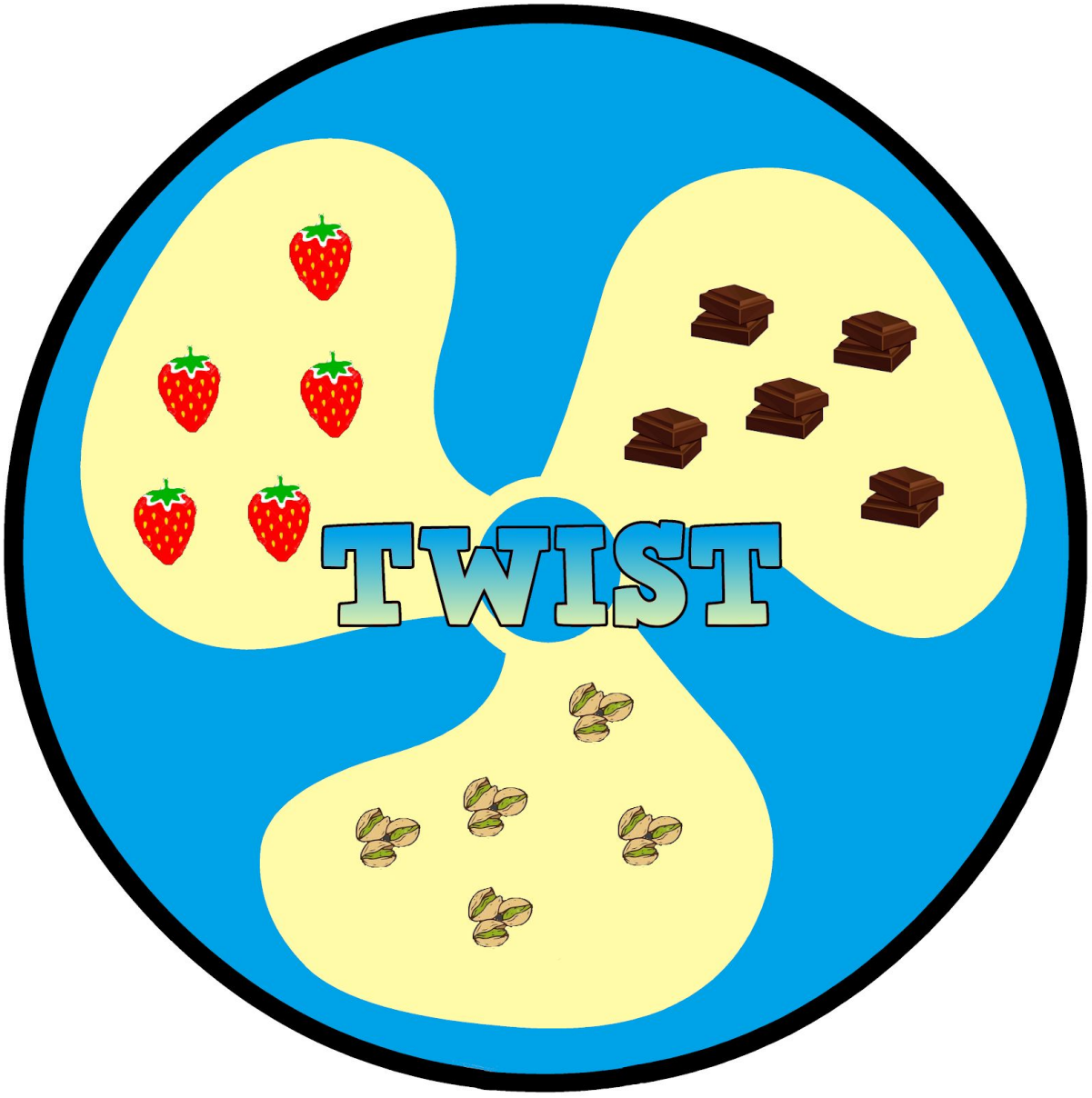
Supply Chain of the Nice Cream Twist



Assignment for SEN9720: Logistics and Supply Chain Innovations

Group 16

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Summary

The logistics and supply chain of the company Nice Cream is analyzed in three parts: quick logistics business analysis overview (A), structured and detailed supply chain analysis (B), and supply chain engineering and final work (C). The temperature conditioned goods for the retail market discussed in this paper is ‘Twist’, a customizable luxurious ice cream product with a wide variety of different toppings and flavours.

Nice Cream is providing a customizable luxury ice cream product with the brand name *Twist*. The strength of this product lies in the customizability of its toppings, where the customer will have a variety of options to choose from. This strength can also form a weakness for the company as it complicates the logistics of the company. This report analyzes the complex logistical issues dealing with ice cream and customizable toppings.

In Chapter A, the supply chain is divided into three aspects, namely base ice cream (general products, dairy, and flavour), toppings (fabricated products, fruit), and facilitative products (cups, spoons). It is an international operation with suppliers from South-America and Africa, however, due to the location of Nice Cream in the Netherlands there are also a lot of opportunities in Europe. The supply chain of the company will mostly be truck-based due to the aspects of the cold chain. The temperature of the transport needs to be kept at a constant low temperature, as variety or high temperature can lead to degradation in the product.

From the quick logistics business analysis Swirl has a few unique characteristics where the supply chain needs to be suited to. Firstly, it is important that supply chain is temperature controlled so that the ice cream can be transported with marginal losses in quality. Secondly, the hygiene of ice cream needs to be guaranteed for the safety and wellbeing of the customers. Thirdly, there is uncertainty in the demand of the product due to the seasonality, day-to-day temperature, and local competition.

Key factors that became apparent in the logistics and marketing analysis help understand the position Nice Cream is in. The uncertainty of demand and marketing can complement each other by helping offload unnecessary inventory. There is a lot of importance in getting the planning right to make sure the retailers get the right products at the right time, as quantity, condition, place, and time are very important to keep track of. Therefore, a fast and special lifecycle is important due to the condition of ice cream. It is important to provide a personalized but consistent experience across all the retail sector.

In Chapter B, the supply chain is analyzed through an own framework in which people, process, product, and performance are integrated with each other. These building blocks help identify the weaknesses and strengths in each area for Nice Cream. SCOR shows that compared to other businesses in this sector, the strong focus on flexibility and speed in the supply chain helps the reliability of the product. Nice Cream takes two core

processes into account, which are manufacturing ice cream and toppings, and distribution and storage of the products. Interestingly, there is a difference in the delivery of toppings and ice cream. As ice cream can be mostly push-based, whereas toppings are pull-and push based. This is important because it shows the difficulty in managing two different products in essence, as Fisher's effectiveness stresses the right supply chain for the right product.

Nice Cream does not reach its potential in the building block of people, as there is a wide range of toppings that can be combined with existing manufacturers such as M&M's and Mars for better promotion. The process building block shows that agile is the way to go, despite the fact that lean also have some strengths. The low predictability of demand was the key factor because it can provide a lot of potential in adding more toppings and in inventory management. Lastly, the product building block sets out the overall strategy in the competitive ice cream market and how Twist differentiates from the competition.

In Chapter C, a SWOT analysis is performed where a design objective is derived from, so that innovations can be discussed to improve the supply chain. The strength lies in the uniqueness and reliability of the product. There are weaknesses in the seasonality and the due dates of the product. Opportunities lie in marketing new toppings during events and partnerships with well-known producers. Customers can be included as well to incorporate better connections, for example they can design their own toppings. The focus on sustainability could also be a strong point. However, there is a constant threat on the availability of the products as the logistics remain a difficult problem. There is also a risk of competitors catching up to Nice Cream because the sector is moving towards more data collection to keep track of inventories and customer behavior.

Regarding the SWOT-analysis one of the most potential innovations Nice Cream could implement now is the blockchain technology in the supply chain. The tracking and data collection features will greatly benefit the information chain in the supply chain. It can make the process more efficient and reliable as information can be easily shared for the suppliers and buyers to make an easy fit. It will also help the customer connection as the data could be transparent how Twist is sourced, which will benefit Nice Cream to target ethical and sustainable customers. Ultimately, this will benefit the predictability of demand so that the supply chain can be better prepared. As the right quantity of the product on time is difficult to get right, blockchain can help with that.

A. Quick Logistics Business Analysis Overview

This part of the report will give a small introduction to the Nice Cream Twist. Certain interesting or problematic characteristics are explained and discussed to give an overview of the company and its surroundings. In each of the (sub)paragraphs a code is given between brackets, for example (A3). This code reveals which part of the assignment part A is discussed in the corresponding (sub)paragraph, to give a clear overview of the location of each of the needed parts.

1.1. Introduction to the product-market combination (A2.1)

The Nice Cream Twist is a product like no other in the world. Combining luxury ice cream with a wide variety of toppings that range from nut-based to fruit-based to chocolate-based, Twist is a unique product that fits anyone. Top it, Twist it, Taste it. The ingredients are top class and freshly retrieved from all over the world. The mission of Twist is to create luxury ice cream that is the same wherever you go, whenever you go. The idea is that at every selling point, the toppings are exactly the same for a large part, to make sure that the transaction costs for customers are 0 after the first purchase. This can create favorites for the customers, but also establishes a certain level of trust and expectation. Alternating some special toppings from time to time creates a combination of known quality with unknown surprises, which is the perfect balance between exploration and exploitation. The unique selling point can be seen in this balance combined with the high quality of the product. All in all, Twist offers a unique, high quality attraction that customers will want to ride over and over again.

The product is a combination of one out of three tastes of ice cream (vanilla, strawberry or chocolate), and a selection of 5 (different) toppings. The toppings can be Chocolate flakes, strawberries, kiwi, pistachios, vanilla wafers, almonds, smarties and magnum disks. Next to these standard toppings, sometimes Nice Cream offers a special prepared Twist that has a link to some event happening. Using the system of mostly standardized products, Nice Cream can keep track of the consuming and the supply chain will be mostly pull-based. Selling points will indicate their needs in terms of ingredients, which will only then be sent towards them. Data could strengthen this process by preparing sets of ingredients per selling point beforehand, and then changing it minimally when the order arrives. Next to the ice cream itself and the wide variety of toppings, Nice Cream orders its own specialized cups and spoons, which are produced externally. The machines that can twist the Twists are also manufactured elsewhere, but are delivered to selling points by Twist. Maintenance is outsourced. Most ingredients can be found within the Netherlands, which is at the moment also the only location where sales take place. The entire supply chain will be discussed in paragraph 1.2.

1.2. Visualization of the logistic chain (A1)

For the production and consumption of Twists, there are several steps involved that must be undertaken.

The basis of producing ice creams are dairy products like milk and cream as well as general products such as emulsifiers, sweeteners, and stabilizers (Milkfact, 2019). The flavours of twist ice creams consist of strawberry, chocolate, and vanilla. The base products for these flavours will be provided with high quality products from West-Africa, Netherlands, and Madagascar.

The base products for toppings that are important for Twist, must also be manufactured or at least made ready to use as topping. These products are sorted into three sections: special fabricated products, unfabricated products, and fruit. The special fabricated products are toppings such as Magnum White Disc, Cornetto Waffle, Smarties. These will be provided by the manufacturers of these companies, however, their supply chain is not included due to the focus being on Twist. Unfabricated products are products such as pistachios and almonds. Whereas fruit will mostly be exotic fruits such as kiwi and peaches.

Thereafter, the manufactured products must be supplied, fabricated, and transported through the distribution center and warehouse to reach the retail sector. The ice cream manufacturer will be able to transform the raw materials into the ice cream for Twist whereas the toppings manufacturer produces the specific toppings.

All these steps create the logistic chain of Twist. Figure 1 shows the logistic chain of Nice Cream, including the locations of origin. Other aspects of the supply chain will be discussed in the chapter.

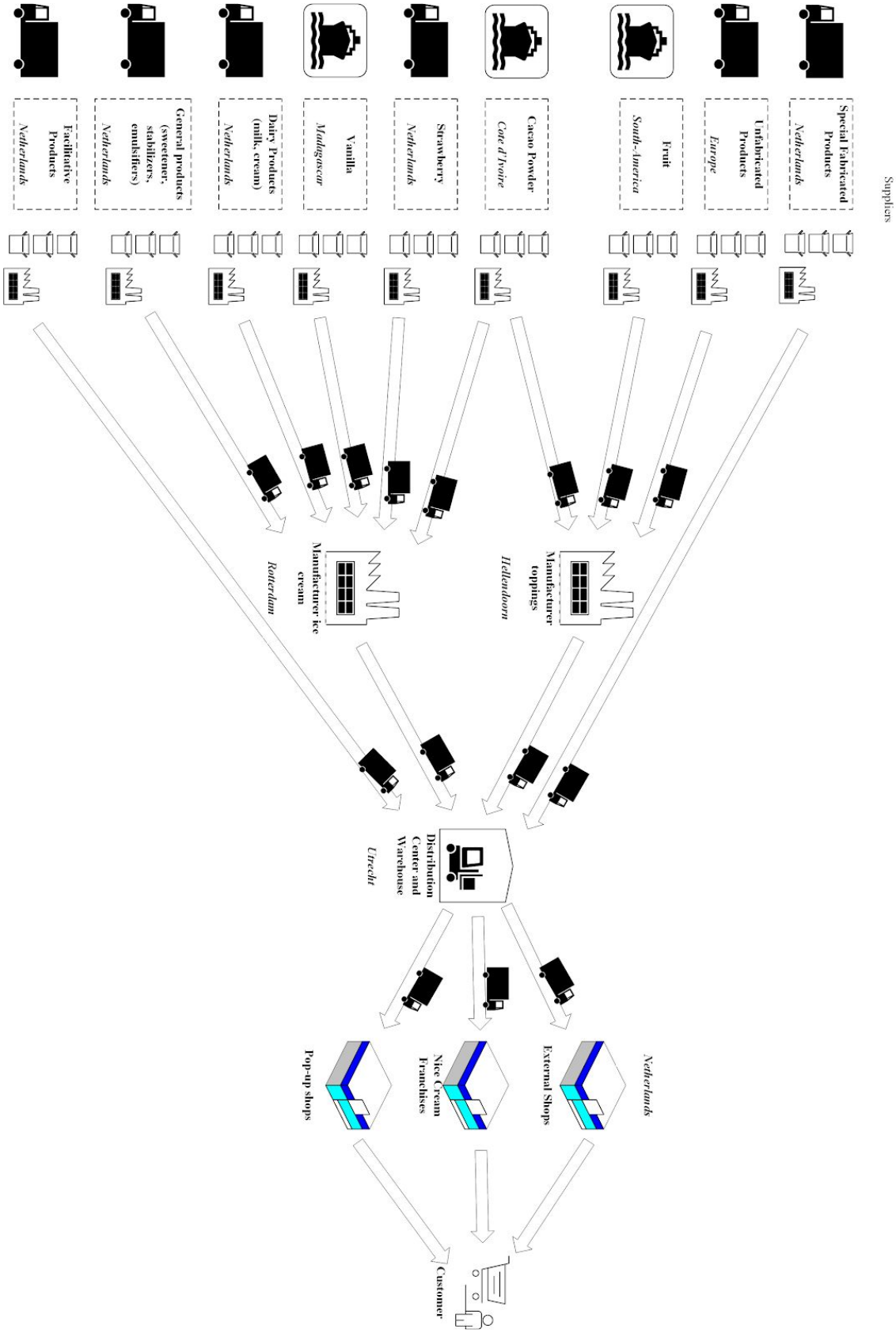

Figure 1. Logistics Chain of the Nice Cream Twist.

1.3. Remarkable characteristics of the product-market combination

In this paragraph, the characteristics of the product-market combination will be elaborated on. Each of the 7 subparagraphs discusses a characteristic that has influence on the way the product-market combination should be approached optimally.

1.3.1 Packaging price/size and price/weight factors (A2.2 & A2.3)

As the ice cream will only be delivered partially finished to the selling points, the packaging of this ingredient will be in plastic bags, which can be done quite efficiently. As the packages are completely full, and no boxing is needed, the size of the packaging is proportional to the volume of ice cream. However, the ice cream is fairly heavy in relation to the price it is worth. For simplicity we assume that every Twist has 5 toppings, which are equally valuable, and have the same weight per portion in a Twist. The total weight of a Twist is equal to 300 grams and is sold at a price of €4,00. We assume that this price exist for 45% of ice cream, 45% of toppings and 10% of cup and spoon. With this, we can fill in table 1. Twist has relatively low price/weight and price/size factors, but at the same time also a low weight, so many Twists can be made out of one transportation run.

Table 1. Ingredients for the Nice Cream Twist and their attributes

Product-part	**Weight (g)**	**Kcal**	**Price (€)**
Strawberry ice cream	240	384	1,80
Chocolate ice cream	240	384	1,80
Vanilla ice cream	240	360	1,80
Cup	18	-	0,40
Spoon	7	-	0,40
Chocolate Flakes	7	24	0,36
Almonds	7	25	0,36
Pistachios	7	24	0,36
Peaches	7	24	0,36
Kiwi	7	4	0,36
Strawberry	7	3	0,36
Smarties	7	37	0,36
Twist (total)	**300**	**480**	**4,00**

1.3.2 Due dates of the product (A2.4)

As most of the ingredients used in the product have a relatively short window in which they can be consumed, it is important in this product-market combination to have fast deliveries, and fast sales. If this can not be achieved, most of the products will be unusable and total revenue will drop significantly. A way to secure some delay in the due date of the product, is to deliver the ice cream only as a partially prepared product, which can then be finalized at the selling points. Also, some toppings have a very long shelf life, meaning due dates are not an issue there. The supply chain could be separated in half from the preservability point of view, by handling the long-life products at a slower pace, but at a bigger volume and the short-life products in a faster pace, but at a smaller volume.

1.3.3 Safety issues (A2.5)

Considering the safety of the product-market combination, the Nice Cream Twist does not have a particularly high demand for safety. Closest to safety is probably the hygiene that should always be kept in mind when compiling, transporting or selling the product. As we try to ensure complete consistency across all of the selling points, it is very important to keep the ingredients from getting infected with any type of other substance. Every food related product has to deal with hygiene to ensure quality, which is only more present at Twist as consistency is so important. In practice, this means cleaning the trucks in which the product is transported, as well as the machines where the ice cream itself is produced. Furthermore, the selling point need gloves for the employees to ensure hygienic handling of the toppings. This also means that toppings should be removed before their due date, to ensure that even outliers in due dates do not infect the product whatsoever.

1.3.4 Special care (A2.6)

The temperature during transportation and storage is a critical factor in the quality of the ice cream and toppings. This is the most important aspect of how the product should be handled next to the hygiene. At all times, the temperature has to be low, because temperature changes can make the product too icey and grainy (Kroll, 2016), which is not desirable. This special care is most essential in being transported from a reever to a warehouse, or to the selling point. This has to happen fast and efficiently to ensure a small time period in which the product is exposed to high temperatures. Exposure to heat for too long leads to bacteria growth in ice cream, and will influence the quality of the product. A possible way to deal with the time window is to prepare arrivals of products and having the resources and space available for storing. This has to be supported by communication between deliveries and selling points, that should align.

1.3.5 Product life cycle (A2.7)

To have a good understanding of how much a product can still grow, or how long the product will be interesting for consumers, it is useful to place a product somewhere along the product life cycle (Vernon & Wells, 1966). As Twist has existed for sometime and is known by the customers, it can be stated that the product has past the introduction

phase of the life cycle (figure 2). Also, the hype around the product has almost expired, although the hype was long and the aftermath can still be seen. Therefore it can be stated that the product is now at the beginning of the stabilization phase. It is important to have products all across this cycle, to ensure the continuation of the company. In order to keep the Twist from entering the decline phase, chapter 3 will discuss ways to create subproducts at the beginning of the cycle, which will also create new life into the standard Twist as customers know it.

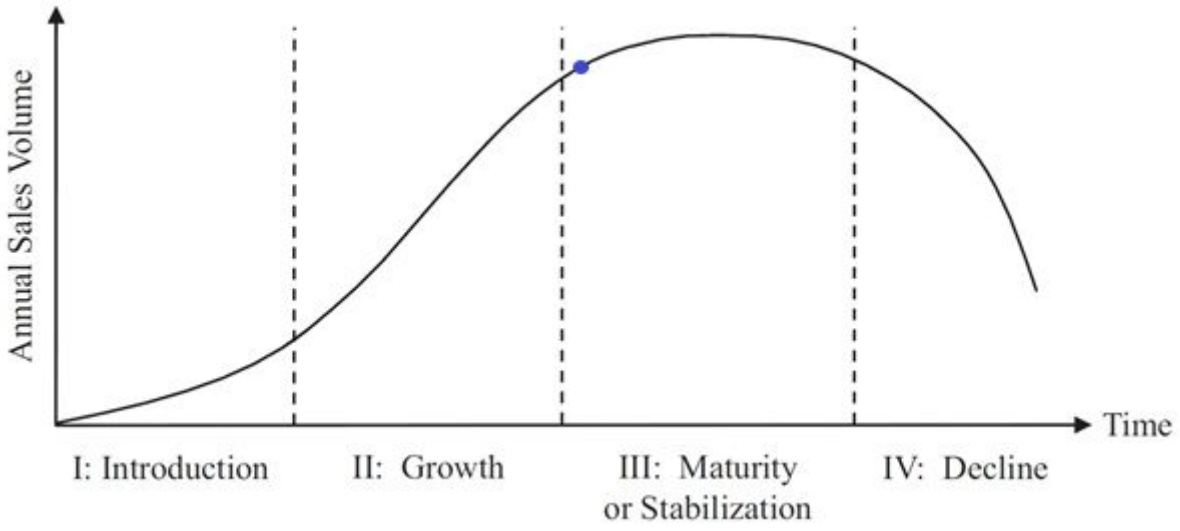

Figure 2. Position in the product life cycle. Malakooti B, (2013) CC BY-SA 4.0

1.3.6 Level of estimation (A2.8)

For establishing a good understanding of the product-market combination, an important aspect is the level with which needed inventories and consumption can be estimated. Because of the limited set of ice cream and toppings that can be used in a Twist, it is relatively easy to keep track of the consumption of each of these ingredients. The pull-based factor of the consumption makes this process even easier, as everything that leaves towards the selling points will probably be sold. After running for several years, a clear prediction and sensitivity can be created containing for each possible ingredient, how much is needed for each of the selling points. Of course these values can always vary from year to year, or even from day to day. Fluctuations can be caused by the influence of multiple factors such as the weather, temperature, sales of neighbouring selling points, or events that take place nearby.

1.3.7 Seasonal issues (A2.9)

Due to the end product being located in the Netherlands, the local weather can be expected to vary relatively much through the seasons of a calendar year. As the product takes place in the ice cream market, it can be stated that the consumption is largely dependent on the weather, and especially the temperature. As the average temperature can differ more than 15 degrees celsius across a year, seasonality (Hylleberg, 1992) plays a big role in the market of ice cream. The demand in summer will be higher for all ingredients (both ice cream and toppings). A smaller seasonal change is the kind of

toppings that will be consumed the most. The different fruit toppings will be more desired in summer while nut toppings are prefered by customers in winter. When combining these seasonal dynamic demands with the due date of a product, it can be challenging to keep up with the demand in summer, as the product can not be kept in inventory for a long time. Another interesting feature of the product, is the desired consistency in quality and taste. Especially for fruit toppings, keeping consistency in freshness and taste can be hard across a whole year.

1.3.8 Mode dependability (A2.10)

As stated before, most of the ingredients of the Twist should be preserved at a low temperature. This means the product-market combination is completely dependent on the usage of refrigerated trucks, also called reefers. These trucks should be checked upon regularly in order to make sure that they do not malfunction, which would mean that the whole batch it carries would be unusable for selling. Also, these reefers should be able to move from point A to point B relatively fast, as most of the ingredients have a short life (an early due date). If there would exist a delay that is too large, the ingredients at the selling points will be outdated, and the selling points will not be able to offer them to the customers. This adds to the finding that the product-market combination of Twist should have a good estimation system in place to predict needed volumes as soon as possible.

1.3.9 Size of order (A2.11)

A consequence of what is described in subparagraph 1.3.8, is that in some periods of time, a larger amount of consumption takes place that the average amount. Next to that, it could happen that Twist finds a second growth period due to some addition or seasonal speciality. Therefore, it is necessary to be prepared for a large increase in production, transportation and selling. As the market as it is right now is pull-based, it could be hard for the product-market combination to meet the requirements needed for a growth in size. Although the seasonal increases can be prepared for by ordering more ingredients beforehand and also some reserve batches could be hold back to be sure, some growth in size will be hard to account for. As Twist exists of multiple fresh ingredients, it will be hard to pick up a significantly larger amount of these ingredients in time to satisfy the demand in that case. This challenge also occurs when the demand suddenly drops. As the ordering right now is based on data gathered in the previous years, this will not take into account a sudden drop, which means too much of the fresh, short-life ingredients will be present. Luckily the ordering could be put to a hold relatively quickly, and the price per kilogram is not particularly high, which means the losses do not explode in case of a lowered demand.

1.4. Scheme of the inventories (A3)

In paragraph 1.3, it has been discussed that Twist is a combination of parts put together. Also, it has been stated that each of these parts has a different speed of being consumed at the selling points, throughout the year and in general. Therefore it can be difficult to prepare delivery packages with the right amount of each ingredient far before this delivery is due. It is important to keep this in mind when designing an optimal inventory system.

In this paragraph, several general designs will be given and explained, that support the way the product-market combination is set up. Before the packages can reach the selling points, they first need to be prepared.

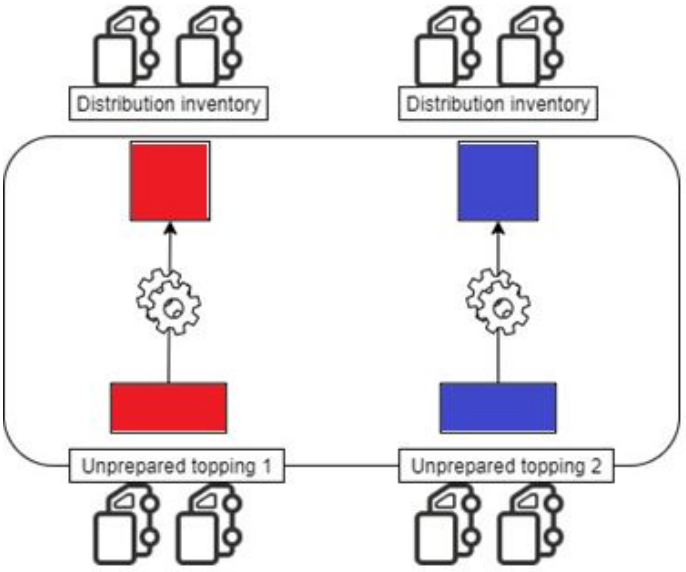

Figure 3. Inventory for preparation of toppings

In paragraph 1.1 it has been discussed which of the toppings need this additional preparation before they can be delivered. Figure 3 shows the factory where these preparations take place and how the inventory movement looks like. As can be seen in figure 3, the inventories are relatively simplistic, as only one ingredient (or possible more in one location) is being processed and no combination of ingredients is ever occurring. The ingredient enters unprepared and leaves ready for selling. Concerning the geographical location of these inventories, it will be most efficient is they are close to the location where the corresponding ingredient is being harvested, or enters the country. This could be close to the port of Rotterdam, or to the airport of Schiphol.

In contrast to these simplistic inventories, the inventory where selling point specific deliveries should leave is more complicated. Here, what is called ***cross-docking*** takes place. As refrigerated trucks enter separately, each holding a different ingredient, but other reefers should most of the time leave with all different ingredients, or at least a large subset, the inventory and transferring is more complex. Figure 4 shows a sketch of what the inventory could look like to increase the efficiency of the one to last step of the supply chain. The colours in the sketch represent different toppings that are put together in the compiling of packages for different selling points. As can be seen, lots of reefers enter the inventory, from which the ingredients are taken and combined in the specific pull-based packages. These composed packages are then loaded into several other reefers to make the last step towards the selling points. In this inventory, a well designed logistic system is present to smoothen the process of “order picking” at a maximum. The geographical location of this complex distribution centre should be centralized between all of the selling points. To increase the centrality of the inventory, a weight can be put on each of the selling points representing the number of reefers that need to go to that selling point per time unit. This way, the reefers make the least kilometers, which is most efficient. In the Netherlands, this probably will be somewhere around Utrecht. Notice that

not every ingredient is being shipped to every selling point. This is because not every selling point needs the same ingredients, as selling velocity might differ for ingredients per selling point.

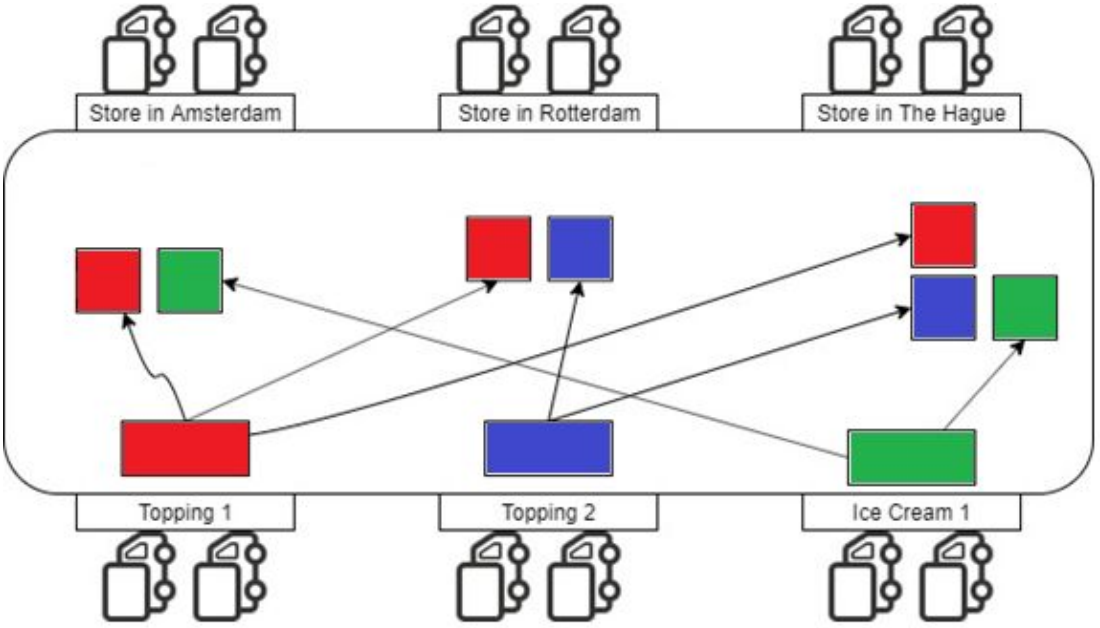

Figure 4. Inventory for compiling and distributing of ingredients

1.5. 7R's of logistics (A4)

The seven "rights" of logistics are important for the success of a company, to cite Swamidass (2000): "The seven rights are, to deliver the **right** product, in the **right** quantity and the **right** condition, to the **right** place at the **right** time for the **right** customer at the **right** price". The seven R's help the efficiency of a supply chain as it is brings the critical tasks to the forefront. From the seven rights the objectives of the company can be reached with an effective supply chain. Supply chain management helps to reach the strategic objectives such as optimization, flow, information, and capital of the supply chain (MITSDE, 2018). This helps the organization as it lowers the operational cost, customer dissatisfaction, and delay-time. Therefore, it is crucial that these aspects are considered for the organization in the ice cream market. As the product-market combination requires many difficult problems to consider before it reaches the end-customer.

The right product

The market for ice cream is forecasted to grow significantly in the next few years with a compound annual growth rate of 5.4% from 2017 to 2023 ('Ice Cream Market Size, Share & Trends | Industry Analysis, by 2023', 2017). However, Twist is supplied and distributed in this organization differentiates itself in the market. It is important that

the customer has the ability to pick and choose their preferences in ice cream. That is why the current product is able to appeal to a large part of the target audience, however, this diversity also complicates the logistics of the product. By providing a wide range of choices for the customer for them to pick flavours to their own choosing, it enhances the experience for the customer. Europe is leading the ice cream market in the world. The market shows enough potential for the product.

The right quantity
The quantity of the different flavours (toppings) is a complicated logistical problem that needs to be addressed. An overabundance of the quantity will increase difficulties in the inventories, risking overflow of products (paragraph 1.3.9) . There is a risk that longer time in inventory will decrease the quality and freshness of a topping. While certain items in the supply chain are not critical, such as containers, toppings remain important. Due to the abundance of choices it will be difficult to balance the quantity of mixes between them all, because the demand of each quantity will differ. The seasonal aspect of ice cream is also something to consider in the fluctuations of products (paragraph 1.3.7).

The right condition
As mentioned before, the temperature during transportation and storage is a critical factor in the quality of the ice cream and toppings. It has to be constant low temperature, because temperature changes can make it too icey and grainy (Kroll, 2016). Especially when the product changes from transport to a warehouse, there is a risk of temperature fluctuation. Exposure to heat for example also leads to bacteria growth in ice cream. To minimize the transport risk of temperature change, there needs to be a certain waiting period before a room / transportation mode cools or make use of facilities which are permanently cold but this is expensive.
Furthermore, the toppings are sourced from different production facilities all having their own specific requirements to maintain the quality. The different materials sourced from all over the world are in need of specific care, which complicates the logistics issue.
The biggest safety issue that can be found within the product-market combination is that of hygiene. As we try to ensure complete consistency across all of the selling points, it is very important to keep the ingredients from getting infected with any type of other substance. Of course, for any type of food product hygiene should be seen as one of the main challenges in delivering a product, but in this case, hygiene can be seen as part of the consistency of the product, and should have some more focus.

The right place
The product needs to end up in the right place, meaning that the ice cream and topping needs to end up at the final retailer and consumer. While this idea sounds simple, it is difficult because there are certain facilities it has to go to first. This was explained in 1.2 and 1.3, so it is important that the products follow this supply chain.

The right time
The time is important for a logistic issue, however detailed planning is required to make sure the products arrive at the right time. As time is an important factor in the quality and freshness of the product this is an important factor. Therefore, coordination is important

to organize the logistics of the problem. The ability to track inventory and supply of products allows the supply chain to predict the need for a product beforehand. However, due to the difficulties associated with demand for ice cream and freshness this becomes a difficult problem to solve.

The right customer
The customer and their demand for ice cream is something that should always be in the eye of the company. Regular possibilities to acquire feedback from the customers should be implemented to make sure the product is marketable. Not only should the focus be on existing customers but also on the potential customers and why they have not gotten ice cream yet. This way, new markets can be explored as well. Another aspect of this, are the possibilities customers have in ice cream. By focusing on the competition and their good qualities we can use it to improve our current business model as a way to attract the right customers. The customer which the company wants to attract are the types who are not happy with standard products and want to create something for themselves.

The right price
The price at the moment has been set for €4 but it can fluctuate how much profit the company makes depending on the toppings chosen by the customer. There are price differences between the toppings, market analysis should determine if the current price is viable. Besides products, most of the costs are not necessarily fixed. For example, the logistics price also depends on the price of gasoline. The total procurement price is ultimately decided by a lot of different figures, adopted from Lambert (1975). Measuring all these different costs factors needs to be done in order to measure the profit of the company.

1.6. 4P's of marketing and their relation to the 7R's (A5)

In this section, the 4P's of marketing will be discussed related to the seven rights of logistics in the company's product-market combination. The 4P's of marketing will help the company line out strategic decisions for creating a competitive advantage (Singh, 2012). The marketing mix stands for Product, Price, Place, and Promotion and this combination of different areas helps firms out to influence the customer.
The concept was originally coined by Borden (1964), however, there used to be far more elements than the mentioned four. Only these will be discussed for simplicity. The goal of the marketing mix is to create insight into the variety of combinations for marketing.

The marketing variables have been filled in the table 2 according to the paper of Singh (2012), however the place specifics did not involve enough specifications to be useful. The variables of Bos (2013) have been used to supplement the variables for place. These decisions will be clarified further under table 2 with help from the theory of Borden (1964).

Table 2: The 4P's of Nice Cream

Product	**Price**	**Promotion**	**Place**
Design: clean branded cup / container focusing on 'happy' colors	*Strategies*: competitive pricing with luxury ice creams	*Special offers*: offers that encourage groups to come in (buy one, get the 2nd one half price) will encourage people to come together	*Distribution channel:* ice cream will be sold directly to the customer using retail stores, however the possibility of cooperation with other firms should be possible
Usefulness: provides good-tasting customizable ice cream for everyone	*Skimming*: release of 'new' hyped toppings can have a higher price than normal toppings in order to recover initial costs rapidly and to reduce the price later	*Endorsements*: endorsements from a diverse range of people targeting different audiences will boost sales as consumers follow the rest	*Locations:* high foot traffic locations such as stations, city centres, and beaches make ideal locations however the trade-off is costs
Technology: easy way to produce customizable ice at location	*Penetration*: penetration pricing can be used in 'hotspots' where there are a lot of different ice cream shops	*Advertising*: sponsoring 'summer' sports such as beach volleyball will target audiences who are more likely to buy, advertisements during off-season will help boost sales during weaker periods	*Market coverage:* while availability is important, seasonality plays an important issue. Pop-up stalls can be used to keep the cost down and increase coverage when it is actually needed
Value: good quality and fresh ice cream provided with a wide variety of toppings	*Psychological*: instead of 4 euro, the price will be 3.99.	*User trials:* free scoops of toppings can be provided to try and test	*Logistics:* from a distribution factory to retailing shops
Convenience: only ask for user-input for the toppings and the rest is done by the firm		*Direct mailing*: direct targeting on social media and email can help boost sales and provide loyalty bonuses if they sign up	
Quality: keep the products fresh, strict time restrictions to throw items away		*Leaflets/posters:* big obvious branded posters should be the same across all shops to associate the good quality of ice cream with all shops	
Packaging:		*Free gifts*: additional	

eco-friendly cups and minimalistic branding helps increase our reach to target audiences		gifts can be provided with large purchases. Also getting an extra topping in every 5th Twist you buy.	
Branding: associate the ice cream with happy vibes		*Competitions*: competitions help customer participation, example would be to ask which new topping would they want next.	
Warranties: assurance that if the ice is not up to standard to return it		*Joint ventures*: working together with other firms that have the same target audience can provide synergy, such as candy shops Jamin.	

Product

The policies and procedures which are related to the product, markets, and R&D form the most critical aspect in the mix. This is related to the right customer, right place, and of course the right product from the 7R's of logistics. The product in this case offers an innovative custom ice cream to the customers where the quality of the toppings and the ice cream are high. It is designed in such a way that it will be easily customizable while offering fast service to the customer from the order to delivering ice. The target market is selling to people who want to customize their ice cream, however location remains important as the consumer is not always in the mood for ice cream. By being available at important strategic locations you can increase businesses, however it will also lead to more location costs.

Price

Price policies are very complex to develop and understand due to high variety of different costs and fluctuations (Lambert, 1975). In the 7R's of logistics, Nice Cream set its price to 4 euro to deal with the uncertainty of procurement prices. However, there are grand visions that can be set in order to maintain a competitive edge. These will however depend on how the competing firms react to our strategy. Initially, competitive pricing with luxury ice cream shops will be important as they target much of the same target group with the quality and freshness. They form the biggest threat, it would not be logical to compete with ice cream from supermarkets because the costs for a customizable high quality ice cream product will be too high. Secondly, skimming can be used to recover costs from newly introduced toppings. By introducing new toppings every so often, the formula will not get stale. It can also generate hype in combination with the promotion strategy of asking for which topping to introduce. However, it is important that these costs will quickly be recovered due to the added complexity in logistics. The price can then be reduced after an initial period. Lastly, psychological pricing is also influential.

People are psychologically more motivated to consider 3.99 lower than 4 euro. Furthermore, consumers also look for discounts and bargains. This can be combined with promotion and logistics for synergy but by discounting non-wanted toppings it will be easier to get rid of supply and attract more customers.

Promotion

Special sales plans and creating awareness are important aspects of promotion. Promotion deals with a lot of the logistics mentioned in 1.5, however, product and customer especially is a big one to match. By understanding the market audience it will be possible to create specific promotion materials to enhance the demand for the product. As mentioned in Table X, there are a lot of different methods and tools that can be used to achieve this goal. This will focus on the main goals of the promotion aspect of the firm. Firstly, it is important that the ice cream product will be associated with good memories. One way to achieve this, is to create special offers where groups of people (2+) can benefit from this. This will add social pressure between groups to actively go to our retail shop. Secondly, endorsements, advertisements, user trials, direct mailing, posters, and free gifts are different ways to target the customer. To become a major player in the ice cream market, it is important to use all these different channels. As they are able to (indirectly) influence the customer's ability to purchase. Advertising during the off-season might help keep the brand alive in all seasons, especially in cold days ice cream will not be an attractive good. The user trials of free scoops offers 'lock-in' of the customer as well when they have tried and tested something. Thirdly, competitions also can help the firm create new ideas from user-feedback. Similarly to the Lay's flavor competition it helps to attract buzz around your product (O'Rourke, 2015). Lastly, because seasonality plays such a big problem in this product-market combination, joint ventures might be helpful. This way, during the off-season another synergistic firm might focus on their own product and during the on-season it can supplement their businesses with our ice cream. So they can attract more people in general. Interesting partners for such a joint venture would be Jamin, supermarkets or snack bars. It should be clear that from the analysis of the firm at the moment there lies a lot of opportunities in promotion to increase the demand for the product.

Place

The end location of where the product is sold is critical to the type of business in the firm. As discussed before, the supply chain and the remarkable characteristics of the product make this aspect quite difficult to manage. However, the marketingmix could provide a solution for this. At the moment the distribution channel focuses on selling the product directly to the customer in retail stores. These retail stores can be owned from the firm itself, or the firm supplements other retail stores with the ability to offer our customized ice cream. There will be a variety of stores which are outsourced in essence. This allows for better availability in high traffic locations without increasing the cost too much. The market coverage will be higher than usual, especially when pop-up stores / stalls will be added during times where there is high demand. These temporary locations can help with the increased demand without suffering from losses in the off-season. By applying shared and temporary locations the customer will always be able to buy the product near them.

1.7. Transport modality (A6)

The dominant modality type within the logistics of Twist ice cream is road transport. The supply chain is designed in mind with the difficulties associated with a cold (supply) chain, meaning that temperatures should be at a constant low degree. Trucks have been chosen as the mode of transport because of the efficiency of trucks protecting perishable foods (Ashby, 1987). The transportation of ice cream must be quick and cheap since it is a low-value product and consumption is fast. There are also several steps before the products arrive in stores. When there is unexpected demand, these steps could create delays that decrease the consumer satisfaction, for example because of missing toppings. High flexibility is important in order to deal with such unexpected demand. Road transport fits into these characteristics because it is cheap, flexible and relatively quick in short distances. Important to repeat is that reefers are the most logical option, due to a low temperature that is needed.

Delivering of special fabricated and unfabricated products to the manufactory is transported domestically or within Europe. General products and fruits are supplied by local suppliers. So, the transportation of products from suppliers to manufacture is mostly about short distances. The end-products are domestically transported as well which means that the transportation of Twist ice cream is mainly over short distances. This makes road transport a logical choice. Only a handful of toppings finds its origin in other continents, such as pistachios, for which boats can be used.

The transportation of the products can be realised with small trucks because there is no transport of high volume products. Toppings and the basis for ice cream could be transported with relative small cars. However, the quality of products must be kept at a certain level. That means refrigerated and hygienic trucks must be used during transportation.

1.8. Current logistical control center (A7)

Managing a manufactory nowadays requires companies to make decisions about systems that improve the efficiency of production. Therefore, choosing the right system is extremely important and high implementation costs are taken along. In the last decades, some system approaches have excelled: materials requirements planning (MRP-I), manufacturing resource planning (MRP-II), enterprise resource planning (ERP) and Just in Time (JIT). These systems differ from each other. A description of each system approach will be provided in the upcoming paragraphs.

1.8.1 MRP-I

MRP-I is namely about planning which raw-materials are needed at what moment in time. By calculating and automating raw materials, semi-finished products and finished products demand can be measured. MRP is therefore manufacturing-centric and focuses on controlling the level of materials required in the production process.

The main objectives of MRP-I are maintaining minimum required stock in the store and to ensure that raw materials are available for production and finished goods should be ready for on-time delivery

1.8.2 MRP-II

In comparison to MRP-I, MRP-II does not only take production capacity of raw-materials into account but also the planning of the production process, in which humans play an important role. The production capacity of both humans and machines is important to consider, these are the so called resources. Aspects like manufacturing, human relations, finance and production are also included in the system. MRP-II is therefore a broad term.

1.8.3 ERP

ERP manages all significant departments. It includes all core business functions and processes. In addition to inventory and production, ERP also provides financial and accounting management. ERP can provide information about all the activities in the company, such as transactions, accomplished operations and others. The status of activities in these different departments can be seen in ERP. The main advantage of ERP in comparison to MRP systems is that ERP enables employees to work internationally together and collaborate with colleagues, suppliers and outsources.

1.8.4 JIT

JIT strives to reduce work in progress to an absolute minimum. JIT's core objective is to obtain low-cost, high quality and on time production. Companies use this strategy to increase efficiency and decrease waste by receiving goods only when they are needed for the production process in order to reduce inventory costs. Therefore, correctly forecasting demand is very important. It is very important that suppliers are reliable and machine breakdowns do not occur.

1.8.5 Comparison and recommendation

For Nice Cream it is important to focus on important criteria before implementing one of these system-approaches. Forecasting as precisely as possible is one of the most important criteria for Nice Cream. Ice cream demand differs over the four seasons and it is very important to forecast demand very closely to prevent over- or underproduction. Firstly, It might not be appropriate for Nice Cream to maintain an ERP system approach due to the fact that they produce a relatively simple product, while ERP systems may be more suitable for more complicated business models. For an ice cream selling company the JIT approach does also not seem convenient due to the fact that ice cream must be in stock before the customer arrives while the arrivals of customers are randomly distributed. It is not possible for Nice Cream to instantly receive raw-materials that are not in stock after an order has been made. This JIT strategy is mainly used by companies that produce expensive items and aim to reduce the risk of over producing. MRP-I focuses mainly on the production process of raw materials, while MRP-II also takes human resources into account. In MRP-II the production capacity of both humans and machines are included for the production of ice cream and toppings, which can then

be finalized at the selling points. Moreover, implementing a MRP-II system does not only include the production process, but finance and forecasting are also presented in the system. For an ice cream selling company that sells one product with different variations, the MRP-II seems to be the best fit because the focus is getting the right ingredients at the right place, at the right time while human resources are also considered in the production process.

1.9. Logistics Business Processes (A8)

The business-logistics processes consist of inbound, outbound and reverse logistics processes. The outbound logistics process is the most dominant process of the business. Since the customer is very crucial in the consumption of the different types of ice cream and toppings. For the satisfaction of customers, the supply must satisfy the demand. As the shops have products that are out of stock, this must be refilled quickly. Hereby, the characteristics of ice creams of fluctuating demand could create challenges. For instance, unexpected nice weather could create higher demand than expected. This could result that stores are out of stock for products. So, the outbound logistics process must be quick and responsive to demand.

Inherently, the inbound logistics is important as well because the manufacturer must keep the products ready when it is requested by the shops. For this, the manufacturer has to contain the products and prepare them for delivery to the stores within a day. On the other hand, when products are purchased too early or too much, this could create quality losses in products which transforms into economic losses.

Reverse logistics includes a small part of the business-logistics processes. After cups are used, this could be recollected in order to recycle it. This means that consumers must throw away their cups in bins, which are located in stores. These cups can be collected and removed to an external recycling industry. For the ice cream itself, reverse logistics are completely absent. It could happen that dissatisfied customers will ask for a refund, but their Twist will then be unusable for further selling.

1.10. Logistics in demand (A9)

Ice cream, as mentioned before, is a product with seasonality in its demand. The demand is very dynamic, however, not only seasons play a role. It could be influenced by the daily weather as well. For Nice Cream to be able to respond to these fluctuations, there needs to be an assessment of the response of the company.

Simatupang & Sridharan (2002) argues that in a competitive market companies are only credited if they are able to deliver the products on time with good quality. As Nice Cream, the window of opportunity for demand is very small as well. During this time, the product needs to be available to everyone, however short-cycle products make forecasting very difficult. A way to combat the difficulty of prediction is to increase collaboration and specifically information (Fisher, Hammond, Obermeyer, & Raman, 1994).

Fisher et al. (1994) gives critical information regarding this collaboration process to meet demand. These will now be discussed in relation with Twist. The first important thing is to make sure that accurate responses (data) are recorded in the supply chain process. Simply, it is important that there is a record of lost sales and a record of predictability of the product. To account for lost sales, Nice Cream can offer discounts if a certain topping is not available. This will attract customers to still come to the store, while the company can log these discounts as a sign of lost sales due to unavailability of that topping. It can also become clear that certain toppings will generally do well while others might differ due to hype or promotions. By having better records of the sales in general, a better predictability model can be created.

While better data is always appreciated, from a top-down perspective it is also important that the planning and system integration is done correctly. Schary & Skjøtt-Larsen (2001) discuss this with an information system that is integrated into the supply chain so that upstream and downstream has enough information of each other. The paper of Stadtler (2005) discusses what to do with this information, namely the management and the advanced planning of the supply chain. The different aspects, such as demand, distribution, transport, production, scheduling, and requirements planning, need to be adjusted to this flexible demand. For the mid-term to long-term planning it is required that the supply chain of Nice Cream is easily adjustable in certain toppings.

1.11. Organizational structure (A10)

In order to get a view on how the organization is structured within Nice Cream, an organogram has been created. For Nice Cream, the structure is relatively straightforward. The organization can be seen as a combination of marketing and production, where marketing is focused on sales, product publicity and everything that

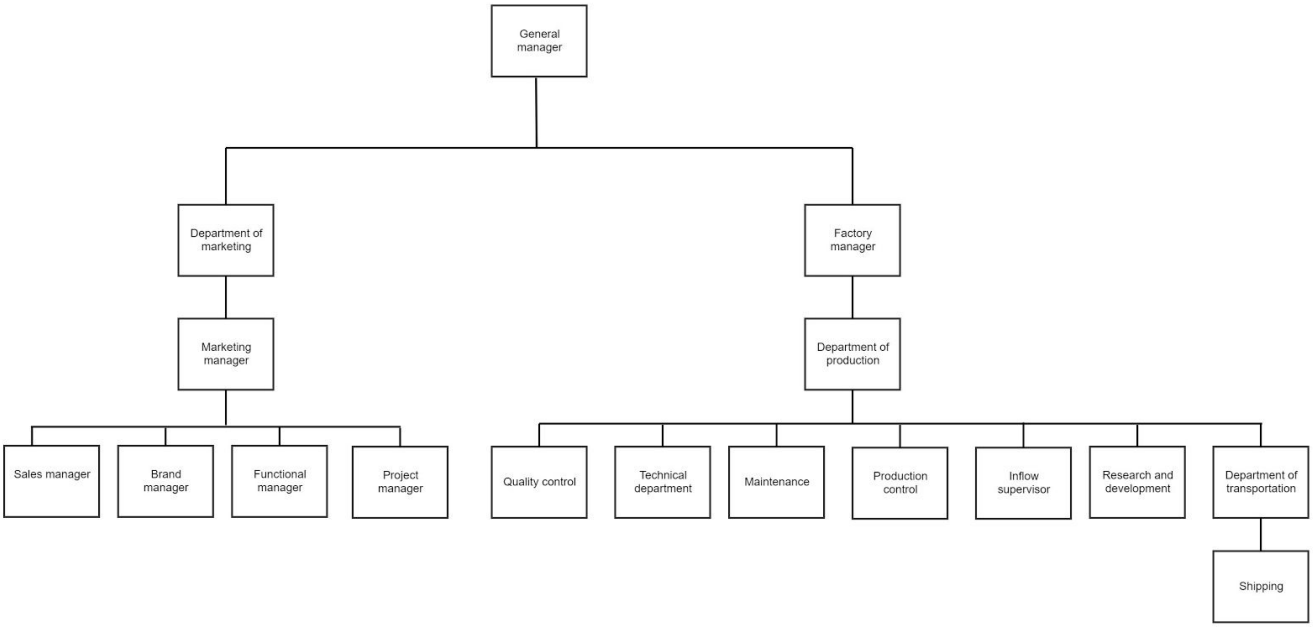

Figure 5. Structure of the organization of Nice Cream

does not include the physical product. On the other side of the organization, the product is lead from the origin to the selling points. As quality is one of the most important aspects of the company, a quality control section has been selected that focuses mainly on checking and ensuring consistent quality. Aside from that, the transportation department has a separate section, as due dates are short and efficiency in transportation is a must within the company.

1.12. Performance metrics (A11)

In order to give meaning to processes, performances and progress, it is necessary to have certain covering metrics in place. In the case of Twist, these performance metrics can be separated into two groups. The first group is that of metrics that show how well the product is doing in the outside world, focussed on sells and the end result of the supply chain. The second group of metrics focuses more on the process that leads to these sales of the product.

In figuring out how well the product performs in the market, total turnover and profit can be measured. From these 2 metrics, also the total costs can be measured and kept track of over time. This will show change in performance over time, but also relative performance compared to opponents in the market. These market performance indicators can give insight into how well the product is received by customers, but this customer satisfaction could be measured more thoroughly by looking at retention rate, or by giving the opportunity to give reviews and ratings to the customers. With a rating system, it should always be kept in mind that the opinions present have an extremity bias, as only the happiest and the least happy people will put effort in writing a review. By looking at the usage of the different toppings, it can become clear what toppings are favorites and which are almost never used.

Taking into account how well the logistics and the supply chain perform, additional performance metrics are needed. Next to the end results, the different processes that take place can also improve how well the company performs. Although these metrics do not immediately show improvements, they will indirectly increase the metrics related to the end result. By looking at the accuracy of production, transportation and compilation of ingredients, it can be seen how well the product is being handled from the first supplier to the end customer. Accuracy in the case of Twist, would be about the amount of ingredients that reach the selling point and are suitable for consuming. This should be related to the amount of ingredients that enter the supply chain in the first place, to calculate the percentage of efficiency. To emphasize the transportation part of the supply chain, the total amount of kilometers that trucks have to drive can be kept track of. By optimizing this metric, the best location for selling points and the distribution centre can be pinpointed. Combining these optimal distances with the value of the selling points (how much profit they create), an optimal network can be created where certain selling points could be far away, but they would have to make enough profit to cover for this distance.

1.13. In- and outsourced activities (A12)

The activities that are in- and outsourced by Twist are described in this paragraph. The main activities that are executed by Twist are: collection of raw materials for ice cream (1), production of frozen, solid, ice cream (2), the distribution of raw-material for frozen, solid, ice cream to the shops (3), production of toppings (4), distribution of toppings to shops (5), collection of fresh ingredients (6) and collection of cups for ice cream (7). It is

important to distinguish in- and outsourced activities due to the fact that complete production by Twist of all materials might not be convenient and profitable. Raw materials to produce ice cream could be collected by a department within Twist or being purchased from another company that produces these raw-materials, like milk, cream, sugar, etc.). These raw materials should then be turned into solid, frozen ice cream that can be transported to the Twist shops. It is most convenient if this activity is done by Twist themselves. In the shop, this solid ice cream can be converted in machines to ice cream. Transportation of the frozen, solid ice cream to the shops can be executed by either Twist or another transportation company.
Twist uses many toppings, many of these can be produced by Twist or being purchased from other suppliers. Although, transportation of the toppings to the shops might be executed by the same shipping company or Twist themselves, demand per shop might differ and thus different toppings could be transported in different quantities to different shops. This order picking process should definitely be done by Twist, as they have the needed data on consumption patterns. Cups, machines and spoons should be purchased from other suppliers in order to avoid production, maintenance and installation costs. These can be outsourced as they have a low influence on the quality of the product, which is the main goal.

1.14. Conclusion part A

This chapter has given an overview of the characteristics of the Nice Cream twist, which puts the product-market combination into perspective. In the different paragraphs, Twist has been shown to be a product that needs a fast and special life cycle, as due dates and temperature are critical. Moreover, the way in which Twist offers a consistent, but personalized experience for customers, many opportunities can be seen in using data for an efficient flow of toppings through the supply chain. By calculating expected demand by selling point based on data of previous years and other selling points, prepared compiled packages can be created to minimize the time needed before an order can be shipped to a selling point. Optimally, the systems of selling points are connected to the distribution centre, which means it is known at all times which selling points needs what toppings. Also, this part A has shown that Twist is very dependent on refrigerated trucks (reevers) in their transportation, and thus also on traffic jams and such. Twist has a well thought business model with a large product life-cycle, but has to keep the product exciting enough for customers to keep coming back.

B. Supply Chain Analysis

In this chapter, the supply chain of the Nice Cream Twist will be analyzed. This analysis will include both the detailed supply chain itself, as well as the content and the environment of the product-market combination. Using existing literature, a framework will be presented that both fits the product-market combination and is useful to analyse Twist thoroughly and completely. The analysis can then be used to find improvements for Twist. In paragraph 2.1 the framework will be presented and for each of the parts of the framework, a source and an explanation will be given why the part is necessary in the framework. The paragraphs after that will each tackle one of these parts and the last paragraph will conclude on the findings.

2.1 Analysis framework

In order to get a complete overview of the supply chain of Twist and its surroundings, the framework in Figure 6 has been created. The framework takes into account 4 aspects that together cover the company and its environment relatively well. Product, People, Process and Performance, together form the 4P framework, which will be used to measure how well Twist is doing. Each of these building blocks covers multiple “tiles” found in literature that together shape an understanding of how the P is managed within the product-market combination.

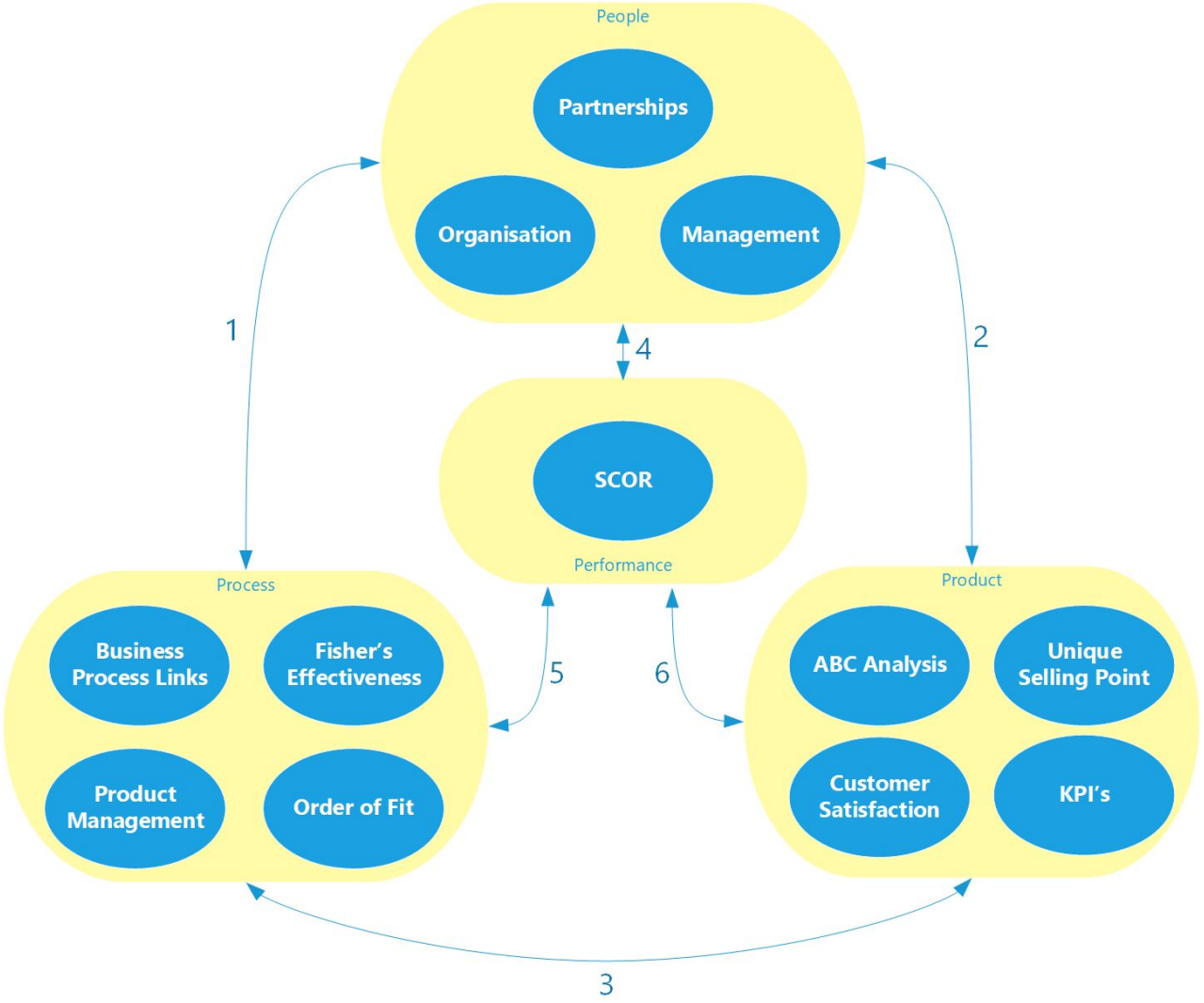

Figure 6. The 4P's framework for evaluating supply chains.

2.1.1 Building Blocks

For the People building block, the framework will discuss the partnerships that Nice Cream maintains. Next to that, the inner organization is discussed as well as how this organization is managed. Note that each of these elements is about the roles of different people within the company and the supply chain. For people, we decided not to look into clusters, as these are not easily achievable in the market for ice cream. As ingredients come from all over the world to ensure high quality, it is unlikely that a geographical cluster is profitable.

The Product building block is set up by the overall strategy that Nice Cream has to stand out in the market, but also to connect to customers as much as possible. Next to this unique selling point (USP), the building block focuses on KPIs that measure how well the chosen strategies work in the market, by measuring how well the product scores. The last part that creates the Product building block is the way the connection to the customers is established. For the product, we decided not to focus on additional different products or large adjustments to the current product of Twist. As the product already is

based on a variety of toppings and consistency to create an image in the minds of people that corresponds to “Twist”, it is unlikely that adding products or changing the product dramatically will be profitable for Nice Cream.

The Process building block focuses mainly on the supply chain of Twist, by looking at the steps taken from initial supplier to end-customer. This includes what is in- and outsourced, but also how well the connections to the other parties in the supply chain are set up. Next to that, it discusses what type of supply chain is most effective, based on the type of product, using the framework of Fisher (1997). Thirdly, a balance should be found between leanness and agility within the supply chain, by looking at the optimal product management. The last tile of the building block is the order of fit, that discusses the different actions within the supply chain, and how (well) they are interlinked. In processes, we do not look at changing the scope of Nice Cream either by broadening it (insourcing) or by doing less (outsourcing). As data is important for an efficient way of doing business, the current scope of Nice Cream can be seen as most profitable. By creating the ice cream ourselves, quality can be assured. The connection to selling points is enough to ensure efficient deliveries.

The final part of the framework is about the performance of each of the other P’s. Using the Supply Chain Operations Reference (SCOR) model, the strengths can be pointed out within the supply chain of the product, and the (needed) geographical connections can be seen. Of course, other ways to measure performance exist, but using more than one or interlink different methods would take away the comprehensibility of the method.

Note that the smaller tiles of each of the P’s most often cover more than only the P they are placed into. For example, the effectiveness in the Process also has to do with the Product and the order of fit covers actions across the supply chain next to looking at actions that are about the product. Another example is the customer connection that influences the processes that are performed within the supply chain. For simplicity reasons, we have placed the tiles in only one P, however, this does not mean that the tiles are independent.
The opposite is actually shown by making use of the bidirectional arrows. As can be seen in figure 6, each of the P’s is connected to the other ones. This shows that the type of product a company is dealing with, is related to how the supply chain should be set up, but also to how the organization should be implemented. For example, innovative products might need a large research and development department, but also a relatively flexible supply chain. Also, SCOR makes use of the current way the other P’s are performed, but also can pinpoint improvements, which means an infinite communication between the P’s takes place.

2.1.2 Relations of Building Blocks

To give a better insight in the way in which the P’s are connected, each of the relations will be explained in bullet points, per number arrow.

1. The link between people and process comes from the thought that the needed processes will influence the way in which the company should be set up

organizational. As processes are divided into marketing related processes and sale related processes, it would make sense that also the management is split up in these two categories.
2. The relation between product and people has to do with responsibilities. As certain aspects of the product should be assured by the company, it is important that certain people are also responsible for these parts, such as quality consistency.
3. Process and product influence each other because the kind of product that is being sold influences all the steps that have to be done before the product is ready to be sold.
4. The P of people can be seen in SCOR in the business scope. Here it is determined what exactly should be done by Nice Cream, and where the boundaries are. This influences the way that management should be set up.
5. Processes come back in SCOR in the thread diagram and the geographical map, where it is shown what processes lead to which other processes and where bottlenecks exist.
6. Lastly, the product can be seen in the performance positioning in SCOR, where key performance indicators can be found, but also weaknesses.

The following paragraphs will discuss each of the P's mentioned in the framework, and will elaborate on each of the tiles within these P's. Naturally, we end with the Performance, that will combine the other P's and conclude on the current performance of Twist. These conclusions can then be used in chapter 3 to pinpoint possible innovative improvements of Twist using a SWOT analysis.

2.2 Product building block

2.2.1 Unique selling point

To make sure that Nice Cream can retain its unique position in the market, it is important to understand the underlying strategy that is being used in order to differentiate and remain efficient. Porter (1980, 2008) has found that a balance is needed between cost leadership, differentiation and segmentation. Cost leadership means that a firm focuses completely on reducing the price of their product, by continuously increasing efficiency within the company. The strategy of differentiation is to offer uniqueness in a product that no other firm offers at the moment. Having uniqueness inherently means that efficiency is less important, as the price can be set relatively higher due to the low amount to supply in the market. The third possible strategy which is referred to as segmentation or focus, puts a small scope on the market and aims at only a small set of customers. This strategy is particularly useful for small firms that can not survive to compete with big firms.

With the Twist, Nice Cream can be found mostly in the differentiation corner, as it is the only product that has both high quality ingredients and a wide variety of toppings. By having this wide variety, the opposite of segmentation is being done. Because there is something for everyone, the customer set is very large. In order to attract as many

customers as possible Nice Cream has to reduce the price as much as possible, but this should not be at the cost of the quality. Therefore it can be stated that Twist is a slightly cost efficient, differentiated product. By focussing mainly on one of the three strategies, Nice Cream can specialize relatively well on this one method. This can be seen as an advantage over firms that chose to pick a combination of strategies, which means they will need to spend their resources in a distributed fashion.

2.2.2 Customer connection

In addition to the positioning of Twist considering competitive advantage (paragraph 2.2), it is also important to focus on the way in which Twist approaches its customers. Porter (1996) distinguishes three ways specialize in this way. Variety based firms focus on a small set of needs that comes from a large set of customers. At the other end, need based firms focus on a large set of needs for a small set of customers. Another strategy is to base the firm on access to customers. This strategy targets customers based on a certain way of approaching them. The firm chooses a set of activities that can excellently access a subset of customers, which might have the same needs as other customers.

In the case of Twist, clearly the variety based strategy is dominant. By focussing only on dessert and/or snacks for customers, only a part of their need is fulfilled. However, customers are not segmented in any way, excluding both access based as well as need based from the strategy.

2.2.3 KPIs

Based on the performance metrics that were created in part A of this report, several useful Key Performance Indicators (KPIs) can be created that together give an overview of how well the Nice Cream Twist is performing in the market. As has been stated before, these KPIs can be separated into two groups of indicators. The first group has its focus on the end result of the sales of the product and merely looks at a stale moment in time. The second group of KPIs looks at the process that lead to these end results and is more of a continuous view on the company.

Result related KPIs

The first metric concerning the end result is that of turnover, profit, and total costs made by the company. Scanning these 3 metrics over time can show the improvement of the company, but also how well the company is performing compared to the other players in the market. A promising metric to measure how well the company is doing compared to other companies of different sizes is the Return On Investment (ROI) (Ferris et al., 2010). ROI accounts for company size by dividing the profit over the costs made. This way the unit of ROI is profit per euro of cost made by the company. To support these business focussed metrics, some metrics should be in place to measure the quality of the product and the happiness of the customers. However, these two performance metrics are hard to measure in a quantitative way and it can even be stated that there is no single metric that points out these metrics. They should be seen as latent variables (Aigner et al, 1984). A way of keeping track of the set of customers, is to keep track of

the retention rate of these customers. When the size of the set of returning customers is known, this is an indicator for the latent variable of customer happiness. Surveys could be used to keep track of the happiness of the customers concerning the quality of the product. Which would also support the information needed for a smooth and adaptive demand satisfaction.

This can also immediately be seen as a metric. The usage of each of the ingredients can be compared to each other to find out favorites and runner-ups, but also failing toppings that might have to be changed. To support this metric, selling points should keep track of the percentage of each ingredient being consumed relative to the amount of each ingredient that has not been consumed by the time it reaches its due date.

Process related KPIs

Next to managing the results of the supply chain, it is also important to focus on the process that eventually leads to these results. Although it can be argued that results should be leading, improvements in the process can definitely lead to better results as well. Therefore it can be fruitful to also look at the logistics and the process of the supply chain of the product-market combination.
A first indication of how well the logistics are settled within the supply chain is closest to the result. By looking at the accuracy of production, transportation and compilation of ingredients, it can be seen how well the product is being handled. Accuracy in this sense would be the amount of ingredients that reach the selling point and are suitable for consuming divided by the amount of ingredients that enter the supply chain in the first place. This gives an indication of how much is lost and about the efficiency with which is worked within the supply chain.
To emphasize the transportation part of the supply chain, the total amount of kilometers/hours driven can be helpful in deciding where to locate the inventories and the distribution centre. As has been mentioned in paragraph 1.3, the distribution would be most fruitful being in the centre of all the weighted selling points. Weighted means in this case that the number of sales per selling point are taken into account to measure the distance to the centre. Looking at time needed to transport rather than the distance in kilometers can add common traffic jams to the decision arena.

The third step of interest is the compilation of ingredients within the supply chain. Measuring the average time it takes to compile a certain order set by a certain selling point, together with the transportation time gives an indication of time lost in compiling and reordering the ingredients. This is a step that could benefit from improvements in the future, because it is essential to perform it as fast as possible. As has been stated before, it is hard to know the exact orders before they actually arrive at the distribution centre. That is why a quick response time and compiling is so important.

2.2.4 ABC analysis

The ABC analysis provides a review of the range of products in an organization. Since this report is only focused on the ice cream produced by Nice Cream, we will compare the different flavoured ice creams and toppings. The ABC analysis is able to determine

how much percent of the overall turnover has been created by a certain flavoured ice cream (chocolate, vanilla, strawberries). Nice Cream can be seen in the great area of C (figure 7), where the turnover is almost equally divided over the different products that are produced. Although, fruit toppings might have an increased consumption in summer periods, this is nullified by the increased demand for nut-based toppings in winter times. Also, it can be stated that strawberry ice cream might have an advantage over the other two possibilities but this difference in consumption is not large enough to run the firm as if it were a B category.

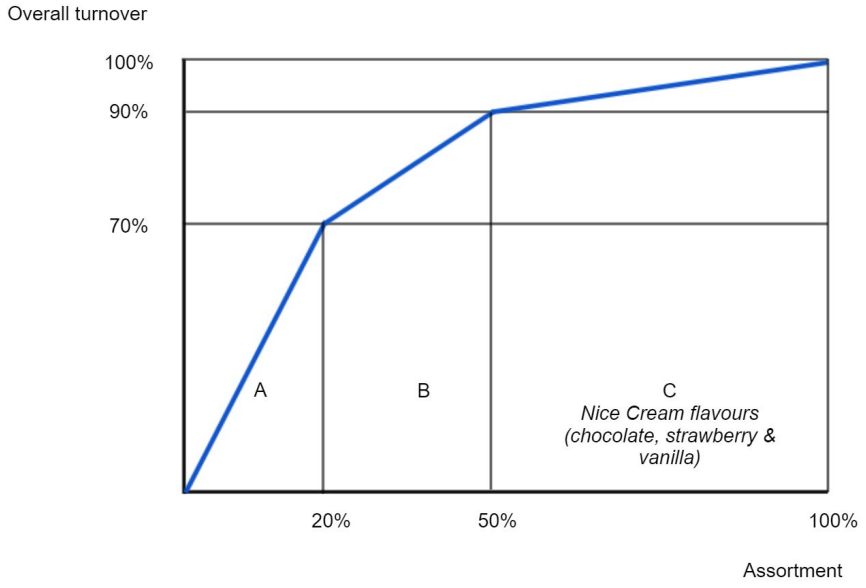

Figure 7: ABC analysis for Nice Cream

2.3 Process building block

2.3.1 Business process links

In order to understand the processes that are involved in the logic chain of Twist, it is important to know the type of links between business processes since not each link has the same importance (Lambert, 2014). The business process links can consist of several types: managed process links are links that are of high importance because the focal company wants to integrate and manage these links; monitor process links are links that are monitored by the focal company, since they are not as critical as managed links but it is still important that these are managed well; not-managed process links are links in which the focal is not actively involved in managing or monitoring it.

The focal company in our case is Nice Cream who manufactures and distributes Twist. The business process links between involved companies are visualized in Figure 8**.** These links show the degree of importance for the local company to manage or monitor activities. Figure 8 shows that the processes between the factories and retailers/shops are crucial. The links to the factories are very important as well since these links are the basis for the manufacturing process. Especially, the links to the ice cream manufacturer

must be managed because the degree of substancibilaty is much lower compared to the toppings. When failures occur in the process of topping, it could be substituted by another topping because there is a wide range of toppings. However, this is still not good for the image of the company and this is why these links must be monitored. A failure in the process of ice cream is more crucial since a lack of ice cream will deteriorate the image of the company.

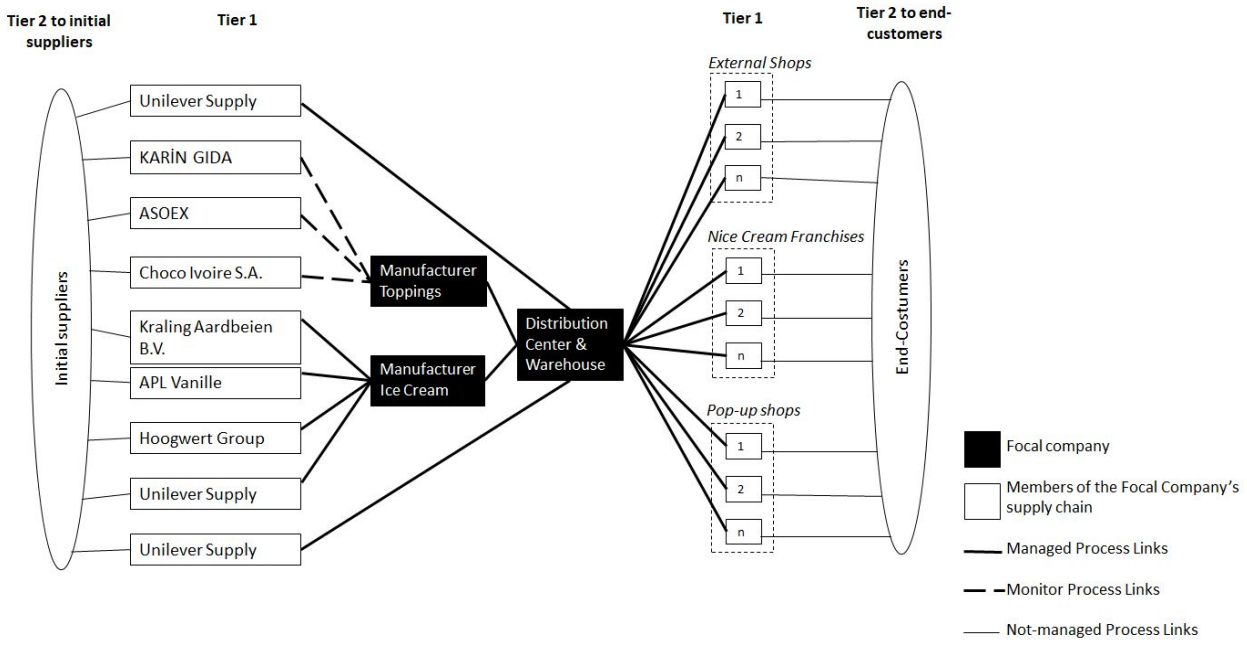

Figure 8. Business process links of Twist

2.3.2 Order of fit

To strengthen the strategy of a company, the performed activities should be intertwined and certainly not negate the effect of each other. The activities should be part of a fit to create a sum that is bigger than its parts (Porter, 1996). Porter (1996) describes three types of fits: The first-order fit (simple consistency between activity and strategy of the company), the second-order fit (activities that are reinforcing), and the third-order fit (optimisation of efforts).

Nice Cream follows a combination of order fits. Firstly, there is a certain degree of the first-order fit due to the consistency of activities and the overall strategy of Nice Cream. Nice Cream has a differentiative strategy that provides high-quality ingredients and a wide variety of toppings. The activities that are performed are also based on keeping the product and ingredients fresh and keeping the variety of toppings high. Secondly, there is a second-order fit because there is a certain level of reinforcement activities as well. For instance, Nice Cream decides to provide Twist in external shops such as Jamin. Customers who intend to buy candy or other sweets can be seduced to try Twist as well. After trying a Twist, people are more likely to purchase twist when they particularly want to eat ice cream. It is also more likely that people go to Nice Cream shops since they are the brains behind twist.

In the processes that take place within the supply chain, there is a strong relation to the mission and vision of Nice Cream. Consistent high quality for everyone is ensured by putting focus on quality controls and insourcing the production of ice cream. Also, keeping track of the usage of toppings ensures sufficient supply of each of the toppings so no customer is dissatisfied because their wanted topping is not present.

2.3.3 Fisher's effectiveness

The framework of Fisher (1997) discusses the right supply chain for the right product. Using the framework, Twist would fall into the innovative product due to the unpredictability in demand. With a very short product life cycle, due to the quality of the ice cream, and the high product variety in toppings also leads to high contribution margins. A nuanced view on this topic however, is that the distinction between a functional and innovative product is not always clear. For example, ice cream in its old form would most-likely fall into functional whereas the innovative part comes from the varied toppings you can choose yourself. Due to this distinction with the traditional ice cream manufacturers, Twist is considered to be innovative. With an innovative product also comes a responsive supply chain.

The market-responsive supply chain primary purpose is to quickly respond to unpredictable demand. This leads to a few major strategies for different processes in the supply chain, for example manufacturers should create more products than the expected demand to deal with this uncertainty. However, for Nice Cream this might not be the best solution to apply, as higher supply of the product could also lead to waste. Another strategy would be to invest in reducing the time needed to create the products, where selecting suppliers based on speed, flexibility, and quality is a must. It is therefore important while discussing the supply chain to keep in mind the strategy for this specific product.

2.3.4 Product management (lean versus agile)

In designing the right supply chain for the product at hand, it is important to look at how "lean" or how "agile" the supply chain should be. In short, leanness means that a supply chain is highly predictable, meaning processes can be performed as efficient as possible. Due to a low variety in products, demand and changes over time, the product is stable and can be processed without any waste of time and effort (Taylor, 2005; Cooper 2017). Waste can be separated into 7 different categories, namely overproduction, waiting, transportation, inappropriate processing, unnecessary inventory, unnecessary motion and defects. By eliminating these 7 types of waste as much as possible, a lean supply chain can become efficient to its full potential. This should only be targeted by lean companies, but should be kept in mind by any company.

Agility in a supply chain belongs to situations where predictability is low and it is unknown how demand, products and time will influence the processes. There should be space to maneuver through changes over time, to which should be reacted in a flexible manner (Christopher & Towill, 2001; Bradley & Nolan, 1998). In this type of supply chain,

the focus is more on reacting to change easily than on being as efficient as possible as the latter is impossible in a changing environment. Lee (2004) points out that companies should be agile, adaptive and aligned in order to perform optimally. Companies should be able to respond to short time changes in demand, which could happen due to a sudden change in weather in the case of Nice Cream, the partners should eye the same goals as the company to ensure improvement along the whole supply chain and the company should adjust their supply chain to changes in the market.

As the Nice Cream Twist focuses both on quality and service for customers, it is logical to implement the agile point of view into the supply chain. This will ensure Nice Cream to deal with sudden changes in demand, remain a large variety of toppings and it also fits with the needed information enrichment to ensure an efficient and well-performing supply chain. Using the paper of Mason-Jones et al. (2000), it can be seen that Twist does not fit in an agile system in all of its characteristics. As part A of this report has shown, the product life cycle of Twist is very long, which fits better with a lean way of working. However, as will be elaborated upon in part C of this report, Nice Cream in reality creates several small product life cycles next to the main cycle, by introducing new toppings that revives Twist over and over again. The other part where Twist could use parts of a lean supply chain, is the way of forecasting, which can happen relatively algorithmic, using the right data. Because Twist should focus on preparing most of the deliveries to selling points even before orders come in, algorithms in place will predict the needed demand by selling points beforehand, using data on previous years and the development of other selling points that might be further in the product life cycle and thus can return information on the way Twist develops. Looking into the variability of both demand and supply, it can be stated that Twist should be looking merely at an agile way of working, as variety is part of the business model. Moreover, the inherent small life cycle of the ingredients makes agility necessary in keeping a small inventory and fast adjustments in deliveries.

2.4 People building block

2.4.1 Organization and management

In this section the organizational structure of Nice Cream has been described (see Fig. X). The general manager is on top of this hierarchical structure. The organization of the company has been distinguished in the department of marketing and the factory department, which is led by the factory manager, the same applies to the marketing manager for the marketing department.
The marketing department exists of the sales manager, brand manager, functional manager and the project manager. In Nice Cream, the sales manager is occupied with leading and guiding a group of sales people within the organization in order to set goals, build a sales plan and data analyzation. The brand manager monitors marketing trends and competitive products in the same sector in order for Nice Cream to resonate with the current and potential consumers. The functional managers within Nice Cream are responsible for how functions within the organization are carried out and how their

employees carry out these functions. The organization exists of different areas of speciality, such as finance and marketing. The project manager is responsible for planning and procurement within Nice Cream.

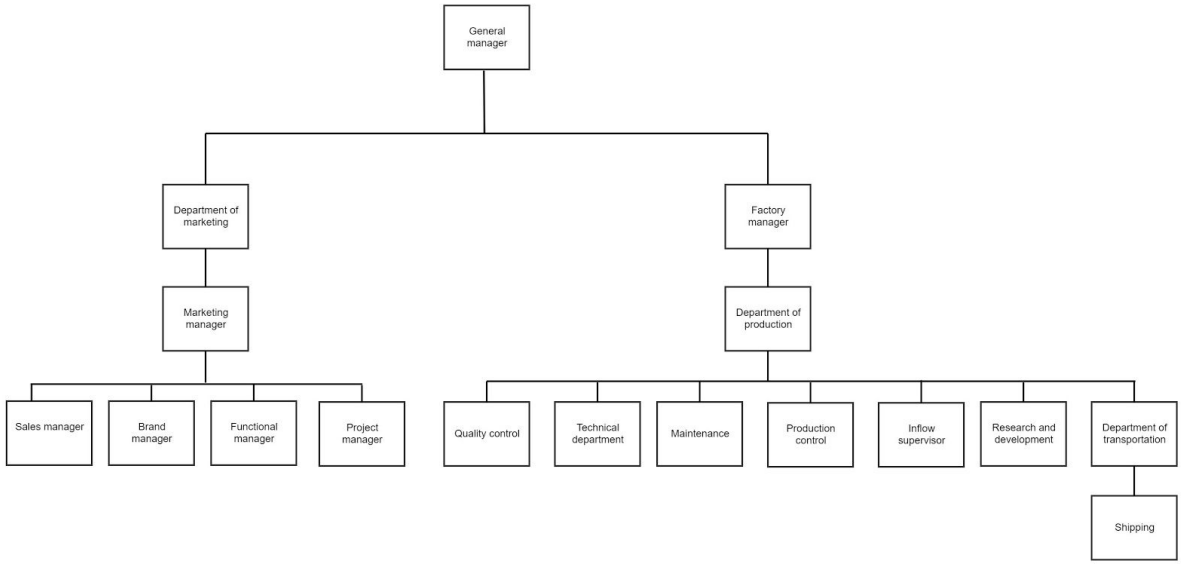

Figure 9. Organizational structure of Nice Cream

The department of production exists of quality control of the machinery and ice cream. The technical department carries out machinery for the production of frozen ice cream and toppings. Production control monitors and controls the production of ice cream and toppings in collaboration with the inflow supervisor. Research and development experiments with new potential ice cream innovations and toppings. Finally, the department of transportation is responsible for shipping of ice cream and toppings to the Nice Cream shops.

2.4.2 Existing partnerships of Nice Cream

At this point, Nice Cream has a partnership with several external shops that sell Twist as one of the products, such as Jamin or snackbars. Currently, the only other connection to external parties takes place at the sourcing of ingredients and the transportation steps in the supply chain. As a large variety of toppings can increase the likeability of Twist, there is opportunity for partnerships with for example producers of chocolate based products. For example Mars or M&M based toppings could be added to the selection of toppings in selling points to increase both the product range of Twist as well as the value, because of the fame of these partners.

2.5 Performance building block

The *Supply-Chain Operations Reference Model* (2008) is used to describe the complex supply chain processes. It is useful to design, evaluate, and set the business priorities of the company. **These will be used as the basis for our own meta-framework of supply chain management**. As has been stated before, SCOR will use the findings of the other P's to create an overview of the current state of the Nice Cream Twist.

Together the P's will show improvements in the way people, product and process is being arranged in the company at this point. The process reference model plays an important role in our framework due to the ability to analyze the current situation in order to find improvements. It compares the current supply chain with competitors to find the best practices which result in better performance.

2.6.1 Performance Positioning

Performance positioning is helpful to evaluate the metrics with these different performance attributes. The chosen performance attributes are reliability, responsiveness, and agility as customer-facing attributes, while the attributes costs and assets are internal-facing. These are characteristics to compare different supply chains with each other.

The positioning of Nice Cream will be compared to the competition, due to the niche market, the competition will be other deluxe ice cream shops. The performance of the entire supply chain will be evaluated in their planning, sourcing, manufacturing, and delivery. While it is difficult to create metrics for different parts of the supply chain, the metrics in table 3 give a relatively complete overview of metrics that should be focused on to keep competition behind.

Although the main mission of Twist is to deliver consistent high quality ice cream to everyone, always, it can be stated that reliability in this sense is not aligned with that mission. Reliability in the supply chain is about perfect deliveries, not about consistency. Within the supply chain metrics, Twist is still at the front in the reliability of the supply chain, as can be seen in the Unique Selling Point and the Key performance indicators under the P of Product. As the mission is to have every topping and type of ice cream available at all times, Nice Cream is efficient in delivering the right amount of the right product to the right place at the right time. Additional to this, the responsiveness of the supply chain can be seen as advantageous as well. By keeping track of usage of the different toppings, new orders can be compiled and sent relatively fast. This covers the "always" part of the mission, as well as part of the "consistency", as all toppings are available at all times. As most toppings need to be kept under cold circumstances, having different types of toppings in the inventories and distributions centre does not change the way these toppings should be handled. When new toppings are added to the set of available toppings, the only thing that changes in the supply chain is the initial sourcing. The moment that this new topping arrives either in Rotterdam in the port, the remains of the supply chain is the same as with other toppings. This shows that Twist also does well in terms of flexibility. It seems that Twist performs very well in the customer part of the metrics, but relatively bad in the internal facing attributes. This does align with the mission and the customer connection which is part of the P of product in the framework, but should be kept in mind.

Performance attribute	Performance vs Competition (current)	Performance vs Competition (future)
Reliability (Perfect Order Fulfillment)	●	●
Responsiveness (Order Fulfillment Cycle Time)	◉	○
Agility (Flexibility and Adaptability)	○	◉
Costs (Cost of Goods Sold & Supply Chain Management Cost)		
Asset efficiency (Cash-to-Cash Cycle Time & Return on Fixed Assets)		

● Superior (use once) ◉ Advantage (use once) ○ Parity (use once)

Table 3: Performance Positioning

Looking at the future, Twist will move further down the product life cycle, and will therefore have to introduce more and more new toppings to ensure continuity of existence. While the mission of reliability of quality for everyone will stay the same, and thus reliability remains the most important unique selling point for Twist, agility will probably become more dominant in the supply chain than responsiveness. While competitors will increase their responsiveness by making use of data smartly, which will remove the advantage of Twist, Nice Cream should focus on being adaptive in the demands of customers. As Twist is a quality product, the focus will stay on the customer side, and will focus less on the internal efficiency. Higher costs will be compensated by higher turnover as the quality of the products is high enough to cover these high costs.

2.6.2 Business Scope

In Figure 10 it shows what the scope is for Nice Cream. The company focuses on the manufacturing and the distribution of the product rather than the supply and the selling. It should be clear that even while there will there will be a lot of integration with the customers, these are independent shops who operate for themselves. The Nice Cream company will provide licensing and franchise opportunities to promote Twist.

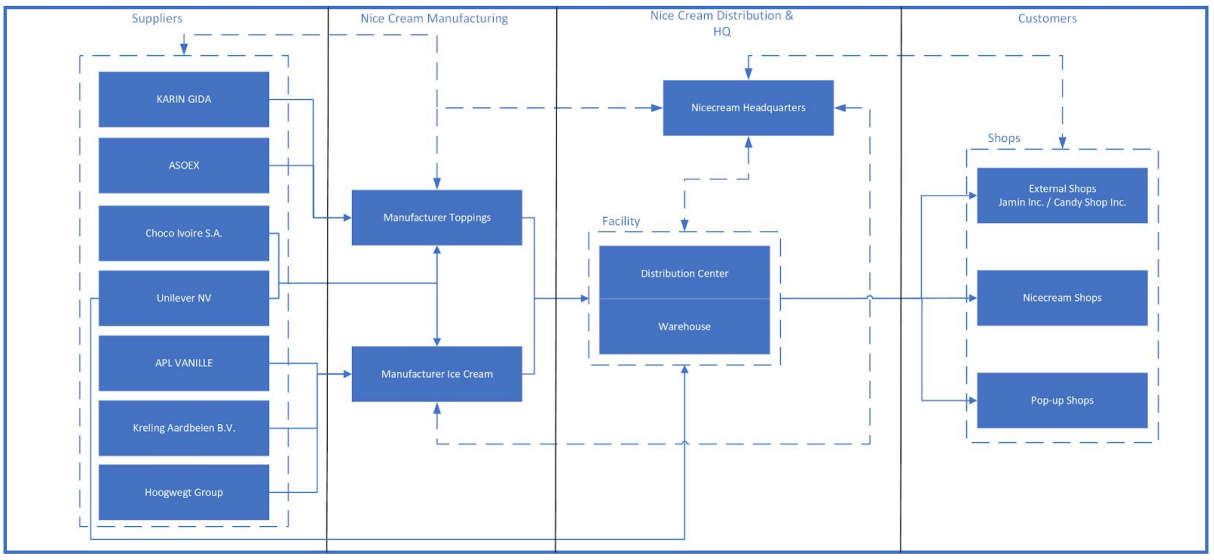

Figure 10. Business Scope of Nice Cream

The decision to do the manufacturing and distribution in house is to create consistency in the product. What is important is that the product is the same across multiple shops in the country. In order for the brand to flourish we have to negate bad experiences otherwise it can tarnish the reputation of all other shops.

The product flow follows a clear structure from suppliers to manufacturers to distribution center to end up in shops. In order to accomplish this, the Nice Cream HQ is the coordinator of the information flow in the organization. They act as facilitators between the different facilities to manage the planning process, for example if shops do not have enough toppings anymore in the short-term the distribution center will be notified to deliver more products and in the long-term there will be changes in the supply orders to manufacturer more.

2.6.3 Geographic

The map describes the material flows from the business scope in a geographical context, including the processes at each location.

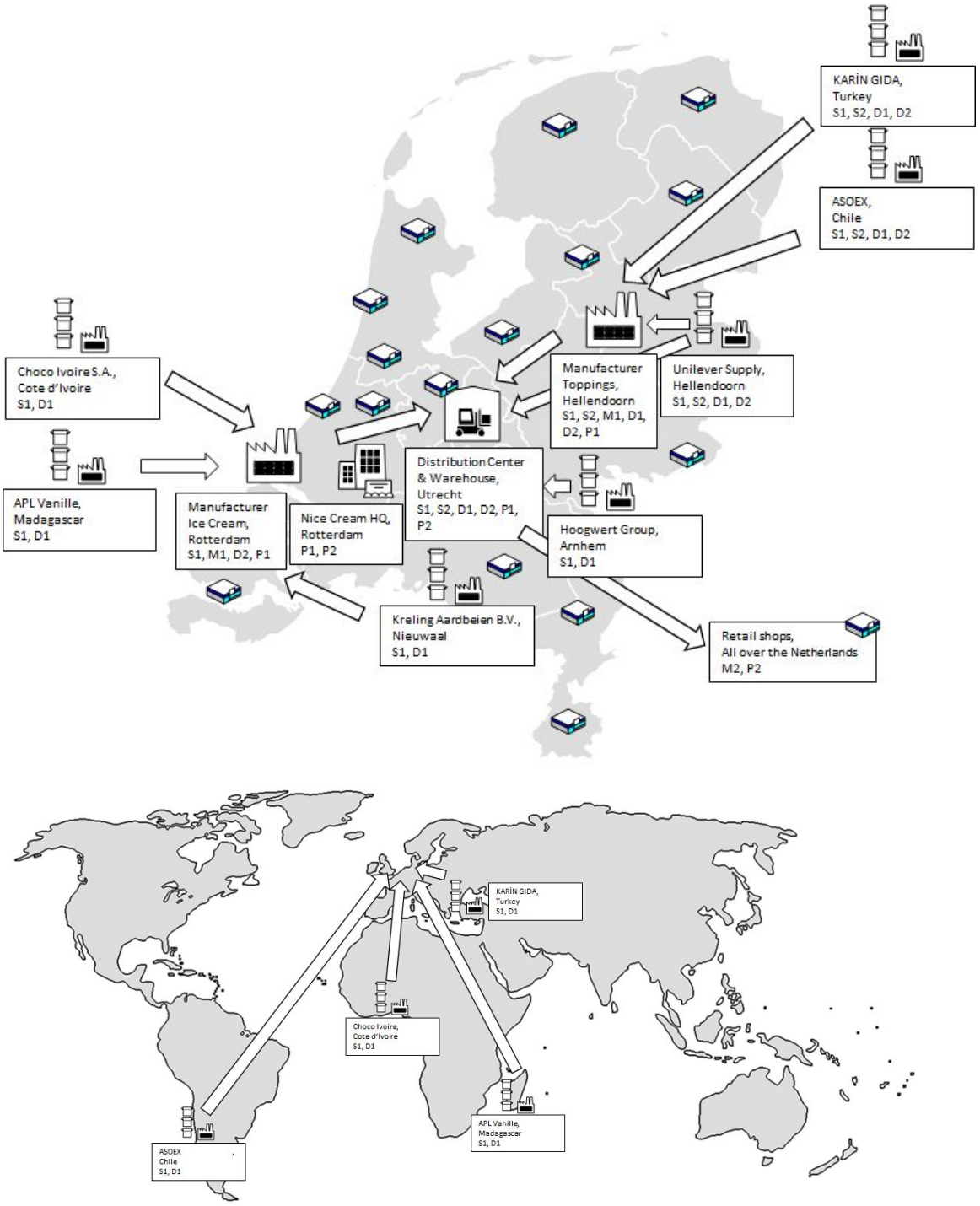

Figure 11. Geographical streams of ingredients.

From the map in Figure 11 it shows that the majority of the processes happen in the Netherlands. Nice Cream will start out only in one country before it expands. There are three important products which cannot be supplied from the country itself: vanille, cacao (chocolate), and exotic fruits. These companies; APL Vanille[1], Choco Ivoire[2], ASOEX[3],

[1] http://aplvanille.com/the-vanilla
[2] http://www.safgroup.ci/choco-ivoire/index.php?lang=en
[3] https://fruitsfromchile.com/about/

could complicate the logistic process due to the distance from the manufacturing companies. Especially APL Vanille and Choco Ivoire form an important link because their supply is necessary for the base ice cream of Twist. A shortage in these supplies should not be able to occur.

In the Netherlands, the distances between the facilities are not that far from each other. All of the international suppliers will have their supplies delivered through the Rotterdam harbor to end up in one of the two manufacturing companies. These are strategically placed, as the ice cream manufacturer is located close to the harbor due to the majority of the supplies coming internationally. The toppings manufacturer is close to the Unilever Supply[4] because they also offer a lot of toppings to Twist. The distribution center and warehouse is located in Utrecht to provide availability to every customer in the country with its central location.

The processes will be further explained in the section regarding thread map (paragraph 2.6.4).

[4] https://www.unilever.nl/contact/adressen.html

2.6.4 Thread Map

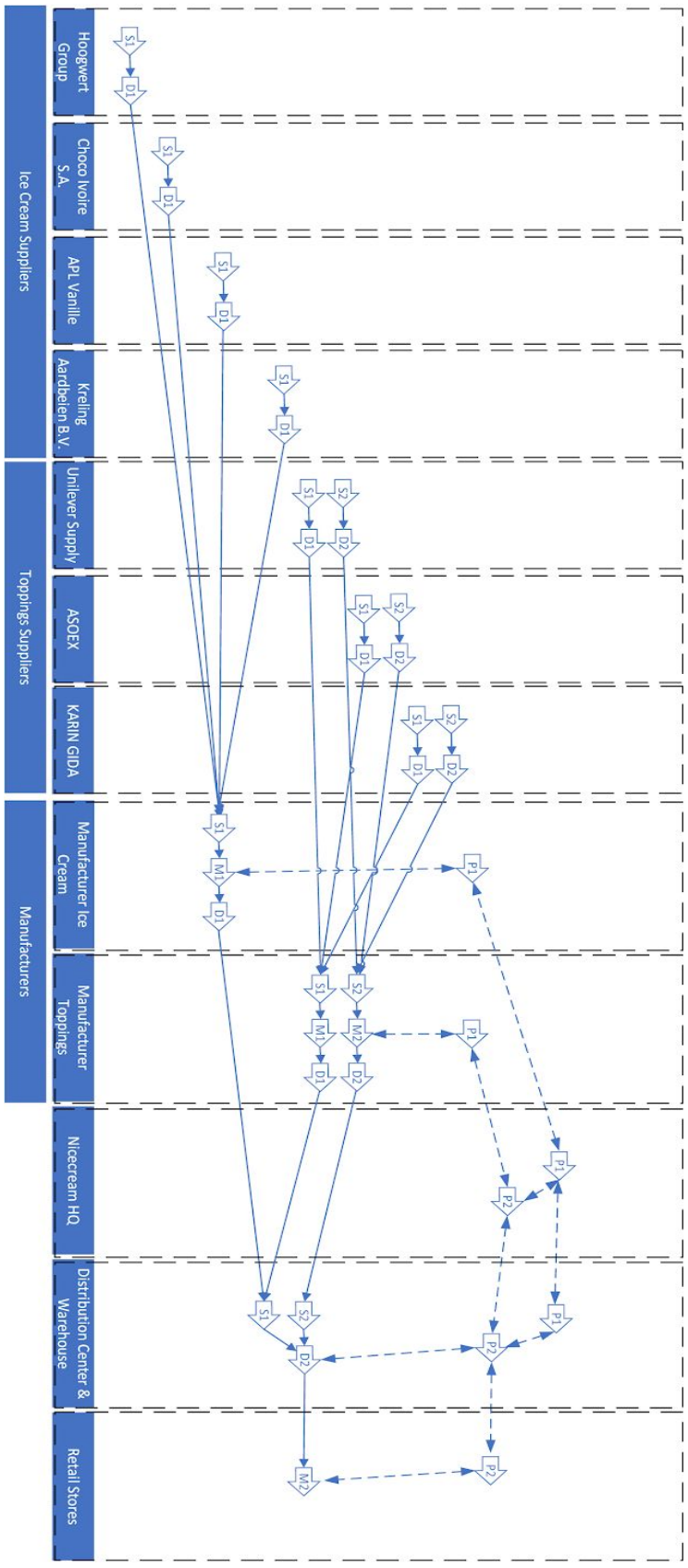

Figure 12: Thread Diagram

In Figure 12 the thread map visually describes the process of different nodes on the geographic map and how they are connected. It combines the material and information flow from the previous chapters in a meta-model for more structure.

Briefly, the processes described based on the five core management processes from SCOR. In Table 4, these are explained, however the return process is not mentioned in the thread diagram because it is not relevant for the current manner of operations.

Table 4: Five Core Management Processes from SCOR (Bolstorff & Rosenbaum, 2007)

SCOR Process	**Definitions**
Plan	Processes that balance aggregate demand and supply to develop a course of action which best meets sourcing, production and delivery requirements
Source	Processes that procure goods and services to meet planned or actual demand
Make	Processes that transform product to a finished state to meet planned or actual demand
Deliver	Processes that provide finished goods and services to meet planned or actual demand, typically including order management, transportation management, and distribution management
Return	Processes associated with returning or receiving returned products for any reason. These processes extend into post-delivery customer support

The numbers next to the letter of each process describe the representation of customer orders.

Table 5: Three capabilities of representing and responding to customer orders

Level	**Definition**
1	Stocked Product
2	Make-to-Order
3	Engineer-to-Order

To start with the suppliers, they are divided into two types. Suppliers for the base ice cream and suppliers for the toppings have the same processes with differences in product. They both supply products to stock. However, the suppliers of toppings have an additional process because they apply a level 2 order as well. The toppings are push and pull based, while the ice cream is only push based. That means that ice creams and a part of toppings are pushed into to market from which customers can choose their preference. Toppings which are pull based are determined by customers, after which manufacturers and suppliers respond to this demand. So, the suppliers for ice cream supply stocked raw materials and deliver them to the manufacturing companies and the suppliers for toppings supply stocked products and make-to-order.

The manufacturing companies,have more processes. They source, manufacture, and plan for stocked products. They are sourcing natural complementary (artificial) ingredients added to the ice cream and toppings in the manufacturing process. They then are responsible for the planning of the sourced products from other suppliers to make sure they meet the demand of customers. Their deliveries are however customer order driven where the cargos are configurable based on demand needed.

Headquarters are responsible for the planning of stocked and make-to-order product deliveries (Table 5), which makes them crucial in the information flow of the plans of other facilities.

The distribution and warehouse procure goods and services from manufacturers to meet the demand from customers. The delivery process is very much the same as with the manufacturers, as it is very customer order driven.

The customers have one important job which is manufacturing the configurable ice cream Twist with different flavours and toppings on location.

2.6 Conclusion of part B

The 4P’s framework created in part B of the report has given an overview of the position of Twist in the market compared to competitors, but also relative to other parties within the supply chain. By focusing on the how the people are organized (partnerships, management, etc.), looking into how well the product performs in the market (unique selling point, customer connection, KPIs) and by identifying crucial choices in the processes (agility, order of fit, effectiveness), we were able to perform a SCOR analysis that showed the Performance P of Twist.

SCOR forms a crucial link in the discussed framework, where the building factors of people, process, and product come together. The performance positioning of the company shows that the current situation depicts Nice Cream beating the competition in reliability, responsiveness, and agility. Reliability because of the focus on flexibility and speed in our supply chain strategy to beat competitors of Nice Cream. All companies in this sector will deal with the same uncertainty in demand, however, Nice Cream is prepared for that with quick responsiveness and agility. The business scope defines the

boundaries of the company, it is clear that Nice Cream takes two core processes in their own hand: manufacturing of ice cream & toppings; and distribution & storage of these products. They are reliant on the suppliers of these materials, which could be from suppliers all over the world. This was seen in the geographic map, where the location of these processes were discussed. The thread diagram details these processes even more, which shows the different processes of the toppings and ice creams. Toppings have a pull and push based delivery, while the ice cream experiences only a push based delivery.

Next to the conclusions that SCOR created, several conclusions can be seen within the other Ps of the framework. First of all, Nice Cream does not reach its full potential in the creation and maintenance of partnerships with partners of different kinds. In part C of this report, several possible partnerships will be explained that could strengthen the market position of Twist. Also, Twist has a strong position in their uniqueness, by using data smartly to have a pull-based system in delivering toppings. This could be improved further, which will be elaborated upon in part C. Lastly, although Twist has some characteristics that fit within a lean way of working, Nice Cream should focus on working in an agile way. Due to the big and increasing variety of toppings, and the dependency on the weather, Twist has to be agile in their supplying. As the due dates of the toppings are short, many deliveries are needed to cope with demand. When unexpected good weather occurs, in the soon to come order, this higher demand can be solved. In part C a SWOT analysis will be performed based on the findings in part A and B. This will lead to a promising intervention in the current supply chain, for which a design will be presented.

C. Opportunities for improvements

In this chapter the framework created and implemented in part B will be used in order to identify strengths, weaknesses, opportunities and threats for the supply chain of the Nice Cream Twist. Based on the SWOT (Piercy & Giles, 1989) analysis that will be performed to cover these 4 segments, a substantiated recommendation will be proposed that can improve the supply chain further. Before this recommendation, several other possible innovative improvements will be discussed and compared to each other on feasibility and effectiveness. Naturally each of the 4 parts of SWOT will be discussed in a paragraph. After that, the possible innovations will be discussed and finally one of these innovations will be elaborated upon. Also, in this last paragraph a setup for how the innovation should be implemented will be presented. This part C reflects on the findings both in part A and B.

3.1 Strengths

From both part A and part B, it can be concluded that Twist finds its uniqueness in their reliability. The mission of having consistent high quality for everyone comes back in the whole supply chain. For example, the focal point takes place in compiling and distributing the different toppings to make sure that all selling points have all the toppings available. Within the organizations, a specific part has been assigned to ensure high quality among the product, which is lengthened in the transportation, where reevers (refrigerated trucks) are used to cross as short as possible distances towards the selling points. Within the framework in part B, this reliability can be seen in the Product P, where customers stay connected by compiling their own swirls, but also in the Process P where an agile way of working ensures that changes in demand can be covered, but also where a fit can be seen in the reinforcing activities within the company. To further improve the reliability, data is being collected for all selling points, which is used to do the order picking up front based on predictions. When actual orders differ from these prepared orders, only small changes have to be made to the prepared orders, which takes just a small amount of time. This leads to a supply chain that is very responsive, as the time that is needed to fulfill an order is short.

3.2 Weaknesses

As the Nice Cream Twist is a cold product that will be consumed mostly during nice weather, the product-market combination is extremely weather dependent. Although there are several options in taking away this dependency, for example by adding products like hot chocolate or coffee to the assortiment, this is far away from the business model of Twist. Something that already keeps the product attractive during bad weather in winter or autumn, are the nut-based toppings. These will be more attractive during cold periods, which saves a part of the customer set in these days. Another thing that takes away part of the weather dependency, is the agility of the supply chain of Twist. As predictions are made on how much of each of the ingredients is needed for each of the selling points at several moments in time, Twist can prepare for winter by

supplying less ingredients. This will ensure minimal losses, but will not increase sales during cold periods. This is inherent to the type of product that Twist is.

Another weakness of Twist is the short due dates of the ingredients. As the product needs to go through the inventories and the distribution centre before arriving at the selling points, this transportation step should be efficient. If traffic jams occur that delay the reefers, this is at the cost of both the reliability of having all toppings available, but also at the cost of even shorter windows of opportunity in which the toppings can be sold. A possible solution to improve this weakness is to remove the distribution centre completely and move the toppings directly from the supplier to the selling points. This saves time and effort, but takes away the opportunity to efficiently compile packages for selling points. This compiling step should take place during transportation, or preferably before entering the country in the first place. If data were to be shared with all parties, this could still happen efficiently. In this case, the preparation of toppings also takes place near the origin of the ingredients, meaning only transportation of prepared packages takes place in the Netherlands.

3.3 Opportunities

A first possible opportunity, in order to keep the product exiting next to the standard set of toppings, would be to introduce limited edition Twist toppings, that correspond to a certain event happening. Examples would be to introduce an orange themed product when a FIFA World cup is near, a christmas themed topping during December or a silver themed topping when the product exists for 5 years. Introducing such a thing can reset the product on the product life cycle (part A, figure 13), as a new hype could emerge around consumers. In particular, the combination of having a standardized product that consumers can rely on to be consistent and the introduction of a completely new setting can be powerful in keeping customers around. This would eliminate the weakness of the product having few reviving techniques to keep the product from falling down the product life cycle.

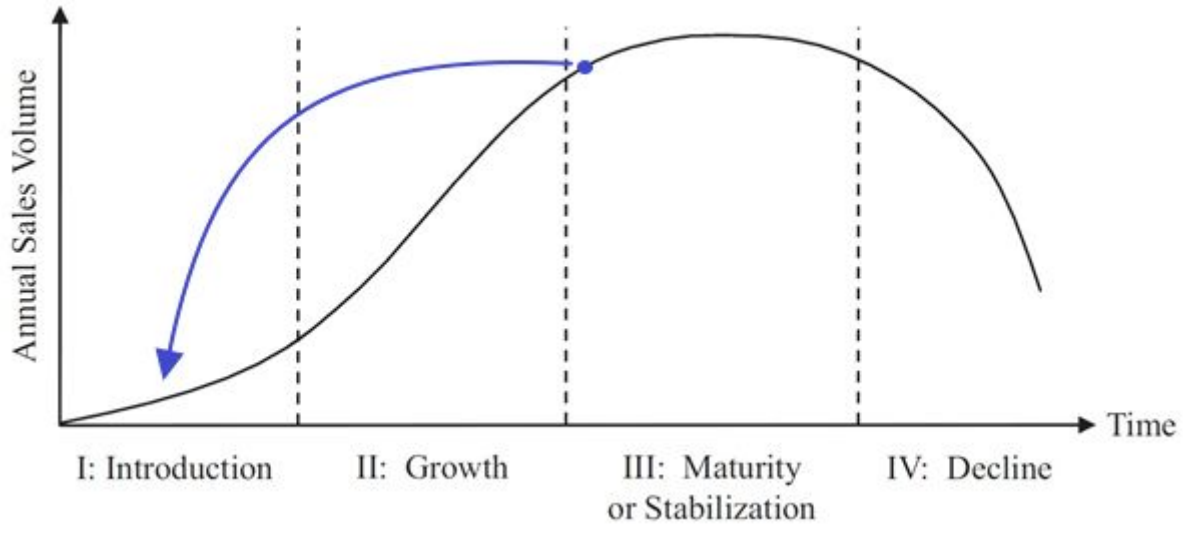

Figure 13. Restarting in the product life cycle. Malakooti B, (2013) CC BY-SA 4.0

Moreover, these new toppings could evolve from created partnerships with well-known producers (part B, people P) of for example chocolate-based products such as Mars or M&M's. As was mentioned in part A and B, the uniqueness of Twist arises from the combination of reliability, responsiveness and flexibility. Introducing well-known toppings will not only reset the product life cycle (part A), but will also increase the flexibility of the company. As these partnerships would support the products of both companies due to a network effect (Shapiro et al., 1998), more and more famous companies would want to join Twist, which means creating new partnerships will get easier as more partnerships have been created. This leads to a situation in which demand by customers can be answered relatively quickly by setting up a new partner and introducing another topping. As has been stated in part B, the supply chain as it is does not change when a new topping is introduced except for the initial supplying. Twist has to be aware of not adding too many new toppings, as it does increase the complexity of the compiling step, where more and more ingredients would have to be inventoried, compiled and distributed.

To increase the connection to the customers further (part B, product P) Twist could organize contests where participants can come up with their own topping. The topping created by the winner would then be implemented in the real world as well. This inherits the benefits of the other opportunities that involve new toppings, but also increases the connection to the customer base. Moreover, if customers were to have a voice in deciding the winning topping, this inherently means that the winning topping has a large customer base attached to it, which takes away the chance that the topping will flop.

To join the current flows toward sustainability, Twist could start focusing on using sustainable material for their products. Although sustainability is nowhere to be seen within the supply chain right now, replacing the cups and spoons with recyclable ones could be profitable as aware customers might feel more comfortable in consuming the product. A type of collection mechanic could be added here as well, by having different colours of spoons or different pictures on the cups. This could add the likeability of the product as a whole.

A way to make more use of the order of fit, could be to create partnerships with for example theme parks. These theme parks would create new locations for us to sell Twists as part of the experience in a theme park. Right now, only stores make use of the selling of Twists, which could be increased in number. When Twist is available in theme parks or children's playgrounds, this could change the image of Twist from “just another snack” into the “way to go snack” during days out.

3.4 Threats

Related to the strenghts of Twist, there is a constant threat of the ingredients either being not available or crossing their due date. As the supply chain of Nice Cream focuses on having all toppings available at all times, this collides with the fact that the due dates of the ingredients are short. Therefore, Twist might overdo their deliveries which means toppings will have crossed their due dates before they can be sold, or Twist delivers to little of the toppings, which means they are out of stock before their due date has been reached. A solution to this threat is to deliver small sets very often, or to have an excellent prediction system in place. The latter costs significantly less money, but it is hard to create a trustworthy predictor.

Another threat that Twist feels is the catching up of competitors. As it is getting more and more easy to keep track of inventories and customer behaviour, many competitors or companies in general will be able to be responsive and deliver products fast. Therefore, Twist will lose its advantage in responsiveness step by step. A possibility to keep this advantage, is by increasing their own system as well, while others try to come closer. By letting customers create an account, they can point out their favorite toppings and selling points, but also create new toppings, which has been discussed to be a good change in paragraph 3.3. This could also be a way of receiving feedback easily. Optimally, this customer data can add to the current available data in predicting needed orders and changes in demand even better.

3.5 Potential innovations

3.5.1 Sustainable Supply Chains

As has been stated before, Twist could focus on becoming more sustainable by using recyclable spoons and cups. This could give a boost in the way Twist is perceived by consumers, but is far away from the business model of Twist. Therefore it is probably not that profitable to focus on sustainability in the short term.

3.5.2 Synchromodal Supply Chains

Synchromodality is far away from the way that Twist works at this point in time. The biggest part of the supply chain takes place in the Netherlands, which means these distances can best be covered by reefers. Also, most ingredients and toppings have a short due date, which means that speed is a necessity in transporting them to the selling points.

3.5.3 Customs and Trade Compliance;

Most products that are needed for the ice cream and toppings are originating from the Netherlands, like dairy products, general products and fabricated products. Thus, there are no customs and trade compliances. The same applies to unfabricated products that are imported from European countries. There are free import duties within the European Union. However, some products are ordered from Cote d'Ivoire, South America and Madagascar. For orders of 150 euro and over import costs must be paid (Belastingdienst, 2019). Nice cream also needs an EORI number for the imported products. This is an identification number that is required when dealing with customs.

3.5.4 Cross Chain Control Centres(4C);

Cross chain control centres are are control centers where the most modern technology, advanced software concepts and supply chain professionals come together. Information flows are connected to good flows in a smart way. The realisation of the 4 C's will improve overview and coordination of activities and reducing supply chain costs. However, 4C is a very innovative step in the supply chain management for complex systems, in which multiple countries, companies and industries are involved. Therefore, such a complicated system with the most modern technology comes with high implementation and maintenance costs while it is actually not needed for a simple product like Twist.

3.5.5 Through Life Logistics of Durable Systems

As the Nice Cream Twist is a 1 time consumable, it is impossible to implement innovations that cover maintenance or life time cycles. The only type of machines that could benefit from such implementations, are the machines that produce the ice cream, or the machines that make sure the toppings are well twisted into the product. However, at this moment these machines are not part of the supply chain of Twist, as they are just bought. Innovations in this field do not make sense. Moreover, in the way inventories are managed at this point, only small improvements can be made. It would be more beneficial to focus on getting rid of the entirety of inventories, as will be explained in paragraph 3.5.9.

3.5.6 Service Logistics

As service logistics is about the steps that are taken after purchase, this is far away from the activities of Twist. The life of a Twist after purchase is particularly short as it is a one time consumable. Therefore, looking into service logistics is not profitable for Twist.

3.5.7 Smart Supply Chains and the Internet of Things

As most of the parts of Twist exist of consumables, it is unlikely that Twist can make use of the Internet of Things in the short term. An idea to make use of IoT could be to create smart cups that are connected to the internet, which would make them sustainable as a bonus. These cups then keep track of what selling points the customers visit and show the customers how cold their product is when they reuse the cup. However, the benefits of implementing smart cups are too small at this point to think about actually doing this.

3.5.8 Supply Chain Finance

Supply chain finance is about making very clear that profit can be made from creating a better supply chain. As efficient logistics it is already an important part of Twist, it is not necessary to create an even better overview of what can be gained by increasing the supply chain.

3.5.9 Blockchain Technology and the Supply Chain

Since blockchain has emerged for enterprises, supply chain tracking has been a hot topic. The idea that all the individual raw-materials for the ice cream can be traced from collection to the factory, to the shops is something that benefits Nice Cream Twist. Blockchain technology in the supply chain can make the process more efficient and secure because arrivals, losses or delays of individual raw-materials can be tracked. As a result of this Nice Cream Twist will save a lot of money down the line. Aside from that, the conditions of products will be monitored during the storage and transportation processes. For milk and eggs, for example, it is important to keep it in a cool environment. This type of information that highly improves the quality of the products can be realised with blockchain technology in the supply chain.

Moreover, introducing blockchain tracking in the supply chain tracking will also benefit consumers. The consumers will be able to know from which party at what time the milk and eggs that are used to produce ice cream, are collected. The same applies to the topics. As a result of providing more transparency to consumers, Nice Cream Twist can attract more consumers.

A chip will be attached to the products that are needed for the realisation of Twist: vanilla pods from Madagascar, cocoa from Côte d'Ivoire, fruits from South-America, unfabricated products from Europe and other products from the Netherlands, like fabricated products, strawberries, general products and dairy products. As a result of this, the quality of the products will improve and the transportation process will be more efficient and reliable due to transparency in the available data. Thus, supply and demand can be better aligned to one another. Though, the collection, storage and transferring of data should be well organized in order to not have errors in the logistic process.

3.6 Implementation of innovation and re-design

By introducing blockchain technology the management of the supply chain can be improved. The introduction of blockchain technology does not affect the physical logistic chain of Twist. The effects are more based on the efficiency, reliability and strategic fit of the logistic chain.

The first change will occur in the information flow between the different parties. For instance, the blockchain technology provides the possibility that the shops can get a direct information connectivity with suppliers. Figure 15 shows the change of information flows between parties. An important advantage of the blockchain technology is that the

demand can be predicted in a better way because of the better information flows between consumers and other parties of the supply chain. The better predictability of the demand provides the opportunity to be more prepared. This will also increase purchasing the correct amount of product at the correct time. So, the logistics processes will be improved due to the more intertwined supply chain management between the parties.

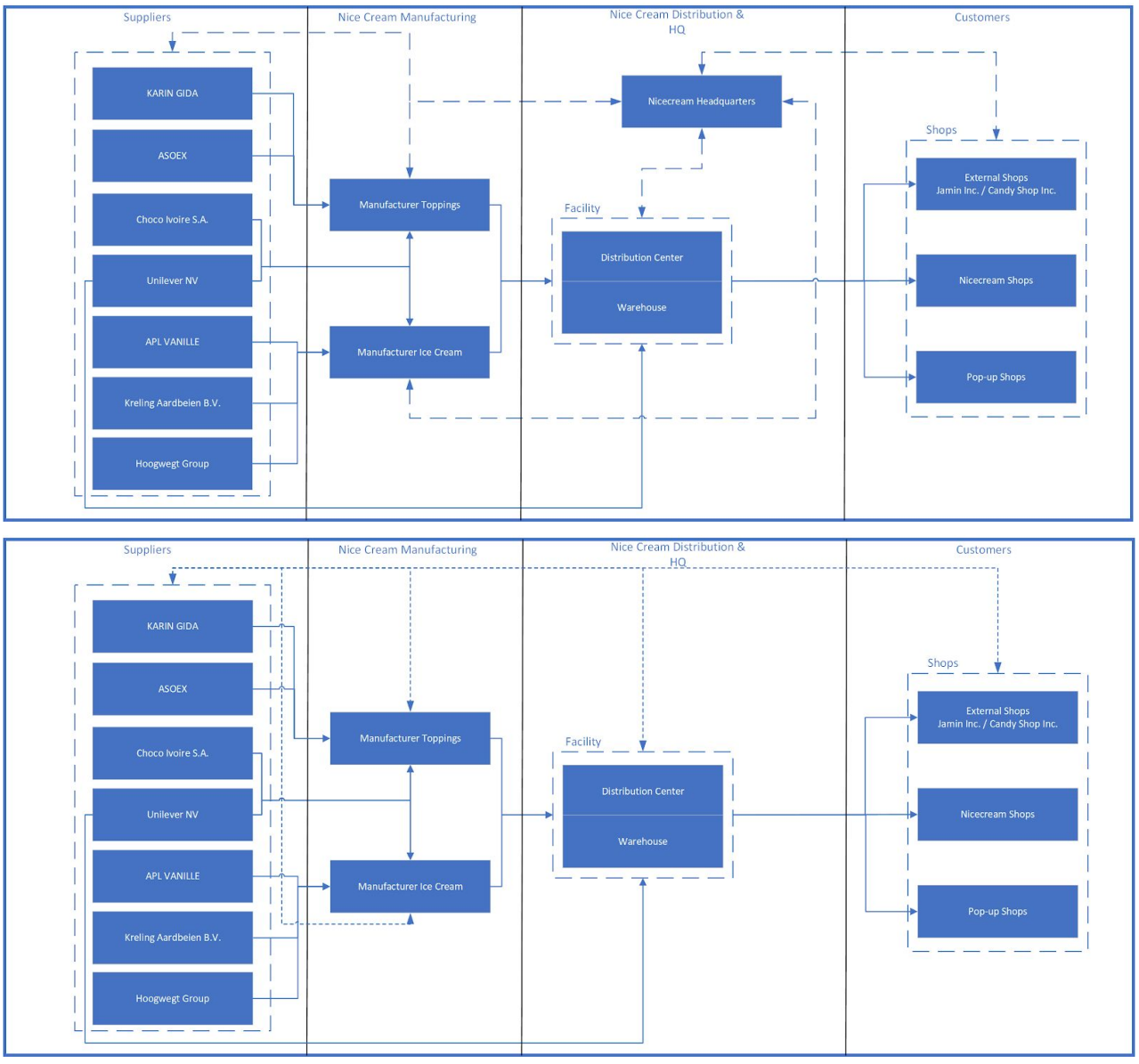

Figure 15. Changes in the thread diagram.

There will also improvements occur in the reliability of Twist. Namely, customers will get more insights in the time, the location and the manner of how the products are sourced. The quality and the way how products are transported will also be traceable. This will provide more transparency which increases the reliability as well as the image of Twist. Thereby, knowing that customers have more insights will enforce Nice Cream to strengthen the strategy of first-order-fit in terms of keeping the quality high.

Additionally, there can be changes in the thread diagram too. People who now have more insights will have an influence on the sourcing of products. This gives the possibility to engineer-to-order. The thread diagram with changed material flows by using blockchain technology are represented in figure 15. However, the level of engineer-to-order will probably be too costly because Twist is not sold for high prices and sourcing at demand is very costly. So, it is not be considered to implemented directly. Nevertheless, such a manner of supplying ice creams will create a lead in the market of selling ice cream. Because of this reason implementing the level of engineer-to-order is an subject that have to be taken into account and research must be done in ways of cheaply introducing it.

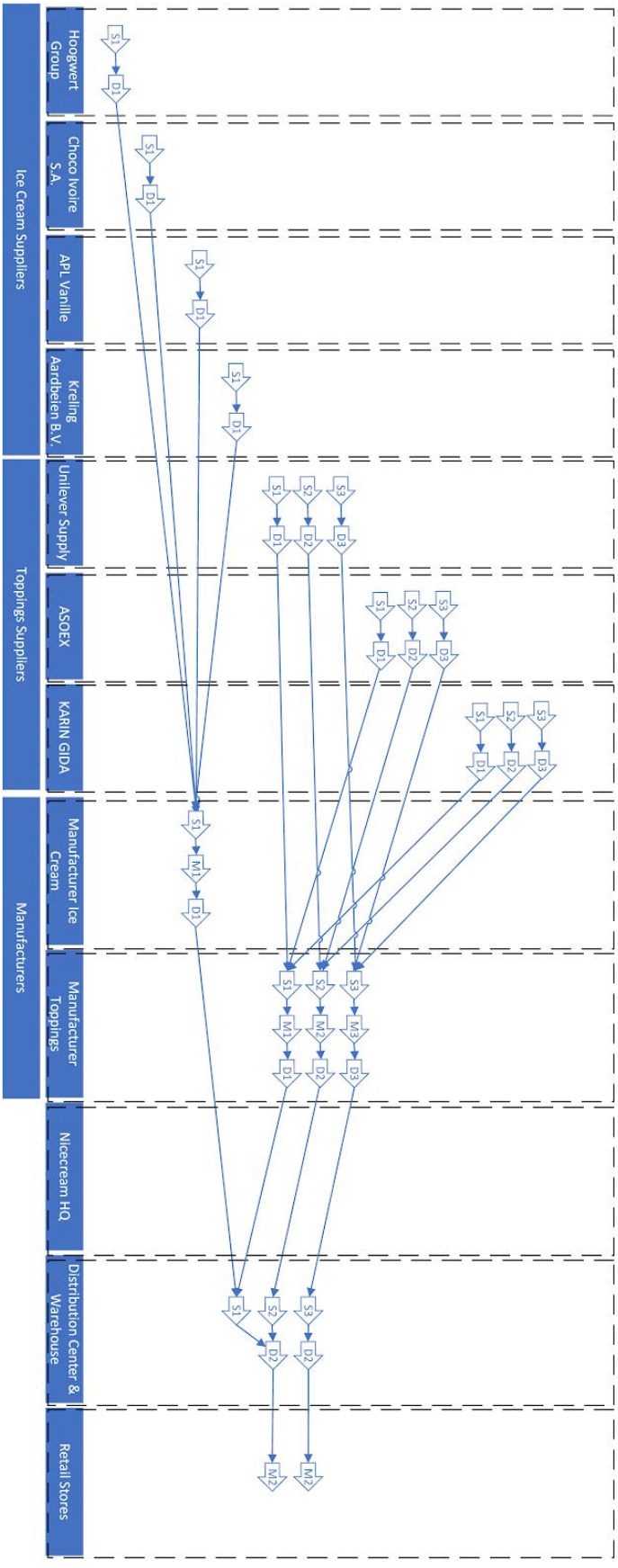

Figure 16. Thread Diagram with Blockchain Technology

3.6 Conclusions of part C

Part C is applied for discovering appropriate innovations that improve the logistic chain of Twists. The SWOT analysis showed use the strengths, weaknesses, opportunities, and threats. There is a constant threat of the ingredients either being not available or crossing their due date and that Nice Cream can lose its advantage in responsiveness to competitors by time. In order to solve these threats, better use of data and information is necessary. After considering several innovations, introduction of blockchain technology looked as the most potential one.

By redesigning the logistic chain management of Twist with Blockchain technology, it showed that there are more information flows and more insights between the actions of other parties. This creates more transparency, reliability, strategic fit and predictability of demand which creates more efficiency. Thereby, new level of responding on customer demand (engineer-to-order) can be introduced which will create competitive advantage. However, it is recommendable to do further research on this with regards to economic feasibility, before implementing it.

All in all, blockchain technology will be able to reduce threats and improves important elements of the supply chain. It will also provide possibilities for further development, when additional researches are done.

D. Reflection

By using the theory that we learned during the lectures and the reading of the literature, we managed to have a critical look on the supply chain, but also the environment of Twist. Beforehand, supply chains seemed to be hard to grasp, let alone find improvements. Due to the many different ways to interpret the choices made within a supply chain, we have found out that there is more to logistics and supply chain than just efficient production, transportation and selling. We have learned to always look critically at the choices made, and find improvements and reasons why these improvements can or can not work in the specific case that we are dealing with. Most of all, SCOR has put our minds to think about how a company can be unique and efficient, which does not always mean having the lowest price possible. Also, by mapping the activities in a thread diagram, it is easy to see processes that are not logical and can be improved, which is valuable in every firm or organization.

Building a framework to completely tackle the aspects of the supply chain of a product-market combination is harder than expected. Because supply chains are so complex and can be categorized across many different dimensions, it is hard to grasp all characteristics and have a complete overview of which kind of processes happen when and where. However, we have learned that it is useful to think about which of these dimensions are the most important ones to cover the biggest part of the supply chain without making the analysis too complicated.

A last thing that we have discovered which will be usable for the rest of our lives, is not to only focussing on improving weaknesses or taking action according to opportunities, but to also keep focussing on making strengths stronger (or at least making sure that strengths will remain strengths) and dealing with threats by looking at yourself. Rivals will increase their skills, which means what is a strength today, might be an average skill tomorrow.

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