A trade-off between Centralized and Decentralized Purchasing

How can a corporation maintain flexibility in supplier- and product-choices and benefit from the advantages of centralized purchasing at the same time?

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Abstract

The Heutink Group, a supplier of educational material, is looking for ways to develop their strategic purchasing and solve the problems that they encounter in their purchasing departments. The Heutink Group is a corporate group and consists of two major organizations, Heutink and Reinders. Despite a product overlap of around 85%, Heutink and Reinders have separate purchasing processes and make little use of economies of scale. Another problem is the capacity and efficiency of the warehouses. As a result, out of stocks happen too often and Heutink and Reinders often transfer small inventory between their two warehouses in urgent cases, which is a very costly and inefficient problem.

This study is focused on centralized purchasing as a way of solving the current problems of the Heutink Group. However, a disadvantage of centralized purchasing is losing supply flexibility in supplier- and product-choices. Supply flexibility is very important for the Heutink Group, as they want to maintain a wide and flexible product portfolio for their customers. Therefore, the following research question is drawn up: '*How can a corporation maintain flexibility in supplier- and product-choices and benefit from the advantages of centralized purchasing at the same time?'*. To answer this question, semi-structured interviews are executed with the CPO and purchasers of Heutink and Reinders.

The results from this thesis provided new insights into how a corporation can improve their flexibility in supplier- and product-choices in combination with centralized purchasing. Firstly, the Heutink Group can achieve a trade-off between the advantages of centralized purchasing and flexibility in supplier-choices by selecting preferred suppliers and backup suppliers to their articles. The preferred suppliers can provide the Heutink Group with the desired cost advantages of centralized purchasing, while the backup suppliers can provide the Heutink Group with the desired flexibility in supplier-choices. By selecting backup suppliers on delivery speed and a wide product range (in addition to quality), the backup suppliers can improve the certainty and flexibility of deliveries, and the total number of suppliers can be minimized to lower the supplier management costs. Backup suppliers can be used when a customer wants to receive an article quickly or when problems occur that would otherwise lead to backorders. In this way, backup suppliers can solve the current problem of too many backorders, which offers potential cost-savings and improves the customer satisfaction.

Secondly, the Heutink Group can achieve a trade-off between the advantages of centralized purchasing and flexibility in product-choices by a combination of component commonality and backup suppliers. The Heutink Group can use component commonality by

focusing on (functionally) identical articles, and substituting the less valuable articles by the most valuable articles in the eyes of the customer. Thereby, component commonality increases opportunities for centralized purchasing. The way in which customers accept the alternatives is important in component commonality, and can be increased by an effective marketing strategy. For the customers that still have an insufficient alternative acceptance, supplier backups can be assigned to provide the desired flexibility in product-choices. Selecting backup suppliers on a wide product range makes it possible to minimize the total number of suppliers, which can save supplier management costs, and offer the customers more product-choices at the same time. In this way, component commonality will lead to more opportunities for centralized purchasing, and backup suppliers will avoid unsatisfied customers. This combination between component commonality and backup suppliers could offer the potential for cost savings without losing customer satisfaction.

Therefore, while the literature indicated that losing supply flexibility is a disadvantage of centralized purchasing, this study provided new insights into how a corporation can maintain their flexibility in supplier- and product-choices and benefit from the advantages of centralized purchasing at the same time. In doing so, the results of this study showed how the Heutink Group can improve the problems related to their purchasing departments.

Table of Contents

1. Introduction

Since the end of the twentieth century, the perspective of the purchasing function has changed dramatically from being a basic function – in which the only goal was to buy as cheaply as possible - to being an important strategic function within a firm (Gadde & Håkansson, 1994). The importance of the purchasing function started to grow even further when more and more researchers focused their studies on strategically managing and coordinating the supply chain (Spekman, Kamauff, & Salmon, 1994; Freeman & Cavinato, 1990; Ellram & Carr, 1994). Managers and organizations started to realize the potential of the purchasing function as a way of achieving competitive advantage and solving problems.

The Heutink Group, a supplier of educational material, is looking for ways to develop their strategic purchasing and solve the problems that they encounter in their purchasing departments. The Heutink Group is a corporate group and consists of two major organizations in the Netherlands: Heutink (Rijssen) and Reinders. More information about the Heutink Group and the organizational structure can be found in Appendix 1.

The problems that the Heutink Group encounter are related to their purchasing process and inventory. After the acquisition of Reinders by Heutink, the Heutink Group decided to maintain the two brands in order to keep the market share of Reinders in the south of the Netherlands, where they had built a name over the years. This included that Heutink and Reinders maintained their separate purchasing processes, while around 85% of their inventory is similar. The Heutink Group has a wide product range with more than 66.000 different products, ranging from consumables (like pencils) and playing material (like tricycles and building material) to entire learning packages for schools. Despite the overlap in inventory, the organizations make little use of economies of scale. Another problem is the capacity and efficiency of the warehouses. As a result, backorders happen too often and Heutink and Reinders often transfer small inventory between their two warehouses in urgent cases. The distance between the warehouses is 150 kilometers and because this problem occurs more than monthly, it is a very costly and inefficient problem. In addition, the Heutink Group is building a large new warehouse that will be finished in 2022, which provides more opportunities to store large amounts of inventory.

This study investigated the opportunity of combining the purchasing processes of Heutink and Reinders. Centralized purchasing is one of the most general terms in the literature of strategic purchasing to describe the combination of purchasing processes. Centralized purchasing means that a single department in a corporation is responsible for the purchasing of

the entire corporation (Rozemeijer, 2000). A similar term for combining purchasing processes is cooperative purchasing, which is defined by Bakker, Walker and Harland (2006) as "horizontal cooperation between organizations, the bringing together of the purchasing functions of two or more organizations" (p. 15). In general, centralized (or cooperative) purchasing can improve the effectiveness and efficiency of a purchasing department (Jost, Dawson, & Shaw, 2005).

According to Kanepejs and Kirikova, (2018), organizations that are solely based on centralized purchasing tend to lose supply flexibility. If an organization urgently needs an article or if deliveries are delayed, it could take a lot of time to receive an article through a centralized purchasing process. This can lead to backorders and unsatisfied customers. Moreover, centralized purchasing reduces the choices in suppliers and the choices in products, as centralized contracts for certain articles are assigned at certain suppliers. In a fully centralized corporation, it could be costly and inefficient to deviate from these contracts. Preliminary research showed that this supply flexibility is important for the Heutink Group, as they want to maintain their flexibility in supplier- and product-choices, to remain flexible towards customers and to offer a wide product portfolio. However, organizations that are solely based on decentralized purchasing do not make use of the multiple advantages of centralized purchasing. Therefore, the Heutink Group is looking for a trade-off between the advantages of centralized purchasing and the advantage of decentralized purchasing, supply flexibility. How a corporation can benefit from centralized purchasing without losing supply flexibility is a topic that is not explained in the literature of strategic purchasing. Therefore, the goal of this study was to answer the following research question:

> *How can a corporation maintain flexibility in supplier- and product-choices and benefit from the advantages of centralized purchasing at the same time?*

To find out how the Heutink Group can maintain their flexibility in supplier- and product-choices and benefit from the advantages of centralized purchasing at the same time, semi-structured interviews were executed with the CPO and the purchasers of Heutink and Reinders.

This research distinguishes itself from the existing literature by looking at the trade-off between the advantages of centralized purchasing and the advantage of decentralized purchasing, supply flexibility. While the literature indicates that losing supply flexibility is a disadvantage of centralized purchasing (Schmitt, Sun, Snyder, & Shen, 2015; Schotanus & Telgen, 2007; Wissema, 1992), this study shows how a corporation can maintain their flexibility in supplier- and product-choices and benefit from the advantages of centralized

purchasing at the same time. In doing so, this study offers two main theoretical contributions to the literature. The first contribution shows that the trade-off between centralized purchasing and flexibility in supplier-choices can be improved by assigning preferred suppliers and backup suppliers. The second contribution shows that the trade-off between centralized purchasing and flexibility in product-choices can be improved by a combination of component commonality and backup suppliers. At the same time, this study offers practical contributions by providing the Heutink Group with new insights into their current problems. These practical contributions show that the Heutink Group can achieve potential cost savings and improve their competitive position through centralized purchasing, and that flexibility in supplier- and product-choices can reduce the number of backorders and improve the customer satisfaction.

2. Theoretical Framework

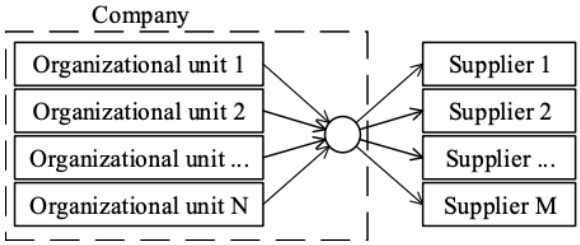
2.1 Centralized Purchasing

Around the end of the twentieth century, the purchasing function developed into an important strategic function within a firm (Gadde & Håkansson, 1994). Organizations and researchers started to recognize the potential of synergies in the field of purchasing as a way of creating competitive advantage (Rozemeijer, 2000). Purchasing synergy is described as the situation in which combined purchasing processes obtain more benefits together than the separate purchasing processes do individually (Rozemeijer, 2000). One of the most general terms in the literature of strategic purchasing to describe the process of combining purchasing processes is centralized purchasing.

In centralized purchasing, a single business unit or organization within a corporation is responsible for the purchasing of the entire corporation (Rozemeijer, 2000). The entire corporation can consist of different business units inside an organization or multiple organizations within a corporation. While the other business units or organizations in centralized purchasing are not responsible for the purchasing of their own products, they are often consulted by the centralized purchasing department (Rozemeijer, 2000). In fully centralized purchasing, the authority, responsibility, and power over the purchasing process is assigned to the central purchasing department (Kanepejs & Kirikova, 2018).

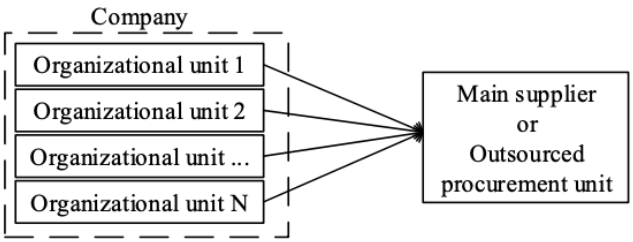
Kanepejs and Kirikova (2018) differentiate two types of centralization: centralization of outgoing orders and centralization regarding number of suppliers. Centralization of outgoing orders, also called internal centralization, is the situation in which all business units or organizations in the corporation place their orders to one central purchasing department. This central purchasing department then places the collective orders to the suppliers. This situation is illustrated in Figure 1, in which the central purchasing department is illustrated as the circle. Centralization regarding number of suppliers, also called external centralization, is the situation in which all business units or organizations in the corporation place their own orders, but only at one (central) main supplier. This situation is illustrated in Figure 2.

Figure 1: Centralization of outgoing orders



Note 1: Organizational structure of a centralized purchasing department that makes use of centralization of outgoing orders. Reprinted from: "Centralized vs. Decentralized Procurement: A Literature Review", by E. Kanepejs & M. Kirikova, 2018, BIR Workshops 2018, 217-232.

Figure 2: Centralization regarding number of suppliers



Note 2: Organizational structure of a centralized purchasing department that makes use of centralization regarding number of suppliers. Reprinted from: "Centralized vs. Decentralized Procurement: A Literature Review", by E. Kanepejs & M. Kirikova, 2018, BIR Workshops 2018, 217-232.

The most important advantage of centralized purchasing is obtaining lower purchasing prices per unit, due to larger purchasing volumes (Johnson, 1999). Pedersen (1996) found that purchasing groups, which is a form of combined purchasing, in the electronics and automotive sector obtained savings in their total purchasing costs between 20% and 35%. According to Muse and Associates (2000), cost savings from purchasing groups in the healthcare sector vary between 10% and 15%. The advantages and disadvantages of centralized purchasing are summarized in Table 1.

Table 1: Advantages and Disadvantages of Centralized Purchasing

Centralized Purchasing	
Advantages	**Source**
Lower purchasing costs per unit	Dimitri, Dini, and Piga (2006) Evans (1987) Johnson (1999) Pedersen (1996) Muse and Associates (2000) Nollet and Beaulieu (2003) Tella and Virolainen (2005) Schneider and Watson (1997) Chen and Roma (2010)

Enlarged negotiation power of the buyer	Dimitri, Dini, and Piga (2006) Evans (1987) Chen and Roma (2010)
Lower transaction costs	Dimitri, Dini, and Piga (2006) Tella and Virolainen (2005) Schneider and Watson (1997)
Lower minimal stock level	Schneider and Watson (1997)
Less duplicate processes	Dimitri, Dini, and Piga (2006) Johnson (1999)
Improved knowledge	Dimitri, Dini, and Piga (2006) Johnson (1999) Tella and Virolainen (2005)
Uniform purchasing policy	Dimitri, Dini, and Piga (2006)
Improved overall purchasing efficiency	McCue and Pitzer (2000)
Secures purchasing department integrity	McCue and Pitzer (2000)
Inventory planning benefits	Ball and Pye (2000)
Regular and more transparent expectations	Ball and Pye (2000)
Improved supplier management	Johnson (1999) Tella and Virolainen (2005)
Improved product quality	Tella and Virolainen (2005)
Disadvantages	**Source**
Physical distance between warehouses	Dimitri, Dini, and Piga (2006)
Losing supply flexibility	Schmitt, Sun, Snyder, and Shen (2015) Schotanus and Telgen (2007)
Danger of reduced quality when suppliers are suppressed by buyers' power	Ball and Pye (2000)
Coordination costs	Johnson (1999)
Uncertainty in success of purchasing staff	Johnson (1999)
Organizational alignment	Johnson (1999)
Money allocation problems	Johnson (1999)

The literature shows that centralized purchasing also enlarges the negotiation power of the buyer and provides other potential advantages such as lower transaction costs, less duplicate processes, the sharing of knowledge resources and a uniform purchasing policy across the entire corporation (Dimitri, Dini, & Piga, 2006; Evans, 1987). Due to these advantages, centralized purchasing is seen as a way of obtaining purchasing synergy, as it creates advantages that the organizations would not have achieved individually. According to McCue and Pitzer (2000), a centralized purchasing department also improves the overall efficiency and secures the integrity of the procurement department.

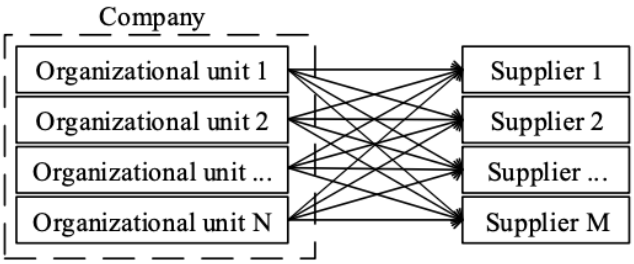
The literature shows that centralized purchasing can offer a corporation the potential for cost savings, improve the overall purchasing efficiency, and offer other advantages. However, centralized purchasing also has some disadvantages. Disadvantages of a fully centralized purchasing department are often related to the physical distance between the central warehouse

and the other organizations or business units (Dimitri, Dini, & Piga, 2006). In a situation of centralized purchasing and warehousing, small problems or misplaced orders can lead to extreme product delivery delays, as products need to be transferred from or through a central location. According to Schmitt, Sun, Snyder and Shen (2015), a disadvantage of centralized purchasing is that organizations lose supply flexibility. This means that in centralized purchasing, individual organizations usually lose the ability to make flexible decisions between products and suppliers. Losing supply flexibility is a sensitive topic for the Heutink Group, because they want to keep their organizations flexible towards customers in terms of their product portfolio.

2.2 Decentralized Purchasing

In decentralized purchasing, organizations within a corporation are responsible for the purchasing of their own supplies (Joyce, 2006). In a fully decentralized corporation, each business unit or organization orders and stores their own supplies in their own warehouse. There are no inter-company agreements or rules about which products to buy at which suppliers, like in a centralized purchasing department (Munson & Hu, 2010). The situation of a decentralized purchasing department is illustrated in Figure 3 (Kanepejs & Kirikova, 2018).

Figure 3: Decentralized Purchasing Department



Note 3: Organizational structure in decentralized purchasing. Reprinted from: "Centralized vs. Decentralized Procurement: A Literature Review", by E. Kanepejs & M. Kirikova, 2018, BIR Workshops 2018, 217-232.

One of the advantages of decentralized purchasing, mentioned by Wissema (1992), is the ability of an organization to respond quickly and flexible to the demands of their customers. In decentralized purchasing, an organization can offer their customers a flexible product range, as they are not bound to gaining volume discounts. Therefore, decentralized purchasing can lead to a more flexible purchasing department. The advantages and disadvantages of decentralized purchasing are summarized in Table 2.

Table 2: Advantages and Disadvantages of Decentralized Purchasing

Decentralized Purchasing	
Advantages	**Source**
Quick response to customers	Wissema (1992)
Flexible to demands of customers	Wissema (1992)
Warehouses located closer to customers	Wissema (1992)
Decision-makers closer to the purchasing process	Gadde and Håkansson (1994)
Disadvantages	**Source**
Higher price per unit	Dimitri, Dini, and Piga (2006)
Higher transaction costs per unit	Dimitri, Dini, and Piga (2006)

In a fully decentralized corporation, warehouses are generally located closer to their customers. This increases the flexibility of a business unit or organization and reduces delivery times and delivery costs towards customers. Another advantage of decentralized purchasing is that decision-makers are closer to the purchasing process if problems occur (Gadde & Håkansson, 1994). In a centralized purchasing department, decision-makers can be far away from the organizations for which they are responsible. It often occurs that they have no idea of what is going on at a purchasing department or how to solve problems rapidly. Especially in large worldwide corporations this can be a disadvantage of centralized purchasing.

However, decentralized purchasing also has some disadvantages. A decentralized purchasing department places orders in smaller quantities than a centralized purchasing department, which increases the price per unit. Decentralized purchasing also increases the transaction costs per order, because every business unit or organization needs to place their own orders. For the same reason, other transaction costs such as material handling, warehouse management costs and relationship management are relatively high for each decentralized purchasing department. However, Joyce (2006) indicated that decentralized purchasing can also partly decrease transaction costs due to lower transportation costs, if the business unit or organization is able to purchase their orders at closely located suppliers.

2.3 Hybrid models

The previous sections showed that centralized purchasing and decentralized purchasing both have advantages and disadvantages. The advantages of centralized purchasing seem to offer the Heutink Group cost savings, by combining the purchasing demands of Heutink and Reinders. This can solve one of the problems of the Heutink Group, which is that the corporation does not make use of the advantages of centralized purchasing, despite the product overlap of around 85%. However, one of the disadvantages of centralized purchasing is losing supply flexibility. Supply flexibility is important for the Heutink Group, as they want to remain flexible towards their customers. In addition to fully centralized and fully decentralized purchasing, there are purchasing models that have characteristics of both centralized and decentralized purchasing. These models are called hybrid models (Dimitri, Dina & Piga, 2006). Table 3 provides an overview of these hybrid models.

Table 3: Hybrid models

Hybrid model	**Source**
Group-buying	Chen and Roma (2010)
Centre-led Procurement	Dimitri, Dini and Piga (2006)
Centre-led Action Network	Rozemeijer (2000)
Federal Organization of Purchasing	Rozemeijer (2000)
Lead Buyer/Lead-buying Groups	Schiele (2018) & Schotanus and Telgen (2007)
Purchasing Councils	Schiele (2018)
Shared Services	Schiele (2018)
Centralized pricing with decentralized purchasing	Munson and Hu (2010)
Centralized purchasing and warehousing	Munson and Hu (2010)
Centralized purchasing with local distribution	Munson and Hu (2010)
Piggy-backing Groups	Schotanus and Telgen (2007)
Third-party Groups	Schotanus and Telgen (2007)
Project Groups	Schotanus and Telgen (2007)
Program Groups	Schotanus and Telgen (2007)
Professional Networks	Walker, Bakker, Schotanus, and Harland (2008)

Preliminary research showed that shared services, third-party groups, project groups and professional networks are not applicable for the Heutink Group on forehand. Shared services and third-party groups require the creation of a special organizational unit or a third-party organization that will be responsible for all the purchasing. Because the Heutink Group only consists of two relevant organizations, shared services and third-party groups are not applicable (Schiele, 2018). In project groups, a purchasing group is created for a one-time shared

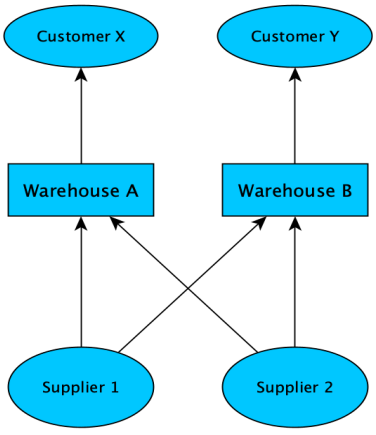
purchasing project (Schotanus & Telgen, 2007). Therefore, this model is not applicable for the Heutink Group. Professional networks only involve the sharing of information and ideas instead of the actual combining of purchasing volumes, which also makes this model not applicable.

The other hybrid models can be divided into four sections, based on the purchasing activities that characterize and differentiate these hybrid models. These sections are centralized warehousing, centralized contracting, centralized operational purchasing, and centralized decision-making. The following paragraphs describe the advantages and disadvantages of the four sections related to either centralized or decentralized purchasing.

2.3.1 Centralized Warehousing

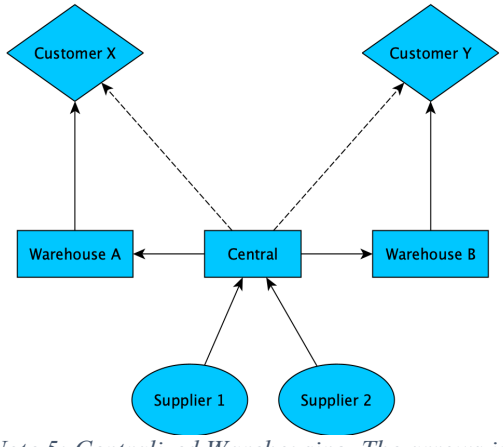
In centralized warehousing, the products for both organizations are purchased for and stored in a central warehouse. The products can be delivered from this central warehouse to other warehouses, or directly to the customers. One of the existing hybrid models is *centralized purchasing and warehousing*. In centralized purchasing and warehousing, products are purchased by a central location and delivered to a central warehouse. Products are delivered from this central warehouse to the organizations when they are requested, or periodically (Munson & Hu, 2010). Figure 4 shows the current decentralized warehousing situation of the Heutink Group. Figure 5 shows an example of a centralized warehousing situation.

Figure 4: Decentralized Warehousing



Note 4: The decentralized warehousing situation at the Heutink Group. The arrows indicate deliveries.

Figure 5: Centralized Warehousing



Note 5: Centralized Warehousing. The arrows indicate deliveries. The dotted arrows indicate the possibility of deliveries directly from the warehouse to the customers.

An advantage of centralized warehousing is low inbound transportation costs, because products are delivered in larger quantities and less deliveries are needed. Another advantage of centralized warehousing is a lower (total) minimal stock. In decentralized purchasing, goods are stored in multiple warehouses and all these warehouses have a minimal stock, to secure

safety in case of problems or unexpected sales. The minimal stock level in centralized warehousing can be lower than the total minimal stock level of the warehouses in decentralized warehousing (Schneider & Watson, 1997). Other possible advantages of centralized warehousing can be improved storage efficiency, larger product availability and better warehousing tools and management. A disadvantage of a centralized warehousing can be high outbound transportation costs, if the other organizations or the customers are located far away from the central warehouse (Wissema, 1992).

2.3.2 Centralized Contracting

In centralized contracting, the negotiating and handling of contracts is done by a centralized function or representatives of both organizations. The operational purchasing and the warehousing of purchased goods can be executed either central or decentral. *Group buying, purchasing councils, piggy-backing groups* and *centralized pricing with decentralized purchasing* are examples of hybrid models in this section.

Group buying is a hybrid model in which multiple organizations sign an overarching contract. These organizations can place their own purchasing orders at the supplier, against the prices and negotiated terms of this contract (Chen & Roma, 2010). In purchasing councils, the assigned purchasers of each business unit or organization come together and negotiate contracts for the entire corporation (Schiele, 2018). Purchasing councils often exist in corporations with 4-8 organizations with similar purchasing volumes. Piggy-backing groups are two or more organizations working together in an informal and simple way. In most cases, a large organization negotiates a contract with a supplier. This contract includes the possibility for smaller organizations to place orders from this contract with (almost) identical prices and negotiated terms (Schotanus & Telgen, 2007). In centralized pricing with decentralized purchasing, the centralized organization negotiates prices for all the organizations and the organizations stay responsible for their own operational purchasing (Munson & Hu, 2010).

Hybrid models for centralized contracting are mostly used to reduce transaction costs and purchasing prices, as smaller organizations can benefit from the purchasing power of the larger organization (Schotanus & Telgen, 2007). However, there is often no direct advantage of piggy-backing for the large organization that arranges the contract. Another disadvantage of centralized contracting is the mandatory purchasing volume. Economies of scale can only be obtained if the buyer and supplier agree on a certain price for a certain purchasing volume. To benefit from the lower purchasing prices in centralized contracting, both organizations need to purchase this minimal purchasing volume.

2.3.3 Centralized Operational Purchasing

In centralized operational purchasing, the purchasing of both organizations is done by a centralized purchasing function. Centralized operational purchasing is especially applicable for corporations in which one organization has a relatively high purchasing volume (Schiele, 2018). A *lead buyer, centralized purchasing with local distribution* and *program groups* are examples of hybrid models in this section.

A lead buyer is responsible for the purchasing of a specific section, for the entire corporation. Thus, this lead buyer buys all material within a specific section, for all the organizations in a corporation (Schiele, 2018). Orders could be delivered to a central warehouse or directly to the warehouses of the organizations. In centralized purchasing with local distribution, the purchasing for the entire corporation is done by a centralized purchasing function, but the articles are directly delivered to the individual warehouses, instead of to a centralized warehouse (Munson & Hu, 2010). Program groups are an intensive form of cooperative purchasing, in which purchasing representatives or managers of organizations work together closely during the steps of the purchasing process (Schotanus & Telgen, 2007). Regular meetings are planned and both organizations have high involvement in product specifications and the selection of suppliers.

Centralized operational purchasing improves the overall purchasing efficiency of the corporation by reducing duplicate purchasing tasks and reducing the total administrative costs for the corporation (Dimitri, Dini, & Piga, 2006; Johnson, 1999). Centralized operational purchasing can also lead to other cost advantages like reduced purchasing prices, if it is used in combination with centralized contracting to benefit from economies of scale. However, centralized operational purchasing often decreases the supply flexibility in the product portfolio of organizations (Schmitt, Sun, Snyder, and Shen (2015). Maintaining flexibility in product-choices is important for the Heutink Group. Therefore, centralized operational purchasing can only be implemented for the Heutink Group, if they can maintain their supply flexibility.

2.3.4 Centralized Decision-making

In centralized decision-making, the decisions related to the purchasing process are made by a centralized purchasing department. This includes the supplier selection, strategic choices, product portfolio decisions and support and control over the purchasing departments of the corporation. Related to the decision-making is the formality of the relationship. The formality of the relationship is determined by regularly planned meetings and the number of rules and duties of the organizations in the corporation (Walker, Bakker, Schotanus, & Harland, 2008).

In most cases, the closer the relationship and the more trust between the organizations, less formality is needed. *Center-led procurement, a centre-led action network* and a *federal organization of purchasing* are examples of hybrid models in this section.

In center-led procurement, strategic choices are centralized, while operational activities remain decentralized (Dimitri, Dini, & Piga, 2006). The centre-led action network is a structure in which the operational purchasing is decentralized and executed by the individual organizations, while the functional excellence is centralized and executed by the corporation (Rozemeijer, 2000). The federal organization of purchasing is a structure in which a centralized basis supports and controls the organizations in a corporation. The organizations are linked through shared services and facilities, but the operational purchasing remains decentralized (Rozemeijer, 2000).

In centralized decision-making, purchasers of multiple organizations can share information and knowledge, which can be an advantage for the entire corporation (Dimitri, Dini, & Piga, 2006; Johnson, 1999; Tella & Virolainen, 2005). Another advantage of centralized decision-making is that the centralized purchasing department can implement a uniform purchasing policy, which can lead to fewer problems and disturbances in the purchasing process (Dimitri, Dini, & Piga, 2006). A disadvantage of centralized decision-making is that the centralized decision-makers can be far away from the purchasing processes of the organizations. They often have no idea of what is actually going on at the organizations or how to solve problems rapidly (Gadde & Håkansson, 1994).

2.4 Supply Flexibility

The literature on centralized and decentralized purchasing indicated that neither fully centralized nor fully decentralized purchasing will solve the problems of the Heutink Group. Kanepejs and Kirikova (2018) support this by stating that organizations that are solely based on centralized purchasing lose supply flexibility, and organizations that are solely based on decentralized purchasing do not make use of the multiple benefits of centralized purchasing. Preliminary research showed that the purchasers of the Heutink Group expressed similar concerns, and that the Heutink Group is expected to lose supply flexibility in supplier- and product-choices. The hybrid models provide a corporation with more possibilities for a trade-off between the advantages of centralized and decentralized purchasing. However, the literature showed that none of the existing hybrid models specifically consider the supply flexibility.

Based on the literature, it seems that implementing centralized purchasing or one of the hybrid models could decrease the supply flexibility of the Heutink Group.

How a corporation can maintain their supply flexibility and benefit from the advantages of centralized purchasing at the same time is not clearly explained or investigated in the literature of strategic purchasing. Therefore, this section focuses on the theory of supply flexibility. The article of Angkiriwang, Pujawan and Santosa (2014) classifies twelve supply flexibility strategies into two categories: Reactive/buffering strategies and Proactive/redesign strategies. The information regarding these strategies is used for the interview questionnaire, to find out if these supply flexibility strategies can offer value in maintaining or improve the flexibility in supplier- and product-choices in combination with centralized purchasing.

Reactive strategies focus on reacting to the level of uncertainty, instead of improving the supply flexibility by actively doing something. There are four reactive strategies that can be used to remain flexible:

Safety stock – A higher safety stock can reduce the amount of out of stocks.

Capacity buffer – More capacity can serve as a buffer, to be able to store more inventory than needed in case of problems or emergencies.

Supplier backups – Having multiple suppliers for your products instead of only one supplier can decrease supply risk. However, more suppliers can lead to extra costs.

Safety lead times – Increasing the calculated time between order placement at a supplier and the time when the article is ready for delivery to the customer. Thereby, inventory will arrive earlier than needed, to offset for demand variability or delivery problems and emergencies.

Proactive strategies focus on actions related to products or the supply chain, to improve the supply flexibility. There are eight proactive strategies that can be used to remain flexible:

Component commonality – Component commonality is mostly used in product design processes, by finding components that can be used in multiple products. Component commonality can be used in an almost identical way by the Heutink Group, by finding (functionally) identical articles and combine their purchasing demands.

Postponement – Postponing deliveries to customers can lead to higher purchasing volumes, due to the combined demands of multiple orders. However, postponing deliveries can decrease supplier satisfaction.

Risk Pooling – Storing inventory for multiple organizations in one location so that if one organization receives a large order, the inventory level will be offset by a small order from another organization. Risk Pooling decreases the chances of out of stocks in case of an unexpected (high) demand at one organization.

Subcontracting/outsourcing – Ensuring (flexible) external warehouse space can increase flexibility and reduce unused warehouse space in your own warehouse. However, external warehouse space can be expensive.

Flexible supply contract – Arranging contract agreements that increases the supply flexibility, such as lower minimal order values or fast deliveries in case of demand increases.

Lead time reduction – Adapting a purchasing process to reduce lead times, for example through selecting suppliers on speed criteria instead of price criteria. With reduced lead times, an organization can respond quicker in case of unexpected demands.

Setup time reduction – Reducing the time before production or before packaging. For the Heutink Group, this can be achieved in two ways. Reducing the time before an order is placed at the supplier, or reducing the time between receiving orders from suppliers and the delivery towards customers.

Alternative routing/mode – Preparing flexible delivery methods or routing methods for unexpected orders can increase the delivery flexibility and prevent problems.

3. Methods

The methods section provides information about how the research is designed and how data will be gathered, to answer the following research question:

> *How can a corporation maintain flexibility in supplier- and product-choices and benefit from the advantages of centralized purchasing at the same time?*

3.1 Research Design

The research design of this study is exploratory qualitative research. An exploratory qualitative research design was used to gather a deeper understanding of the trade-off between the advantages of centralized purchasing and flexibility in supplier- and product-choices. To find out how the Heutink Group can maintain flexibility in supplier- and product-choices and benefit from the advantages of centralized purchasing at the same time, semi-structured interviews are executed with the CPO and the purchasers of Heutink and Reinders. The interview questionnaire is based on the literature of centralized purchasing, decentralized purchasing, and the supply flexibility strategies and can be found in Appendix 2. The goal of the interviews is to gather information related to the advantages of centralized purchasing and the flexibility in supplier- and product-choices.

The results of the interviews are used to form an initial answer to the research question. However, the purchasing departments of Heutink and Reinders are relatively small and have a total of six purchasers. To improve the validity of the findings, the initial results of this study are discussed with the purchasers during a meeting. In this meeting, the initial results were presented to the participants, followed by a discussion regarding the findings of this study. The initial results were improved based on this meeting.

The answer to the research question of this study will show how a corporation can maintain flexibility in supplier- and product-choices and benefit from the advantages of centralized purchasing at the same time. In doing so, this study offers theoretical contribution to the literature of strategic purchasing, by providing new insights into the trade-off between the advantages of centralized purchasing and the advantage of decentralized purchasing, supply flexibility. Moreover, this study offers practical contributions as it is conducted for the Heutink Group, to solve the problems that they encounter in their purchasing departments.

3.2 Research Setting

According to Shenton (2004), a well-performed case study is based on four criteria, creditability, transferability, dependability, conformability. These criteria can be linked to respectively internal validity, external validity, reliability, and objectivity. The following paragraph describes how these criteria are ensured in this study.

Firstly, the internal validity of a research is the way in which a study measures what is meant to measure (Shenton, 2004). To ensure the internal validity of this study, the interviews with the participants are executed face-to-face and in a private area. In this way, the respondents did not encounter any distractions during the interviews, and the answers of the respondents remained private. Also, the interviews and the coding of the results are executed in the same way for all the participants. Therefore, the internal validity of this study is ensured.

Secondly, the external validity of a research is the way in which the results of a study can be generalized and used in other situations (Shenton, 2004; Saunders et al., 2016). The research design of this study is a single-case study. The disadvantage of a single case study is that it is more difficult to generalize the results. To improve the external validity, the research setting of this single case study is set up to enlarge the generalizability of the results. The study is executed at the Heutink Group, a corporate group that consists of two major organizations, Heutink and Reinders. The data collection is executed at both of these organizations. Because the research setting includes multiple organizations within one corporation, the external validity is improved. This can increase the generalizability of the results and the value of the findings (Saunders et al., 2016).

Thirdly, the reliability of a research is the way in which the findings would be identical if the research is replicated or executed by another researcher (Shenton, 2004; Saunders et al., 2016). In this research, semi-structured interviews are executed with the six purchasers of the Heutink Group. The interviews are executed face-to-face in a private area, in the same way for all the participants. In this way, participant bias is reduced, as the participants can speak in private. Afterwards, the interviews were transcribed and coded. The coded interviews were analyzed and used to form the initial results of this study. To reduce participant and researcher error, the interviews were scheduled far ahead so that every employee, as well as the researcher, had the time to prepare for the interview. Therefore, the reliability of this research design is ensured.

Lastly, the objectivity of a research is the way in which the results of the research are influenced by biases of the researcher. The objectivity of this research is ensured by presenting

and discussing the initial results with the participants. By discussing the initial results of the study, researcher bias is reduced, as the participants were given the opportunity to reflect on the interpretations of the researcher.

3.3 Research Participants

The participants that were selected for the interviews are the CPO of Heutink and the CPO of Reinders, and the operational purchasers of both organizations. The purchasing departments of Heutink and Reinders are relatively small and only include a total of six purchasers. Therefore, there are six participants selected for the interviews, which can also be seen in Table 4. The table shows the name of the participants, their function, and the number of years that they are working at the Heutink Group, to show their experience at and knowledge of the company and the purchasing process.

Table 4: Interview Participants

Participant	Name	Function	Experience at the Heutink Group
Heutink			
P1	Bram	CPO of Heutink	6 years
P2	Remco	Operational Purchaser	2 years
P3	Jasmijn	Operational Purchaser	1 years
P4	Hanneke	Operational Purchaser	18 years
P5	Marcel	Operational Purchaser	40 years
Reinders			
P6	John	CPO of Reinders	12 years

3.4 Sample

The unit of analysis in this study are corporations with multiple organizations or business units that are interested in a trade-off between centralized and decentralized purchasing. The unit of observation (or the sampling unit) in this study is the Heutink Group. The Heutink Group is used as unit of observation because they are interested in combining the purchasing departments of their two organizations, to achieve a trade-off between centralized and decentralized purchasing. More specifically, the Heutink Group is used as unit of observation in this study to find out how a corporation can achieve a trade-off between the advantages of centralized purchasing and the specific advantage of decentralized purchasing, supply flexibility. Because the Heutink Group is a corporation that consists of two major

organizations and is interested in this trade-off, it is a valuable case to represent the unit of analysis. Therefore, the results of this study can be useful for corporations that are interested in the trade-off between centralized and decentralized purchasing, or more specifically in the trade-off between the advantages of centralized purchasing and supply flexibility.

3.5 Data collection

The data is collected as primary data. Semi-structured interviews are conducted with the CPO and purchasers of Heutink and Reinders. These interviews are executed face-to-face, which gave the interviewer the advantage of anticipating possible concerns or attitudes of participants about a certain topic (Saunders, Lewis, & Thornhill, 2016).

The interviews were recorded and afterwards transcribed. To interpret the qualitative data from the interviews, the transcripts needed to be organized and structured. This is done by a coding process, which included two steps, open coding and axial coding. Firstly, the transcripts of the separate interviews were analyzed, and open codes were assigned to the quotes of the interviews. Secondly, these open codes of the interviews are compared, to find similarities and patterns between the open codes of the separate interviews. These similar open codes are combined, and axial codes are assigned to these quotes (Saunders, Lewis, & Thornhill, 2016). Thereby, the quotes of the interviews that provide similar information or information regarding the same topic are combined into the same axial code. The tables with the axial codes of the interviews can be found in Appendix 3. These tables are used to form the results of this study, and to find out how the Heutink Group can maintain their flexibility in supplier- and product-choices and benefit from the advantages of centralized purchasing at the same time.

4. Results: Flexibility in Supplier- and Product-choices

This chapter describes the results of the interviews regarding the desired supply flexibility of the Heutink Group. The literature indicated that losing supply flexibility is a disadvantage of centralized purchasing. Preliminary research showed that the Heutink Group expects to lose flexibility in product- and supplier-choices, if centralized purchasing is applied. The results show how a corporation can improve flexibility in product- and supplier-choices in combination with centralized purchasing, and how this can solve the current problems of the Heutink Group. Section 4.1 describes how flexibility in supplier-choices can be improved in centralized purchasing, while section 4.2 describes how flexibility in product-choices can be improved in centralized purchasing. The results are based on the interviews, of which the tables with codes can be found in Appendix 3.

4.1 Flexibility in supplier choices

Preliminary research showed that the Heutink Group is expected to lose flexibility in supplier-choices if centralized purchasing is applied. The problem of losing flexibility in supplier-choices is that in centralized purchasing, an organization has less choices in the suppliers where they can order an article. If a supplier cannot deliver an order on time, this can increase the number of backorders, which is one of the current problems of the Heutink Group. This problem is illustrated in Figure 6. The results of this section are focused on the first part of the research question and show how the Heutink Group can maintain flexibility in supplier-choices in centralized purchasing.

Figure 6: Problem related to flexibility in supplier-choices in centralized purchasing

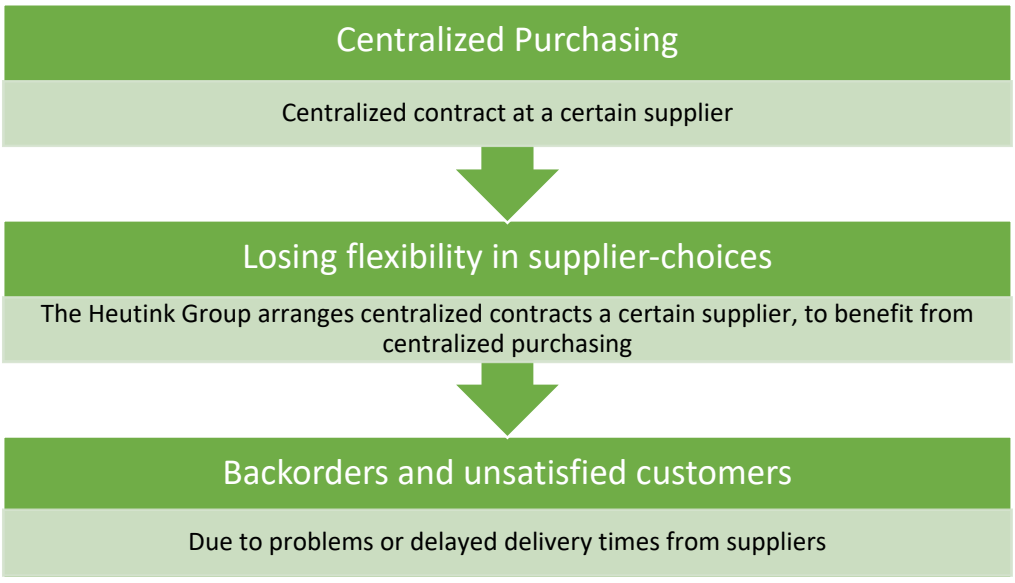


Table 5 shows the results of the interviews regarding the supplier base. These results indicate that the Heutink Group needs a diverse supplier base, to avoid backorders. If suppliers have problems or delayed delivery times, the Heutink Group currently has no flexible alternative suppliers, and this results in backorders. Moreover, the interviews also show that the number of suppliers of the Heutink Group is currently too high.

Table 5: Codes Supplier Base

Code:	***Supplier Base***
P5	"The diversity of our current suppliers is needed. I think that it is necessary to keep the current diversity of suppliers, to stay flexible."
P4	"We see that more articles are out of stock than other years, and we do not have another party where we can simply buy these articles."
P1	"Heutink wants to stay flexible in terms of certain suppliers to secure the customer satisfaction and remain a flexible product portfolio."
P2	"I think that we have too many suppliers."
P5	"The current number of suppliers is high. Maybe we should look at which supplier we can reduce."

However, a diverse supplier base seems to be in conflict with practicing centralized purchasing. The literature indicated that centralized purchasing reduces the choices in suppliers, because the purchasing needs of organizations are combined into centralized contracts at a certain supplier. Therefore, the Heutink Group needs to achieve a trade-off between the cost advantages of centralized purchasing, and a diverse supplier base to maintain flexibility in supplier-choices.

Based on the link between the literature and the results of the interviews, this trade-off can be achieved by re-evaluating the supplier base. Firstly, the Heutink Group should assign preferred suppliers to the centralized articles, to benefit from the advantages of centralized purchasing. A preferred supplier is a company that delivers goods or services and is selected as the primary supplier for a certain article (in this case, for the articles that will be purchased through centralized purchasing). The literature showed that close and long-term relationships with these preferred suppliers should provide low cost and high-quality articles. Secondly, to improve the diversity of the supplier base, the Heutink Group should select backup suppliers for the centralized articles. A backup supplier is a supplier that can serve as a backup for when a preferred supplier expects problems or delayed delivery times. Based on the literature and the results of the interviews regarding the supplier base, it seems that *supplier backups* (one of the supply flexibility strategies) can improve the flexibility in supplier-choices in centralized

purchasing. By selecting backup suppliers, the Heutink Group can maintain the diversity of their supplier base.

A backup supplier can be used when preferred suppliers have problems that will lead to backorders. The preferred suppliers deliver articles that will be purchased through centralized purchasing, which are mainly the fast-moving articles. These articles are mostly delivered overseas from China. The interviews showed that if preferred suppliers have problems, the delivery times can be delayed by weeks or even months. If suppliers expect problems or delayed delivery times, backup suppliers can be used to prevent backorders. During the interview, *P1* indicated that extending the delivery time from 24-hours to 48-hours would not decrease the customer satisfaction, as long as it is communicated to the customer. Therefore, backup suppliers should be selected on delivery speed (in addition to quality, which is always most important). If an article is expected to be out of stock, backup suppliers can deliver the article before the order needs to be delivered to the customer. In this way, backorders and unsatisfied customers can be avoided.

So, based on the results of the interviews, backup suppliers can improve the diversity of the supplier base and increase the flexibility in supplier-choices. However, introducing backup suppliers should not increase the number of suppliers, as the interviews showed that the number of suppliers is already too high. Table 6 shows the results of the interviews regarding the diversity of suppliers.

Table 6: Codes Diversity of Suppliers

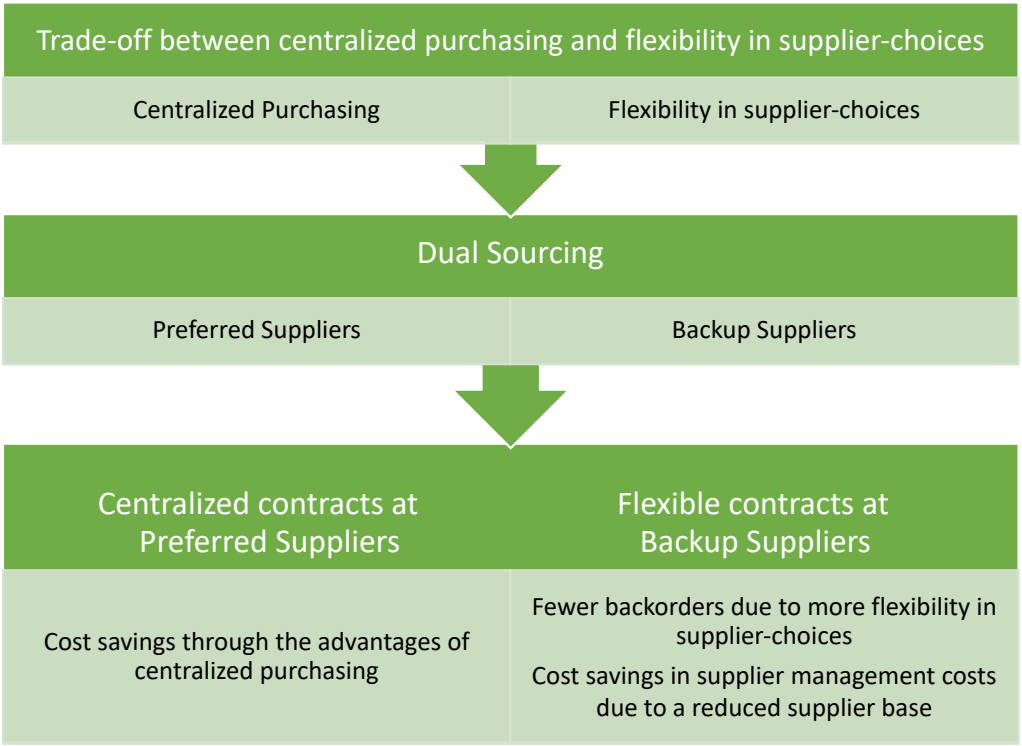
Code:	***Product Range of Suppliers***
P1	"There are over 350 suppliers in our supplier base that deliver articles such as pens, pencils, other consumables etc. Some of these suppliers can offer a wide product range."
P2	"We have a lot of small suppliers that just do 1 product group, but we also have a lot of big suppliers that are total suppliers, and where we can purchase almost everything. So the diversity in suppliers is big."

The results show that there are over 350 suppliers only in consumables, and that some of the current suppliers can deliver a wide product range. Therefore, the Heutink Group should select backup suppliers on their (wide) range of the product portfolio. This makes it possible to minimize the number of suppliers, which can save supplier management costs, without losing diversity in the supplier base. The backup suppliers should serve as backup to the preferred suppliers and should therefore only be used if a quick or flexible delivery is needed to prevent

backorders. Therefore, an ideal backup supplier is a supplier that is focused on delivery speed and can offer a wide range of the product portfolio.

By assigning preferred suppliers and backup suppliers to the articles, the Heutink Group can make efficient use of dual sourcing. The preferred suppliers provide the organizations with the desired cost advantages of centralized purchasing, and due to the backup suppliers, the organizations can both maintain a diverse supplier base and reduce the number of suppliers. Backup suppliers can thereby solve the problems that are related to flexibility in supplier-choices. If a (preferred) supplier has problems or delayed delivery times, a backup supplier can solve this problem and avoid out of stocks and backorders. This would solve the problem of too many backorders and increase the customer satisfaction. This solution is illustrated in Figure 7.

Figure 7: Summary of the solution related to flexibility in supplier-choices



4.2 Flexibility in product choices

Preliminary research showed that the Heutink Group is expected to lose flexibility in product-choices if centralized purchasing is applied. The problem of losing flexibility in product-choices is that in centralized purchasing, the purchasing needs of multiple organizations are combined into centralized contracts at a certain supplier. This means that an organization has to offer their customers a specific article to make use of these contracts. This could result in unsatisfied customers when a customer wants a specific article that is not part of

the centralized contracts. This problem is illustrated in Figure 8. The results of this section are focused on the second part of the research question and show how the Heutink Group can maintain flexibility in product-choices in centralized purchasing.

Figure 8: Problem related to flexibility in product-choices in Centralized Purchasing

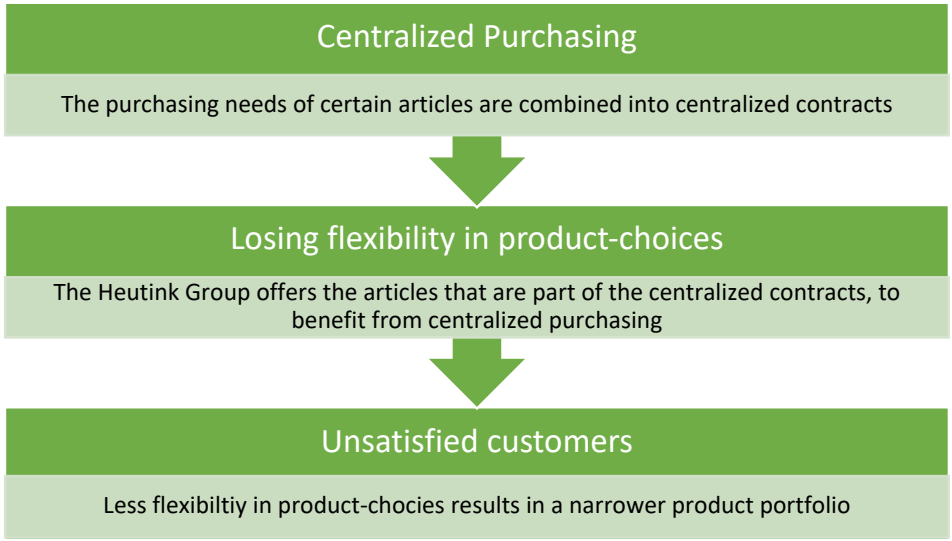


Table 7 shows the results of the interviews regarding the product portfolio of the Heutink Group. These results show that the Heutink Group needs a wide product portfolio, as they want to remain a total supplier of educational material. The Heutink Group wants to be the organization where customers can order all their needs for in and around a school.

Table 7: Codes Product Portfolio

Code:	***Product Portfolio***
P4	"I do think that our wide product portfolio has to do with our diversity in suppliers."
P1	"The product portfolio positively influences the customer satisfaction, because the customers can say: everything that I need in and around a school, Heutink can deliver."
P1	"Because of our product portfolio, a school only needs 1 party for all their needs, which also means 1 contact person, 1 invoice flow, 1 contract."
P2	"We want to offer our customer everything, and be a total supplier."
P2	"We can definitely take a step and combine some of our products, because we have a lot of the same things."

However, a wide product portfolio seems to be in conflict with practicing centralized purchasing. The literature indicated that centralized purchasing reduces the choices in products, and thereby narrows the product portfolio, because the purchasing needs of certain articles are combined into centralized contracts. Therefore, the Heutink Group needs to achieve a trade-off between the advantages of centralized purchasing and a wide product portfolio.

Although the interviews showed that the Heutink Group needs a wide product portfolio, the results also show that there are a lot of articles, and that the Heutink Group can take a step and combine some articles that have similar (functional) characteristics. One of the supply flexibility strategies, *Component Commonality*, can provide this step and thereby increase the opportunities for centralized purchasing. In component commonality, Heutink and Reinders can put their product portfolios side by side and look for (functionally) identical articles. An example of functionally identical articles are two blue pens of two different brands. For these articles, the organizations need to decide which of the articles will offer the most value to the customers, and substitute the less valuable article by the most valuable article. In doing so, the product portfolio will be more efficient and offer more possibilities for centralized purchasing, as the purchasing demands of the articles can be combined.

However, looking at the trade-off between the advantages of centralized purchasing and a wide product portfolio, component commonality should not narrow the product portfolio in a way that would influence the customer satisfaction. Therefore, the alternative acceptance of customers should be sufficient. The alternative acceptance of customers is the way in which a customer accepts an alternative for the article that they initially wanted. Customers should identify the substituted articles as interchangeable alternatives. These alternatives should be accepted without losing customer satisfaction. Table 8 shows the results of the interviews regarding the alternative acceptance.

Table 8: Codes Alternative Acceptance

Code:	***Alternative Acceptance***
P2	"I think that customers would reasonably easily accept an alternative, and that it also has to do with how an advisor explains/sells it. Some schools think that they can only work with one specific brand, while another brand is just as good, so they should just be aware of that."
P4	"I think that is also a bit of marketing. You just have to convince customers to use other brands/pens. It is often laziness of us, that we will just order that one extra pen for a customer."
P3	"Replacing products with similar products is possible. The marketing behind it is also very important, maybe also in combination with durability. I think that you can communicate that very well to customers. If you tell customers that if they choose for a similar product, but just a slightly other brand, Heutink can purchase and transport more durable and cheaper, customers will accept an alternative easier. I think that the marketing department could and should promote that very well."

Based on the results from the interviews, it seems that customers would reasonably easily accept an alternative, and that the marketing department can play an important role in improving the alternative acceptance of customers in the educational sector. The marketing department should

implement a strategy to convince the customers of the Heutink Group that the alternatives are just as good as the substituted products. If customers are convinced that the alternatives are similar and functionally identical, unsatisfied customers are avoided. Component commonality can thereby improve the trade-off, by increasing the opportunities for centralized purchasing without losing width in the product portfolio from a customers' perspective.

However, situations could still occur in which the alternative acceptance of customers is insufficient, and customers want a specific article from a specific brand. Table 9 shows the results of the interviews regarding the customer satisfaction.

Table 9: Codes Customer Satisfaction

Code:	***Customer Satisfaction***
P4	"Customers are willing to go along with what we are offering until a certain point, at that point they do want exactly a certain brand or article."
P2	"We want to offer every customer everything, but at one point you should make a trade-off between the time you spend on 1 supplier for some customers, and if you want that… So I do think that we can make a step in that."

In situations where the customer satisfaction cannot be improved (even by a marketing strategy), centralized purchasing would lead to unsatisfied customers. Therefore, the trade-off between the advantages of centralized purchasing and flexibility in product-choices would be hard to achieve in these situations. Flexibility in product-choices could be more important than the advantages of centralized purchasing, to avoid unsatisfied customers. The results of the interviews showed that the Heutink Group should make decisions in these situations, whether a customer is worth the extra costs of ordering a specific article, instead of offering an article that is part of the centralized contracts.

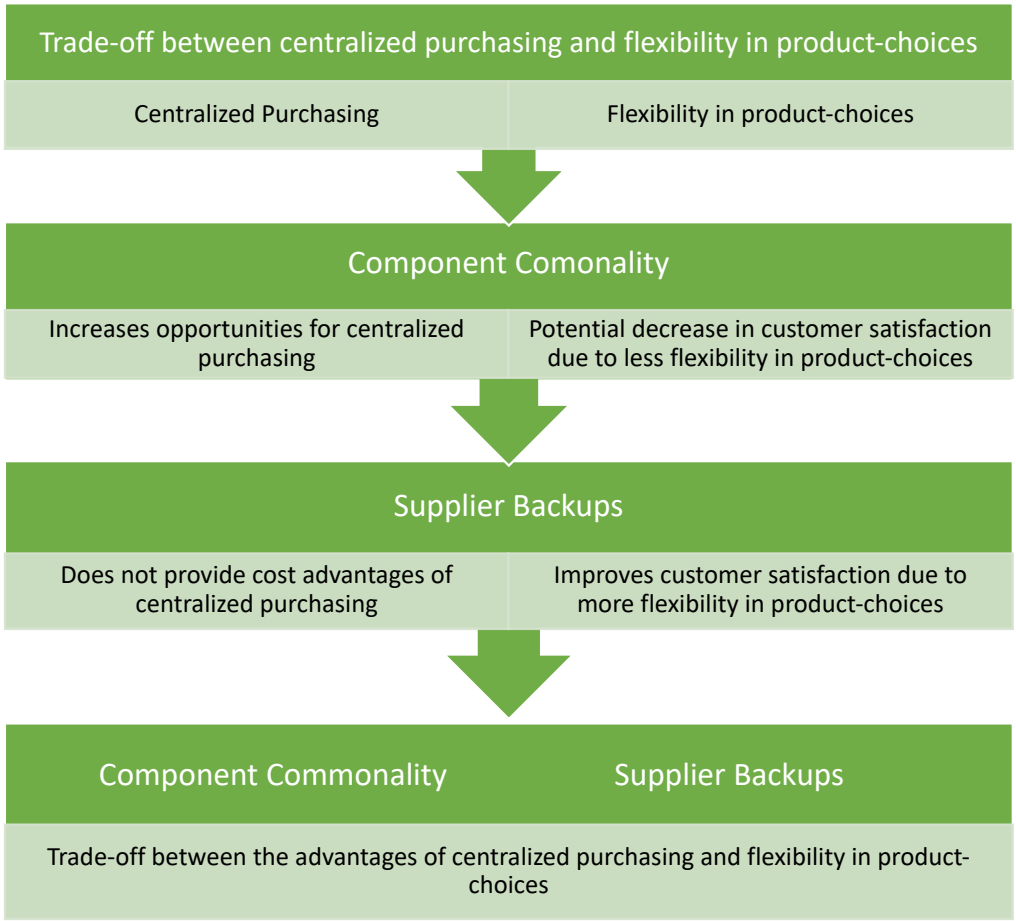
An important customer could be worth the extra costs of ordering a specific article. In these situations, *Supplier Backups* can be used to improve the flexibility in product-choices. The backup suppliers, already mentioned in section 4.1, should be selected on delivery speed and a wide product range (in addition to quality). The wide product range of the backup suppliers would let the purchasers of the Heutink Group offer these important customers more product-choices. Thereby, supplier backups can increase the flexibility in product-choices, and avoid unsatisfied customers for the customers with a low alternative acceptance.

Using backup suppliers costs more time and transactions. Therefore, the Heutink Group should avoid the situation in which backup suppliers are used too often to satisfy customers. During the discussion regarding the initial solution, the CPO of Heutink indicated that

implementing price differences between the centralized articles at a preferred supplier and the other articles at a backup supplier would be a solution for this problem. In doing so, more customers are shifted towards purchasing the centralized articles, which will lead to cost advantages for both the customer and the Heutink Group. If customers still want to order articles through backup suppliers, the extra costs of the backup supplier are calculated in the price and therefore paid by the customers themselves. According to the CPO of Heutink, this is a good solution, and this will not lead to problems.

Therefore, the trade-off between the advantages of centralized purchasing and flexibility in product-choices can be achieved by a combination of component commonality and supplier backups. Component commonality increases the opportunities for centralized purchasing, in which the focus on alternative acceptance should avoid unsatisfied customers. Supplier backups increase the width and diversity of the product portfolio, which improves the flexibility in product-choices for the customers with a low alternative acceptance. This solution is illustrated in Figure 9.

Figure 9: Summary of the solution related to flexibility in product-choices



5. Results: Advantages of Centralized Purchasing

This chapter describes the results of the interviews regarding the advantages of centralized purchasing. The results show how the Heutink Group can benefit from the advantages of centralized purchasing and how this can solve the current problems of the Heutink Group. Chapter 5.1 describes how the ratio between inbound and outbound transportation costs can offer advantages in centralized warehousing. Chapter 5.2 describes how the division of safety stock between the warehouses can offer advantages in centralized purchasing and how Risk Pooling can reduce the chances of out of stocks. Chapter 5.3 describes how centralized purchasing can increase the purchasing power of a corporation, and how this can lead to advantages. Chapter 5.4 describes why information- and knowledge-sharing is important in centralized purchasing, and how this will lead to advantages. The results regarding the advantages of centralized purchasing are based on the interviews, of which the tables with codes can be found in Appendix 3.

5.1 Inbound vs. Outbound transportation costs

The literature indicated that centralized purchasing could lead to cost savings in inbound transportation, due to less deliveries and more efficient transportation towards a central warehouse. However, a disadvantage of centralized purchasing is that in general, decentral warehouses are located closer to the customers. The results from the interviews are used to find out whether centralized purchasing can offer more advantages in inbound transportation or in outbound transportation. Therefore, this section describes if the ratio between inbound and outbound transportation costs can offer advantages for the Heutink Group.

The interviews showed that the inbound transportation costs are higher than the outbound transportation costs, due to the extremely high container prices. The results showed that most of the fast-moving articles are shipped overseas from China. Fewer and more efficient transportation towards a central warehouse would therefore offer the potential for cost-savings for these articles. Moreover, the transportation costs are currently at an all-time high and could even rise further, according to Yanelli (2021).

The results from the interviews regarding outbound transportation showed that the outbound transportation costs will not be a lot higher, because the central warehouse will be in the Netherlands, just like all the customers of the Heutink Group. Because the Netherlands is a small country, the distance to customers will not be much further from a central warehouse than from a decentral warehouse, and this will not lead to high extra costs. Therefore, even if the

inbound transportation costs will not rise further, the ratio between inbound and outbound transportation costs in centralized purchasing will offer more cost savings in inbound transportation costs than the potential extra costs in outbound transportation.

5.2 Division of Safety Stock

The interviews showed that the safety stock is very important for Heutink and Reinders, who are both aiming for a high delivery reliability. If the safety stock in a warehouse is too low, one big order from a customer can result in out of stocks and backorders. Backorders lead to high transportation- and transaction-costs and negatively influences the delivery reliability and the customer satisfaction, as customers like to receive their orders in one package. This section describes how the division of safety stock between the warehouses can offer advantages in centralized purchasing and solve the current problem of too many backorders.

The interviews showed that out of stocks happened a lot this year. One of the problems with the current safety stock is the wide product portfolio of the Heutink Group. The product portfolio contains a lot of slow-moving articles with a low predictability. Due to the low predictability of these articles and the limited warehouse capacity, not all the slow-moving articles have a safety stock. One or two orders can make these articles run out of stock. The following quote of *P4* clearly indicates this issue.

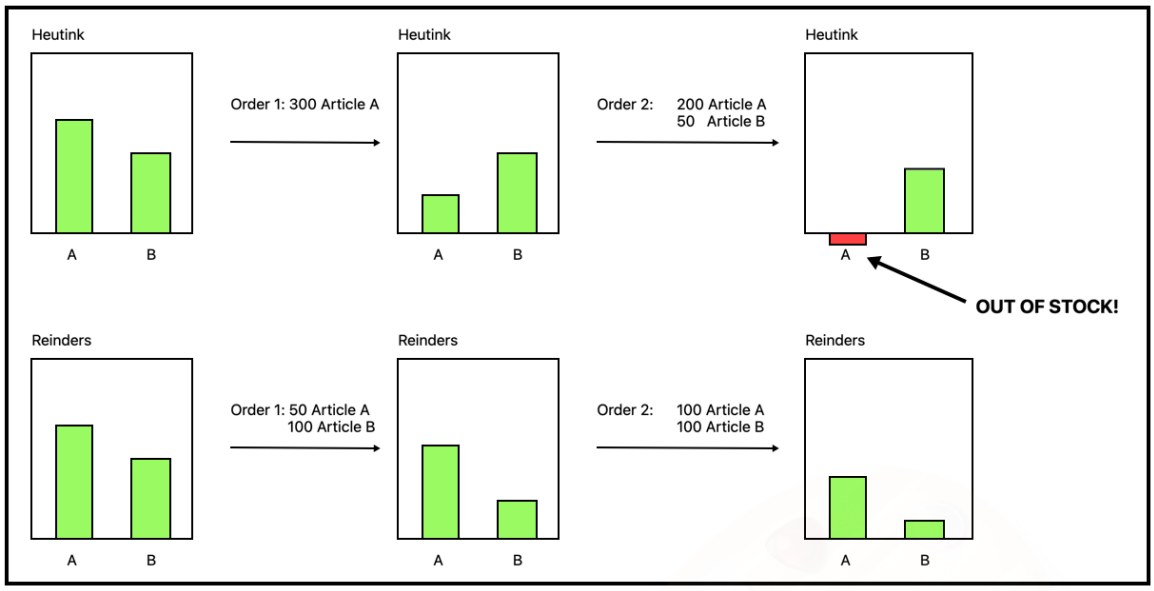
P4: *"Especially the creative market, the small cheap articles, is unpredictable. Where you might have sold 50 products last year, you could sell 100 products this year, so it is hard to determine how much stock you need."*

The Heutink Group uses a 9-boxes method, in which the turnover rate and the revenue determine the urgency of an article. Every article receives a score from A to C for both the turnover rate and the revenue. Therefore, an article with a high turnover rate and a high revenue has an AA score, and an article with a low turnover rate and a low revenue has a CC score.

Firstly, the fast-moving articles are the articles with an A-or B-score in turnover rate. A central warehouse can combine the safety stock of both organizations and store a high safety stock of the fast-moving articles. Replenishing a higher safety stock can lead to lower prices per unit and lower transaction- and transportation-costs. The results of the interviews showed that Heutink and Reinders can both have big differences in their order values. Some orders may only include one can of paint, while another order is very diverse or a large year-order. Because the interviews showed that there can be big differences between order values, *Risk Pooling* (one of the supply flexibility strategies from the literature) can be effective for the situation of the Heutink Group in centralized purchasing. In the current situation, a large (unexpected) order

can empty the entire stock of an article in one of the decentral warehouses of Heutink or Reinders. This current problem is shown in in Figure 10.

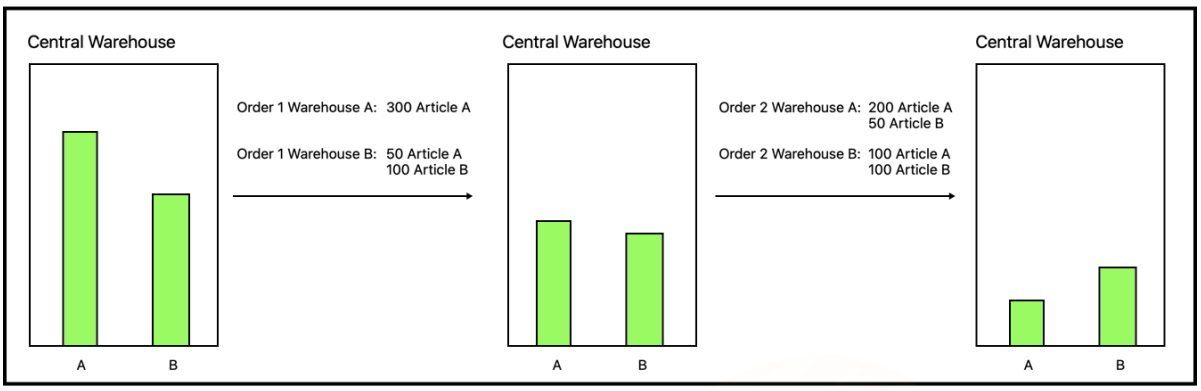
Figure 10: Safety Stock in Decentral Warehouses



Note 6: The situation in decentralized purchasing. Both warehouses A and B have their stock values of Articles A and B. After two orders, warehouse A has out of stock for Article A.

In centralized purchasing, Heutink and Reinders can combine their purchasing needs and have a high stock value in a central warehouse. Because the interviews showed that there can be big differences between order values, a large (unexpected) order from one organization will be offset by a small order from the other organization. This reduces the risk of out of stocks in case of large (unexpected) orders. For the Heutink Group, this will result in fewer out of stocks, and solve the current problem of too many backorders. Figure 11 illustrates how this would reduce the current problem of too many out of stocks.

Figure 11: Safety Stock in a Central Warehouse with Risk Pooling principle



Note 7: The situation in a central warehouse. The safety stocks from the decentral warehouses are combined in the central warehouse. After the same orders as in Figure 1, there are no out of stocks.

Besides the fast-moving articles, a high safety stock in a central warehouse can also solve the problem of the common out-of-stocks of slow-moving articles (articles with a B- or C-score in turnover rate). If the central warehouse holds a high safety stock of fast-moving articles, the decentral warehouses will have more capacity to store a wider range of the total product portfolio, including the slow-moving articles. The interviews showed that these slow-moving articles have a less predictable pattern and often cause out of stocks. Therefore, the division of safety stock can reduce out of stocks for both the fast-moving articles and the slow-moving articles.

A high safety stock (of fast-moving articles) in a central warehouse in combination with safety stock (of slow-moving articles) in the decentral warehouses appears to lead to high inventory costs. However, the safety stock in the central warehouse has the same value and costs as the current safety stock in the decentral warehouses. This high safety stock can also increase economies of scale and save transaction and transportation costs. The extra safety stock in the decentral warehouses does increase the inventory costs. However, the interviews showed that the inventory costs will be offset if backorders are prevented. Table 10 shows the results of the interviews regarding the inventory costs and backorders.

Table 10: Codes Backorders vs. Inventory Costs

Code:	***Backorders vs. Inventory Costs***
P1	"We always want to avoid backorders. We rather have a high safety stock value, than backorders. What we always say is that the customer should and will receive deliveries as complete as possible. So, that customer satisfaction is definitely worth more than the costs of safety stock."
P1	"Every backorder costs us €25. Backorders costs us money and time. It costs a lot of handlings, and costs of transport, and communication etc."
P2	"We usually pick everything that is in stock in 1 time, with 1 time transportation costs, 1 time order picking costs, etc. When we are out of stock, we have to send more deliveries, which will lead to more order picking costs, more transportation costs. This leads to a lot of extra costs."

As *P1* indicates, the costs of backorders and unsatisfied customers are higher than the extra inventory costs. The costs of a backorder are set at €25, caused by extra handling-, transaction- and transportation-costs. This means that every single backorder increases the costs for the Heutink Group with €25. The CPO of Heutink mentioned that adding up to 30% to the optimal safety stock level (given by the inventory management system Slimstock) would still save more backorder costs than the extra inventory costs. Therefore, the extra inventory costs of the safety-stock in the central and decentral warehouses will be offset by the backorders that are prevented.

5.3 Purchasing Power

In the current situation, Heutink and Reinders make little use of economies of scale, despite their product overlap of around 85%. Moreover, out of stocks happen too often, especially in the slow-moving articles. The following section describes how centralized purchasing can solve these problems and increase the purchasing power of the Heutink Group.

The interviews showed that multiple participants believe that the purchasing power of the Heutink Group at their suppliers will increase in case of centralized purchasing. When Heutink and Reinders combine their demands, the purchasing volume increases. During the interviews, *P1* indicated that an increase in purchasing volume as a result of combining demands would not directly increase the purchasing power solely based on the purchasing volume. This is because the purchasing volume that will be purchased extra, would for some products normally be purchased at the same supplier. This is caused by the overlap in suppliers of around 80%. Although combining the purchasing needs would not increase the overall purchasing volume at a certain supplier, which *P1* mentions, the supplier does get the chance to benefit from economies of scale. Economies of scale is not just caused by an overall increase in purchasing volume over a longer period. Classic economies of scale are related to the costs and efficiency of production. Purchasing in higher volumes means that the supplier can improve the efficiency of its production process, and lower its average costs per unit (Silberston, 1972). Therefore, the purchasing power of the Heutink Group could still increase for these products.

Not only the fast-moving articles can increase the purchasing power. The interviews showed that if there is more warehouse capacity, stock levels of the slow-moving articles should be increased, because these are the articles that most often cause out of stocks. These articles are currently purchased in small volumes, because their stock level cannot be too high due to the warehouse capacity. In centralized purchasing, the stock levels of the slow-moving articles can be increased, which increases the purchasing power of these articles and reduces the chances of out of stocks. This will lead to lower costs per unit, lower transaction- and transportation costs, and cost savings in backorders.

To increase the purchasing power, Heutink and Reinders need to arrange centralized contracts. Based on the results from the interviews and the literature, the Heutink Group should arrange two types of contracts. Heutink should arrange contracts for slow-moving articles based on piggy-backing, and Heutink and Reinders should jointly arrange centralized contracts for fast-moving articles, based on their total combined purchasing volumes.

The slow-moving articles are the articles with a B- or C-score in turnover rate. Due to the warehouse capacity, these articles can be purchased and stored in larger volumes, which is

mentioned in the previous paragraph. Heutink and Reinders can decide together for which articles this would be efficient. For articles with a B-score in turnover rate and a high predictability, this could be more efficient then for articles with a C-score in turnover rate and a low predictability. The contracts for these slow-moving articles should be based on 'piggy-backing', in which the largest organization (Heutink) arranges a contract with a supplier, and the other organization can place orders from this contract, against identical prices and terms. The interviews showed that both organizations believe that this would work efficiently. Piggy-backing contracts would offer benefits for the Heutink Group, because the interviews have shown that it is not efficient to jointly negotiate contracts for slow-moving articles, and that the purchasing demands can easily be combined.

Fast-moving articles are the articles with an A-score in turnover rate, that are mostly delivered overseas from China. These articles should be delivered to the central warehouse. Because there is sufficient warehouse capacity, Heutink and Reinders can combine the demands for these articles to obtain purchasing power. Heutink and Reinders should jointly arrange centralized contracts for these fast-moving articles based on the combined total demand. More information on how to organize the centralized contracts can be found in Appendix 4.

If Heutink and Reinders arrange their contracts for slow-moving articles based on piggy-backing and their contracts for fast-moving articles based on large centralized contracts, the purchasing power will be increased. In doing so, lower prices per unit and lower transaction- and transportation-costs can be achieved.

5.4 Information- and Knowledge sharing

Communication is an important element in centralized purchasing. This section describes how the relationship between Heutink and Reinders can offer advantages and avoid problems in centralized purchasing, and how information- and knowledge sharing can improve the competitive position of the Heutink Group.

The current relationship between Heutink and Reinders is described by the participants as informal. In most cases, the closer the relationship and the more trust between the organizations, less formality is needed. The interviews showed that Heutink and Reinders both have a high level of trust in the other organization, and that trust is not a problem. Therefore, a strict formal relationship does not seem necessary. The results of the interviews showed that an informal relationship, as it is now, is ideal for the Heutink Group. This is because Heutink and Reinders are relatively small and flat organizations, with a small purchasing department.

Table 11: Codes Division of Tasks

Code:	***Division of Tasks***
P4	"In case of centralized purchasing, I think that you should do it a bit more formal, and set more things on paper."
P4	"I think that people could have difficulties in giving up some of their tasks, so you should put it clear and formal on paper, especially in division of tasks and clarity."
P3	"I think that we can shift/change very quickly."
P5	"Changes in the purchasing department are discussed together, in good harmony. It could be that you do not agree with something, but we always work it out through good consultation."

However, in centralized purchasing, new tasks or responsibilities may arise. Table 11 shows the results of the interviews regarding the division of tasks. Based on the interviews, it is important to formalize the division of tasks in centralized purchasing. Every purchaser needs to be aware of the tasks that are related to their purchasing function. Therefore, the division of tasks should be discussed clearly with the purchasers of Heutink and Reinders, prior to the implementation of centralized purchasing. The interviews showed that Heutink and Reinders are flexible in terms of changes within the purchasing departments, and that problems or disagreements are always solved in good consultation. Because the purchasing departments are relatively small, discussing the division of tasks should not lead to problems. In this way, all purchasers are aware of their tasks, and this will avoid problems in centralized purchasing.

The interviews also showed that regular meetings could improve the relationship between Heutink and Reinders, in addition to the informal daily contact and communication. During these meetings, Heutink and Reinders should discuss topics regarding centralized purchasing, such as information about suppliers, articles, and contracts, but also purchasing policy, strategy, and the product portfolio.

In centralized purchasing, information- and knowledge-sharing can offer advantages. The interviews showed that Heutink and Reinders make some use of information- and knowledge sharing in the current situation regarding suppliers, products, innovations, and contract conditions. The participants also believe that more information- and knowledge sharing could lead to more advantages. Because information- and knowledge sharing is seen as efficient and pleasant in the current situation, the purchasers of Heutink and Reinders should share more information about suppliers, products, innovations, and contract conditions in case of centralized purchasing. More information- and knowledge sharing could be done formally

(during regular meetings) or informally during day-to-day contact (like in the current situation). During the interview, *P2* indicated that information- and knowledge sharing is extra important for the Heutink Group, because there are only a few players on the market. More information- and knowledge sharing could therefore be extra important for the Heutink Group, to improve their competitive position.

In addition, a uniform purchasing policy can improve the efficiency of centralized purchasing and improve the relationship between a corporation and their suppliers. When the purchasing process of organizations are identical, problems and disturbances occur less frequently and can be solved quicker. More information about the advantages of a uniform purchasing policy and aligning purchasing processes can be found in Appendix 5.

6. Conclusion and Discussion

6.1 Conclusion

This research answered the question: '*How can a corporation maintain flexibility in supplier- and product-choices and benefit from the advantages of centralized purchasing at the same time?'.* The answer to this research question shows how the Heutink Group can achieve a trade-off between the advantages of centralized purchasing and flexibility in supplier- and product-choices. Moreover, the findings offer contributions to the literature by providing new insights into this trade-off, which will be elaborated in the discussion. This thesis derived two main conclusions. The first conclusion describes how the Heutink Group can maintain flexibility in supplier- and product-choices in centralized purchasing. The second conclusion describes where and how the Heutink Group can specifically benefit from the advantages of centralized purchasing.

Firstly, the Heutink Group can achieve the trade-off between the advantages of centralized purchasing and flexibility in supplier-choices by selecting preferred suppliers and backup suppliers to their articles. The Heutink Group should assign preferred suppliers to the centralized articles, to benefit from the advantages of centralized purchasing. Close and long-term relationships with these preferred suppliers provides low cost and high-quality articles. When these preferred suppliers have problems or delayed delivery times, which causes backorders in the current situation, flexibility in supplier-choices is needed to prevent these backorders. To improve this flexibility in supplier-choices in centralized purchasing, the Heutink Group should select backup suppliers. In decentralized purchasing, backup suppliers are ineffective because an organization can purchase their articles at multiple suppliers, like the Heutink Group does in the current situation. However, centralized purchasing reduces the number of suppliers, because centralized contracts are arranged at a certain (preferred) supplier. In centralized purchasing, suppliers often require a minimal purchasing volume to be able to offer reduced purchasing prices, which makes it impossible to arrange centralized contracts at multiple suppliers for the same articles. When problems occur at preferred suppliers that would otherwise lead to backorders, backup suppliers can deliver quickly and avoid these backorders. By selecting backup suppliers on delivery speed and a wide product range (in addition to quality), the backup suppliers can improve the certainty and flexibility of deliveries. Suppose a supplier has manufacturing or shipping problems (like the recent Suez-canal obstruction) and the delivery of an order from China will be delayed by three weeks. In the current situation, the Heutink Group often accepts the delay and informs their customers of the longer delivery time,

which leads to backorders and unsatisfied customers. However, if backup suppliers are assigned to the articles, a purchaser can decide which of the articles of the delayed order must be delivered to the customers urgently, and contact the backup supplier for the urgent delivery of those articles. In this way, backup suppliers can solve the current problem of too many backorders, which offers potential cost-savings and improves the customer satisfaction.

The Heutink Group can achieve the trade-off between the advantages of centralized purchasing and flexibility in product-choices by a combination of component commonality and backup suppliers. The results of the interviews showed that component commonalty can be used by the Heutink Group in a way that increases the opportunities for centralized purchasing. The Heutink Group can use component commonality by focusing on (functionally) identical articles, and substituting the less valuable articles by the most valuable articles in the eyes of the customer. In decentralized purchasing, component commonality can only be used by analyzing the product portfolio of one organization. Substituting articles with alternatives would only offer limited cost advantages. In centralized purchasing, component commonality can be executed by analyzing the product portfolios of the individual organizations, as well as putting the product portfolios of multiple organizations side by side to look for identical articles. This could potentially offer cost-savings, as more of the less valuable articles can be substituted by more valuable alternatives. Thereby, component commonality increases the opportunities for centralized purchasing. However, the way in which customers accept the alternatives is important in component commonality. A marketing strategy can increase the alternative acceptance, for example by focusing on convincing customers that the most valuable article is the best article or by focusing on the durability of transportation in centralized purchasing.

For the customers that still have an insufficient alternative acceptance, supplier backups can be assigned to provide the desired flexibility in product-choices. In centralized purchasing, the number of suppliers is reduced because centralized contracts are arranged at a certain supplier. Moreover, centralized purchasing (and component commonality) decreases the flexibility in product-choices, as similar products are combined into a centralized contract. This increases the potential for cost savings, but decreases the flexibility in product-choices. Selecting backup suppliers who can offer a wide product range makes it possible to minimize the total number of suppliers, which can save supplier management costs, and offer the customers more product-choices at the same time. In this way, the combination between component commonality and backup suppliers can improve the trade-off between the advantages of centralized purchasing and flexibility in product-choices, and offer the potential for cost savings without losing customer satisfaction.

Secondly, the results have shown where centralized purchasing can offer specific advantages for the Heutink Group. The interviews showed that the ratio between inbound and outbound transportation costs towards a central warehouse offers the potential for cost savings. A central warehouse can also lead to a more efficient division of safety stock, in which risk pooling, one of the supply flexibility strategies, can reduce the chances of out of stocks and offer more possibilities for centralized purchasing. Combining the purchasing demands of Heutink and Reinders in centralized purchasing will also increase the purchasing power. This is likely to lead to lower prices per unit and lower transaction- and transportation costs. Lastly, information- and knowledge-sharing can improve the relationship between organizations in centralized purchasing and improve the competitive position of the Heutink Group.

To conclude, the findings related to flexibility in supplier- and product-choices showed how the Heutink Group can reduce the chances of backorders and increase the possibilities for centralized purchasing. The findings related to the advantages of centralized purchasing showed where the Heutink Group can achieve potential cost savings, and how this can reduce the chances of backorders as well. Therefore, the results of this study provided new insights into the trade-off between the advantages of centralized purchasing and flexibility in supplier- and product-choices, and showed how this can solve the current problems of the Heutink Group.

6.2 Discussion

6.2.1 Contributions to the literature

At the beginning of this study, the Heutink Group was interested in developing their strategic purchasing to solve the problems that they encounter in their purchasing departments. This study focused on centralized purchasing as a way of solving these problems of the Heutink Group. However, the literature indicated that losing supply flexibility is a disadvantage of centralized purchasing (Schmitt, Sun, Snyder, & Shen, 2015; Schotanus & Telgen, 2007; Wissema, 1992). Preliminary research showed that the purchasers of the Heutink Group expressed similar concerns regarding this disadvantage. The purchasers expected to lose flexibility in the choices for suppliers and in the products that they can offer their customers.

Multiple studies in the literature of centralized purchasing have discussed this relationship between centralized and decentralized purchasing. Dimitri, Dini, and Piga (2006) focused on the consideration between centralized and decentralized purchasing. This study mainly focused on elaborating the problems of centralized and decentralized purchasing, rather than investigating ways to improve these problems. McCue and Pitzer (2000) analyzed the

movement and trends of governmental purchasing organizations towards centralized and decentralized purchasing. These studies are both focused on the relationship between centralized and decentralized purchasing and are used in this thesis to describe the advantages and disadvantages of centralized purchasing. Moreover, the findings of this thesis contribute to these studies by offering new insights into one of these disadvantages, the flexibility in supplier- and product-choices. These new insights show how a corporation can maintain their flexibility in supplier-choices by assigning backup suppliers and making use of dual sourcing, and how a corporation can maintain their flexibility in product-choices by a combination of component commonality and backup suppliers.

Another study that is related to the trade-off between centralized and decentralized purchasing is the study of Arnold (1999), which focuses on an optimal degree of centralization. The case studies that are described in the study of Arnold (1999) show that an optimal degree of centralization can be different for every organization. Therefore, instead of focusing on the optimal degree of centralization, this thesis focused on providing new insights into the flexibility in supplier- and product-choices. In doing so, this thesis contributes to the study of Arnold (1999) by offering insights into the trade-off between centralized purchasing and flexibility in supplier- and product-choices, which can contribute to the optimal level of centralization described by Arnold (1999).

Most of the results of the existing literature that discusses the relationship between centralized and decentralized purchasing have shown how a corporation can achieve a certain level of centralization, and which (cost) advantages and disadvantages arise with that level of centralization. Although losing supply flexibility is mentioned in these studies as one of the disadvantages of centralized purchasing, the existing literature does not focus on how a corporation can maintain their flexibility in supplier- and product-choices in combination with centralized purchasing. The findings of this study are related to this gap in the literature, as they are focused on how a corporation can maintain their flexibility in supplier- and product-choices and benefit from the advantages of centralized purchasing at the same time. Investigating this trade-off between the advantages of centralized purchasing and flexibility in supplier- and product-choices has led to two main theoretical contributions to the literature of strategic purchasing.

The first contribution shows that the trade-off between the advantages of centralized purchasing and flexibility in supplier-choices can be improved by assigning preferred suppliers and backup suppliers. Schmitt et al. (2015) and Schotanus and Telgen (2007) indicated that

centralized purchasing reduces the choices in suppliers, because a centralized contract is arranged at a certain supplier. Similar concerns were expected by the purchasers of the Heutink Group. In fully centralized purchasing, problems or delayed delivery times of a certain supplier can result in backorders. The results of this study showed how preferred suppliers can provide a corporation with the potential cost advantages of centralized purchasing, while backup suppliers can provide a corporation with more flexibility in supplier-choices. The interviews showed that this flexibility is needed to reduce the number of backorders in case of problems or delayed delivery times.

This first theoretical contribution is closely related to the study of Tomlin and Wang (2005), which is focused on the relationship between resource flexibility and dual sourcing in uncertain supply environments. The study of Tomlin and Wang (2005) indicates that dual sourcing can improve the supply flexibility of organizations with an uncertain supply environment. Although the study of Tomlin and Wang (2005) has a similar outcome, the findings from this thesis are the result of researching the flexibility in supplier- and product choices in combination with centralized purchasing. Thereby, it can be stated that the results of this thesis support the study of Tomlin and Wang (2005). Moreover, this thesis offers contributions to the study of Tomlin and Wang (2005) by offering insights into the relationship between dual sourcing and centralized purchasing. These insights have shown that assigning backup suppliers can avoid backorders and unsatisfied customers, and offer the potential for cost-savings, when centralized purchasing is applied.

The second contribution shows that the trade-off between the advantages of centralized purchasing and flexibility in product-choices can be improved by a combination of component commonality and backup suppliers. Wissema (1992), Schmitt et al. (2015) and Schotanus and Telgen (2007) indicated that centralized purchasing reduces the supply flexibility, and more specifically, the choices in which products to offer a customer. Similar concerns were expected by the purchasers of the Heutink Group, because the purchasing needs of certain articles are combined into centralized contracts. This decreases the customer satisfaction, as organizations have to offer their customers a specific article to make use of these contracts.

The results of this study showed that component commonality can increase the opportunities for centralized purchasing and thereby offer the potential for cost-savings. Karjalainen (2011) investigated the potential cost savings of centralized and decentralized purchasing. Although the study is not focused on the relationship between centralized and decentralized purchasing, it does provide evidence that centralized purchasing offers the potential for cost savings. This supports the conclusion of this thesis regarding the potential

cost savings that can be realized through component commonality, as this increases the opportunities for centralized purchasing. Most studies related to component commonality investigate the effect of component commonality on the efficiency of a production process (Baker, 1985; Heese & Swaminathan, 2006). In these studies, component commonality is used to improve the flexibility through articles that can be used in the production process of different end products. This thesis regards component commonality as a way of increasing the opportunities for centralized purchasing, by using the commonality of similar articles to combine them into one centralized contract. The results have shown that in this way, component commonality can increase the opportunities for centralized purchasing and offer potential cost savings.

However, component commonality focuses on the advantages of centralized purchasing, which only improves one side of the trade-off. The interviews showed that a diverse product portfolio is needed to maintain the flexibility in product-choices and to avoid unsatisfied customers. This study showed how backup suppliers can improve the diversity of the product portfolio and thereby offer the customers (who have a low alternative acceptance) more flexibility in product-choices. The combination of component commonality and backup suppliers can therefore lead to the desired cost-savings of centralized purchasing, without losing customer satisfaction.

Thus, this study offers theoretical contribution to the literature of strategic purchasing by providing new insights into the trade-off between the advantages of centralized purchasing and the advantage of decentralized purchasing, supply flexibility. More specifically, the first theoretical contribution to the literature has shown the relevance of dual sourcing (assigning preferred suppliers and backup suppliers) in relation to centralized purchasing, while the existing literature does not focus on the relationship between flexibility in supplier-choices and centralized purchasing. The second theoretical contribution has shown that component commonality can be used as a way of combining similar products to increase the opportunities for centralized purchasing. This offers theoretical contributions to the existing literature by investigating the applicability of component commonality in relation to centralized purchasing, while the existing literature mostly focused on component commonality as a way of improving the production efficiency. Therefore, while the literature indicated that losing supply flexibility is a disadvantage of centralized purchasing, this study provided new insights into how a corporation can maintain their flexibility in supplier- and product-choices and benefit from the advantages of centralized purchasing at the same time.

6.2.2 Practical contributions

This study offers practical contributions as it is conducted for the Heutink Group, to solve the problems that they encounter in their purchasing departments. The problems of the Heutink Group are related to their purchasing process and inventory. Heutink and Reinders have separate purchasing processes, while around 85% of their inventory is similar. Despite this overlap in inventory, the organizations make little use of economies of scale. Another problem is the capacity and efficiency of the warehouses. As a result, backorders happen too often and Heutink and Reinders often transfer small inventory between their two warehouses in urgent cases. The distance between the warehouses is 150 kilometers and because this problem occurs more than monthly, it is a very costly and inefficient problem.

To solve the problems that the Heutink Group encounters in their purchasing departments, this study investigated how a corporation can maintain flexibility in supplier- and product-choices and benefit from the advantages of centralized purchasing at the same time. Investigating this trade-off between the advantages of centralized purchasing and the advantage of decentralized purchasing (losing supply flexibility) has led to three main practical contributions for the Heutink Group.

Firstly, this study shows how the Heutink Group can achieve potential cost savings and reduce the number of backorders, by assigning preferred suppliers and backup suppliers. The results of this study showed how preferred suppliers can provide the Heutink Group with the desired advantages of centralized purchasing, while backup suppliers can reduce the number of backorders in case of problems or delayed delivery times. Secondly, this study shows how a combination of component commonality and backup suppliers can offer the Heutink Group potential cost savings without losing customer satisfaction. The results showed how component commonality can provide the Heutink Group with more opportunities for cost savings through centralized purchasing. However, the interviews showed that component commonality could decrease customer satisfaction, for customers with an insufficient alternative acceptance. For these customers, backup suppliers can provide the Heutink Group with flexibility in product-choices and thereby prevent a decrease in customer satisfaction. Thirdly, this study provided insights into where centralized purchasing can offer specific advantages for the Heutink Group. These insights have shown where and how centralized purchasing can offer the Heutink Group potential cost savings, reduce the chances of backorders, increase the purchasing power, and increase their competitive position.

Thus, this study offers practical contributions by providing the Heutink Group with new insights into their current problems, which are related to the trade-off between the advantages

of centralized purchasing and flexibility in supplier- and product-choices. As mentioned before, the initial results were presented to the purchasers of the Heutink Group, followed by a discussion. During this discussion, the CPO of Heutink summarized his view on the results with the following quote.

R1: "Positive and recognizable, it is good to see the theory behind some things that we are doing on a small scale and that we want to expand, and to see new insights into the things that we are interested in doing."

Thereby, the CPO of Heutink indicated that the practical contributions of this study are relevant for the Heutink Group, and that the theory behind the findings are helpful for the organizations.

Moreover, the practical contributions that this study has provided can be of use outside of the Heutink Group. The results of this study are focused on centralized purchasing and flexibility in supplier- and product-choices, as a way of solving the current problems of the Heutink Group. These problems are the high number of backorders, inefficient and expensive transportation between warehouses, and not taking advantage of the product overlap between Heutink and Reinders. The new insights that this study has provided can therefore be used by organizations that encounter similar problems or organizations that are interested in centralized purchasing.

6.2.3 Limitations and Future Research

The first limitation of this study is related to the interview participants. Because the purchasing departments are relatively small, Heutink and Reinders only have six purchasers. Therefore, only six participants were interviewed during the study. These respondents are the four operational purchasers of Heutink, the CPO of Heutink, and the CPO/operational purchaser of Reinders. A larger purchasing department could have improved this limitation by increasing the sample size of this study. Although there is not one ideal sample size for qualitative research (Sandelowski, 1995), the sample size should be high enough to achieve variation in the results, but not be so high that it leads to saturation. After analyzing the results of the interviews, it is expected that a larger sample size of between ten and fifteen participants could have increased the variation of the results, which could have increased the value of the findings.

However, to make up for this limitation, the initial results of this study were discussed with the purchasers of the Heutink Group during a meeting. In this meeting, the initial results were presented to the respondents, followed by a discussion regarding the findings of this study. The initial results were improved based on this meeting.

The second limitation of this study is related to the external validity. As mentioned in the methodology, the external validity of a research is the way in which the results of a study can be generalized and used in other situations (Shenton, 2004; Saunders et al., 2016). Because this study is a single case study, the external validity of this study can be seen as one of the limitations. The disadvantage of a single case study is that it is more difficult to generalize the results. In a multiple case study, contradictory to a single case study, multiple cases can be compared and analyzed to improve the generalizability of the results. Although the research setting is set up to improve the external validity by collecting data at two organizations within the Heutink Group, the study is a single case study, which can be seen as a limitation.

Future research can be executed to improve the external validity of this study. This can be done by expanding this research into a multiple case study, to find out if the findings of this study can solve the same problems in other situations and across other sections. The research design of this study could be changed into a multiple case study with the following research question: *'How can organizations across different sections maintain flexibility in supplier- and product-choices and benefit from the advantages of centralized purchasing at the same time?'* or with a more specific research question related to the findings of this study, such as: *'How can backup suppliers solve different problems across different sections in centralized purchasing by improving the flexibility in supplier- and product-choices?'*. A multiple case study could provide more diverse insights into the potential advantages and problems of the trade-off between centralized purchasing and flexibility in supplier- and product-choices. This could increase the generalizability of the findings.

Future research can also be conducted into the practical implementation of the findings of this study. It is interesting to find out in what way the findings of this study would offer the advantages and solve the problems that are mentioned in this study in practice. Future research could focus on how much cost savings can be realized through centralized purchasing by assigning preferred suppliers, and in what way assigning backup suppliers could reduce backorders and improve the customer satisfaction. Future research could thereby show how the theoretical insights regarding the trade-off between centralized purchasing and flexibility in supplier- and product-choices would work out in practice and how this can solve problems in the purchasing process.

Another topic for future research is sustainability, related to centralized purchasing. During the interviews, one of the participants mentioned sustainability as an advantage of centralized purchasing, that can be used to improve the alternative acceptance of customers. There are some other studies that discuss the relationship between centralized purchasing and

sustainability. Contreras (2016) describes how centralized purchasing can improve sustainability by reducing pollution levels and selecting more sustainable articles. Perez, Trujillo, Mejia and Contreras (2019) describe that centralized purchasing is used in Colombia as a way of increasing access to medication and new technologies, to improve the sustainability of the health care system. These two articles indicate that centralized purchasing can lead to more sustainability in the purchasing process, which was also mentioned by one of the participants during the interviews in this study. However, sustainability in not yet recognized as one of the well-known advantages of centralized purchasing. Because sustainability is a topic that is becoming more and more popular in the twentieth century, future research could offer new insights into the relationship between centralized purchasing and sustainability. Future research could find out whether sustainability can be seen as one of the general advantages of centralized purchasing in the future.

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Appendix 1: Organizational Structure of the Heutink Group

The Heutink Group

The Heutink Group is a Dutch supplier of educational materials and consists of two major organizations in the Netherlands: Heutink Rijssen and Reinders. The Heutink Group has its origins in 1911, when Reinier Willem Heutink started his first company. Over the years, the company turned into a family business and developed itself as a supplier of educational material with a wide product range, under the name Heutink Rijssen. Heutink Rijssen acquisitioned Reinders in 2012 and founded Heutink International in 2014. Heutink International is focused on the international market and has its own production and purchasing process. Therefore, Heutink International is not included in this study.

In addition to these organizations, there are some other smaller and oversees companies that are part of the Heutink Group. Table 1.1 shows an overview of all the companies that are part of the Heutink Group and their main activities, focus and target audience.

Table 1.1: Organizations of the Heutink Group

Company	Activities	Focus on	Target audience*
Heutink (Rijssen)	Retail	Full-range supplier	A, B, C, D, E
Reinders	Retail	Full-range supplier	A, B, C, D, E
Heutink International	Retail	International market	A, B, C, D, E
K-Twee	Production	Furniture	C
Techni Science B.V.		Biology, Physics, Chemistry	B
Heutink U.S.A.	Retail	U.S.A. market	A, B, C, D, E
Marsival	Retail	Belgian market	A, B, C, D, E
Heutink voor Thuis	Retail	Education at home	E

*Note 1.1: **

A = primary education (primair onderwijs)
B = secondary education (voortgezet onderwijs)
C = day-care (kinderopvang)
D = healthcare (zorg- en welzijn)
E = private individuals (particulieren)

Appendix 2: Interview Questionnaire

Introductie voor participanten

Ik ben bezig met onderzoeken hoe Heutink Rijssen en Reinders hun inkoopbehoefte (deels) kunnen samenvoegen om zo voordelen te behalen. Echter, het samenvoegen van de inkoopbehoefte gaat vaak gepaard met een verminderde flexibiliteit van het productaanbod of verminderde flexibiliteit in leverancierskeuze. Deze flexibiliteit is iets wat voor Heutink belangrijk is. Mijn onderzoek richt zich er daarom op hoe de Heutink Groep centrale inkoop kan realiseren en organiseren, en hoe ze daarbij deze flexibiliteit kunnen behouden.

De interviewvragen zijn opgedeeld in vijf categorieën:

1. Warehousing
2. Operational Purchasing
3. Contracting
4. Decision-Making
5. Flexibility

1. Warehousing

Inbound vs. Outbound logistic costs

- Hoe worden de transportkosten van inkomende orders vanuit leveranciers geregeld en bepaald in de huidige situatie?
- Waar komen de grote leveranciers vandaan?
  - Is er verschil voor leveranciers tussen leveren aan Heutink/Reinders of het nieuwe magazijn, qua locatie?
  - Hoeveel dezelfde leveranciers hebben Heutink en Reinders?

- Hoe worden de transportkosten voor uitgaande orders geregeld en bepaald in de huidige situatie?
- Wat is over het algemeen duurder, inkomende of uitgaande transportkosten?
- In hoeverre zou minder inkomende orders besparingen op kunnen leveren?
- In hoeverre zou minder afstand tot klanten besparingen op kunnen leveren?

Minimumvoorraad

- Hoe belangrijk is de minimumvoorraad voor Heutink/Reinders?
- Hoe vaak wordt deze minimumvoorraad gebruikt?
- Wat zijn de gevolgen als er te weinig minimumvoorraad is?

Directe leveringen

- Wordt er wel eens direct aan klanten geleverd vanuit de leverancier?
- Zo ja, wat zijn hier de huidige voordelen van?
- Levert dit wel eens problemen op?
- Als leveringen van snellopende artikelen naar een centraal magazijn worden vervoerd, kunnen deze dan van het centrale magazijn naar de klant worden vervoerd?

2. *Operational Purchasing*

Inkoopbehoefte

- Hoe wordt de inkoopbehoefte bepaald bij Heutink/Reinders?
    - Is dit proces de laatste jaren veranderd?
    - Waarom, en hoe verliep deze verandering?

Flexibiliteit in product-keuzes

- Kun je uitleggen wat je van het productaanbod van Heutink/Reinders vindt? (breed aanbod, smal aanbod, te veel verschillende producten, ...)
- Hoe is dit in vergelijking met concurrenten?
- In hoeverre beïnvloedt dit de klanttevredenheid?
- In hoeverre heeft deze flexibiliteit/het brede productaanbod te maken met de hoeveelheid of diversiteit in leveranciers?

"We hebben het er eens over gehad dat er meerdere artikelen zijn die op elkaar lijken, zoals vergelijkbare pennen van verschillende merken. Gelijkwaardige producten kunnen worden samengevoegd om gezamenlijk in te kopen en schaalvoordelen te behalen."

- In hoeverre zou het de klanttevredenheid beïnvloeden als er minder (gelijkwaardige) producten beschikbaar zijn?
- Op welke manier zou dit de klanttevredenheid beïnvloeden?
- In hoeverre zouden klanten een product alternatief accepteren?
- Zijn bepaalde specifieke productgroepen of specifieke producten gevoeliger voor klanten?

- Kun je uitleggen waarom Heutink/Reinders flexibel wil blijven in het kiezen voor bepaalde leveranciers?
- Is dit ook om het productaanbod flexibel te houden?

3. *Contracting*

Verantwoordelijke voor gezamenlijke contracten

- Wie zou er verantwoordelijk moeten zijn voor het contractmanagement?
- In hoeverre vertrouwt u de capaciteiten van Heutink voor het contractmanagement?
- Is het voor Reinders belangrijk om betrokken te zijn bij het contractmanagement?
- Waarom is het belangrijk? (Is het vertrouwen er dan toch niet?)

Purchasing Power

- In hoeverre heeft Heutink/Reinders nu macht over de leverancier door middel van de hoeveelheid die je inkoopt? (purchasing power)
- Hoeveel % zou Heutink/Reinders meer willen inkopen als er genoeg ruimte is?
- Hoe zeker/voorspelbaar is de inkoopbehoefte van Heutink/Reinders?
- In hoeverre zou de macht over leveranciers toenemen als de inkoopbehoefte het bovengenoemde percentage groter is?

% van de inkoop in centrale contracten

- Als er centraal wordt ingekocht, hoeveel % van de gezamenlijke inkoop zou dan voor Heutink zijn en hoeveel % voor Reinders?
- Hoe zou dit geregeld kunnen worden in de leverancierscontracten?
- Is het een mogelijkheid dat Heutink Rijssen contracten afsluit met een leverancier, en Reinders koopt van Heutink?
- Hoe kan dan de gezamenlijke vraag bepaald worden?

4. Decision-Making

Relatie tussen Heutink en Reinders

- Zou u de huidige relatie tussen Heutink en Reinders als formeel of informeel omschrijven?
- Waaruit blijkt dit formeel of informeel te zijn?
- Zijn er bepaalde formaliteiten (meetings), regels of verplichtingen van beide partijen tegenover elkaar in de huidige situatie?
- Gaat je voorkeur uit naar een formele of een informele relatie?
- Zouden regelmatige meetings (bijvoorbeeld maandelijks of per kwartaal) de relatie tussen Heutink en Reinders op het gebied van decision-making kunnen verbeteren?

Information and Knowledge Sharing

- In hoeverre wordt er in de huidige situatie informatie en kennis gedeeld over leveranciers, producten, innovatie?
- Zou er meer gedaan kunnen worden om hier meer voordelen uit te halen?
- Is dit erg belangrijk (of niet) in deze sector of tussen Heutink en Reinders?

Purchasing Policy

- Zijn er grote verschillen tussen het inkoopbeleid van Heutink en Reinders?
- Levert dat problemen op in de huidige situatie?
- Zou een uniform inkoopbeleid effectief zijn?
- Zou dit veel veranderingen opleveren?
- Hoe zou Heutink/Reinders met deze veranderingen omgaan?
- Als er een vorm van centrale inkoop wordt toegepast, zou een uniform inkoopbeleid dan nodig zijn om problemen te voorkomen?

Verantwoordelijke voor Decision-Making

- Ontstaan er wel eens problemen omdat keuzes worden gemaakt door mensen die niet helemaal op de hoogte zijn van de zaken op de inkoopafdeling?
- Waarom wel, of waarom gaat dit goed?
- Is het belangrijk voor de mensen die beslissingen maken dat ze dicht bij het inkoopproces zitten?

5. *Flexibility*

Safety Stock
- Worden de voorraadkosten berekend door Heutink en Reinders? (Rente, ruimte, risico)
- Wat is de verhouding tussen voorraadkosten van de safety stock, en de kosten van backorders en een lagere klanttevredenheid?

Capacity Buffer
- 1 manier om flexibeler te zijn is het hebben van meer capaciteit. Dit gebeurt al in de huidige situatie, maar wat zijn de nadelen of voordelen hiervan?
- Is het nog nodig om extra capaciteit te hebben als er een centraal magazijn is?

Supplier Backups (ook veel vragen in andere categorieen m.b.t. Supplier Backups)
- Zijn er veel leveranciers die veel verschillende producten voor de Heutink Groep leveren?
- Zijn er meer leveranciers beschikbaar die dat kunnen?
- Zijn er meer vergelijkbare leveranciers als de huidige leveranciers beschikbaar?
- Worden er offertes voor dezelfde producten aangevraagd bij meerdere leveranciers?

Safety Lead Times
- Uit hoeveel artikelen bestaat een order gemiddeld?
- Uit hoeveel verschillende artikelen bestaat een order gemiddeld?
- Wordt een order pas verstuurd naar de klant als de hele order compleet is?
- Wat is de levertijd van een artikel gemiddeld?
- Zit er veel verschil tussen de levertijd van verschillende artikelen?

- Hoeveel tijd zit er tussen het bestellen van een artikel bij een leverancier, en het versturen van dit artikel naar de klant?
- Wordt dit doorberekend in het systeem?
- En hoeveel tijd zit er tussen het ontvangen van een artikel van een leverancier en het kunnen versturen naar een klant?

Component commonality
- Grotendeels behandeld in OPERATIONAL PURCHASING

- Zouden dit voor veel snellopende artikelen het geval zijn?
- Zouden dit veel artikelen zijn die al onderdeel zijn van de product overlap?
- Zouden dit veel artikelen zijn tussen Heutink en Reinders? (die dus product overlap kunnen worden)

Postponement
- In hoeverre bestellen klanten hun orders vooruit?
  (Tijd wanneer ze het nodig hebben en plaatsen van bestelling)

- Zou het verlengen van de levertijd invloed hebben op de klanttevredenheid?
- Zou het mogelijk zijn om klanten verder vooruit te laten bestellen?

Risk Pooling

- Zijn er verschillen tussen de orders die Heutink ontvangt en de orders die Reinders ontvangt van hun klanten?
  (Grootte, gewenste levertijd, orderbedrag €, aantal verschillende artikelen)
- Zijn er verschillen tussen order waardes die Heutink van klanten ontvangt?
  (Ene order een erg laag bedrag, en de andere order een erg hoog bedrag)

Flexible supply contract

- Zouden leveranciers bereid zijn om sneller/flexibeler te leveren tegen een hogere prijs? En zou deze prijs dan lager zijn dan de kosten van backorders en ontevreden klanten?
- Is het mogelijk om contracten af te sluiten die meer gericht zijn op flexibiliteit, zoals lagere order waardes?
- Is het mogelijk om contracten af te sluiten waarbij snelle leveringen in geval van spoed mogelijk zijn?

Lead Time reduction

- Hoeveel leveranciers heeft Heutink/Reinders?
- Zijn er veel andere leveranciers op de markt?
- Op welke eigenschappen worden leveranciers nu beoordeeld of gezocht?

Setup Time reduction

- Hoe gaat het proces van het ontvangen van de behoefte naar een artikel (de order van de klant) en het geleverd krijgen van dit artikel?
- Is het mogelijk om de tijd tussen het ontvangen van de behoefte naar een artikel (de order van de klant) en het geleverd krijgen van dit artikel te versnellen?

- Hoe gaat het proces van het ontvangen van een levering van een leverancier en het leveren naar de klant?
- Is het mogelijk om de tijd tussen het ontvangen van een levering van een leverancier en het leveren naar de klant te versnellen?

Alternative Routing/Mode

- Moet er wel eens gewacht worden met het versturen van orders omdat er nog geen vervoer beschikbaar is?
- Is het mogelijk om het aantal vrachtwagens/vervoer opeens uit te breiden of is de capaciteit gering en kan dit voor problemen zorgen?
- Is eigen vervoer (flexibel) mogelijk, of gebeurt dit al in geval van spoed?

Subcontracting/Outsourcing

- Zijn er in Nederland veel leveranciers afhankelijk van de orders van Heutink?
- En geldt dat ook voor Reinders?
- Zijn dit leveranciers die dicht bij Heutink/Reinders/centrale magazijn zitten?
- Verkoopt de Heutink Groep producten die risico loopt als ze in het magazijn liggen?
- Heeft de Heutink Groep een voorspelbare afname bij leveranciers in NL?
- En zijn dit ook artikelen met een hoge afzet?
- En hebben die normaal een lange levertijd vanuit deze leveranciers in NL?

Appendix 3: Tables with Axial Codes

Flexibility in Supplier-Choices

Table 3.1: Axial Coding Supplier Base

Axial code:	***Supplier Base***
Participant	Quote from interview
P3	I think that a widespread supplier base is needed to have a wide product portfolio.
P4	I do think that our wide product portfolio has to do with our diversity in suppliers.
P4	We see that more articles are out of stock than other years, and we do not have another party where we can simply buy these articles.
P4	Heutink wants to stay flexible in terms of certain suppliers to secure the customer satisfaction and remain a flexible product portfolio.
P5	The diversity of suppliers is needed for our current product portfolio.
P5	The diversity of our current suppliers is needed. I think that it is necessary to keep the current diversity of suppliers, to stay flexible.
P2	I think that we have too many suppliers. We want to offer every customer everything, but at one point you should make a trade-off between the time you spend on 1 supplier for some customers, and if you want that… So I do think that we can make a step in that.
P2	The big number of suppliers does not make things easier.
P4	Less suppliers are always better. This saves money in incoming invoices and everything.
P5	The current number of suppliers is high. Maybe we should look at which supplier we can reduce.

Table 3.2: Axial Coding – Problems or Delayed Delivery Times

Axial code:	***Problems or Delayed Delivery Times***
Participant	Quote from interview
P1	I don't think that our delivery times have much influence on our customer satisfaction, as long as we communicate it clearly. If we go from a 24-hours delivery time to a 48-hours delivery time, it is just a matter of managing the expectation towards our customer.
P1	I do think that suppliers could be willing to deliver quicker or more flexible against higher prices
P1	Sometimes we orders something from China and it takes a couple of months. It also occurs that we order articles from the Netherlands that have a long delivery time, because it needs to be produced firstly.
P2	Especially with fast-moving articles from China. If your lead time is increased from one moment to the other, this can cause problems, and because it comes from China, we can't quickly receive orders, so that could cause problems.

Table 3.3: Axial Coding – Product Range of Suppliers

Axial code:	***Product Range of Suppliers***
Participant	Quote from interview
P1	There are over 350 suppliers in our supplier base that deliver articles such as pens, pencils, other consumables etc. Some of these suppliers can offer a wide product range.
P2	We have a lot of small suppliers that just do 1 product group, but we also have a lot of big suppliers that are total suppliers, and where we can purchase almost everything. So the diversity in suppliers is big.

Flexibility in Product-Choices

Table 3.4: Axial Coding – Product Portfolio

Axial code:	***Product Portfolio***
Respondent	Quote from interview
P1	In terms of product portfolio, we really are a total supplier for the educational sector.
P1	The product portfolio positively influences the customer satisfaction, because the customers can say: everything that I need in and around a school, Heutink can deliver.
P1	Because of our product portfolio, a school only needs 1 party for all their needs, which also means 1 contact person, 1 invoice flow, 1 contract.
P1	I believe that you can differentiate yourself from the competitors by offering a wide range of products and brands.
P1	In terms of product portfolio, we really are a total supplier for the educational sector.
P1	We can definitely take a step and combine some of our products, because we have a lot of the same things.
P2	We want to offer our customer everything, and be a total supplier.
P2	I think that we have a very broad product portfolio for our customers. We call ourselves a total supplier, so I think that we can deliver everything that our customers need for a school. Everything that we do not have, we will search for the customer so that we can still deliver it, so I think that we have a very complete product portfolio.
P2	I think that we have the biggest and broadest product portfolio, compared to our competitors. The competitors are not that far, and certainly not that of a total supplier as we are.
P2	I think that our product portfolio has a big influence on our customer satisfaction. A lot of customers tell us that they want 1 organization where they can purchase all of their needs, and that we can offer them that.
P4	I do think that our wide product portfolio has to do with our diversity in suppliers.

Table 3.5: Axial Coding – Alternative Acceptance

Axial code:	***Alternative Acceptance***
Respondent	Quote from interview
P2	I think that customers would reasonably easily accept an alternative, and that it also has to do with how an advisor explains/sells it. Some schools think that they can only work with one specific brand, while another brand is just as good, so they should just be aware of that.
P3	Replacing products with similar products is possible. The marketing behind it is also very important, maybe also in combination with durability. I think that you can communicate that very well to customers. If you tell customers that if they choose for a similar product, but just a slightly other brand, Heutink can purchase and transport more durable and cheaper, customers will accept an alternative easier. I think that the marketing department could and should promote that very well.
P3	Marketing should improve the product alternative acceptance.
P4	I think that is also a bit of marketing. You just have to convince customers to use other brands/pens. It is often laziness of us, that we will just order that one extra pen for a customer.

Table 3.6: Axial Coding – Customer Satisfaction

Axial code:	***Customer Satisfaction***
Respondent	Quote from interview
P1	Customers are willing to go along with what we are offering until a certain point, at that point they do want exactly a certain brand or article.
P2	We want to offer every customer everything, but at one point you should make a trade-off between the time you spend on 1 supplier for some customers, and if you want that… So I do think that we can make a step in that.

Inbound vs. Outbound Transportation Costs

Table 3.7: Axial Coding – Inbound Transportation

Axial code:	***Inbound Transportation***
Respondent	Quote from interview
P1	Overseas orders, from China, always come with transportation costs from the container itself, and the importer, the transportation firm.
P1	Incoming orders are more expensive than outgoing orders, because the container prices are now extremely high.
P3	I think that would work more efficient. If you arrange it efficient than less and larger orders to a central warehouse could lead to savings.
P4	At this moment it is convenient to fill up the warehouse and have a high stock value, because transportation costs are very high.
P5	Less orders to a central warehouse could offer savings.
P6	The publishers are settled in the Netherlands, and we have some big suppliers in the far east, in China.

Table 3.8: Axial Coding – Outbound Transportation

Axial code:	***Outbound Transportation***
Respondent	Quote from interview
P1	Incoming orders are more expensive than outgoing orders, because the container prices are now extremely high.
P2	I think that we would have way more savings on the incoming orders than on the outgoing orders. The order needs to be shipped to the customer, and whether you are in Utrecht, the middle of the country, or here [Rijssen], that is not a big difference.
P3	Transportation costs would be closer if you are closer to your customer in decentralized warehouses. But I do not think that that is relevant for us [Heutink].
P3	If that [distance to customers] would have been important for us, we would have had more warehouses, and warehouses in the west, or more centrally.
P4	I don't think that less distance to customers [in decentralized warehousing] saves a lot of money in this country [the Netherlands].

Division of Safety Stock

Table 3.9: Axial Coding – Safety Stock Importance

Axial code:	***Safety Stock Importance***
Respondent	Quote from interview
P6	The safety stock is very important for Reinders, that is because of the delivery reliability
P6	A lower delivery reliability. Backorders. And we do not want that.
P2	Then you will get backorders to your customers. We usually pick everything that is in stock in 1 time, with 1 time transportation costs, 1 time order picking costs, etc. When we are out of stock, we have to send more deliveries, which will lead to more order picking costs, more transportation costs. This leads to a lot of extra costs.
P2	I think that more safety stock can help us, by giving us more security and less chance of out of stocks.
P3	Back-orders, and thereby high costs.
P4	If you calculate the costs of a backorder, I think that having a high stock value could save money.
P5	The safety stock is very important. In the current situation, we have a capacity problem. In the new warehouse in Nijverdal, we can increase our stock, and the safety stock can be increased as well. Then, out of stocks will be less regular.
P5	Backorders, extra costs/money, more costs.
P6	You get multiple invoices. Customers also receive multiple invoices, and multiple deliveries, so that is a disadvantage.

Table 3.10: Axial Coding – Safety Stock Problems

Axial code:	***Safety Stock Problems***
Respondent	Quote from interview
P4	We see that more articles are out of stock than other years, and we do not have another party where we can simply buy these articles.
P4	It happened a lot this year [being under the safety stock level], there are a lot of articles that are difficult to predict.
P1	Depends on the products, a 'fickle' product that almost never gets sold, is not always in storage. Then, 1 or 2 orders can make such a product run out of stock.
P4	Especially the creative market, the small cheap articles, is unpredictable. Where you might have sold 50 products last year, you could sell 100 products this year, so it is hard to determine how much stock you need.
P4	The list with articles that are out of stock or below their safety stock level is pretty long, so that happens more than we want at this moment.

Table 3.11: Axial Coding – Opportunities Risk Pooling

Axial code:	***Opportunities Risk Pooling***
Respondent	Quote from interview
P1	We have a 9-boxes method, in which the turnover and revenue determine the urgency of an article. If an article has a high turnover and a high revenue, it has an AA score, the most important. An article with a low turnover and low revenue has an CC score.
P1	Yes, we have very large foundations as customers, but we also have a small school around the corner as customer. Order values can be very different, from one can of paint to a large year-order.

Table 3.12: Axial Coding – Safety Stock of Slow-moving Articles

Axial code:	***Safety Stock of Slow-moving Articles***
Respondent	Quote from interview
P1	Especially for the slow-moving articles, more inventory is needed to prevent out-of-stock and backorders, because these articles have a less predictable pattern.
P2	I think that more safety stock can help us, by giving us more security and less chance of out of stocks.
P3	If there is more warehouse space, more of the NVH (niet-vooraadhoudende) articles should be stocked, because these articles mostly cause backorders and costs. So more of these NVH articles would become VH (voorraadhoudende) articles.This would lead to less backorders, which saves a lot of money.

Table 3.13: Axial Coding – Inventory Costs vs. Backorder Costs

Axial code:	***Inventory Costs vs. Backorder Costs***
Respondent	Quote from interview
P1	We always want to avoid backorders. We rather have a high safety stock value, than backorders. What we always say is that the customer should and will receive deliveries as complete as possible. So, that customer satisfaction is definitely worth more than the costs of safety stock.
P1	And, regardless of the costs, we say, if we can avoid 20.000 backorders in a year, we avoid 20.000 unsatisfied customer moments in a year, and we find that more important than the costs of the safety stock.
P4	If you calculate the costs of a backorder, I think that having a high stock value could save money.
P1	Every backorder costs us €25. Backorders costs us money and time. It costs a lot of handlings, and costs of transport, and communication etc.
P1	If we put it in percentage, I think that if we add 30% safety stock, we are covered for our backorders. But this is also a little different for other articles. For fast-moving articles such as pens, we can't have backorders, so we have extra safety stock. For some slow-moving articles, we do not have to have that extra safety stock. But then we can have backorders, so it is difficult.

Purchasing Power

Table 3.14: Axial Coding – Increased Purchasing Power

Axial code:	***Increased Purchasing Power***
Respondent	Quote from interview
P1	Purchasing higher orders would result in lower transportation costs, because less shipments, orders, invoices would be needed.
P1	Turnover rate is important. You often see that we can get discounts with higher purchasing amounts, if we order per pallet or even per truck.
P2	A lot of suppliers are dependent on us because we are a big player on the market. If we would purchase bigger orders, the purchasing power will increase.
P2	A problem that we encounter is that we order too many times. If we have a central warehouse, where we can store way more, we can order once in 3 months, instead of once in 3 weeks. Then we can place bigger orders, and we can demand something in price perspective at the supplier. That could definitely lead to cost savings.
P3	If we have more inventory, and order in larger volumes, the supplier has less risks, so we can demand more.
P5	Maybe we can improve the price. In an evaluation with a supplier, we look at our purchasing volumes of the last year. If this is higher than expected, we can ask the supplier what they can offer us for the next period, against the higher purchasing volumes.
P1	With a 10-15% higher purchasing volume, the purchasing prices would not be 10-15% lower, because the volume that we would purchase extra, would be the volume of Reinders, that they would otherwise also order at that supplier.
P1	Especially for the slow-moving articles, more inventory is needed to prevent out-of-stock and backorders, because these articles have a less predictable pattern.
P3	If there is more warehouse space, more of the NVH (niet-vooraadhoudende) articles should be stocked, because these articles mostly cause backorders and costs. So more of these NVH articles would become VH (voorraadhoudende) articles. This would lead to less backorders, which saves a lot of money.

Table 3.15: Axial Coding – Type of Contracts

Axial code:	***Type of Contracts***
Respondent	Quote from interview
P1	It is possible that Heutink arranges a contract with a supplier for the combined needs.
P6	It is possible that Heutink negotiates a contract with a supplier, and we [Reinders] purchases from Heutink.
P4	I think that it is good that 1 company does the contract management, for some articles that is already in place. Reinders is partly 'piggybacking' on our contracts.
P1	This could be 1 company, Heutink.
P1	Heutink should be responsible for both organizations because they are the biggest party.

Table 3.16: Axial Coding – Combining Purchasing Needs

Axial code:	***Combining Purchasing Needs***
Respondent	Quote from interview
P1	The purchasing needs from Heutink and Reinders can simply be added up, we both know our needs and the needs are predictable. After the needs are added up, this can be arranged with the supplier. These are the purchasing needs, we want it delivered then, and with these conditions.
P1	We both use our data, and we have a pattern, we know our needs and sales for each year, so we can combine these easily.
P2	If we know from each other what we need, and we draw up contracts together, I do not see any problems in centralized contracting.
P6	The combined demand can be determined based on the history.
P6	Heutink will purchase with information about demand form Reinders.
P1	As an example, I take Crepe-paper that we purchase in China. We get a notification from our inventory management system, that we need to order to avoid out of stocks. At that moment, we get into contact with Reinders, and ask them what they need. They communicate their demand, and we combine it to one order.
P6	Education sector is very predictable. The customers in education purchase the same as they purchased the year before, in consumables.
P2	Our customer group is very stable, especially in our primary educational market, that need has been the same for the last couple of years and that is very predictable.

Information- and Knowledge Sharing

Table 3.17: Axial Coding – Current and Desired Formality of Relationship

Axial code:	***Current and Desired Formality of Relationship***
Respondent	Quote from interview
P1	Flat organizations, so contact is informal.
P1	Other things like intercompany-prices and delivery-details are formally fixed.
P3	I think that the current cooperation works good for both parties, so informal.
P6	I prefer the way it is now, so informal.
P2	I think that an informal relationship would be the best, so that we can quickly discuss things and keep it casual. I think that this would be the best also if we want to centralize it, instead of very strict, because we are a small and flat organization.
P1	Informal relationship has my preference.
P4	The relationship itself should stay informal.
P3	I think that the current cooperation works good for both parties, so informal.

Table 3.18: Axial Coding – Division of Tasks

Axial code:	***Division of Tasks***
Respondent	Quote from interview
P4	In case of centralized purchasing, I think that you should do it a bit more formal, and set more things on paper.
P4	I think that people could have difficulties in giving up some of their tasks, so you should put it clear and formal on paper, especially in division of tasks and clarity.
P3	I think that we can shift/change very quickly.
P5	Changes in the purchasing department are discussed together, in good harmony. It could be that you do not agree with something, but we always work it out through good consultation.

Table 3.19: Axial Coding – Regular Meetings

Axial code:	***Regular Meetings***
Respondent	Quote from interview
P1	Regular meetings could absolutely improve the relationship between Heutink and Reinders
P2	I think that regular meetings, for example once a month, would be a good thing, especially in combination with how we do it now, we just call if we need to know something, or we ask them to come by. But I think that meeting once a month to discuss certain topics would be a good thing in case of centralized purchasing.
P3	Regular meetings can improve the relationship if there is centralized purchasing, I think that that is important.
P4	I don't know if weekly meetings is the right amount of meetings, but I do think that it is good to sit together more often to discuss things, instead of discussing everything over the phone. I think that that would be better.
P5	I think that more regular meetings could improve the contact, if there is centralized purchasing
P6	Regular meetings would improve the relationship in terms of decision-making.

Table 3.20: Axial Coding – Informatino- and Knowledge Sharing

Axial code:	***Information- and Knowledge Sharing***
Respondent	Quote from interview
P1	We share knowledge about price agreements, availability of materials. We also have a lot of overlap in suppliers, so if there are issues or opportunities, we share this with each other.
P2	We share some information about conditions, suppliers, problems with suppliers. If needed we can go to the suppliers together, if we both have a problem or something.
P3	Information sharing about suppliers, products or innovation happens, in a good way, informal, via phone or email.

Table 3.21: Axial Coding – More Information- and Knowledge Sharing

Axial code:	***More Information- and Knowledge Sharing***
Respondent	Quote from interview
P1	More information sharing is always a good thing. But you should not be meeting regularly if there is no use.
P2	I think that it would be better to share even more information with each other. In the end, we are both the Heutink Group/ the same corporation. If we have certain conditions at a supplier, we should always share that with the other party, so they can demand the same conditions. This would only lead to advantages.
P3	If we centralize the purchasing, I think that we can do more in this area [information sharing], and that this would offer benefits.
P6	There can definitely be done more in terms of information sharing to get more advantages.

Table 3.22: Axial Coding – Importance of Information- and Knowledge Sharing

Axial code:	***Importance of Information- and Knowledge Sharing***
Respondent	Quote from interview
P2	Information sharing could be extra important for our sector, because in the end we only have three suppliers like us, Heutink, Reinders, and the Wolff Group. So, the market is very small. Therefore, it could be more important for us to share information.

Table 3.23: Axial Coding – Uniform Purchasing Policy

Code:	***Uniform Purchasing Policy***
Respondent	Quote from interview
P1	I think that a uniform purchasing policy/process can offer advantages, because suppliers then know exactly what he is and isn't up to.
P1	A uniform purchasing policy would avoid problems in the relationship with suppliers.

Appendix 4: Organizing Centralized Contracts

Appendix 4 provides more information into organizing centralized contracts, by describing how Heutink and Reinders can combine their purchasing needs and who should be responsible for the contract management of the centralized contracts.

Table 4.1: Codes Combining Purchasing Needs

Code:	***Combining Purchasing Needs***
Participants	Quote from interview
P1	The purchasing needs from Heutink and Reinders can simply be added up, we both know our needs and the needs are predictable. After the needs are added up, this can be arranged with the supplier. These are the purchasing needs, we want it delivered then, and with these conditions.
P1	We both use our data, and we have a pattern, we know our needs and sales for each year, so we can combine these easily.
P2	If we know from each other what we need, and we draw up contracts together, I do not see any problems in centralized contracting.
R6	The combined demand can be determined based on the history.
R6	Heutink will purchase with information about demand form Reinders.
P1	As an example, I take Crepe-paper that we purchase in China. We get a notification from our inventory management system, that we need to order to avoid out of stocks. At that moment, we get into contact with Reinders, and ask them what they need. They communicate their demand, and we combine it to one order.

Firstly, table 6.1 shows the results from the interviews regarding the combining of the purchasing needs. The interviews showed that combining the purchasing needs of Heutink and Reinders is not a problem. In the current situation, the demands for some articles that are delivered from China are already combined. CPO of Heutink mentioned that the purchasing needs from Heutink and Reinders can simply be added up. Both organizations have a predictable sales pattern and know their purchasing needs. The purchasing demands are added up, and one total demand is ordered by Heutink, at the supplier. Operationally, this is a very informal process, which can be seen in the quote of the CPO of Heutink.

Table 4.2: Codes Predictability

Code:	***Predictability***
Participants	Quote from interview
R6	Education sector is very predictable. The customers in education purchase the same as they purchased the year before, in consumables.
P2	Our customer group is very stable, especially in our primary educational market, that need has been the same for the last couple of years and that is very predictable.

Combining the purchasing needs of Heutink and Reinders is also possible due to the predictability of their purchasing needs. As we can see in Table 6.2 the participants indicate that the educational sector is very predictable, and customers in education purchase almost the same as they purchased the year before. Therefore, the interviews show that combining the purchasing needs of Heutink and Reinders will not be a problem.

Secondly, the question arises who should be responsible for the contract management of these contracts for fast-moving articles. Table 6.3 shows the results from the interviews regarding the responsibility for the centralized contracts.

Table 4.3: Codes Responsibility Centralized Contracts

Code:	***Responsibility Centralized Contracts***
Participants	Quote from interview
P1	The direction should be responsible for the contract management of centralized contracts, in combination with the purchasing department.
P4	The more you are into the contracts, the better you can manage them and fix agreements, and the less risk you take. 1 person will work in a certain way, and in that way with all suppliers, if possible, because we often have to do with big suppliers, where we do not have a lot to say.
R6	We always have to do it together. You always have problems that play with one party and not with the other. You can agree that everything will be delivered at once, but we don't have a lot of warehouse capacity, so that is sometimes not possible. We have to make good arrangements.

Although the interviews do not provide one clear solution to who should be responsible for the centralized contracts of fast-moving articles, the results do show that forming a combined team of purchasers from Heutink and Reinders can solve the uncertainties. This team can negotiate contracts with big suppliers and can be joined by people from the direction if needed. In this way, this team includes people from the direction and people from Heutink and Reinders (who both indicated the importance of being involved), and the people within the team can work in one certain way and gain experience, which increases efficiency.

Appendix 5: Uniform Purchasing Policy

A uniform purchasing policy can lead to fewer problems and disturbances in the purchasing process. A uniform purchasing policy is optimal when the purchasing process of both organizations are identical. The interviews showed that a uniform purchasing policy can offer advantages for the Heutink Group. The following quote of *P1* summarizes the results regarding the advantages of a uniform purchasing process.

P1: *"I think that a uniform purchasing policy/process can offer advantages, because a supplier then knows exactly what he is and isn't up to."*

The interviews showed that a uniform purchasing policy could offer advantages for the Heutink Group in the future. Especially the relationship with suppliers can be improved if both organizations work in the same way. Suppliers will know how they will receive orders and how they need to deliver the orders. Problems will occur less frequently and can be solved quicker.

Table 7.1 shows the results of the interviews regarding a uniform purchasing policy. The interviews showed that the purchasing processes of Heutink and Reinders have some differences in the current situation. The biggest difference is the inventory management system. Heutink uses Slimstock, an inventory management system that predicts and manages an optimal inventory throughout the year. Reinders does not work with Slimstock and purchases everything for their whole season. The interviews showed that this is a less efficient way of working, as their inventory costs are very high, and their warehouse capacity is overfull.

Table 5.1: Codes Aligning Purchasing Departments

Code:	***Aligning Purchasing Departments***
Participants	Quote from interview
P1	I think that it would be effective to let the processes slowly blend in with each other. In that way, we get a uniform way of working, and a more optimal inventory due to Slimstock. This means that we do not have to have a high inventory value the entire year. Because a high inventory value also means high costs.
P1	*The biggest difference is that we use a inventory management system, and Reinderes not. Slimstock.*
P6	There are big differences in the purchasing policy of Heutink and Reinders. They work with a different program, Slimstock, so they have more orders every week. In the peak season, they let orders come in every week.

P1	You have yearly costs for using Slimstock. But now, Reinders purchases everything for their whole season, and has a very high inventory value, and high inventory costs, with which they cover the entire year. What we do is ordering what we need, which means that we have a more optimal stock throughout the year. So before the peak season, our stock value is lower that that of Reinders, but for us it is a systematic process of ordering.
P3	Communication is very important. A problem could be that you are used to doing your work in a certain way, but when it is changed you have to communicate well and have more meetings to discuss how it is going and possible problems.

Implementing a uniform purchasing policy could require high costs and effort. Changing the way of working of a purchasing department can be difficult for purchasers. Therefore, it would be better to slowly implement a uniform purchasing policy. If the processes are slowly being blend in with each other, the purchasers can slowly get used to a different way or working, without drastic changes. In addition, Slimstock can improve the efficiency of the inventory of the Heutink Group. Although implementing a uniform purchasing policy can be expensive, this would be beneficial on the long term, as it increases inventory efficiency, improves the relationship with suppliers and improves the efficiency of centralized purchasing.