemented in 2021.
- Waste re-use project at Florensis Portugal where the local bakery used the old wood pallets as firewood for the oven
- Florensis Portugal modified the tray washing machine to also clean the production pots for re-use
- Separate waste collecting was implemented at all offices of the Dutch locations



- As compensation for our freight transport emissions we invest on a small scale at local reforestation programmes. We planted 3,000 tree seedlings in Kenya and 7,500 in Ethiopia
- Florensis Cut Flowers invested in darkening clothes for 5,760 m2 in production, deployed at night in the winter period. A normal energy cloth retains 47% heat and these darkening clothes resulted in retaining 70% heat.
- The new production location Dinteloord has been taken into use and at two departments (2,500 m2) we produce everything under LED lights
- Florensis H.I.-Ambacht invested in (180 LED lights to scale up lightning in three departments (9,600 m2) and in the offices all defect lamps are standard replaced by Led
- Florensis Cut Flowers replaced 155 1000W lamps with 624W LED lamps in various production and test departments and replaced all LED lights in the seed storage.
- Internationally we joined the Digital World Cleanup day. By cleaning up our mailboxes for one hour we deleted 473 GB. Storage of this amount equals to baking 4730 hours with your regular household oven or to 70,000 low energy light bulbs (9W) left on for a day!
- On the same day Florensis Ethiopia team collected plastic bottles and rubbish in an area of almost 1000 m2.
- The Finance department digitalized the complete financial archive and uses no paper anymore



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EXHIBIT 2: 23 NOVEMBER 2020 INTERVIEW ELLEN MOLENAAR CFO NETHERLANDS GROUP

When entering the new high-tech location of Florensis, we must disinfect our hands, clean our shoes and put on protective clothing. Not only because of the coronavirus, but also to prevent us from bringing in bacteria or viruses that can influence the growth process of the young plants. We are here for Alexander van der Bijl. He has been CFO at Florensis for ten years and is responsible for Finance, Control and Information Management. As a supervisor, he is involved in various organizations³⁸.

Florensis is an international family business that focuses on breeding and supplying propagation material for floriculture to professional growers. The company was founded in 1941 as Hamer Bloemzaden and has grown into a company with production and breeding locations in the Netherlands, Germany, Portugal, Kenya and Ethiopia. Florensis annually produces more than a billion young plants in 4,000 different varieties from seed, cuttings and tissue culture and supplies them to 8,000 growers in fifty countries. Florensis employs more than two thousand employees worldwide.

The state-of-the-art production location in Dinteloord will be open at the beginning of 2020. Six hectares in size and equipped with the most advanced equipment. Everything that is needed to realize the cultivation of young plants with minimal energy consumption and the use of chemical pesticides and fertilizers. CFO Alexander van der Bijl proudly shows us around the convertible and glass greenhouses and the production hall with eighteen cutting robots: "We like to invest in sustainable solutions."

About Alexander van der Bijl

Van der Bijl (50) lives in Barendrecht with his wife and youngest son. His eldest son has since left home. Like their father, both sons study in Rotterdam. After studying Business Economics, Alexander worked for PricewaterhouseCoopers for fifteen years. After two years of financial management at the Cargo Division of Vos Logistics, he transferred to Florensis. Until the lockdown, Van der Bijl was regularly found in the gym. Now he steps out a few times a week at six in the morning to run around in the polder. But the CFO prefers to start the day in the swimming pool. On weekends, he likes to walk in nature with his wife. In addition to his position as CFO, Van der Bijl is a supervisor and supervisory director at both organizations in his own sector and at social organisations. "You have to fill your days a bit," he smiles modestly. "I get all the space I need for this personally and professionally. I find it very relevant that you transfer your knowledge and skills to the social field."

How is Florensis holding up during the corona crisis?

Van der Bijl talks about the start of the crisis: "We saw waves of panic going through Europe and customers cancelling orders. Florensis has seasonal peaks in the spring and late summer, and the crisis broke out at the very beginning of the spring season. We were overflowing with

³⁸ <https://executivefinance.nl/2020/11/natuurlijk-draait-het-in-deze-tijd-om-cashmanagement/> (Google Translate)

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plant material that had to be delivered. Fortunately, the operational process was hardly disrupted and we were able to deliver most of our plants to our customers in all parts of Europe. We then decided to hold stocks as much as possible. And that turned out to be a good tactic. Because soon the consumer started investing in their own home and garden and buying plants again.”

“The first few weeks of the crisis was all about cash management. We have gone through all the scenarios. What if all summer falls away? Then we could easily incur a twenty to thirty percent loss of turnover. I immediately put us on the GO-C list, but luckily we don't need that support now. Of course we will notice it in the annual figures. But everything that is home and garden-related has bounced back well.”

At the start of the lockdown, the CFO was able to return from Africa just in time. Recently he worked 'normally' at the head office in Hendrik-Ildo-Ambacht. However, he has limited his presence to one location to prevent cross-contamination. “If you ask your people to be flexible, you have to do that yourself. As a board, we have consciously started to participate in the peak of the crisis in the workplace. Being visible and telling people what happens, what you can control and what you can't, keeps everyone involved.”

Van der Bijl is concerned about the poor continents. “In addition to corona, we are dealing with social unrest, severe flooding and a plague of locusts in Kenya and Ethiopia. And if employees cannot go to work and earn the money they need to eat tomorrow, a humanitarian problem quickly arises.” This also poses a risk to production. “We produce cuttings at the three locations in Africa. If people can't come to our farms, we don't have workers to harvest the cuttings. And if the airport is inaccessible or the planes do not fly, part of the supply of cuttings will be cut off.”

What is currently on the financial agenda

“Of course we have just completed a substantial investment for our new location. But actually we are always busy with investments. Not so much in branches as in knowledge, technological developments and artificial intelligence. We don't invest in market shares, you have to earn them.” The CFO gestures around him. “There is still six hectares of fallow here. We are now looking at this cautiously, but we have already made some investment decisions. As a down-to-earth family business, we are innovative based on healthy business operations. I think patience is a good word here. We always look for opportunities and carefully consider the risks we want to run. So now too.”

What qualities do you have to be a good CFO?

“What I strongly believe in is that as a CFO you have to be able to move from top to bottom. You have to dare to go into every nook and cranny of the organization and be able to listen and understand what is happening.” During our tour no one is surprised when their CFO walks by. “We do a lot of canteen sessions and contact moments here, although that is a bit more difficult now. There is not such a high turnover, so you get to know the people. For our foreign branches it remains a quest: how do you keep good contact with them? At least not behind your desk.”

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Both in terms of involvement and modesty, this CFO fits perfectly into the picture of Florensis. “Florensis attaches great importance to social interest. For example, in Kenya we have arranged that new mothers can express milk on location. Something that is very common in the Netherlands, but certainly not there. Do we have to shout that from the rooftops? We consider it only normal to provide good working conditions.”

What do you think about the financial market?

Van der Bijl philosophizes aloud: “What concerns me at the moment is the ethics of this crisis. What do we learn from this? Which companies are worth having the right to exist? Which companies need to be saved? And what does this teach us about risk thinking?” Looking at our own market: “Of course it's all about cash management these days. But in the markets that are important to us, consumers have continued to spend their money. And if consumers continue to spend, liquidity will continue to flow and we can look ahead.”

“Sustainability is in our genes”

In 2025, Florensis wants to be the most reliable, innovative and sustainable breeder and propagator. Florensis attaches great importance to responsible business operations with an eye for people and the environment and sees sustainable thinking and acting as a precondition for growth.

Florensis has formulated two concrete sustainable objectives for 2025: further reducing the use of crop protection products by 30 percent and reducing CO2 emissions by 25 percent. Furthermore, Florensis contributes to six selected international Sustainable Development Goals (SDGs): Good health and well-being, Quality education, Gender equality, Clean water and sanitation, Responsible consumption and production and Climate action.



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EXHIBIT 3: RABOBANK BACKGROUND STORIES - FLORENSIS

Florensis: sowing the seeds of colour in its sector

Every glorious plant and flower sold at your local florist or garden centre was once but a humble seed or seedling. As the world's largest producer of planting stock, seedlings and seed for flower or plant nurseries, Netherlands-based Florensis quite literally adds a splash of colour to trends in the floriculture trade.

A consumer buying plants at Carrefour in Bordeaux, flowers at Ikea in Prague or organic primulas at Coop in Salzburg probably won't give much thought to where these items originated. Most likely, they'll be thinking about how these varieties of nature's jewels will brighten up their home – or that of a loved one.

We tend to forget that every plant and flower started out as a seedling, cutting or seed a few months earlier. Of course, the germination period will be longer if, say, a researcher sets out to develop an even more stunning, superior variety of orange primula – in these cases, it will take years for the product to become commercially available.

900 million small plants a year

If anyone knows about cuttings, seedlings and seeds, it is Dutch company Florensis, which will have its 75th anniversary in 2016. With its head office, and 11 hectares of greenhouse space, based in the small town of Hendrik-Ido-Ambacht near Rotterdam, the company also operates production sites as far afield as Kenya, Ethiopia and Portugal. Florensis develops and produces flower and plant species and manages the distribution of 4,000 different products to a total of 7,500 growers, making it the world's largest player in its sector. In addition to seeds and cuttings, the company also produces 900 million small plants annually.

As Florensis COO Leo Hoogendoorn explains, the flower or plant nurseries in their network subsequently tend to these plants and flowers and prepare them for the consumer market. Florensis, which operates at the top of the supply chain, won the Dutch Horticultural Entrepreneur Award in early January 2015. 'As far as recognition from the industry goes, it doesn't get any better than that', Hoogendoorn beams. 'We're not interested in taking over the grower and retailer's jobs, but we do take on the role of supply-chain managers, as it were.'

Not only a financier, but also a valuable partner

Over the years, the Florensis team has established a close relationship with the company's principal banker, Rabobank. Hoogendoorn: 'Our industry is one of peaks and troughs, and Rabobank perfectly understands the processes involved. They support us in ways that go well beyond providing finance – Rabobank is the only bank with the expertise required to provide this kind of service in our industry. They know the sector well, are able to assess our financial needs and are a valuable partner to us every step of the way.'

Florensis recognises some of the trends noted by Rabobank in its most recent international report on the floriculture industry. In fact, with its global operations, Florensis is the very

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embodiment of a number of these trends, checking every box including ‘specialisation’, ‘internationalisation’, ‘cooperation’ and ‘supply-chain management’.

Increasing focus on protected species developed in-house

Florensis markets products which could also be produced by other companies in the sector, but the company is focusing increasingly on using its expertise to develop its own plant and flower species, complete with patented names and properties. Consumers purchasing a primula with the mellifluous name ‘Primula Princess’ or ‘Primula Cleopatra’ can be certain that the seed of the plant was sown by Florensis. These protected species help the company to strengthen its market position – and that of the businesses that grow these products for the consumer market.

More specialised products, longer lead times

As a result of this change of direction, Florensis has found that its financing needs have changed as well, Hoogendoorn explains. Whereas your basic garden-variety plants take a maximum of six months to grow from seeds into the seedlings that are supplied to nurseries, the germination times for the species developed by Florensis itself will be significantly longer. ‘We have to start out by developing a parent line, for which we will produce the seeds. We then have to select the highest-quality seeds from the bunch, build up a stock, and start producing young plants that we can then go on to supply to nurseries. This means our lead time could be up to four times as long as for other products, so our working capital requirement will change as a result’, Hoogendoorn says. He acknowledges that these changes will also increase the risk levels to which his company is exposed. For example, it may turn out that one of its new products is not viable for large-scale production after all. ‘That could be due to the demands of the market: say we have created a new red-coloured plant and customers at stores suddenly develop a taste for yellow. What can you do?’ Hoogendoorn shrugs.

Supply-chain management

Despite being ensconced at the top of the supply chain, Florensis, then, is not immune to shifts in consumer behaviour, and the company is looking to gain greater control over the processes that influence this behaviour. Hoogendoorn: ‘We’re not interested in taking over the grower and retailer’s jobs, but we do take on the role of supply-chain managers, as it were. We work with retailers to develop a proposition, for example for the plants and their packaging. We develop the promotional materials and then find growers who can take over from there. We put them in touch with buyers so that they can broker a deal. Growers are guaranteed a premium price and added value is created for the entire supply-chain.’

Additional greenhouse space and expertise

Florensis depends on its network of partners to be able to maintain its output of seedlings and seeds. ‘We’re a typical seasonal company. We’re lucky because the Netherlands has a thriving vegetable greenhouse industry, and many of those greenhouses have adjacent nurseries. Their operations are countercyclical to ours in that their low season is our peak time, so during

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the busy season we rent an additional 16 hectares of greenhouse space, including the services of a team of growing experts. This process is coordinated by our own people. The products grown in this way are shipped back to our facilities here in Hendrik-Ido-Ambacht, where we prepare them for distribution. We can truly say our model of cooperation is unique in the world.'

EXHIBIT 4 – SALES, OPERATIONAL AND FINANCIAL PERFORMANCE 2020

Florensis' robust financial position has been further strengthened

With a turnover roughly equal to 2019, we closed the year 2020 financially well. The savings resulting from the crisis measures offset the loss of sales due to cancellations and 'Covid discounts' at the start of the crisis. The strong operational performance during the summer period and the increased sales of products with a better margin contribute to the strong operating result.

Although investments were initially subdued, the investments deemed necessary have taken place. Expansion of production capacity has been realized in Kenya (Greenhouse E of 12,000 m²) and Portugal (rooting greenhouse for Sedum of 2,000 m²). Portugal has also made preparatory investments for the construction of the Multi Propagation Facility for tissue culture, which is postponed to 2021.

Florensis maintains a very solid financial position, reflected by a solvency rate of 51% (2019: 45%) and an EBITDA of EUR 19.7 million (2019: EUR 16.0 million). The group's financial ratios are safely beyond the currently applicable banking covenants which require a yearly EBITDA of the group above EUR 12 million. Redemptions of long-term loans from banks amounted to EUR 4.6 million (2019: EUR 3.3 million). Further explanation on cash flows is provided in the cash flow statement in the financial statements.

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EXHIBIT 5A: HOW TO GROW AND MARKET BEDDING PLANTS

Florensis

Florensis

3 Consolidated balance sheet as at December 31, 2020 (before appropriation of net result)

(in thousands of euros)	2020	2019
Assets		
Fixed assets		
Intangible fixed assets	2,772	3,226
Property, plant and equipment	61,663	67,698
Financial fixed assets	1,296	1,519
	65,731	72,443
Current assets		
Stocks	15,902	16,641
Receivables, prepayments and accrued income	9,381	9,774
Cash	7,581	6,197
	32,864	32,612
Total assets	98,595	105,055
Equity and liabilities		
Group equity		
Shareholders' equity	49,987	47,067
Third-party share in group equity	92	112
	50,079	47,179
Provisions	834	1,031
Long-term liabilities	30,057	34,351
Current liabilities	17,625	22,494
Total equity and liabilities	98,595	105,055

4 Consolidated profit and loss account 2020

(in thousands of euros)	2020	2019
Net turnover	116,140	116,697
Cost of sales	(35,410)	(35,141)
Gross margin	80,730	81,556
Personnel expenses	41,066	40,663
Depreciation and amortization of fixed assets	10,927	7,209
Other operating expenses	19,975	24,312
Operating expenses	71,968	72,184
Operating result	8,762	9,372
Share in result from participations	142	90
Financial income	9	0
Financial expense	(696)	(649)
Profit before taxation	8,217	8,813
Income taxes	(2,563)	(1,939)
Group net result	5,654	6,874
Third-party share in group result	19	(5)
Net result	5,673	6,869



herbaceous plants sold to home gardeners for "dead-
ding out" in the outdoor landscape in the spring to
provide seasonal color. However, from a greenhouse
production point of view, bedding plants are a het-
erogeneous group of plants started under controlled
conditions that share a common production method-
ology. Bedding plants include a wide range of plant
species and cultivars that may have multiple applica-
tions. These include herbaceous annuals and perenni-
als, biennials, herbs, ground covers, vegetables,
small fruits (strawberry), and a few woody species
that die to the ground in the fall.

When consumers buy bedding plants, they prob-
ably don't see the same thing you see. To many grow-
ers, bedding plants are small plants to be planted
in the landscape. To many consumers, these plants
are **instant color** to perk up the home and garden.
Planting bedding plants gives consumers an oppor-
tunity to dig in the soil around the home and spend
some time outside in the spring. Most consumers want
to put little or no effort into maintaining the plants
once they are planted. Householders want plants
that produce color all summer long even if there is

too much or too little rain or too much heat. Many
consumers look for something different from their
neighbors' plants. Others look for those plants that
performed well last year. Consumers often remember
which plants did poorly, and they make an effort not
to buy them again the next year. So, think consumer
and think instant color when planning bedding plant
production.

Market Period

By far, the largest market period for bedding
plants occurs in four to six weeks during the spring.
In Alabama, this occurs from late March to early May.
American consumers demand that bedding plants
be in bloom at the time of purchase. Most bedding
plants are sold in small containers or market packs
for transplanting into the garden. This poses several
challenges for the grower. The large assortment of
species and cultivars tests the knowledge and skill
of the grower to meet environmental and cultural
requirements. Likewise, scheduling production for a
wide variety of plants to meet market dates with top
quality requires an intimate knowledge of the needs
and timing for each plant type. Lastly, peak sales are
often driven by the arrival of warm weather that en-

www.aces.edu

EXHIBIT 5B: BASIC PRINCIPLES OF NURSERY CROP PROPAGATION³⁹

Plant propagation plays a vital role in the profitability of most commercial horticultural operations. While today's comments are slanted toward traditional nursery operations specializing in woody plant species (trees, shrubs, etc.), most of the principles cross over to herbaceous plant species that bedding plant growers and perennial plant growers produce. In order of discussion this article will cover the stock or mother plant, cutting, rooting medium, propagation environment, and rooted cutting fertilization.

Stock or mother plant

Most growers subscribe to the adage that the quality of a crop is only as good as that of the cuttings or seedlings that are planted. Regarding plant propagation this rule reaches further upstream as the stock plants as well should be grown under strict conditions to present a healthy, pest free plant from which to harvest cuttings. It is also common in horticulture crops for cuttings to be harvested not only from dedicated stock plants but also from plants being grown as a finished crop. This practice tends to be used on crop species with low susceptibility to high-threat pest infestations and is frowned upon for crops needing vigilant protection against viral, bacterial, and certain fungal pathogens. Regardless, clean growing practices that encourage healthy, pest free plants from which to harvest cuttings is a pre-requisite. Pests include plant pathogens in three main categories; fungi, bacteria, and viruses. Pests also include insects and physiological disorders. Cuttings infested with insects or infected with any of the pathogens cited naturally insert these pest issues into the propagation cycle making control exponentially more challenging. Physiological disorders can be nutritional, environmental, or crop culture based. For example, if a stock plant is experiencing a nutritional deficiency or toxicity either can create enough stress to negatively affect rooting and subsequent growth and development of cuttings harvested from it.

Cutting

Basic rules of plant propagation apply similarly across a wide range of horticultural crops requiring asexual propagation. Whether terminal stem cuttings are being used to propagate a poinsettia or geranium, immature wood cuttings for an ornamental tree or shrub, or root divisions for a herbaceous perennial, growers committed to clean, sound propagation practices are likely to experience higher yields and quality of rooted cuttings. Start with healthy, clean asexual propagules whether they are stem cuttings, leaf cuttings, grafts, or root divisions. Stem cuttings will be referenced in the remainder of this discussion for brevity. Complementing asexual cutting propagation is sexual propagation involving flower pollination, seed production, seed sowing, and germination. Good propagation practices are nearly identical for asexual (cutting) and sexual (seed) propagation alike. Cutting uniformity is a requirement that ripples through the entire propagation cycle and subsequent production cycle. Start by harvesting and sticking uniform terminal stem cuttings if terminal cuttings are preferred. Occasionally, cutting numbers may fall short of what's scheduled to be stuck. In order to harvest and stick enough cuttings it might be necessary to harvest some sub-terminal cuttings. When this practice becomes necessary additional effort is required. Isolate sub-terminal cuttings in separate plug trays because they likely will require more time to root given their older age and maturity. Having terminal and sub-terminal cuttings in a single plug tray may result in removal of the tray from mist earlier or later than desired as one of the two cutting types will influence the decision process. Also, subsequent growth and development of the young plants can be quite different. A terminal cutting begins growth as an un-pinched plant whereas a sub-terminal cutting, by definition, has already been pinched. Growing these plants side by side may create challenges in maintaining crop uniformity.

³⁹ <https://www.nurserymag.com/article/grow-tech-basic-principles-nursery-crop-propagation/>

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Rooting medium

Growers often find this area of propagation to be unnecessarily challenging. There are many growing mixes on the market which can be confusing. The primary characteristics of a quality propagation medium is that it be balanced regarding drainage and water holding capacity. Secondary inputs include nutritional amendments, growth promoting compounds (hormones, microbial products), pest control inputs (fungicide, beneficial microbes), and others. These secondary inputs add complexity to the decision of which mix to purchase. In a future article proper design and execution of product trials will present effective ways growers can conduct their own on-site trials to help make decisions on which product upgrades enhance profitability and which are not worth the investment.

Propagation environment

The basic factors affecting plant growth in general also play a role in propagation; temperature, water, light, and nutrition. The first two factors, temperature and water, play a primary role during the rooting phase of a cutting. Light and nutrition can be considered secondary, to a degree, until roots have initiated. Both temperature and water are needed in higher amounts during propagation than during finished crop production. The rooting of cuttings usually requires a warmer temperature than the growth of the finished crop. Generally, the temperature of the rooting medium should be in the low seventy degree F range with 68-74 degrees being an acceptable target. Air temperature, particularly night temperature, does not have to be as high which meshes nicely with a bottom heat system of delivery. Heat delivered to the root zone from below the plug tray is transferred to the plug tray and root medium. Some heat continues to be transferred from the plug tray and root medium to the air above the cuttings, keeping them warm but not as warm as the medium which is ideal. If the air temperature around the cuttings is too high stress can be created; before the cuttings root they may lose water faster than it can be replaced. Water has two dimensions in a propagation discussion, root medium moisture content and relative humidity of the air. It is common to apply intermittent mist during cutting propagation to maintain relative humidity in the micro climate surrounding the cuttings. This moist air helps the cutting avoid desiccation via its leaves, petioles, and stems. Misting of cuttings usually applies enough water in the form of a fine mist to settle on the surface of the root medium and percolate through the root zone profile, thereby maintaining moisture throughout the root cube. Once cuttings form roots they are weaned off of mist to reduce disease incidence (Figure 3). Simultaneously, traditional irrigation commences to deliver water to the rooted cutting as it's needed. Hand watering, boom watering, overhead sprinklers, and flood and drain benches are common irrigation systems in propagation areas. At this time, rooted cuttings are usually moved from the warm, moist propagation environment to a hardening off area where root development continues and the young plant's shoot resumes active growth. Light and fertilizer are not needed in high amounts during rooting. Shade is often used during high light periods and supplemental light is sometimes used during low light periods. Supplemental light may not be required during the early stage of rooting but has been shown to be beneficial once the rooted cuttings resume active shoot growth. An exception is photoperiod control where certain species may require day length manipulation. This area of light management is separate from photosynthetic light management.

Sanitation

Sanitation is a critical consideration in a propagation environment and deserving of its own discussion in a future article. Good sanitation practices correlate directly to successful propagation outcomes. Clean practices have been cited repeatedly in this article. Two of the pest categories presented above, plant pathogens and insects, can destroy crops during propagation. Comprehensive sanitation procedures go a long way in eliminating both pests. General sanitation includes keeping hard surfaces in and around the propagation area clean and free of microbial contaminants. The list of microbes that cause problems is long and includes the plant pathogen categories cited above; fungal, viral, and bacterial pathogens.

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Associated with plant diseases as well are non-plant pathogenic microbes that indirectly interfere with a horticultural environment at any level. Algae is at or near the top of the list of microbial contaminants that can disrupt a propagation setting. Biofilms are also on this list and are known to associate with algae in a symbiotic way that allows both to flourish in the presence of the other. Biofilm is ever-present in irrigation lines and when teamed with algae in the irrigation stream can result in line clogging as layered and resistant accumulations that are difficult to remove. Additionally, biofilm-algae complexes provide safe haven for plant pathogens such as Pythium and human pathogens such as E. coli. Algae is at or near the top of the list of microbial contaminants that can disrupt a propagation setting. Biofilms are also on this list and are known to associate with algae in a symbiotic way that allow both to flourish in each other's presence. Biofilm is ever-present in irrigation lines and when teamed with algae in the irrigation stream can result in line clogging, layered, and resistant accumulations that are difficult to remove. Additionally, biofilm-algae complexes provide safe haven for some plant pathogens such as Pythium. Sanitation options such as chlorine, ozone, quaternary ammonium, UV light, and others will be discussed in a future article in this series.

Fertilizer

Until a cutting forms roots there is little need for applying fertilizer during propagation. Doing so can have the opposite effect as fertilizer salts in the root medium could damage the fresh wound at the base of the cutting. Once a cutting roots and the shoot resumes active growth fertilization can commence. Depending on crop species the resumption of fertilization often begins at a lower than final rate and gradually increases. Young rooted cuttings coming out of a warm propagation area may not be ready for full fertilization until they are acclimated (hardened off).

6: SOME EUROPEAN GROWERS – FLORENSIS B2B CUSTOMERS

Emsflower

Emsflower GmbH is located in Emsbüren, Niedersachsen, Germany and is part of the Nursery & Floriculture Production Industry. Emsflower GmbH has 80 employees at that location and generates 10 million in sales (USD). (Sales figure is estimated). There are 6 companies in the Emsflower GmbH corporate family.

Kwekerij Baas

Kwekerij Baas is a family business that is always on the move. Thinking along with their customers to make them perform better. They show responsibility for the well-being of relations and employees.

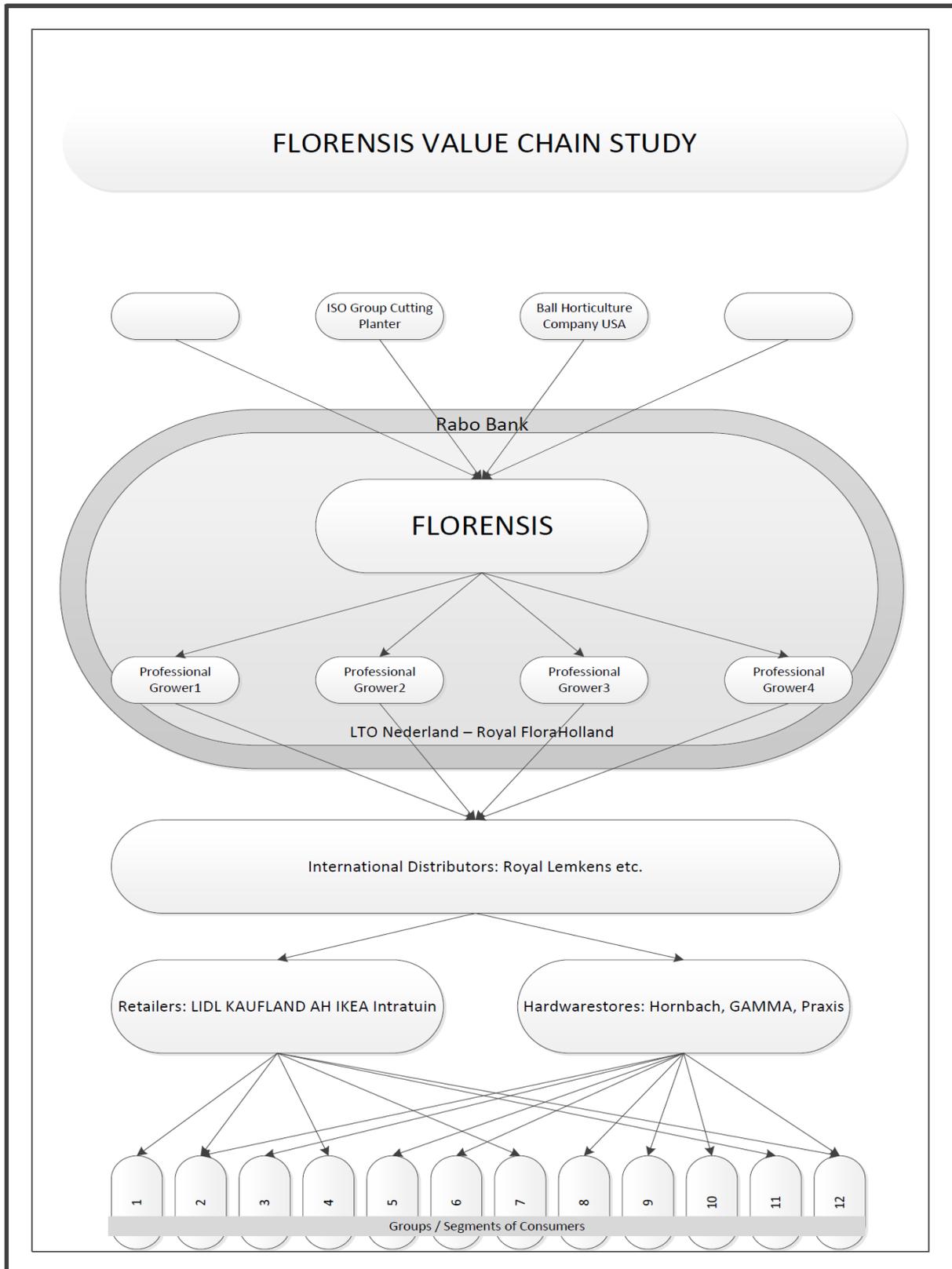
With almost forty years of growing experience, Kwekerij Baas produces the most beautiful seasonal bloomers in the best quality every season. They take responsibility as a supplier of quality plants and therefore keep the entire process from seed or cutting to the end product in own hands. In this way they contribute better to optimal sales, maximum shelf yield and a consumer who comes back for this every year.

Endhoven

Endhoven Flowering Plants is specialized in the cultivation of countless colorful seasonal bloomers of top quality. Since its foundation in 1994, their nursery has developed into a modern company with a fully automated cultivation system. This ensures uniform batches, flexible delivery and optimal use of space. Moreover, intensive cultivation operations are no longer required. This makes the working conditions for their employees very labor-friendly.

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EXHIBIT 7 – VALUE CHAIN



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EXHIBIT 8: A FLORISHING INDUSTRY LOOKING AND MOVING AHEAD - RABOBANK⁴⁰

The Netherlands

Global flower and plant exports amount to a 20 billion dollars annually. With more than half of the global flower trade originating in the Netherlands, the country is far ahead of any other in the world. As those who travel across Holland discover, swathes of its countryside are dotted with large greenhouses, used for breeding flowers and plants. Suppliers and buyers do business in massive compounds that serve as marketplaces (founded as 'auctions'), while virtual marketplaces have been emerging alongside traditional physical marketplaces. The cooperative FloraHolland is the largest flower and plant marketplace in the world. 'We feel it is our duty to help the floriculture industry to flourish and to permanently supply good and sustainable flowers and plants to people all over the world', FloraHolland manager Cees Hoekstra says.

Floriculture is a capital-intensive business

Around 6,000 flower and plant producers in the Netherlands are Rabobank customers, alongside a large number of floral trade businesses. In terms of outstanding loan portfolio in the Netherlands, the floriculture industry is smaller than the dairy farming industry and roughly the size of the arable farming sector. As Ruud Paauwe explains: 'Floriculture is a capital-intensive industry. The greenhouses used in the sector are state-of-the-art and whole parts of the cultivation process are highly automated.' Competition or not, the Dutch floriculture industry continues to go from strength to strength. Paauwe: 'The Netherlands serves as something of a knowledge hub when it comes to breeding, growing, trade, marketing and technology. This gives our country a clear edge over other countries involved in production. The fact that customers from all over the world have access to FloraHolland's extensive range of products also contributes to our competitive advantage.'

Trends

Consumer spending on flowers and plants is stable in the major markets of Western Europe, the United States and Japan. This is the result not only of the economic crisis, but also of growing sales at lower-priced stores. Another trend is the growing popularity of competing gift items. Markets which have shown growth – including Central and Eastern Europe – currently seem to be more unstable than the established markets.

Remote destinations – where flowers can be produced at a low cost and for which shipment by air would be too expensive – have become more accessible as larger volumes of flowers are shipped by sea container. This has caused a shift in the markets. Competition from low cost countries has increased. While the Netherlands still accounts for 52% of the global trade in cut flowers (including both its own production and imports from other countries), the likes of Colombia (with a 15% market share), Ecuador, Kenya and Ethiopia are all gaining ground. The emergence of online technologies and growing supermarket sales have caused the importance of shorter chains, along with increased cooperation, fewer links and improved information provision.

Greater specialisation

So what are Dutch floral businesses to do? Scaling up production and competing on price is decidedly not the way for Dutch businesses to go. Rabobank recommends that flower and plant growers make efforts to further specialise in species that cannot be as readily produced in other parts of the world. At the same time, the various chain partners need to start working even more closely together – and building on their strong position in the production of inputs

⁴⁰ <https://www.rabobank.com/en/about-rabobank/background-stories/food-agribusiness/a-flourishing-industry-looking-and-moving-ahead.html>

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such as seeds, seedlings and cuttings. Another option is to start venturing outside of Europe, in the wake of the several dozens of Dutch entrepreneurs who have already moved their operations to East Africa or South America. Rabobank provides support to the majority of these businesses. Their experience has shown that operating in such remote locations can be very challenging at the best of times, requiring a high level of resourcefulness and perseverance. As Paauwe explains, Dutch growers have the option to only share their valuable professional expertise in the remote location, without actually opening production sites there.

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Increasing profit margins

As the industry continues to grow and develop, FloraHolland finds that it has a role to play right alongside the growers. ‘Working to increase profit margins for our members – that has really always been our mission. As part of ongoing efforts to achieve that mission, we are currently optimizing the logistics system and improving standards, and we consistently work to help reduce costs and improve the quality of processes and services.

Another one of our key responsibilities is creating opportunities for the sector’, says FloraHolland’s Cees Hoekstra. ‘Together with our supply chain partners, we are also involved in efforts to get consumers to spend more money on flowers and plants’. Even if Valentine’s Day only comes once a year.

Top 30 Retailers in Europe

Turnover (net sales) for 2019 in Billion €

Rank	Retailer	Turnover	Headquarter
1	Schwarz	113	Germany
2	Aldi	76 ¹	Germany
3	Carrefour	73	France
4	Tesco	64	UK
5	Rewe	63	Germany
6	Edeka	56	Germany
7	Les Mousquetaires	41	France
8	E.Leclerc	39 ²	France
9	Sainsbury	36	UK
10	Auchan	33	France
11	Amazon	32	USA
12	Ikea	29	Sweden
13	Coop	29	Switzerland
14	Migros	27	Switzerland
15	Ahold Delhaize	26	Netherlands
16	Asda	26	UK
17	Metro	25	Germany
18	Mercadona	24	Spain
19	Ceconomy	22	Germany
20	SystemU	21	France
21	Adeo	21	France
22	Morrisons	20	UK
23	Euronics	19	Netherlands
24	Casino	18	France
25	Inditex	18	Spain
26	El Corte Ingles	15	Spain
27	H&M	15	Sweden
28	Kingfisher	13	UK
29	Otto Group	12	Germany
30	Marks & Spencer	12	UK

¹estimate ²excluding fuel

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EXHIBIT 9: EXPANSION TO DINTELOORD – AN INTERVIEW...

At the end of 2019, Florensis started using a new greenhouse in Dinteloord. A beautiful and high greenhouse, equipped with all modern techniques and equipped with vertical air circulation by means of Nivolators. The different departments are multi-deployable. The starting points for growing in the new greenhouse are The New Cultivation and Plant Empowerment.

A year after the commissioning, Nivola (a specialist company in climate control) spoke with cultivation specialist Erik van Schie. Cultivation Specialist at Florensis. He tells about his experiences with the realization of the greenhouse, the state of cultivation and what else the greenhouse will bring. Erik has been working at Florensis for 10 years as a grower and cultivation specialist. He is an expert in the field of young plants. In these 10 years he has already experienced various developments and many adjustments in cultivation. Introducing The New Cultivation and striving for Plant Empowerment, for example. These are all techniques with which he has been able to raise cultivation to a higher level with lower energy consumption. Part of this is vertical air circulation with the Nivulator, which over the past 6 years has come to play an important role in the growing climate for Florensis in both Hendrik-Ido-Ambacht and Kenya.

New investment and new challenge in Dinteloord

Back to the new greenhouse: this gigantic investment must of course be earned back. That is where the experience of cultivation specialists such as Erik is indispensable. The cultivation specialists were asked how they can achieve the best cultivation results for the design of the new greenhouse. The result is a greenhouse that is considerably higher than the existing greenhouse in Hendrik-Ido-Ambacht with 3 screens, a high-pressure fog system and Nivolators. The bar in the new greenhouse is high and there are new challenges. Erik had to get used to the height of 6 meters. In addition, the set-up of the departments is multifunctional and every crop in the range can be grown in every department. This provides enormous flexibility in business operations.

Why is that Nivulator important?

During the difficult moments of a day in autumn and winter, a Nivulator makes all the difference to growing crops. In addition, the lighting in the greenhouse must also be shielded in winter evenings, because the new greenhouse must meet the stricter light emission requirements. During the past summer months, more and more use was made of the screens against radiation during the day in Dinteloord. During these periods, the Nivulator ensures that an active crop is created under the closed screens. Things are going well in the lower greenhouse in Hendrik-Ido-Ambacht, but is it also successful in the higher greenhouses? "Yes, the power is in the vertical direction in which the Nivulator circulates air. As a result, the air at the top of the greenhouse is mixed with the air at the bottom of the greenhouse. Because you circulate vertically, you create air movement between the crops, resulting in no moisture accumulation, fewer diseases and the crop is stimulated." Erik also indicated that a very homogeneous climate is created, both in temperature and in CO₂ distribution.

Not only a better climate, but also lower costs

Florensis has also carried out measurements for energy savings at the Hendrik-Ido-Ambacht site. By circulating vertically, much less minimum tube was required. At a greenhouse temperature of 20°C, the tube temperature can be 5-10°C lower. This in turn ensures that energy is saved every year. These savings and a better crop also lead to a faster payback time. In addition, there is also a subsidy for vertical circulation⁴¹.

⁴¹ <https://www.bpnieuws.nl/article/9291641/kijkje-in-plantenteelt-nieuwe-kas-florensis/> (Google Translate)

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EXHIBIT 10 – PRODUCT ORIENTATION VS MARKET ORIENTATION

Table 2.3
Product Orientation vs. Market Orientation

Company	Product	Market
Missouri-Pacific Railroad	We run a railroad	We are a people-and-goods mover
Xerox	We make copying equipment	We improve office productivity
Standard Oil	We sell gasoline	We supply energy
Columbia Pictures	We make movies	We entertain people

2-12

EXHIBIT 11: CONCEPTUAL MODEL OF FLORICULTURE SUPPLY CHAIN MANAGEMENT⁴²

⁴² https://www.researchgate.net/publication/349024629_Conceptual_model_of_floriculture_supply_chain_management
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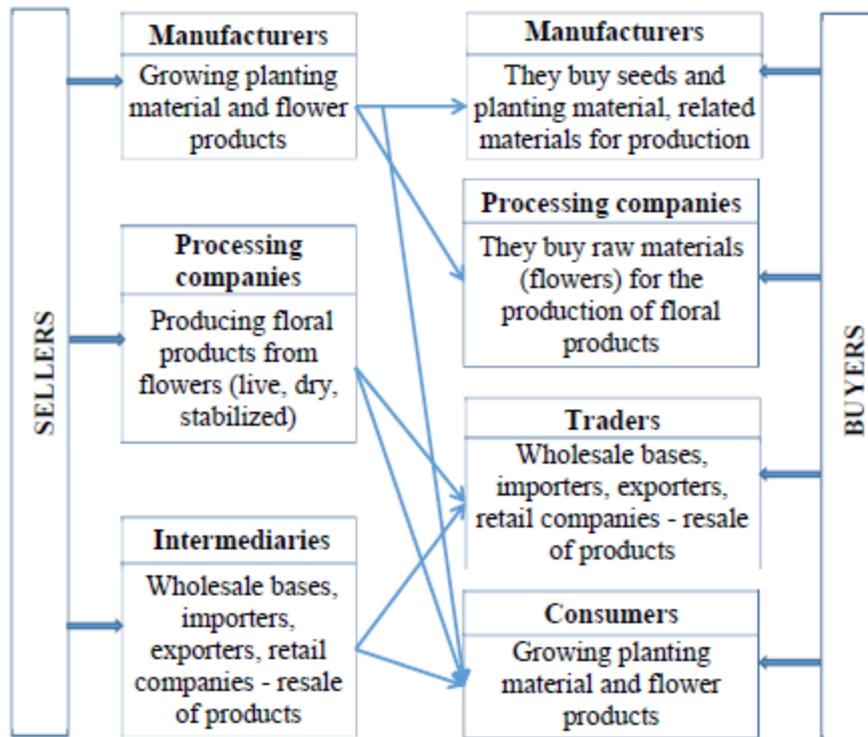
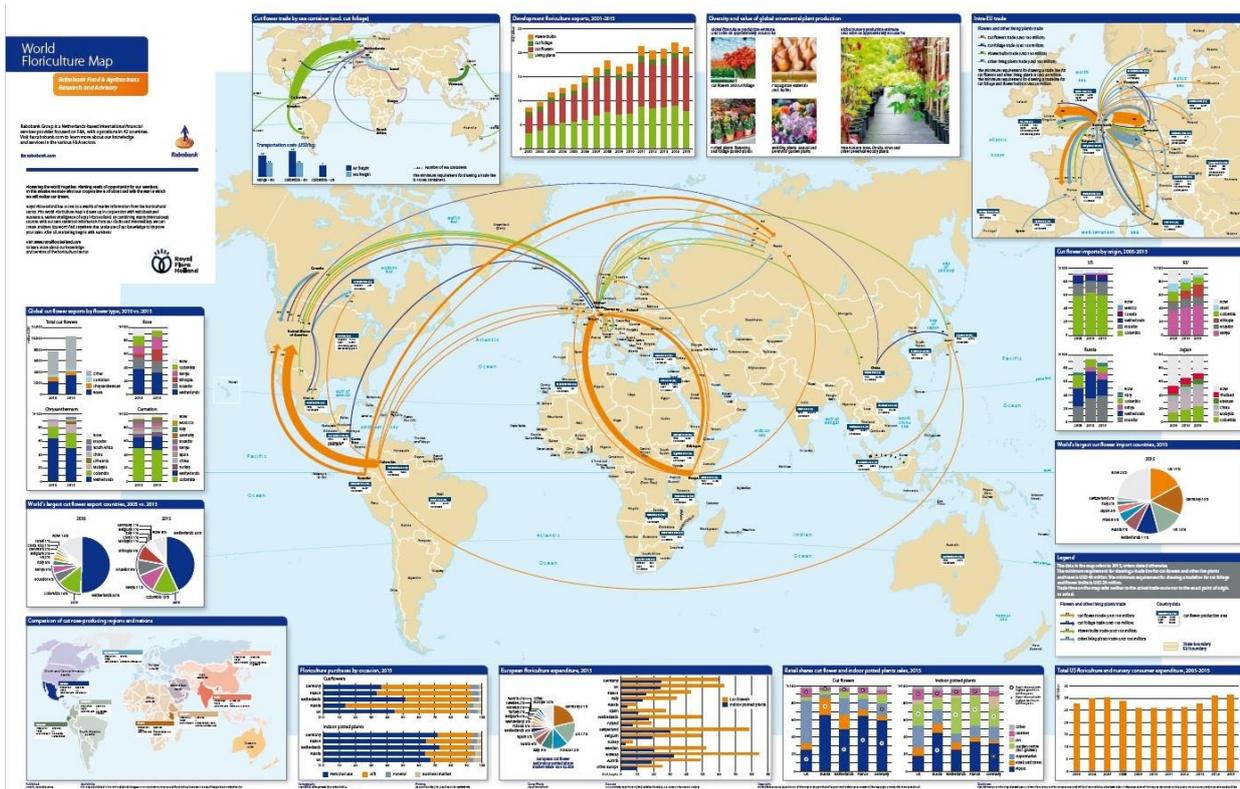


Figure 2 – Relationships of the main participants in the market of floricultural products [based on 2]

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EXHIBIT 12A: 2016 WORLD FLORICULTURE MAP – FLORA HOLLAND⁴³



⁴³ <https://research.rabobank.com/publicationservice/download/publication/token/bahpNYbx0hdtZPhpFMHX>

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EXHIBIT 12B: RABOBANK BACKGROUND STORIES

December 2017



Rabobank

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Flourishing flowers, promising plants

Internationalisation strategy

Dutch floriculture plays a leading role in the world. Dutch companies should focus on exporting propagation materials, technology (building, climate control, biological control), knowledge and services. The market potential is enormous, especially in Asia.

Changing situation in global floriculture

Currently, almost 80% of global flower and potted plant production is sold in the same country as where it is produced, leaving 20% for trading internationally. Who will benefit from international market growth?

With a share of 43%, the Netherlands has a substantial share in global cut flower exports.

However, this share is on the decrease. In 2005, the share was 50%. Rabobank expects the Dutch share to further decline, towards 35%, in 2027. This has several reasons:

- The Asian market is growing relatively quickly, but is mainly supplied by local flowers.
- Kenya and Ethiopia are setting up direct air freight lines to their export destinations.
- Sea freight is still not significant, but the volumes are rising quickly.

Rabobank is expecting a strong growth in the consumption value in Asia. That presents a great opportunity for the whole industry. The recently signed trade agreement between the EU and Japan will expand the possibilities of exporting to Japan. Growth of expenditure in China also provides opportunities there. But who is able to fulfill this market growth?

Production per continent, technology and knowledge worldwide

In the past, internationalisation was about the export of flowers, plants, and propagation materials (seeds, bulbs, cuttings, tubers). Technical exports (greenhouses, climate control, logistics, machinery, biological control, fertiliser) are of a more recent date. Recently, education and counselling have become important too. Agronomic advice bureaus and knowledge providers have increasingly become active abroad as part of their business.

Rabobank is expecting a small growth in the export of Dutch ready-to-use products to destinations outside Europe. Because we are expecting slow growth in European countries, the Dutch share in international production and trade is also going to decrease. This does not imply that the absolute volume of production is shrinking.

Some recent and future trends (e.g., standardisation) are growing need for more active supply chain when it comes to standardisation and being a supplier of technology. However, competition will be intense on collection, pricing, and distribution—there are a lot of new kids on the block.

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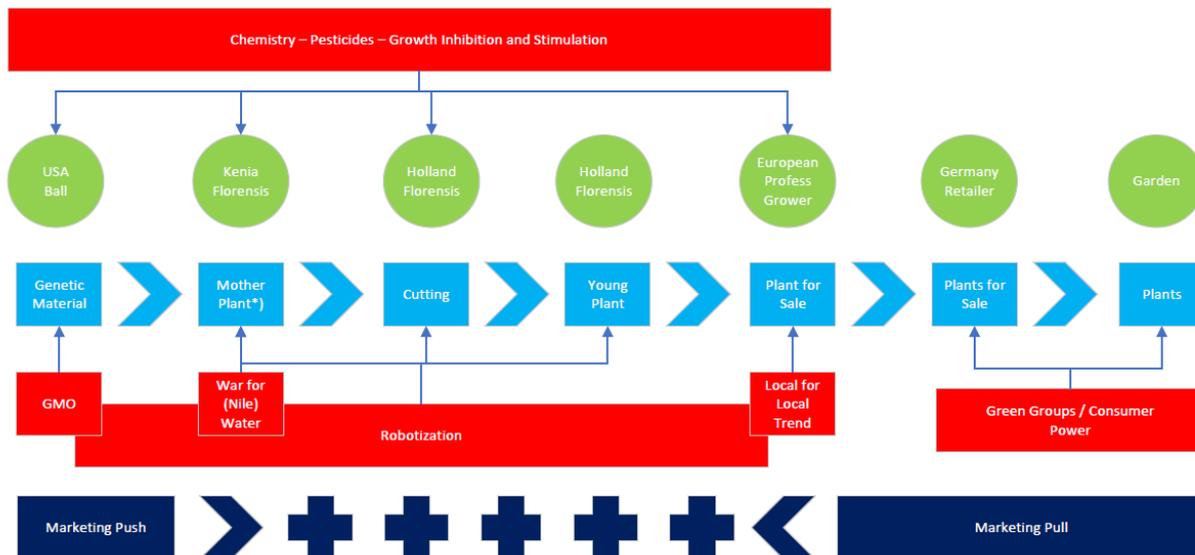
EXHIBIT 12C: DUTCH FLORICULTURE TO SHOW TRUE COLORS: CONSOLIDATION CONTINUES

Fresh Produce March 2021

The wholesale trade in flowers and plants plays a pivotal role in the supply chain. In 2019, Dutch floriculture wholesale realized a turnover of EUR 7bn – EUR 5.7bn of which was realized in export. The import value of flowers and plants stabilized at around EUR 1.2bn. Dutch flower wholesalers differ in company size and market approach, due to the large amount of possible product market combinations. This diversity in retail channels, geography, assortment, and purchasing motives will continue in the years ahead.

EXHIBIT 13: IMPACT OF STRATEGIC ISSUES ON OPERATING MODEL

Example Value Chain Florensis Young Plants & Strategic Issues



*Original Mother Plant is in Holland

EXHIBIT 14A: STAGES ON THE PATH TO BECOMING SUSTAINABLE

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Sustainability Challenges, Competencies, and Opportunities

Most companies go through five stages on the path to becoming sustainable.

STAGE 1 Viewing Compliance as Opportunity	STAGE 2 Making Value Chains Sustainable	STAGE 3 Designing Sustainable Products and Services	STAGE 4 Developing New Business Models
<p>CENTRAL CHALLENGE To ensure that compliance with norms becomes an opportunity for innovation.</p> <p>COMPETENCIES NEEDED</p> <ul style="list-style-type: none"> » The ability to anticipate and shape regulations. » The skill to work with other companies, including rivals, to implement creative solutions. <p>INNOVATION OPPORTUNITY</p> <ul style="list-style-type: none"> » Using compliance to induce the company and its partners to experiment with sustainable technologies, materials, and processes. 	<p>CENTRAL CHALLENGE To increase efficiencies throughout the value chain.</p> <p>COMPETENCIES NEEDED</p> <ul style="list-style-type: none"> » Expertise in techniques such as carbon management and life-cycle assessment. » The ability to redesign operations to use less energy and water, produce fewer emissions, and generate less waste. » The capacity to ensure that suppliers and retailers make their operations eco-friendly. <p>INNOVATION OPPORTUNITIES</p> <ul style="list-style-type: none"> » Developing sustainable sources of raw materials and components. » Increasing the use of clean energy sources such as wind and solar power. » Finding innovative uses for returned products. 	<p>CENTRAL CHALLENGE To develop sustainable offerings or redesign existing ones to become eco-friendly.</p> <p>COMPETENCIES NEEDED</p> <ul style="list-style-type: none"> » The skills to know which products or services are most unfriendly to the environment. » The ability to generate real public support for sustainable offerings and not be considered as "greenwashing." » The management know-how to scale both supplies of green materials and the manufacture of products. <p>INNOVATION OPPORTUNITIES</p> <ul style="list-style-type: none"> » Applying techniques such as biomimicry in product development. » Developing compact and eco-friendly packaging. 	<p>CENTRAL CHALLENGE To find novel ways of delivering and capturing value, which will change the basis of competition.</p> <p>COMPETENCIES NEEDED</p> <ul style="list-style-type: none"> » The capacity to understand what consumers want and to figure out different ways to meet those demands. » The ability to understand how partners can enhance the value of offerings. <p>INNOVATION OPPORTUNITIES</p> <ul style="list-style-type: none"> » Developing new delivery technologies that change value-chain relationships in significant ways. » Creating monetization models that relate to services rather than products. » Devising business models that combine digital and physical infrastructures.

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EXHIBIT 14B: MATURITY IN INTEGRATING SUSTAINABILITY IN NPD

Implementing Sustainability

The companies we interviewed integrated sustainability into their development processes in many different ways, depending on their culture, maturity level, and business and customer needs. To some extent, the implementation also depended on the company's maturity in integrating sustainability in new product development.

- *Maturity Level Beginning:* A mid-sized Chinese company that supplies high-voltage electronic components worldwide does not have a formal product development process. Rather, its executive team meets regularly to discuss progress on new products in development. Sustainability requirements are solely dictated by compliance requirements or customer product specifications (generally Restriction of Hazardous Substances [RoHS] regulations). There are no internally driven environment, health, and safety or sustainability requirements, other than a nonsmoking environment.
- *Maturity Level Improving:* A tier one automotive parts supplier in Mexico uses a company-developed product development process that focuses on internal environment, health, and safety concerns as well as energy efficiency, recyclability, and greenhouse gas generation. Its customers also require products that consume less energy in installation and meet the requirements of RoHS regulations, so these are also key components of the company's product development process.
- *Maturity Level Succeeding:* Customers of a large US-based maker of diverse consumer goods have different sustainability needs and wants, depending on the product or business. All new products follow a standard development process that has sustainability considerations embedded, with slight differences to accommodate the varied product portfolio. The company uses a decision tool to determine whether a life cycle assessment is needed for a particular product. Additional tools used in the process include internal sustainability checklists, frameworks for including life cycle material considerations, and a sustainability design workbook.
- *Maturity Level Leading:* Sustainability is one of the value propositions that a mid-sized European chemical company offers its customers. The company strongly believes that sustainability is an important business and innovation driver that will lead to more future-proof business as well as competitive differentiation. The company uses sustainability workshops at the inception of a new product's development, prior to the beginning of its formal product development process, to embed sustainability in the product design. Life cycle assessments consider both environmental and social impacts, and the results are a factor in decisions about whether to continue projects or terminate them.

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Teaching Note

Discipline background and target groups

Discipline background of the case study: Please define/select the most relevant category

- Strategic management
- Operational management
- Marketing & sales management
- Human resource management
- Supply chain management
- Finance & accounting
- Economics
- Project management
- Other (Business Ethics)

General target groups: Please select all applicable addresses

- UG students
- PG students
- Executive Education
- Other (_____)

Synopsis according to the integrated case method process

This case is a background case about how Florensis is looking for ways to make the Florensis enterprise 'greener' than they currently already are. This comes with major challenges as many opportunities for the industry: a.o. robotization, geneticization, chemicalization have a major downside when it comes to sustainability objectives. Strategic (ethical) decision making in this complex industry is tough. The case researcher/writer has conducted research by collecting qualitative (interviews Chief Financial Officer Alexander van der Bijl, Corporate Product Manager Mark van der Knaap and Manager Sustainability & Corporate Communications Regina Dinkla and collected quantitative data from Florensis itself and various secondary sources about trends possibly effecting the Florensis business and operating model and floriculture value chain. This case is also an exercise case for students to obtain and practice their knowledge about corporate strategic management, integrated marketing communication strategy and new product development by conducting research around the current and desired state of the company in order to determine critical success factors and to develop strategic alternatives and plans. The core subjects of the case study include Integrated Marketing Communication, Sustainable New Product Development, Strategic Decision Making and Business Ethics. This case can be used on functional level (communication), on a management (product management) and on a strategic level (business ethics).

Type

This case is a background case and exercise case.

Format

This case should be distributed and used in (an interactive) pdf format. The case is supported by infographics, videos, photographs and is accompanied by numerous exhibits.

Teaching objectives, target groups and target courses

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Objectives

This case is designed to train graduate students

- to understand a business and an operating model of an international family business enterprise in the floriculture business in the Netherlands and the value chain in which this company is active
- to determine the impact of various megatrends on the floriculture industry and the consequences for an enterprise that is active in this industry
- to analyse the resulting complex and problematic situation
- to develop strategies and answers to this situation taking complicated ethical dilemmas into account

Target group

The case is written for graduate students in their final year of study.

Target courses

The case is intended for specialisation courses in strategy, business ethics, integrated marketing communication and sustainable new product development . Classes in agriculture could also benefit in particular when it comes to the impact assessment of megatrends on the floriculture value chain.

Teaching approach/area and strategy/organisation

Approach/area

The case is intended to develop an understanding on the relationship of developing a sustainable business and the corresponding ethical and moral dilemma's that come with strategic decision making in an existing family enterprise.

Strategy/organization/timing

- *Phase 1 - Integrated Marketing Communication Strategy Discussion* - As a case to discuss with students the current integrated marketing communication strategy (IMC Strategy Discussion) of Florensis and comment.
 - a. *To understand the role of integrated marketing communication in creating a sustainable green image that fits with the reality and current situation*
 - b. *In week 2 working session with students with an emphasis on Florensis communication around their sustainability mission and vision:*
 - i. 1 hour discussion about the case: clarifying issues, identify key issues;
 - ii. 1 hour working session for students: case analysis, possible solutions;
 - iii. 1 hour short presentation of students ideas: cross check the solutions, compare and contrast, lead to the selection of the best possible solutions.
- *Phase 2 - Sustainability Stage Determination* - As a case that challenges students to determine in which stage Florensis is to becoming a sustainable enterprise and advice to come up with a strategy to grow further (Sustainability Growth Strategy).
 - a. *To advise an organisation to becoming a more sustainable company*
 - b. *In week 3 student teams should work for four hours with regular coaching sessions in between:*
 - i. Students determine in 4 hours where and in which stage Florensis currently is and develop and use criteria for their research and arguments for their conclusion. Students work in a teams of 4 students guided by a coach.

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- ii. Based upon found stage in Phase 1 students develop a product development strategy and advice using 10 self-explanatory PowerPoint slides that serve as an easily readable report. Time required for this report is about 10-12 hours.
- *Phase 3 - Strategic Advice Role Play - As a case that put student teams in a consultancy role advising Florensis about how to make the enterprise greener balancing between ethical decision making and the continuity of the company (Strategy Consultancy Advice on Sustainability).*
 - a. *To practice and to feel what it is to take difficult decisions in a complex situation that is full of ethical dilemma's*
 - b. *In week 4 student teams work for four hours in a role play game. Students should be facilitated and coached in order to make the roleplay a successful exercise.*

This case should be provided in PDF format to students and teams at least one week (week 1) before it is used in the classroom. The interactive PDF case and Florensis' website contains information about its history, customer's reviews, project descriptions, product portfolio. Students are required to study this information together with the regular case text and described key issues. The time needed for reading this case is around 4 hours. If students already formed a team, it is important to discuss the questions and possible answers together before they come to class.

Depending on the phase different academics of field experts can join: experts on communication, product development and ethics are encouraged to join discussions and provide the students with their views and opinions about the key issues and solutions presented.

Note 1: The output and the learnings of each phase are required to move to the next phase closing with phase 3.

Note 2: Alternative use of the case is to use the case as a strategic business case in an international competition. Using the case in this way puts more emphasis on the value of the output of the several student teams towards Florensis' management. Each solution will contain insights for the enterprise to develop their strategy accordingly.

Relevant Readings

Phase 1			
Marketing communications: strategies, tactics and planning	Introduction to Marketing Communications		https://nscpolteksby.ac.id/ebook/files/Ebook/Business%20Administration/Marketing%20communications%20interactivit-communities%20and%20content%20(2009)/11.%20Chapter%2010%20-%20Marketing%20communications%20strategi
Marketing communications as a strategic function	Relationship Marketing Communication and Corporate Strategy		https://www.open.edu/openlearn/money-business/business-strategy-studies/marketing-communications-strategic-function/content-section-0?intro=1
Noel Muzondo Integrated Marketing Communications	Textbook about Integrated Marketing Communication		https://www.academia.edu/35120829/Noel_Muzondo_Integrated_Marketing_Communications_INTEGRATED_MARKETING_COMMUNICATIONS_INTEGRATED_MARKETING_COMMUNICATIONS
More than values: The value-based sustainability reporting that investors want	Nonfinancial reports helped stimulate the growth of sustainable investing. Now investors are questioning current reporting practices—and calling for changes that executives and board members must understand. This articles of McKinsey shows that information investors find about sustainability and reasons to	2019	https://www.mckinsey.com/business-functions/sustainability/our-insights/more-than-values-the-value-based-sustainability-reporting-that-investors-want
Phase 2			
Towards sustainable product development	Sustainable Product Development deals with elementary demands, the systems in which the product functions, the nature, availability and selection of resources, distributions of those resources among nations and generations	1995	https://doi-org.ezproxy.hro.nl/10.1016/0959-6526(95)00062-J
Why Sustainability is now the key driver of Innovation	Sustainable Product Development is mentioned in stage 3 (of 5 stages) on the path to becoming a sustainable company	2009	https://hbr.org/2009/09/why-sustainability-is-now-the-key-driver-of-innovation
Determinants of a sustainable new product development	It is important to involve life-cycle management and product life-cycle management in sustainable new product development	2014	https://doi-org.ezproxy.hro.nl/10.1016/j.jclepro.2014.01.053
A Maturity Model for Sustainability in New Product Development	An assessment and guiding tool to benchmark a company's progress in improving, succeeding and leading product development	2014	https://doi-org.ezproxy.hro.nl/10.5437/08956308X5701143
Integrating Sustainability into New Product Development.	In order to incorporate for companies sustainability into their product development processes it is important to embed a concern for sustainability in the companies culture and that employees understands how the company defines sustainability	2018	https://doi-org.ezproxy.hro.nl/10.1080/08956308.2018.1421379
Sustainable product innovation and changing consumer behavior	The more a sustainable product addresses multiple environmental outcomes that do not conflict and affords consumers different possibilities to engage with it the higher the likelihood that they will adopt the product and use it in a sustainable way	2021	https://doi-org.ezproxy.hro.nl/10.1002/bse.2793

Testing is required to come to suggested example answers and grading. Initial thought is grade students according to the results all three Phases with a weight of 25%-25%-50%...

Evaluation/Grading

Evaluation criteria

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Evaluation shall take place based on the following criteria [Define general evaluation criteria (e.g. creativity, rigour, analytical level, presentation technique, communication skills, solution orientation, practicability, etc.) that are needed to be taken into consideration in the evaluation. In addition, an indication of the weighting with which the individual criteria should be included in the evaluation.]:

Evaluation criteria	Weight
---------------------	--------

[AN EXAMPLE:

Analytical level	High (10)
Creativity	High (10)
Communication skills	Moderate (5)
...	...

]

Assessment structure

Grading shall take place according to the following assessment structure: [A typical structure may be the following:

Maximum number of points achievable, thereof for	100
<ul style="list-style-type: none"> • Case research: max. ?? points • Case presentation: max. ?? points • Class participation: max. ?? points • ... 	v w y ...
Final grading: $w + x + y + \dots =$	Z]

Achievement level and grades

Percentage Score	Grade	Grade Definition
------------------	-------	------------------

[A TYPICAL SCHEME MAY BE THE FOLLOWING:

97%-100%	A ⁺	Excellent
93%-96%	A	Outstanding
90%-92%	A ⁻	Outstanding ⁻
...
< X%	F	Fail

Recommendations

Make it clear on which achievement level the following grade definitions were reached:

- Excellent to outstanding [e.g. for A⁺, A, A⁻]
- Good to very good [e.g. for B⁺, B, B⁻]
- Satisfying [e.g. for C⁺, C, C⁻]
- Sufficient [e.g. for D⁺, D, D⁻]
- Unsatisfactory (fail) [e.g. for F]

Differences in the level of education and experience, e.g. of bachelor students and postgraduates, should be taken into account both in the weighting of the evaluation criteria and in the requirements.

Solution outline

Recommendations

At this point, a solution sketch should be provided.

Address the following questions in particular:

- What are the essential learning outcomes that the participants should achieve?
- How strongly should the discussion, results and approach be structured? What degree of openness and unbiasedness should be pursued?
- What would an ideal sample solution look like?