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HOW DO DUTCH HOSPITALS PURCHASE HIGH-TECH MEDICAL DEVICES?

Master's Double Degree in Business Administration

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ABSTRACT

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This thesis explores the purchasing process of high-tech medical devices in Dutch hospitals, with a particular emphasis on low-cost acquisitions. The study also investigates the decision-making processes involved in these purchases and identifies the groups and individuals involved in them.

The literature review conducted in this study examines organizational purchasing and decision-making behavior. It was found that purchasing in organizations can be a complicated and multidimensional process, involving several individuals in the decision-making process.

The empirical part of this study is qualitative in its nature. Eight semi-structured interviews with purchasing professionals from Dutch hospitals were conducted to uncover each step in the purchasing process and to understand the decision-making behind it. The results provide valuable insights and resources for companies looking to enter the medical technology market, as well as for marketers seeking to develop effective marketing and sales strategies. This research was commissioned by a Dutch medical technology manufacturer.

The results of the study indicate that hospitals in the Netherlands follow relatively similar purchasing procedures when making low-cost purchases. The procurement process involves four stages: problem or need recognition, information search, evaluation and negotiation, and purchasing and using. The decision-making process involves multiple individuals from various functions, and several factors are taken into consideration when making purchasing decisions.

TIIVISTELMÄ

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Tässä Pro gradu -tutkielmassa tutkitaan miten alankomaalaiset sairaalat ostavat korkean teknologian lääketieteellisiä välineitä, keskittyen matalakustanteisiin hankintoihin. Tutkimuksessa tarkastellaan myös näihin hankintoihin liittyviä päätöksentekoprosesseja sekä identifioidaan niihin osallistuvat eri ryhmät ja henkilöt.

Kirjallisuuskatsauksessa tutkitaan organisaatioiden osto- ja päätöksentekokäyttäytymistä. Havaittiin, että organisaatioiden hankinnat voivat olla monimutkainen ja moniulotteinen prosessi, jossa päätöksentekoon osallistuu useita eri henkilöitä.

Tämän tutkielman empiirinen osuus on luonteeltaan laadullinen. Kahdeksaa alankomaalaisen sairaalan ostoalan ammattilaista haastateltiin puolistrukturoitujen haastatteluiden avulla, jotta saataisiin selville ostoprosessin vaiheet sekä ymmärrettäisiin päätöksentekoa niiden taustalla. Tutkimustulokset tarjoavat arvokkaita työkaluja lääketieteellisen teknologian markkinoille pyrkiville yrityksille sekä markkinoijille, jotka pyrkivät kehittämään tehokkaita markkinointi- ja myyntistrategioita. Tutkielma toteutettiin toimeksiantona alankomaalaiselle lääketieteellisen teknologian valmistajayritykselle.

Tutkimustulokset osoittavat, että alankomaalaisten sairaaloiden ostoprosessit ovat melko samankaltaiset matalakustanteisia hankintoja tehdessä. Ostoprosessiin kuuluu neljä vaihetta: ongelman tai tarpeen tunnistaminen, tiedonhaku, arviointi ja neuvottelut sekä ostaminen ja käyttö. Päätöksentekoprosessiin osallistuu useita henkilöitä eri toiminnoista, ja useita näkökantoja otetaan huomioon päätöksenteossa.

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ABBREVIATIONS

High-tech	High-Technology
MedTech	Medical Technology
SMEs	Small and Medium-Sized Enterprises
KOL	Key Opinion Leader
EU	European Union
MD	Medical Device
HME	High-Tech Medical Equipment
HMO	High-Tech Medical Organization
MDR	Medical Devices Regulation
BDA	Buying Decision Approaches
B2B	Business-to-Business
B2C	Business-to-Consumer
WoM	Word-of-Mouth
PropFreq	Proportional Frequency

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1 Introduction

The primary objective of this research is to conduct an in-depth investigation into the purchasing process of high technology (high-tech) medical equipment by hospitals in the Netherlands. The study will focus on identifying the various factors that influence purchasing decisions, with a particular emphasis on low-cost purchases. By examining purchasing and decision-making in Dutch hospitals, the goal is to provide valuable insights to be utilized by medical technology (MedTech) companies to develop effective marketing and sales strategies, which would ultimately enable them to penetrate the medical technology market successfully. In addition, the goal was to provide hospitals with the necessary tools to optimize their procurement strategies, allowing them to access the latest and most innovative medical technology while also managing their budgets efficiently.

The study aims to gain a deeper understanding of how Dutch hospitals purchase and how does their decision-making process work. The research is qualitative in nature, and primary data was gathered through interviews with eight purchasing experts from Dutch hospitals. The topic is important to study as the MedTech field is constantly growing and the healthcare industry can offer many promising opportunities, especially for small and medium-sized enterprises (SMEs) operating in the MedTech field. (MedTech Europe, 2021)

Previous academic research on organizational purchasing has primarily focused on the structure of the decision-making group, such as the buying center members (Dawes et al, 1998; Lilien & Wong, 1984). According to Johnston & Lewin (1996), understanding an organization's behavior is crucial to succeed in business-to-business (B2B) markets. However, comprehending this behavior can be challenging due to the process's complexity in many organizations. The decision-making process often involves several individuals, stages, and departments, resulting in conflicting interests and priorities within a single process (Johnston & Lewin, 1996, 1; Bunn, 1993, 38). Previous studies have left a research gap in the literature regarding purchasing in healthcare, especially in Dutch hospitals. This thesis aims to fill in this research gap.

The commissioning company in this thesis is a Dutch medical equipment manufacturer operating in the MedTech industry in the Netherlands. Their products are specialized medical technology equipment designed for clinical use, and the company is preparing to launch its new high-tech medical device to the market. The primary target audience for this new product are Dutch hospital organizations. However, as a newcomer to the market, the company is uncertain about the most effective approach to take when targeting hospitals. This research aims to provide them with a better understanding of how Dutch hospital organizations procure high-tech medical devices, enabling them to develop a concrete market entry and sales strategy for their latest medical device. Dealing with Dutch healthcare organizations can be challenging due to their regulations, networks, and affiliations. Therefore, this research is crucial in providing valuable insights and guidance for the commissioning company's entry plan as well as other medical technology suppliers' marketing and sales strategies.

As mentioned earlier, the commissioning company is currently seeking guidance on how to penetrate the MedTech market and effectively sell their medical products to Dutch hospitals. They are curious as to which decision-making groups they need to target and how to reach potential customers. Additionally, they want to ensure having a viable strategy for selling to both academic and non-academic hospitals. Specifically, the company needs to know how to navigate the purchasing processes of hospitals and who are the individuals involved in the decision-making. They are also interested in understanding the structure of these processes and whether there are any differences in procurement between academic and non-academic hospitals. Additionally, they seek to know the extent to which Key Opinion Leaders (KOLs) impact purchasing decisions. By gaining a better understanding of how Dutch hospital organizations make purchases, the commissioner company hopes to develop an effective strategy for entering the market with its new medical device.

After identifying the research problem, research questions were formed. Based on the research questions, the aim of the study is to understand how Dutch hospitals purchase medical devices (RQ1), how does their decision-making process work? (RQ2), and who are the groups and individuals taking part in the decision-making processes (RQ3).

The findings of this research revealed that purchasing processes in Dutch hospitals are relatively similar when making low-cost purchases. However, it is worth noting that there is a significant contrast when it comes to the acquisition of high-cost items. When making high-cost purchases, Dutch academic hospitals have to select the supplier through the European tender law, whereas non-academic hospitals are not obliged to do so. It is also worth noting that the decision-making process for every purchase is unique and contingent upon the individuals and groups involved in the hospital organizations themselves.

This study makes multiple contributions. First, it provides a systematic review of the existing literature regarding organizational purchasing. Second, the study identifies the research gap within the literature. Third, the study adds to the already existing knowledge by acquiring qualitative data by interviewing relevant purchasing specialists. The result of the research aims to help organizational and academic researchers to better understand how purchasing and decision-making in Dutch hospitals work. This research is structured in the following way: first, the research area is defined. Second, a summary of previous literature is provided. Third, the research methods are described. Fourth, the results are analysed and discussed. Finally, the limitations and conclusions of the study are reviewed.

1.1 Preliminary literature review

The previous focus areas of organizational purchasing and buying will be explained in the literature review. As per the extensive research conducted on this subject, it has been observed that organizational purchasing is a complex process that involves various activities performed by multiple members within the organization. Therefore, to achieve success in organizational marketing and communications, it is of utmost importance to have a comprehensive understanding of the intricate process through which organizations make purchases. (Lilien & Wong, 1984, 1).

When examining the area of organizational buying behavior, research has shown that a significant focus is placed on the decision-making process of the group involved, specifically the members of the buying center (Dawes et al, 1998; Lilien & Wong, 1984). This process typically involves multiple individuals who play a role in the decision-making process for

the organization (Buckner, 1967, Wind, 1970, Lilien & Wong, 1984, 1). As a means of gaining a better understanding of this complex process, Barclay and Bunn (2006) have developed a framework that encompasses decision-making stages, purchasing activities, process heuristics, and decision tactics. This framework can serve as a helpful tool for developing effective strategies when it comes to organizational buying behavior. Additionally, Lilien & Wong (1984, 1) have suggested that a different approach should be taken when it comes to organizational purchasing behavior as opposed to consumer buying behavior. Bunn (1993) has also created a framework of six buying decision approaches (BDA), which link various purchasing activities to corresponding purchasing situations. These situations include Casual Purchase, Routine Low Priority, Simple Modified Rebuy, Judgemental New Task, Complex Modified Rebuy, and Strategic New Task. By identifying and understanding these different approaches, organizations can better navigate the purchasing process and make informed decisions that align with their goals and objectives.

1.2 Research question

Previous academic research shows that B2B purchasing journeys might be complex and might vary widely between fields and organizations. This study aims to investigate the purchasing practices of Dutch hospitals, which are known for their strict regulations and procedures. These hospitals must adhere to both internal guidelines and external legal requirements to ensure the procurement of quality products and services. Thus, understanding the intricacies of their purchasing practices is essential for suppliers and vendors who wish to do business with them.

The commissioner company, a novel MedTech manufacturer, is interested in identifying the best strategy to enter the Dutch hospital market. The company is seeking assistance in this regard, and the purpose of this research is to provide guidance on this crucial issue. In particular, the company is interested in gaining insights into the complex decision-making and purchasing processes that occur within hospitals, including identifying the key decision-makers and establishing contact with them. Given the variability in hospital purchasing systems, navigating the market can be a challenging task for suppliers. The company's struggle to make headway in this market is likely to be shared by other MedTech suppliers,

which highlights the importance of this research. The research aims to respond to this need and fill in the critical gap in the existing research literature regarding organizational purchasing in Dutch hospitals. To support the research objectives, a main research question and two sub-questions were formulated to guide the research. The main research question and the sub-questions are as follows:

RQ1: How do Dutch hospitals purchase high-tech medical devices?

RQ2: How does their decision-making process work?

RQ3: Who are the groups and individuals taking part in the decision-making processes?

1.3 Goals and delimitations

The main objective of this qualitative research was to conduct a thorough investigation of the purchasing process of high-tech medical devices in Dutch hospitals. The study primarily focused on low-cost purchases, with the purpose of identifying the various steps and procedures involved in the procurement process. Furthermore, the second research sub-question aimed to delve deeper into the decision-making process associated with these purchases to gain a better understanding of how suppliers can more effectively enter the medical technology market. Lastly, based on the third research sub-question, the study sought to explore the specific groups and individuals involved in the purchasing decision-making processes, providing a comprehensive overview of all the key players involved in the process. The insights obtained were intended to assist MedTech suppliers in developing effective marketing and sales plans to enter the MedTech market. Additionally, goal was to provide hospitals with the necessary tools to enhance their purchasing strategies, allowing them to acquire cutting-edge medical technology while still maintaining budgetary efficiency.

It is important to note that while doctors and nurses may use medical equipment, according to the interviews conducted, they are not responsible for purchasing it. Rather, hospitals have dedicated purchasing departments that handle procurement decisions. The decision-making processes can vary between hospitals, which can make it difficult for suppliers to navigate. Additionally, companies that supply medical equipment may face some roadblocks when attempting to sell their products to hospitals in the Netherlands. This is because there are certain rules and regulations that must be followed when making purchasing decisions within hospital organizations and suppliers might not be familiar with them. Furthermore, it can be challenging for hospitals to find a supplier that offers the specific medical products they are looking for. Therefore, the objective of this research is to develop tools that make it easier for hospitals and medical device suppliers to connect with each other.

This study has several limitations that need to be considered. Firstly, it is important to note that the research is limited to the B2B context and cannot be extended to the B2C context. Therefore, the findings from this study may not be applicable to consumer behavior and should not be generalized to that context. Secondly, the research is specific to the medical technology industry. As such, the findings may not be transferable to other industries. It is important to mention that the research only applies to the specific purchasing department that was interviewed. Other departments within the hospital may have different purchasing behaviors and practices that could impact the study's findings. Therefore, it is essential to keep in mind that the conclusions drawn from this study apply only to the medical technology sector and not to other industries or departments. Finally, it is important to acknowledge that the sample size of the interviewed professionals is relatively low, with only eight individuals participating. As a result, the findings may not be broadly applicable and could be specific to the industries and organizations of those who were interviewed.

1.4 Research methodology and data collection

The research conducted was qualitative in nature, involving the collection of existing literature. To supplement this, interviews with purchasers in Dutch hospitals were conducted as the empirical part of the study. Interviews were chosen as the preferred method of data collection due to their ability to provide accurate and valuable insights on the topic being researched. The selection of the interviewees for this research was carefully made, considering their expertise and in-depth knowledge of the topics related to their work. The criteria for selecting the participants were based on their employment in hospitals and their roles in the purchasing department. To ensure a comprehensive understanding of the subject matter, eight purchasing professionals were chosen for the interviews. These experts represent a diverse group, with four from academic hospitals, three from non-academic hospitals, and one from a hospital group purchasing organization.

The interviews were conducted using an online video call platform instead of in-person meetings. The interviews were conducted in a semi-structured and guided manner, allowing the interviewees ample room to express their opinions and experiences freely. The aim was to obtain detailed insights into the subject matter from the perspectives and experiences of the interviewees. All interviews were recorded and transcribed with the consent of the interviewees, as per the recommendation of Eskola & Suoranta (1998). This approach ensured the accuracy and reliability of the data collected, making it an invaluable resource for the research.

During the interviews, the participants were asked about the specific steps involved in the purchasing process and how decisions are made when buying medical devices for their hospitals. However, the utilization of semi-structured interviews as a data collection method does present some challenges. For instance, conducting face-to-face interviews requires a significant amount of time and preparation in comparison to online surveys, which ultimately results in a relatively low number of interviewees. Furthermore, due to time constraints, the answers provided by the interviewees may not be as thorough or extensive as desired.

1.5 Structure of the research

This study is divided into eight sections and follows a specific structure. The next chapter, chapter 2 provides an overview of the theory and literature regarding organizational purchasing. It explores the process of organizational buying, exploring its characteristics and behavior. The chapter also highlights key findings and reviews approaches of buying decisions and a framework of organizational buying behavior. The third chapter explains the aspects of the medical technology market and regulations regarding purchasing and producing medical devices. The fourth chapter concludes the literature review. Chapter five discusses the research methods and data collections methods used in the study. This includes a description of the research context and case, data collection and analysis methods, as well as the reliability and validity of the research.

Chapter six presents the findings of the empirical part of the research, which is divided into sections based on the topic area and the stage of the purchasing process. Additionally, it presents findings on purchasing behavior and decision-making. Chapter seven is the discussion section, and finally, chapter eight concludes the research by highlighting its limitations and managerial implications, as well as discussing suggestions for future research.

2 Organizational purchasing

During this research phase, previous studies on organizational purchasing processes and decision-making will be evaluated. The goal of this literature review is to understand the existing findings on organizational purchasing and provide an overview of how the topic of B2B purchasing has been studied in the past. The review will highlight the main focus and key findings of previous academic literature on this topic and suggest areas for further exploration.

2.1 Organizational buying process

Previous studies have provided a broad understanding of how organizational purchasing operates. However, there is a noticeable gap in research when it comes to examining the procurement process of medical devices within hospitals located in the Netherlands. As a result, there is still much uncertainty as to how purchasing decisions are made in this particular context. Further investigation is necessary to shed light on this topic and provide valuable insights to improve the efficiency and effectiveness of procurement practices in the healthcare industry.

In recent years, researchers have closely examined the procurement strategies and processes of various organizations. These studies are particularly valuable to marketers as they provide insights into how to better engage and retain business clients (Lewin & Donthu, 2005, 1). Organizational purchasing is a constantly evolving landscape, shaped by emerging technologies and innovative techniques. Therefore, it is crucial to not only comprehend the purchasing process but also the dynamic environment that surrounds it. (Cannon & Perrault, 1999). According to Lilien & Wong (1984), in the realm of business, the process of organizational buying is a complex and multifaceted affair. It involves several individuals within the purchasing organization who are tasked with various activities. These activities can range from gathering information about potential options, to establishing criteria for selection, and ultimately making a decision on which option is the most appropriate. It is essential that businesses have a strong understanding of the intricacies of organizational

buying, as this knowledge can lead to successful purchasing outcomes and effective marketing and communication strategies within organizations. (Lilien & Wong, 1984, 1)

When it comes to marketing, B2B and B2C have similar economic value. However, B2B marketing is often more complex and requires different research methods compared to B2C. Organizational buying involves multiple stakeholders, both inside and outside the company, such as manufacturing directors, financial analysts, lawyers, and purchasing professionals. This has led to a specific research field in B2B marketing known as *B2B Buying* or *organizational buying behavior*. However, there has been less academic research done on B2B marketing compared to B2C. (Lilien 2016, 543-544)

Lilien (2016, 544) explains that there are challenges when researching B2B domain, and the contrast between B2B and B2C purchasing is remarkable. B2C buying is considered a complex process, which can involve households with multiple individuals over generations. B2B purchasing usually involves organizations and several individuals with diverse backgrounds and different motivations for purchases. Consumers in B2C buying scenarios often have generally similar, consistent demands and requirements. Nonetheless, B2B buying settings are typically more diverse since they consist of customers with greater variations in performance needs and customer size. (Lilien 2016, 544) Additionally, B2B studies are not as substantial as consumer studies, and it is more challenging to collect data from B2B sources than from B2C sources. Therefore, another challenge of B2B research is the lack of data availability. To gather data that can be compared to B2C, it is essential to have one or more organizations involved to cooperate in the data gathering. It might be difficult for academic researchers to establish the needed relationship that allows them to cooperate with organizations, especially if the researcher is early in their career. (Lilien 2016, 545)

As this research studies purchasing especially in academic and non-academic Dutch hospitals, it is worth to note that according to Thai et al. (2004), it is important to optimize the public and private procurement practices to ensure that only useful activities are conducted. Procurement can often face multiple challenges, especially if they are related to political environment or legal factors. (Thai et al. 2004) However, it always requires

experimenting new tendering techniques and methods to reach efficiency in purchasing. (Dimitri et al. 2006)

Grewal et al. (2015, 194) identified through a Delphi-like process that there are four key areas in B2B buying that are concerning and hold potential for further academic exploration. These aspects are as follows.

1. The evolving landscape of purchasing in B2B contexts
2. Increasing expertise and complexity among sellers
3. The influence of technological advancements
4. Increasing significance and expansion of emerging markets

Nevertheless, there are several possibilities in B2B research. The global B2B market corresponds well with the global academic market. Therefore, B2B research collaborations with multinational teams from different countries have the potential to make B2B research more efficient than research focusing on consumer markets (B2C). (Lilien 2016, 546)

2.2 Organizational buying behavior

Generally, the focus in organizational buying behavior research seems to be on the structure of the group that takes part in the decision-making process, for example the members included in the buying center.

Johnston & Lewin (1996) explain that to be successful in business-to-business markets, understanding organizations' buying behavior is critical. It might be challenging to achieve the understanding since many organizations' buying behaviour is often a complicated process. A purchasing process can include multiple phases and purchasing organizations can have multiple departments as well as individuals involved in the decision-making process,

leading to conflicting priorities and interests within one process. (Johnston & Lewin, 1996, 1., Bunn 1993, 38) Examples of activities involved in organizational buying are information acquisition, choice criteria development, and decision-making among all the available options (Lilien & Wong, 1984, 1). Purchasers deal with complicated factors and their buying behaviour is affected by many situational aspects. (Puto 1987, 38). When faced with complex situations, decision-makers tend to "frame" problems according to their preferences (Puto, 1987, 38). Such framing enables them to establish strategies that aid in effectively managing and leading actions in specific circumstances (Newell & Simon, 1972). To manage with complicated situations, decision-makers often "frame" problems in the way they want to. (Puto 1987, 38). This way they develop methods to help them manage and lead their acting in particular situations (Newell & Simon, 1972).

According to Lilien & Wong (1984), organizational buying behavior must be approached differently than consumer buying behavior. When comparing to consumer buying behavior, there are two common attributes to organizational buying behavior: usually, the decision is an outcome of decision-making activities, and a purchase is a result of the process. However, usually in organizational purchasing process multiple individuals are involved in the decision-making activities, unlikely in consumer buying behavior. (Lilien & Wong, 1984, 1) It is important to also note that several studies regarding buying decision process have indicated that individual decision-makers' choice varies within different environments surrounding the decision-making process (Einhorn & Hogarth, 1981).

Early studies on organizational purchasing indicated that there are multiple stages that the decision-making process goes through, additionally identifying critical points of decision (Cardozo, 1983). Many empirical studies have shown that multiple individuals are usually involved and influencing the organizational decision-making process (Buckner, 1967; Wind, 1970).

To use effectively marketing resources, it is essential to understand:

1. who are the people involved in the process of purchasing (who are influencing the purchase) and
2. how do they purchase, for instance what are the stages in the purchasing process and how is the process influenced by the individuals involved in the process? (Lilien & Wong, 1984, 1)

To understand the buying process better, Barclay and Bunn (2006) describe a framework of organizational buying behavior, which consists of four aspects:

1. decision-making stages
2. purchasing activities
3. process heuristics
4. decision tactics

Bunn (1993) has formulated six buying decision approaches (BDA). The study explains that there has been development on classifications of buying situations and patterns. The classification consists of these six buying decision approaches which have been identified with an empirical taxonomy development process. This buying decision approach framework links multiple purchasing activities into corresponding purchasing situations. The categories differ in the areas of searching for information, using analysis techniques, focusing on proactive aspects, and following procedural control. A certain buying decision approach is used depending on four situational features: purchase importance, task uncertainty, extensiveness of choice, and perceived buying power. This framework of six buying decision approaches is useful for instance for marketing managers to assess their client segment categories in taxonomy. Additionally, it offers a tool that helps sales

managers to evolve adaptive sales approaches that are based on a few purchasing situations and equivalent buying decision approach. (Bunn 1993, 38)

These six buying decision approaches by Bunn (1993) are as follows:

Type 1: Casual Purchase

In the casual purchase the buying decision approach does not require effort to search for information. In this approach no analysis will be conducted, and proactive issues such as planning will not be taken into consideration, however, the purchase follows standard purchasing processes. This casual purchase approach is used when the purchase has only a minor importance with only little uncertainty around it. Usually, there are many opportunities and alternatives available, and the buyer has not much power in the purchasing situation. A typical example of a casual purchase would be a situation where a company buys a small, minor asset, where the purchase will be done within a day. There might be multiple sources available to supply the item. The purchase might be bought from a vendor they have also previously purchased. The data conducted by Bunn shows that the casual purchase approach is mostly used for items that are bought incidentally and are low in value. This kind of purchase is customary and does not require much effort. The purchase focuses mostly on putting the order in place. Therefore, only standard purchasing procedures are followed, and there are not many individuals in an organization included in the decision-making process.

Type 2: Routine Low Priority

When comparing the routine low priority to the previous casual purchase, the main difference found is that the routine low priority purchases are more repetitive purchasing decisions. In this buying decision approach, only little consideration will be given to information search or analysis. Proactive aspects will be only superficially considered, and standard procedures will be followed. Purchases in this buying decision approach are usually

important to some extent. Often there are many choices available, and a moderate amount of uncertainty and perceived purchaser power are included. Purchasers often see the options among all items quite similar. Typically, these purchasing decisions are made for instance for components, production supply items, or raw materials.

The data gathered in the study of Bunn (1993) shows that certain purchases in this routine low priority category can be repeated situations. In this kind of purchasing situations the buyer might look at alternative vendors or other ways of manufacturing to find out if there are new, for instance, technical solutions, available in the market. However, usually a repetitive buy is re-purchased from an earlier selected supplier, especially in cases of purchasing items with low value. In more than half of the cases within this buying approach category a competitive bidding process was conducted to consider selecting alternative vendors. In the end, even though bids were requested, the items were generally eventually purchased from a previous supplier. In a purchasing situation example case by Bunn (1993), a competitive bidding process was conducted, but eventually, a supplier the company had used already for 15 years was selected. In another example case, an organization operating in the healthcare industry purchased items in a competitive bidding process from a supplier that had been providing the service for years. Therefore, these cases show that purchasing cases in the routine low priority approach seem to follow habitual and automatic purchasing process with a relatively low level of planning and analysing.

Type 3: Simple Modified Rebuy

The simple modified rebuy can be considered to carry organizational importance, since it shows to include only a little uncertainty in the purchase, only a few choices, and a moderate level of power. However, within this purchasing approach a moderate amount of information search and analysis is done. It is also essential that in this approach purchases focus on proactive issues and they follow standard procedures.

This purchasing approach can be distinguished from others in the way that it has more focus on proactive issues; purchasers focus more on the planning part than they do in in other types of buying approaches, even if the other purchasing type has a similar lever of importance to

the organization (for instance types 4 and 5). The reason behind that has been found to be that the simple modified rebuy can more often involve buying important items which the buyer organization might identify to be somehow restricted. In an example case, the buying organization considered the future and stability of the supplier company, the products' availability on the market, and the long-term relationship between the supplier and the buying organization. Even though the buyer organization focused on the proactive issues, it still followed the existing purchasing procedures. Often in these simple modified buying approach situations purchasers aim to focus on retaining and managing relations and to fulfil the user's demand. The procedures and responsibilities in these purchasing cases are clear.

Type 4: Judgemental New Task

The buying decision approach "judgemental new task" is likely to be followed within organizations' buying situations where there is a lot of uncertainty, a moderate level of power, and only a few choices available in the market. This approach usually has a moderate level of searching, analysing, and proactive focusing. Usually there are no earlier purchasing decision-making processes to follow, so the purchasers usually make decisions as they go.

The level of uncertainty is the highest when the organization does a purchase following this judgemental new task approach. Purchasers might feel uncertain about the purchase since the organization does not have experience with the item. Additionally, products in this approach might be technologically complicated, and therefore also difficult to evaluate. Additional uncertainty might appear from unexpected issues of cooperating with a new supplier. An example of this would be a case where an organization wanted to make a first-time purchase of a special type of a product from a manufacturing company. The organization was not sure which brand or model they would like to choose, or in which levels of quality and price. Many supplier companies provided them with information of their products, and the provided information was evaluated by users and organisations' managers. A second example of this approach is a case where an organization bought a technically complex item. The item had been bought earlier as well, but the company was uncertain this time, since product was complex, and they wanted to consider alternative suppliers as well.

A moderate level of analysis was conducted, and the top managers' subjective judgements influenced the decision.

As a conclusion, within the approach of judgemental new task the purchase can be considered new for many reasons. Mainly, because there are no established procedures to follow in this buying approach. The decision is based on a few persons' individual judgements in an informal, small decision-making group. This buying approach is mainly affected by relatively high level of uncertainty and importance.

Type 5: Complex Modified Rebuy

This buying approach of complex modified rebuy can be described as an important buying approach with a lot of choice, low uncertainty, and a high position of power. In this rational and structured process organizations use a variety of buying activities, for instance searching for a lot of information and using advanced techniques of analysing. They also take the long-term needs into consideration and follow closely already existing purchasing mechanisms. As an example, a buyer organization purchased items from suppliers that were chosen through a competitive bidding. The order was spread between these several selected suppliers. The buyer was in a powerful position in this purchasing case. The buyer conducted an extensive analysis of price, costs, and control modelling. Additionally, the buyer assessed the trends in the market as well as alternative vendors available.

At least in one third of the cases the approach of complex modified rebuy the purchase goes as a routine, following previously negotiated procedures. The buyer organization can assess the prices, and the number of available suppliers is high. This buying process can be framed as a rational and computational process. The process includes a lot of effort because the buying decision is important. The clarity of the decision makes high-level searching, analysing, planning, and controlling easy. This buying process is ideal for competitive bidding, and the largest number of competitive bids happen following this buying situation, and often the purchase is divided between various suppliers.

Type 6: Strategic New Task

The buying situation of strategic new task is also highly important for organizations. The approach consists of a high degree of uncertainty, only a few available choices, and the buyer holds a high level of power. The purchasing situation involves a strong level of searching for information, a high level of analysis, and high focus on proactive issues. However, there is only little relying on established purchasing procedures. The buying approach is similar to judgemental new task (type 4), but this one requires a lot more effort on all the purchasing activities. In the level of effort, this buying type is similar to complex modified rebuy (type 5), but has more importance and uncertainty, and the buyer is unable to rely on already existing purchasing procedures.

The strategic new task is more complex and different than any of the other approaches since it is financially and strategically the most important for the organization. Long-term planning is the main factor to drive the decision process. The approach includes a high level of research, such as large amount of discussion, careful consideration of alternatives, and negotiations with suppliers.

An example situation from this purchasing approach would be a case where a company placed an order of a special product worth of \$700,000, which had a critical purpose on the production line. Therefore, the order was highly significant for the company, and this buying decision approach was followed. In another example case an organization purchased furniture worth of \$600,000 to its office. The decision-making process lasted for six months, and multiple departments of the company took part in it. The factors driving and influencing the decision-making process were the rareness of this kind of purchase and the long-term effect to the office and the working environment. The mentioned example cases of this purchasing approach demonstrate that in this approach the focus is mainly on fulfilling long term needs of users', as well as strategic planning for business. Since the buying situation is quite new, it does not follow established purchasing procedures from the past.

This research study focuses on the procurement procedures involved in acquiring high-tech medical equipment. To analyse the purchasing scenarios in this field, Bunn's (1993) buying

decision methods were applied. The findings reveal that the majority of medical equipment acquisitions in Dutch hospitals fall under the categories of "Type 4 - Judgemental New Task," "Type 5 - Complex Modified Rebuy," and "Type 6 - Strategic New Task." These buying decision approaches are characterized by several common features that are also evident in the procurement practices of medical equipment in Dutch hospitals. The detailed characteristics of purchasing and buying decision-making structures in Dutch hospitals will be assessed later in this study.

When it comes to purchasing "Type 4 - Judgemental new task", the process usually involves a high level of uncertainty, moderate level of power, and limited options in the market. This decision-making approach is commonly seen in the high-tech medical industry, where the commissioner company aims to sell their unique product to Dutch hospital organizations. Typically, this approach involves a moderate amount of information searching, analysis, and proactive focus. For instance, when organizations purchase low-priced high-tech medical devices, these elements are often present in the decision-making process.

The procurement of medical equipment can also be classified as "Type 5: Complex Modified Rebuy". This implies that the purchase process involves extensive research and advanced analysis. Long-term needs are also considered, and established purchasing procedures are followed. In addition, organizations may select suppliers through competitive bidding, as is the case with Dutch academic hospitals and the European tender law. The buyer undertakes a comprehensive analysis of prices, costs, and control models, as well as evaluating market trends and alternative vendors. These practices are commonly used in medical technology purchases. The buyer organization also evaluates prices, and there are numerous suppliers available. Therefore, this purchasing approach has many characteristics that are typical in purchasing medical technology, which will be further explored in this study.

Regarding the buying decision approach "Type 6: Strategic New Task", there are some common characteristics with purchasing in Dutch hospitals. Firstly, the purchase is of high importance to the hospital as the end-users often want to start using a new product as soon as possible. Secondly, there may be a high level of uncertainty due to only a few options being available in the market and because the buying organization has not purchased the new

specific high-tech medical device earlier. This could also apply specifically to the purchase of the new medical equipment product by the commissioner company, as it is a new product on the market with limited options. As the product is specific, there may not be many alternatives available, and the buying organization will need to conduct thorough research and analysis as they have not used it before. Factors driving this type of purchase may include the rarity of the product and its long-term effects. This approach requires careful consideration of alternatives and suppliers through research and discussion. As the medical device is new in the market, the buying organization will discuss and carefully consider the purchase of the product.

According to Bunn (1993), when it comes to making a purchase, there are a variety of factors that can influence the process. For example, the significance of the purchase may play a role in determining the appropriate course of action. Additionally, organizational buyers typically take a careful and detailed approach, evaluating each situation and selecting the purchasing activities that are most appropriate for the circumstances at hand. This ensures that all purchases are made in a thoughtful and deliberate manner, to maximize value and minimize risk.

As mentioned earlier, the usage of a certain buying decision approach varies depending on four specific characteristics, which are purchase importance, the extensiveness of choice, task uncertainty, and perceived buying power. (Bunn, 1993)

1. Purchase importance

Previous studies have revealed a link between the significance of a purchasing decision and the approach taken during the decision-making process. Decision-makers utilize varying techniques to handle decisions with different levels of importance. Based on empirical evidence, the importance of a purchase affects multiple stages of the decision-making process. In summary, the importance of a purchase can be defined as the buyer's perception of the significance and impact of the decision on the organization's operations, taking into account the purchase size. (Bunn, 1993)

2. *Task uncertainty*

The purchasing decision-making process can be affected by various uncertainties, which can impact the overall process. Among these uncertainties, task uncertainty is often considered a significant factor in influencing buying behavior. However, perceptions of task uncertainty can vary depending on the research conducted. (Spekman & Stern, 1979).

3. *Extensiveness of choice set*

According to Choffray and Lilien (1978), the term "extensiveness of choice" refers to the number of alternative brands considered during a purchase decision. However, this definition goes beyond just the number of options available in the market. Other factors such as product differentiation, seller concentration, replaceability, and product uniqueness are also important considerations (Porter 1981). Buyers are often concerned about the extensiveness of their choices and tend to want to expand their options when they feel limited. (Corey, 1978)

4. *Perceived buyer power*

The concept of perceived buyer power refers to how buyers perceive a firm's negotiating strength in a specific buying situation (Bunn 1993). Previous research suggests that a buyer's primary competitive advantage lies in their relative bargaining power (Porter 1981). Moreover, studies have indicated that a buyer's negotiation strength can influence their procurement decisions. (Corey 1978).

Barclay and Bunn (2006) suggest that more research should be conducted regarding organizational buying behavior to build up dimensions for the decision-making process. Therefore, they propose one dimension to be *process heuristics*, or behavioral tendencies, which means tendencies related to behavior and decisions which are conducted based on

multiple characteristics of the decision. Barclay and Bunn (2006) discovered that there are two kinds of process heuristics. They are “structuring” and “downgrading” activities.

Some decision-makers prefer to conduct highly structured purchasing activities that are based on logic and reasons, even on situations where it would not be necessary. The authors name this as “structuring”, where decision-maker consciously uses systematic strategy to make decisions. It was also found that purchasers might make structuring decisions on the purchasing process before, during and after the vendor has been chosen. The authors expect purchasers to be more likely to structure the process *during* the process of making the decision. Structuring *before* making the decision expresses that the purchasers rely on existing information or already established policies. If decision makers structure *after* the vendor has been selected, there is post hoc rationalization included. When “downgrading” decisions, the decision makers tend to conduct purchasing activities on lower levels than would be necessary in certain situations. Downgrading might be a strategy to simplify and minimize the activities done. This process heuristic was found to be a consequence of the interplay of multiple factors. (Barclay and Bunn, 2006, 189)

3 Medical technology market and devices

This chapter explores the medical technology market in the Netherlands as well as in Europe. The chapter also explores the characteristics of medical devices and represents the buying and selling regulations surrounding them. The first sub-chapter starts by examining the key characteristics of the MedTech market, and after that, the second sub-chapter focuses on medical devices and the specific rules and regulations regarding purchasing and selling them.

3.1 Characteristics of the medical technology market

According to European Commission (2023) and MedTech Europe (2021), the European medical technology market is remarkable due to the presence of more than 500,000 types of devices available in the EU, with an overall market value of €140 billion in 2020. Based on the prices of manufacturing medical devices, the European medical device market is estimated to cover up to 27.6% of the world's market. (European Commission, 2023; MedTech Europe, 2021). The field of medical technology is known for being highly innovative and remarkably competitive, with active involvement from SMEs (small and medium-sized enterprises). These companies play a vital role in driving innovation and competition, contributing to the overall growth and development of the industry. The medical device industry is essential in preserving human life and well-being. By providing cutting-edge healthcare solutions for disease prevention, diagnosis, monitoring, prediction, treatment, and symptom relief, medical devices are a critical component of the healthcare industry. (European Commission, 2023)

The medical device market in the Netherlands is a significant and thriving industry. According to recent statistics from MedTech Europe (2022), the Netherlands imported medical devices worth €28 million, while exporting them with a value of €20 million. As a result, medical device vendors might find the Netherlands an attractive market to introduce their medical technologies. Over the past decade, the European medical device market has experienced consistent growth, with an average increase of 2% per year. However, there was a decline in demand in 2009 due to the economic crisis, which resulted in the lowest growth

rate in 12 years, standing at 1%. Nevertheless, the market has since recovered, with the annual growth rate ranging between 2.6% (2013) and 9.3% (2015). In 2020, the market recorded an impressive growth rate of 8.5%. (MedTech Europe, 2021) These positive trends in the Netherlands and Europe's medical device market suggest that there is a growing demand for innovative and advanced medical technologies. Medical device vendors can leverage this opportunity to introduce new solutions that can improve healthcare access, quality, and outcomes.

The commissioning company in this study is a manufacturer of high-tech medical equipment (HME). According to Ilin et al. (2022), HME is a specialized type of medical equipment that is designed to provide advanced medical care. In medical organizations that prioritize innovation and a comprehensive approach to stakeholder interaction, HME plays a critical role in creating value by enabling healthcare providers to offer superior medical services. These organizations are eager to adopt the latest technologies to improve their medical services and stay ahead of the curve in a constantly evolving industry. High-tech medical organizations (HMOs) are especially focused on developing and implementing HMEs, as they provide a unique opportunity to leverage new technologies and take the industry to new heights. By investing in HME, HMOs are able to offer their patients cutting-edge treatment options and stay at the forefront of medical innovation. (Ilin et al. 2022)

3.2 Medical devices and related regulations

The primary focus of this study is the procurement of medical devices. According to European Union (EU) medical device (MD) can be described as “any instrument, apparatus, appliance, material or other article, whether used alone or in combination, including the software necessary for its proper application intended by the manufacturer to be used for human beings” (European Union, 1993). Additionally, medical devices can be described as “products, services or solutions that prevent, diagnose, monitor, treat and care for human beings by physical means” (MedTech Europe, 2021)

According to European Commission (2023), the European Union market offers a vast range of medical devices, making this sector a vital contributor to citizens' healthcare services and

the global economy. The significance of medical devices in enhancing the quality of life cannot be overstated. The smooth functioning of the market is ensured through a regulatory framework that prioritizes a high level of health protection for patients and device users. However, as a rapidly developing industry, establishing sustainable regulations that balance safety and innovation can be challenging at national, European, and international levels. (European Commission, 2023)

Medical technology suppliers need to consider that the market introduction and utilization of medical devices by operators and patients must go through rigorous regulatory and approval procedures. The European Union has strict regulations for medical technologies to guarantee the highest level of safety and performance for all device users. (MedTech Europe, 2021; Bianchini & Mayer, 2022) The thoroughness of these procedures is crucial in preventing potential hazards and risks associated with the use of medical devices. By complying with these rigorous standards, developers can assure operators and patients that the devices they use are safe and dependable. (Bianchini & Mayer 2022) Therefore, entering the MedTech market might feel challenging for medical device suppliers, as medical devices must follow strict rules and regulations.

A significant regulation that suppliers need to consider is the new MDR (EU) 2017/745 regulation. This regulation places more specific requirements on all parties involved in developing medical devices, focusing on setting high standards on quality and safety. (The European Parliament & The Council of the European Union, 2017; Niemiec, 2022) As a result, healthcare organizations and suppliers must comply with this regulation in their operations. The Medical Devices Regulation (MDR) encompasses regulations regarding the development, validation, and upkeep of devices designated for use in human diagnosis, prevention, monitoring, treatment, or relief of ailments or injuries. As such, adherence to the MDR is critical to ensuring that medical devices are of the highest quality and safety standards. (The European Parliament & The Council of the European Union, 2017)

4 Conclusion of literature

According to Johnston & Lewin (1996), it is important to understand organizations' behavior is crucial for success in B2B markets. However, it can be challenging to comprehend this behavior due to the complexity of the process in many organizations. The decision-making process often involves multiple individuals, stages, and departments, resulting in conflicting interests and priorities within a single process (Johnston & Lewin, 1996, 1; Bunn, 1993, 38). Consequently, it is crucial to have a comprehensive understanding of the organizational buying behavior to effectively navigate these intricate and multifaceted systems.

Barclay and Bunn (2006) provide a detailed and comprehensive framework for understanding organizational buying behavior. This framework encompasses four key aspects: decision-making stages, purchasing activities, process heuristics, and decision tactics. Understanding the complex factors that influence purchasing decisions can be achieved by considering these factors.

Moreover, Bunn (1993) delves even further into this topic, highlighting six distinct buying decision approaches that shed light on the defining features of each purchase. Through a careful analysis of these approaches, organizations can gain valuable insights into the underlying motivations and preferences that drive their buying behavior. The circumstances in which a particular purchasing decision method is employed differ based on four distinct traits. These traits are:

1. Purchase importance
2. The extensiveness of choice
3. Task uncertainty
4. Perceived buying power

The usage of these four characteristics can be determined based on the criteria and qualities of the purchase. As purchases are conducted following different procedures and multiple activities are taken based on the qualities of the purchase, the usage of the four characteristics varies. Organizational purchasers repeatedly evaluate purchasing situations to find out what are the best activities to take in each situation. (Barclay & Bunn 2006)

The world of organizational purchasing is constantly changing and fast-paced due to the introduction of new methods and technologies. Therefore, it is crucial to comprehend not only the purchasing process but also the environment in which it operates. (Cannon & Perrault, 1999) Furthermore, optimizing purchasing activities is vital to ensure that all actions taken are beneficial. (Thai et al. 2004) To perform efficient purchasing activities, organizations must continuously experiment with new tendering techniques and methods. (Dimitri et al. 2006) Finally, Barclay and Bunn (2006) suggest that more research could be conducted on organizational buying behavior to develop dimensions for the decision-making process.

The European medical technology market is noteworthy for its extensive range of over 500,000 devices available in the EU, as reported by the European Commission (2023) and MedTech Europe (2021). The market's overall value was €140 billion in 2020 (European Commission, 2023; MedTech Europe, 2021). The medical technology industry is recognized for its high level of innovation and intense competition, with small and medium-sized enterprises (SMEs) playing an active role (European Commission, 2023). To ensure that medical devices meet the highest safety and performance standards, medical technology suppliers and purchasers must adhere to strict regulations, such as recently implemented MDR regulation. By doing so, they can guarantee that all device users are protected and receive the best possible medical care. (The European Parliament & The Council of the European Union, 2017)

5 Research methods and data collection

This chapter provides a detailed explanation of the research context and case, accompanied by an in-depth analysis of the research methods and data collection techniques employed. To gather information for this qualitative research, secondary data was collected from various relevant literature sources.

The research process was initiated by identifying a preliminary research problem that needed to be addressed. To find the answers to the problem, research questions were defined. Relevant data was then collected to gain valuable insights into the research problem. This phase involved gathering relevant literature and conducting interviews for the research. After the data collection phase was completed, the data analysis process began. This involved analysing the collected data to gain a deeper understanding of the research problem. Finally, conclusions were drawn based on the results. A comprehensive explanation of the entire research process is shown in the Figure 1 below.

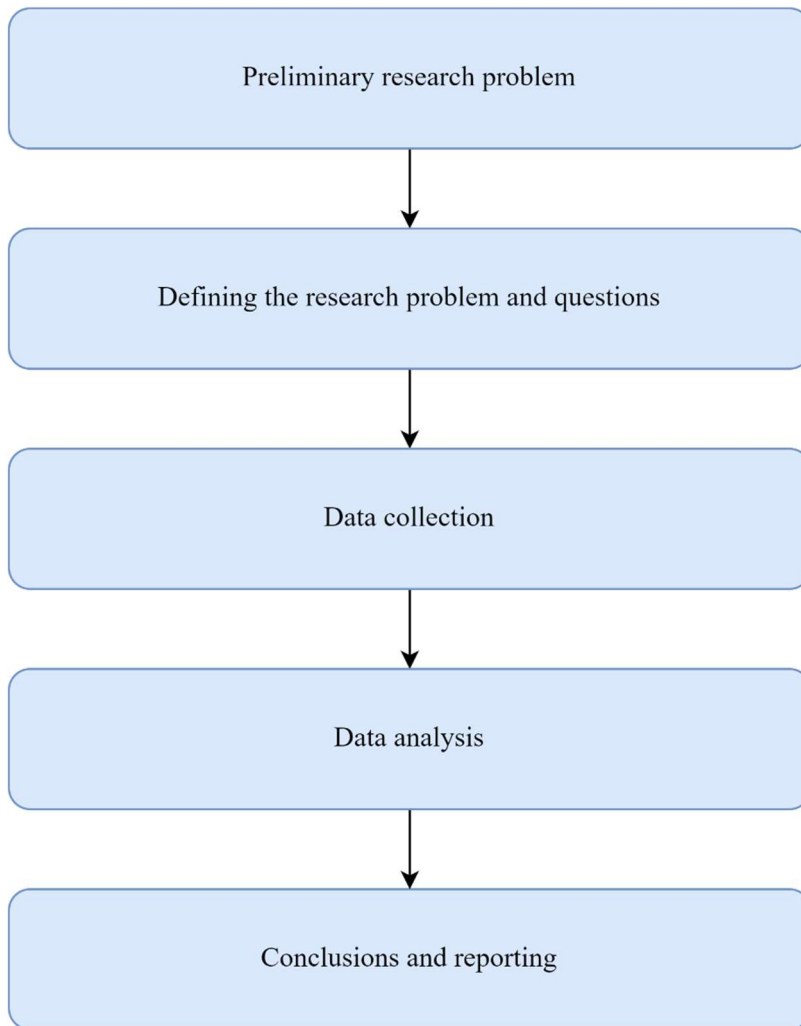


Figure 1. Research process (in accordance with Hirsjärvi & Hurme, 2022)

As for the empirical part of the research, a total of eight purchasing professionals from Dutch hospitals were interviewed to gain a comprehensive understanding of their purchasing processes and decision-making as well as how they approach purchasing new medical devices. Interviews were selected as the research method in this study, as they provide an opportunity for a thorough exploration of the underlying reasons and motivations behind the responses given by the participants (Hirsjärvi & Hurme, 2022).

5.1 Research context and case description

This study is commissioned by a medical equipment manufacturer based in the Netherlands. They specialize in producing top-of-the-line medical equipment that incorporates the latest technology. The company is on the verge of launching their new high-tech medical device, which is designed for clinical use and intended to be utilized by clinicians during specific procedures. As the device is intended for medical use, it would make the most sense to target healthcare facilities for successful sales. The company currently operates primarily within the domestic market, with all hospital organizations in the Netherlands being potential customers. Their goal is to expand their reach in the B2B business sector where they have ample opportunities. This thesis aims to provide the company with valuable insights they can use to develop their marketing and sales plans, ultimately allowing them to enter the MedTech market with their new medical device.

The research was initiated because the company faced challenges in identifying a way to enter the MedTech market and successfully promote their products to potential customers, Dutch hospital organizations. The company also expressed that generally, for other supplier companies as well, it might be challenging to establish relationships with hospital organizations to introduce innovative products to the market.

Therefore, the company is seeking ways to introduce its new, advanced medical device into the market. Valuable insights would include understanding how Dutch hospitals incorporate suppliers into their purchasing systems and identifying the key decision-makers involved in the procurement process. This research delves into these areas to uncover the buying practices of Dutch hospitals.

5.2 Data collection and analysis methods

Data collection methods used in this qualitative research were collecting existing academic literature to gather secondary data, and conducting interviews to gain primary data. The first step of the secondary data collection was to gather relevant academic literature for the research. The data gathering focused on finding academic literature with the focus on choosing high-quality professional articles and books. The chosen literature was taken through a close inspection and critical review. The aim of the literature review was to gather literature regarding organizational purchasing processes and organizational purchasing decision-making behavior. However, the challenge in the data collection was that the topic of this thesis was relatively narrow, which in turn led to a limited availability of existing academic literature on the subject matter.

On the empirical part data was acquired by interviewing eight purchasing specialists in Dutch hospitals' purchasing departments. The empirical part started by identifying who exactly are the key customers the commissioner company aims to sell its medical products to. Based on that, the key customers and decision-makers were identified. The interviewees were selected from Dutch hospitals since they are the target customers of the commissioning company. The interviews consisted of eight purchasing professionals in four Dutch academic hospitals and three non-academic hospitals. One of the interviewees works at a hospital group purchasing organization but has earlier operated at an academic hospital's purchasing department, so the focus of this interviewee was primarily on academic hospitals' purchasing. The interviews were conducted using an online video call platform, and the interviews were recorded with the consent of the interviewees. After that, the interviews were transcribed and analysed.

The type of interviews used in this research were semi-structured interviews. The interviewed purchasing professionals work in purchasing departments in the interviewed hospitals and are part of the purchasing and decision-making processes of medical devices. The aim of the interviews was to map the structure of purchasing practices to gain insight of the processes and the possible challenges as well as to enrich the understanding of purchasing methods and practices from the perspective of purchasing specialists.

Interviews were chosen as a data collection method in this thesis to gather primary data instead of only secondary data. The interviews were semi-structured, and this interview type was chosen because it allows interviewees to freely express their insights and provide more in-depth thoughts and views compared to traditional interview questionnaires. The choice to use interviews as a data collection method was also motivated by the desire to deepen knowledge of a topic area that has not been extensively studied in academia. By gathering primary data through interviews, the knowledge of the topic area was expanded. Interviews provide new information and widens the knowledge of the topic area. The answers of the interviews were expected to deepen knowledge of the topic, as they are expected to be multidimensional and provide varying perspectives and deepen understanding of the topic.

The interview type, semi-structured interviews, was applicable for this research since it allows interviewees to explain their insights and views using their own words. Therefore, interviewees can provide their own insights and use ideas and words in their own way, which adds depth and special implications to the obtained data. (Saunders et al. 2015, 394) Besides that, it allows both the interviewee and the interviewer to ask clarifying questions to ensure that everyone is on the same page. Instead of conducting the interviews face-to-face in real life, they were conducted online via an online video call platform. This method was selected since the hospitals where the interviewees work at are located in different parts of the Netherlands. The language used during these interviews was English, which was chosen as a common language for the participants.

This research is an exploratory study which aimed to understand the causal relationships between different variables (Saunders et al. 2015, 394). In exploratory studies usually open questions are asked to gain insights about the topic area. Exploratory research questions usually start with “What” or “How”, as on the interviews conducted in this study as well. An exploratory study is useful in this research since the aim was to refine the understanding of the specific topic. (Saunders et al. 2015, 174-175) These in-depth interviews were non-standardised, which is a typical feature of semi-structured interviews. (Saunders et al. 2015, 391)

In this research, all interviewees were asked the same questions, however, their answers were not limited to predetermined responses, as is common in semi-structured interviews. Instead, interviewees were encouraged to provide their own interpretations and answers freely. (Eskola & Suoranta, 1998) The list of questions included several key topics and themes, with the format of the questions remaining consistent for all interviewees. However, the order in which questions were asked varied depending on the topics already discussed during the interview. In some cases, later questions were answered earlier due to the interviewee's prior responses, which is typical in semi-structured interviews. (Saunders et al. 2015, 391)

The objective of the data analysis section was to find out how purchasing process and decision-making process are conducted in Dutch hospitals. The technique used was to conduct qualitative interviews with purchasing people in Dutch hospitals. The aim was to find out what is the structure of the purchasing process in the hospital they work at, and how does the decision-making process work. The online interviews were structured with a qualitative questionnaire focusing on the purchasing process and decision-making process.

The structure of data collection of the interviews is shown below in the Figure 2. First, relevant interview questions and the structure of interviews were formulated. After that, interviewees were contacted, and interview times were scheduled. Next, the semi-structured interviews were conducted using an online video call platform. After that, the interviews were transcribed. Finally, the answers of the interviews were analysed and taken through a close inspection to ensure that the essential information was captured accurately.

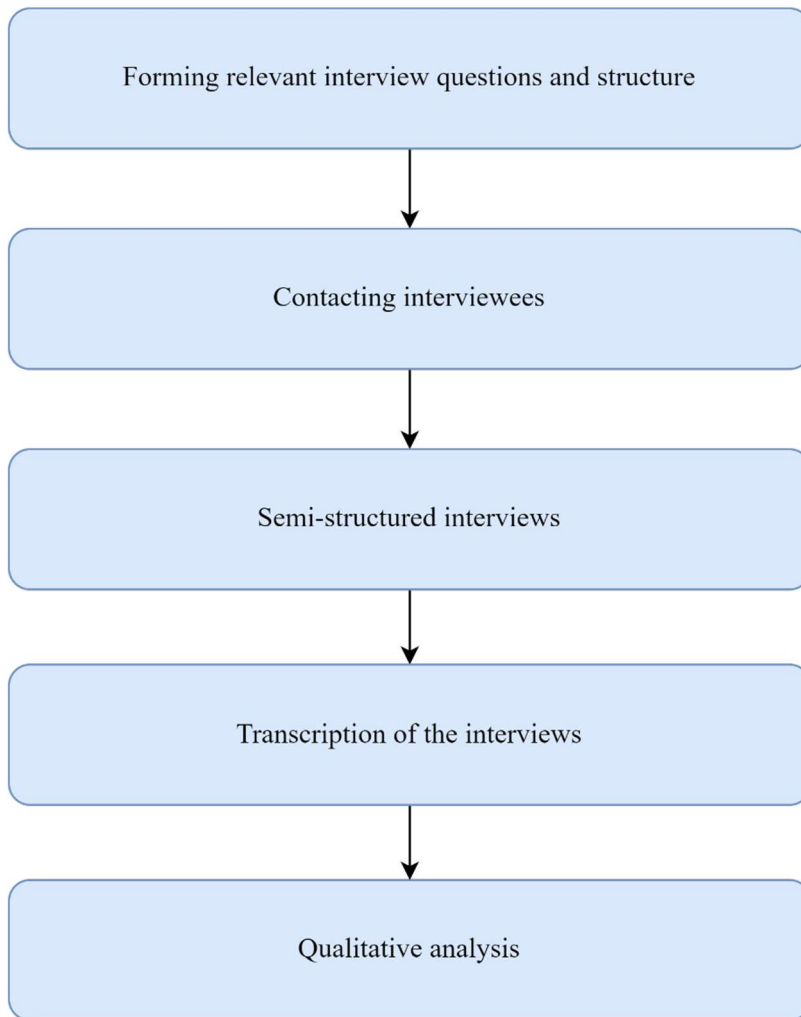


Figure 2. Data collection steps

The detailed information of the interviewees is gathered below on Table 1. The profiles chosen in the interviews are as follows; Profile 1 consists of purchasing professionals in Dutch academic hospitals, and Profile 2 consists of purchasing professionals in Dutch non-academic hospitals. Profile 3 involves an interviewee working at a hospital group purchasing organization in the Netherlands.

The hospital group purchasing organization assists hospitals in sourcing high-quality items from suppliers at a better price and quality. With a strong customer base consisting of several Dutch hospitals, the organization plays a crucial role in the procurement process of Dutch hospitals. The purchaser in the Profile 3 has prior experience in an academic hospital's

purchasing department. As a result, the interviewee's responses primarily focus on the purchasing process of academic hospitals.

Table 1. Purchaser profiles

<i>Purchaser profile</i>	<i>Academic or non-academic hospital</i>	<i>Interview duration</i>
1A	Academic	27 min
1B	Academic	30 min
1C	Academic	44 min
1D	Academic	65 min
2A	Non-academic	28 min
2B	Non-academic	32 min
2C	Non-academic	36 min
3A	Other	83 min

The interviews varied in length, ranging from 27 to 83 minutes. This difference in duration could suggest that there are various types of procurement, with some being more complex to explain than others, depending on the hospital. Furthermore, the interviewee's purchasing

experience may also impact the duration of the interview, as they may have more aspects to cover. The interviewees' anonymity was guaranteed to be able to gain as deep insights and wide answers as possible. However, the type of the hospital was presented to distinguish the answers.

5.3 Reliability and validity

Reliability and validity can be described as factors that define the quality of a qualitative research. Reliable study is replicable and consistent. Research can be seen as reliable, when a researcher can replicate earlier studies and obtain the same research findings. According to Hirsjärvi & Hurme (2022), reliability refers to situations when the same person is interviewed twice, the same outcome comes as a result from both interviews. Another way to understand that research is reliable is when two assessors reach the same result. The third way to define reliability is when two parallel research methods reach the same result.

Another important factor to consider is validity. According to Saunders et al. (2016, 202), validity can be defined as how appropriate the used measures of the research are, how accurate is the analysis of results, and how generalized the research findings are. To make this research more reliable and to strengthen validity of it, the number of interviewed Dutch hospital organizations and interviewees representing them was extensive enough. Additionally, this study purposefully selected purchasing professionals in Dutch hospitals to take part in the interviews, since they were expected to know the hospitals' purchasing processes the best.

Hirsjärvi & Hurme (2022) suggest that the reliability of an interview can be compromised if the interviewee provides socially acceptable answers instead of their genuine opinions or insights. This could also be a potential issue in this study.

What can also apply to this research is that misunderstandings from either the questions or answers, as well as language barriers, can result in false information. Additionally, it is possible that during an interview, the interviewee may have unintentionally left out important information because the questions did not offer specific answer options.

Furthermore, the semi-structured nature of the interviews, with questions asked in varying orders, can also affect the answers given.

6 Research findings

In this chapter the empirical findings of the research are represented. The findings are categorized into sections to present them more clearly. The sections are based on the research sub-questions and different theme areas within the topic. First, the main similarities and differences in purchasing between academic and non-academic hospitals are examined. Secondly, the stages in the procurement process are explained. Thirdly, the buying behavior as well as the groups and individuals involved in the decision-making are explored. Finally, the purchasing process is concluded, and the Figure 3 is presented to visualize the process. To provide a deeper understanding of the responses, some of the key parts of the answers are represented direct citations.

6.1 Stages in purchasing processes in the interviewed Dutch hospitals

This chapter presents the research findings to answer the main research question *RQ1*: “*How do Dutch hospitals purchase high-tech medical devices?*”. The empirical findings are represented by first explaining the main characteristics and differences in purchasing processes between academic and non-academic hospitals. After that, the empirical findings of purchasing stages are represented by using four different purchasing stages: recognition of problem or need, information search, evaluation and negotiation, and purchasing and using.

6.1.1 Main similarities and differences in purchasing processes between Dutch academic and non-academic hospitals

Based on the findings of the empirical research, the procurement procedures followed by Dutch hospitals are largely similar, especially when it comes to acquiring low-cost medical devices. The observations made during this research indicate that purchasing departments often procure new medical devices to meet the needs and demands of clinicians, who are typically the end-users of the medical products. These end-users are usually doctors or nurses who work in the hospital.

The procurement process varies mostly between academic and non-academic hospitals, with particular differences arising in the case of high-cost purchases. In the case of academic hospitals, the European tender law mandates that any purchase contract exceeding €214,000 over a period of four years must adhere to a tendering process, whereby multiple suppliers can apply to be the selected supplier for the hospital. This ensures fair competition and transparency in the purchasing process. However, this study focuses specifically on low-cost purchases that fall below the threshold requiring adherence to the European tender law.

As per the insights shared by Purchaser 1C, the key distinction between the purchasing procedures of academic and non-academic hospitals lies in the fact that academic hospitals are required to abide by the European tender law when the expenses of their purchases go beyond a certain limit. On the other hand, non-academic hospitals can buy whatever they need and in whichever manner they want, since the tendering law is not applicable to them. Furthermore, Purchaser 1C clarified that the Dutch government funds academic hospitals, which is why they are obligated to follow the European tender law for high-cost purchases. On the other hand, non-academic hospitals can be seen operating as independent businesses that have the autonomy to make their own purchasing decisions. According to Purchaser 1C, the reason for this is that Dutch academic hospitals are government-funded, hence the need to comply with the European tender law for high-cost purchases. On the other hand, non-academic hospitals operate as independent businesses and have the autonomy to make their own purchasing decisions. Furthermore, Purchaser 1C also shared that working in an academic hospital may differ from working in a non-academic hospital due to the former's size and the number of individuals involved in the decision-making process. With multiple opinions and factors to consider, purchasing decisions in academic hospitals may take more time and be more complex.

6.1.2 Problem or need recognition

At each interviewed hospital, the consideration of purchasing a new medical device started with the recognition of the problem or need. The reasons to buy new medical items can arise from multiple sources. The detailed results are indicated on Table 2 below. Purchasing a new

medical product is always a well-considered decision. The needs to purchase a new medical product are divided into two categories, internal and external needs:

1. Internal need: Internal recognition of a problem or need

A clinician, who is a user of medical products and equipment, might encounter an internal problem or need. For instance, they might need assistance with a particular medical procedure, which prompts them to seek a solution. Such needs arise internally, without any external influence. In such cases, clinicians usually base their purchase request on their own emotions and needs when they face a problem during their medical procedures.

2. External need: External inspiration of a new medical product

In some situations, an external factor triggers a need for a purchase. This could happen when a clinician learns about a new and innovative medical product from a colleague or a company representative, or at an industry-related conference or event. A clinician could be inspired by a presentation of a new medical device by a Key Opinion Leader (KOL) and wishes to incorporate it into their hospital procedures as well. KOLs are respected experts in the medical technology field. Subsequently, clinicians approach the purchasing department with a request to procure the device, usually with a specific brand or supplier in mind. As the hospital aims to satisfy the needs of the end-users, it will consider the purchase. Clinicians are often aware of the innovations available in the market and have a clear idea of which product from which brand they want. All interviewees emphasized that the hospital's primary goal is to satisfy the end-user, making it highly likely that the product will be purchased.

“I make sure that the needs of the doctors get matched to the budget under the best conditions we can find in the external markets. So, it is constant weighing of quality, which is hard to measure in numbers, and price, which is important to the budget holder.” -PURCHASER 2B

In both, academic and non-academic hospitals, the need to purchase arises most of the times due to the demand of the end-user. Suppliers also tend to contact end-users or hospitals directly. As a result, salespeople from suppliers are often proactive in reaching out to hospitals to introduce their new medical products and technologies.

According to the responses gathered, an external trigger is the most common factor that leads to the need to buy something. Typically, clinicians, such as doctors, are the ones who initiate the need after discussing with a supplier representative or a colleague. Additionally, they may have come across a new medical product during a congress or event, which was introduced by a Key Opinion Leader (KOL). Therefore, they get inspired to integrate that innovative item into their clinical procedures. This research finding highlights the critical role that KOLs play in generating interest among clinicians for a specific device, leading them to request the purchasing department to acquire it.

When a clinician needs a specific medical product, they often ask the purchasing department to make the purchase. The clinician usually has a particular brand and product in mind. The purchasing department then considers and discusses the request. Some interviewees noted that it is evident when clinicians have attended industry events or congresses because they approach the purchasing department with a specific medical product and supplier in mind. This highlights the significance of industry-related events and meetings in generating a need for new innovations or solutions.

“Well, sometimes there's demand from the users, they can be the nurses or doctors or anybody else who is in the field of healthcare, and they have a wish for a special medical product. They give a notice to us that there is a need, and sometimes it is a quite specific (product).” -PURCHASER 2C

Table 2. Factors raising a need to purchase a new medical device

<i>Problem or need recognition</i>	<i>1A</i>	<i>1B</i>	<i>1C</i>	<i>1D</i>	<i>2A</i>	<i>2B</i>	<i>2C</i>	<i>3A</i>	<i>PropFreq</i>
Demand from end-user (internal or external trigger)	x	x	x	x	x	x	x	x	100%
Suppliers contact end-users	x		x				x		38%
Suppliers contact purchasers							x	x	25%
Purchasers visit suppliers						x			13%
Purchasers visit events								x	13%
Budget holder finds a new solution on the market						x			13%

Medical clinicians do not have the authority to make independent purchases of medical products for hospitals. The responsibility of managing all purchases lies solely with the hospital's purchasing department. As clarified by Purchaser 1B, if a hospital's end-user wishes to procure a new item that is not yet available on the purchasing system, they must request the purchasing department to make the purchase. It is not possible for clinicians to directly buy from a supplier, as all purchases must go through the purchasing department. This process ensures that all purchases adhere to the hospital's procurement policies and regulations, ultimately safeguarding the hospital's financial interests.

Another way how the need to purchase emerges is for instance that supplier companies' salespeople sometimes contact clinicians directly about their new medical products, telling them for instance that this new product might be interesting to your hospital as well. As a result, clinicians may want to start using the product and reach out to the purchasing department to request its purchase from the supplier. However, purchasers usually evaluate and discuss whether the purchase is necessary or just an impulse buy since the products are often relatively expensive. Purchaser 1C shared that these discussions and try-outs may influence clinicians' decisions to start using the product.

Clinicians may receive direct contact from supplier companies' salespeople regarding new medical products. The salespeople may suggest that the new product would be beneficial for the hospital. Consequently, the clinicians may request the purchasing department to acquire the product. However, the purchasing team will evaluate and discuss whether the purchase is necessary or not, as the products are usually expensive. Purchaser 1C revealed that such discussions and showcases may increase the clinicians' interests towards the product.

The process of purchasing medical products has become more complex for hospitals due to the guidelines they must follow. Purchaser 3A noted that 10-15 years ago, the approach was different as purchasers would simply buy a medical product that a clinician requested. However, regulations and guidelines have since been introduced, making it necessary to follow certain criteria before purchasing new items.

“Many things have changed. We have regulations now. Products need to be certified for certain usage forms. So, doctor can still come to the purchasing department and say, ‘I want to have this’, but the first question is mostly ‘What is it going to replace?’ So, the purchasing department needs to know if it’s a new product or is it something that replaces some old product.” -PURCHASER 3A

During the interview, the Purchaser 2B shared that purchasers visit suppliers not only to fulfill procurement needs but also to discover new products and innovations in the market. This proactive approach is taken to find possible new innovations and technologies for the end-users to use in their clinical procedures. Product experts from suppliers often inform purchasers about upcoming products, which motivates them to introduce these new innovations as soon as possible in their hospitals. The interviewee revealed that many doctors in Europe and the Netherlands aspire to be the first ones to use new technologies as it is highly valued in the medical industry and adds value to their resumes and portfolios. Therefore, purchasers visit suppliers to gather information on new technologies and fulfil the clinicians' desire to be one of the first to use them.

According to Purchaser 3A, hospital purchasers are occupied with their regular tasks and do not actively seek out new products. However, sales representatives from suppliers often reach out to purchasers to request a discussion or inquire about showcasing their latest products at the hospital. Furthermore, at Purchaser 2C's hospital, suppliers occasionally visit to present their clinical products, which may pique the purchasers' interest and lead to further discussions. Purchaser 3A denoted that sometimes purchasers attend field-related congresses and other events to discover new market trends. They engage with fellow purchasers to exchange experiences and opinions on medical products that catch their interest. These discussions may extend to consulting doctors for their insights on a particular product. It is worth noting that a new product may be rejected if it fails to spark interest or if it uses complex technology that clinicians at the hospital are not equipped to handle.

6.1.3 Information search

When a hospital requires a new purchase, the purchasing department takes on the responsibility of scouring the market for available solutions that effectively address the problem or need at hand. This involves delving into alternative suppliers and solutions, even if a clinician has recommended a particular brand. In both academic and non-academic hospitals, the search for product and supplier information is largely conducted online, with the primary goal of comparing similar products from different suppliers and assessing differences in price and features. While most purchasers are tasked with finding information on new products and suppliers, it is noteworthy that Purchaser 1B's hospital has designated specialized personnel for this task. Nevertheless, the entire department is still held accountable for the information search.

During the interview process, potential buyers place great importance on several key factors when seeking information about potential solutions. The first and foremost of these is the price of the product being offered. Buyers want to ensure that they are getting the best value for their money, and are often willing to look around and compare prices before making a final decision. Another crucial factor for buyers is the quality of the product being offered. Buyers want to know that the solution they are considering is reliable, effective, and meets their specific needs. They may ask for product specifications, testimonials from other hospitals, or other types of evidence to help them make an informed decision. In addition to price and quality, buyers are also interested in the availability of alternative solutions in the market. They want to know what other options are available to them, and how those options compare in terms of price, quality, and other important factors.

Purchaser 1C explained that during the procurement process, the hospital prefers to stick with their current suppliers rather than seeking out new ones. The interviewee explained that they would first check if their existing suppliers offer the required products before considering new partnerships. This helps to avoid the need for adding new suppliers to their purchasing system. This way the hospitals can minimize the risks of approving a new supplier into their purchasing systems.

Based on the interviews, for some interviewees, particularly those in non-academic hospitals or from the group purchasing organization, sustainability and domesticity are also important considerations. These buyers are concerned with the environmental impact of product delivery and want to know where products are manufactured and delivered from. They may ask for information about the supplier's supply chain, including the location of their warehouses and distribution centers.

Transparency is an essential factor for buyers, particularly when it comes to the supplier's supply chain. They want to know that the supplier is trustworthy and reliable, and that they have a clear understanding of how the product or service they are considering is produced and delivered. A transparent supply chain within the supplier company can help buyers feel more confident in their decision-making process and ensure that they are making a responsible choice for their business or organization. Additionally, three out of the eight interviewees from academic and non-academic hospitals emphasized the importance of product suitability information. This pertains to whether the product's intended use aligns with the hospital's needs and intended use. The detailed results are presented on Table 3 below.

Table 3. Factors considered when searching for information of new suppliers or medical products

<i>Information search</i>	<i>1A</i>	<i>1B</i>	<i>1C</i>	<i>1D</i>	<i>2A</i>	<i>2B</i>	<i>2C</i>	<i>3A</i>	<i>PropFreq</i>
Price	x	x	x	x	x	x	x	x	100%
Quality	x	x	x	x	x	x	x	x	100%
Alternative solutions on the market	x				x		x	x	50%
Product suitability for hospital's needs		x				x		x	38%
Sustainability					x		x	x	38%
Financial situation of the supplier		x				x			25%
Adherence to regulations (suitable for clinical use, CE marked, MDR regulations)								x	13%
Safety of the device								x	13%
Ease of use						x			13%

As noted by Purchaser 1A, there are alternative methods to obtain information about medical products beyond conducting online searches. One such approach is to consult with clinicians, who are the end-users of these products. Purchasers can inquire with clinicians regarding their recommended suppliers for specific medical products that the purchasing department is considering. Due to their extensive experience with the products, clinicians are often able to provide valuable insights and recommendations to purchasers.

Another way to gather product information is to reach out directly to suppliers. This can be done by either calling the supplier (Purchaser 2B) or inviting them to the hospital to provide more details about their products (Purchaser 2C). By engaging with suppliers directly, purchasers can gain a deeper understanding of the products and services they offer. In addition, suppliers may be able to provide insights into trends in the industry, best practices, and other helpful information that can assist purchasers in making informed decisions. Finally, purchasers and clinicians can also gain knowledge about products and suppliers by attending field-related conferences or other events. These events provide an opportunity to learn about the latest developments and innovations in the field, as well as network with other professionals and industry experts. By taking advantage of these various resources, purchasers and clinicians can stay informed about the latest products and suppliers and make informed decisions that best meet their needs.

Purchasers also often reach out to other hospitals in the Netherlands to gather information. During the purchasing process, all the interviewees indicated they sometimes collaborate with other Dutch hospitals to obtain information or ask for their views when considering the procurement of new medical products. They may inquire about whether other hospitals are using products from a particular supplier and how their experience has been. Purchaser 2B mentioned that there is a group of business units in the Netherlands with whom they exchange information. This allows hospital organizations to gain a better understanding of the product and its intended use. Additionally, hospitals that cooperate share knowledge about new products and their functionality, which has a significant impact on the decision-making process when it comes to procurement.

An important factor of information gathering that came up from the Purchaser 3A. The interviewee indicated that one of the questions purchasing people ask the clinician who wants to acquire a new medical device is that are the other clinicians in the hospital informed about the fact that this one clinician wants to start using this new product. Have they discussed with other clinicians about starting to use the new device? Because if only one clinician starts using a new device or technology, other clinicians continue using the old methods. The hospital must decide whether to have two different methods or medical devices used in the same clinical procedure or only one. Purchasers also ask questions such as how many old products are still in stock that need to be used before implementing the new product, and how long would it take for everyone to be trained in using the new product and technology in clinical procedures. Academic hospitals must also evaluate whether a new purchase exceeds a contract value of over €214,000 in four years. In that case, the purchase must be tendered. Only after these questions have been resolved can the hospital purchase the product.

6.1.4 Evaluation and negotiation

Once the information search phase is completed, the purchasing department moves on to the evaluation and negotiation stage of potential purchase contracts. This stage is especially crucial in the decision-making process, as multiple factors come into play that must be carefully weighed and considered. According to all interviewees, among the most important factors to affect the decision-making are price, quality, and the necessity of the product. In fact, both academic and non-academic hospital interviewees highlighted the significance of product necessity in the purchasing decision. If a clinician requests a new or unusual medical product, purchasers will evaluate its necessity before making a decision to purchase. To ensure a comprehensive understanding of potential solutions, purchasers will also conduct research on alternative options. By taking all these factors into account, the purchasing department can make informed decisions that will ultimately benefit the organization as a whole.

When it comes to making low-cost purchases, purchasing departments usually gather information and ask for quotes from different suppliers regarding the products that users

might need. The main objective of purchasers is to obtain the best possible contracts for purchasing superior-quality products at the most reasonable prices.

“The competition between the suppliers will make sure that the price probably drops and the quality increases. Therefore, we think it is valuable to do something like a light European tender and ask several suppliers (for quotations) because we want to spend our money as good as possible.” -PURCHASER 1D

As per the statement of interviewee 1B, in the negotiation phase of the purchase, purchasers typically ask for comprehensive information about the supplier's products. This involves specific details regarding the product's adherence to regulations, such as the presence of a CE mark, and confirmation that the supplier accepts the hospital's purchasing terms and conditions. Once the information is provided and validated, the supplier can be added to the hospital's purchasing system, and orders can be placed through it.

According to the conducted interviews, both academic and non-academic hospitals in the Netherlands collaborate with each other while considering purchasing new medical devices, as indicated on Table 4 below. The professionals responsible for purchasing sometimes reach out to other hospitals for discussions on specific products or purchases. Their main aim is to find out if other hospitals are considering buying a particular medical device, and if they have already purchased it, how is their experience with the product. They also exchange views on whether the product is worth buying and if the other hospital recommends its use. As a result, the opinions and experiences of other industry players hold significant importance in the decision-making process, making word-of-mouth (WoM) crucial for hospitals.

Table 4. Do you discuss with other hospitals when considering purchasing a new medical device?

<i>Cooperation with other hospitals</i>	<i>1A</i>	<i>1B</i>	<i>1C</i>	<i>1D</i>	<i>2A</i>	<i>2B</i>	<i>2C</i>	<i>3A</i>	<i>PropFreq</i>
Yes	x	x	x	x	x	x	x	x	100%
No									0%

Hospitals typically communicate with each other before making purchasing decisions, as reported by Purchaser 1D on the direct quote below. Clinicians often exchange their experiences regarding specific medical devices. Meanwhile, purchasers connect with other purchasers to discuss their experiences with various suppliers and organizations.

“They (clinicians) ask their colleagues from other hospitals like, ‘Hey, I have a problem with treating patients this way. Do you have solutions in the form of device, or maybe just some tricks that I can do?’ So, mostly they share their experiences with each other.” -PURCHASER 1D

As a part of the product evaluation and negotiation process, hospitals request trial periods about the products they are planning to purchase. This helps them evaluate its performance in a clinical setting. Based on the interviews, all interviewees request a trial of a new medical device before making the final purchase, as represented on Table 5 below. The trial period usually lasts a couple of months, during which clinicians have the opportunity to try out the product and determine if it meets their needs and the needs of the hospital. This approach

allows hospitals to test a product before committing to a purchase, which helps them avoid the risk of investing in a product that may not be suitable for their needs. If the trial period is successful, the purchase can be approved. It is standard practice for hospitals to test medical devices before entering into a purchasing contract.

Purchaser 3A noted that during the testing period, the hospital may reach out to other hospitals to inquire about their experience with the product. If the other hospital has encountered any issues, they may share this information which could potentially disrupt the testing period of the first hospital. This could cause the first hospital to view the product differently, as their perception of the product may no longer be unbiased. This again confirms that the word-of-mouth (WoM) is highly important in the purchasing decision-making.

Table 5. Do you request a trial period of a new medical device before making the final purchase?

<i>Request for a trial period</i>	<i>1A</i>	<i>1B</i>	<i>1C</i>	<i>1D</i>	<i>2A</i>	<i>2B</i>	<i>2C</i>	<i>3A</i>	<i>PropFreq</i>
Yes	x	x	x	x	x	x	x	x	100%
No									0%

Concerns about sustainability and environmentally friendly practices have become increasingly important in hospital procurement, according to Purchaser 3A. To support Dutch hospitals in this regard, a specialized team within the hospital group purchasing organization offers guidance on various aspects of waste disposal. The organization serves multiple functions for hospitals, providing not only purchasing services but also information and advice.

Interviews with hospital representatives revealed that non-academic hospitals in particular place great importance on sustainability when making purchases and evaluating suppliers and their products. As organizations become increasingly responsible, sustainability has become a significant factor in decision-making. The proximity of the supplier is also a crucial consideration for the hospitals we interviewed. If the supplier is located nearby, such as in the Netherlands, the hospitals are more likely to select them due to the environmental impact of sourcing products from far away and the potential for longer delivery times. Domestic suppliers are therefore preferred. However, even if a medical product arrives from the Netherlands, it may be difficult to evaluate its sustainability if the parts needed to manufacture the product are delivered from somewhere else. In such cases, the hospitals are unable to judge how sustainable the product is in the end. Purchaser 2C revealed during the interviews that the hospital places a high value on sustainability by ensuring that waste is disposed of in an environmentally friendly manner. Before purchasing any product, the hospital carefully evaluates its recyclability and creates a disposal plan for it after use. One factor that the hospital takes into consideration when purchasing new items is whether they are disposable or reusable. Additionally, the hospital strives to minimize waste production and takes this into account when making procurement decisions. A summary of the various factors that influence decision-making are presented on Table 6 below.

Table 6. Factors influencing decision-making

<i>Factors influencing decision-making</i>	<i>1A</i>	<i>1B</i>	<i>1C</i>	<i>1D</i>	<i>2A</i>	<i>2B</i>	<i>2C</i>	<i>3A</i>	<i>PropFreq</i>
Price	x	x	x	x	x	x	x	x	100%
Quality	x	x	x	x	x	x	x	x	100%
Necessity of the product	x	x	x	x	x	x	x	x	100%
Adherence to regulations (suitable for clinical use, CE marked, MDR regulations)	x	x			x			x	50%
Product suitability for hospital's needs		x				x		x	38%
Sustainability					x		x	x	38%
Domesticity	x				x		x		38%
Safety of the device					x			x	25%
Financial situation of the supplier						x			13%
Availability					x				13%
Continuity					x				13%

It is worth noting that while the price of a product plays a crucial role in purchasing decisions, it was not the top consideration mentioned by interviewees when choosing a supplier and product. Instead, their emphasis was on important factors such as quality and adherence to regulations. The interviewee 1A stated that they carefully evaluate the product and purchasing contract based on regulations. Depending on the product, there are specific regulations that must be met. For example, the product must be suitable for clinical use. This implies that the product must be fitting for its intended purpose or usage. According to Altayyar (2020), this means that it should be crafted, packaged, and manufactured in a way that ensures it is suitable for one or more of the objectives outlined in the definition of a medical device. During the interview, interviewee 1A emphasized the importance of having the appropriate markings on the product, such as the CE mark, and compliance with the MDR regulations.

Additionally, all the interviewed purchasers take into account whether a product is truly necessary for the hospital or if it is just a passing impulse from a clinician who recently encountered it for instance at a congress. When it comes to deciding which factor carries more weight in a new purchase, whether it is the clinical benefit or the price, Purchaser 1B stated that it varies depending on the product. Factors such as the remaining budget, expert advice, and availability of alternative options come into play. The interviewee also emphasized that generally, quality is prioritized over price. Meanwhile, Purchasers 1D and 2A emphasized the importance of finding a balance between the price and quality of a product. While the clinical benefit of a product is crucial, the price is also carefully considered.

6.1.5 Purchasing and using

The stage of purchasing high-tech medical equipment focusing on low-cost purchases was relatively similar in the interviewed hospitals. Usually, purchasers request quotations from possible suppliers, and select the supplier based on them. Purchasers 1D and 2B highlighted that their hospital's purchasing department usually requests quotes from several suppliers when looking to buy a new medical device. These quotes should detail the product's intended use, specifications, and requirements. The department then evaluates the quotes based on

their fit with the hospital's needs and requirements before selecting a supplier and approving a purchase contract. Contracts may be for one-time delivery or multiple orders. This hospital's internal selection process for purchasing is similar to the European tender law, since hospitals receive quotations from possible suppliers. However, since the cost of the purchase that goes only through an internal purchasing process is relatively small, academic hospitals do not need to follow the European tender law. This makes the internal purchasing process easier as there are fewer terms to follow.

According to Purchaser 1D, if the hospital must follow the European tender law, they must wait several weeks to receive offers from suppliers. This is because suppliers need time to make an offer that meets the hospital's needs. However, this process is slower compared to purchasing only through the hospital's purchasing department. Two purchasers, 1C and 1D, mentioned that they prefer to buy products internally instead of through the European tender law because the tendering process is more complicated and time-consuming. They find it simpler to choose suppliers on their own and avoid the complex selection process.

During the discussion, various reasons were given as to why the hospital would not consider purchasing the new medical device. Table 7 below outlines the reasons why hospitals may be hesitant to purchase a new product. One reason that was mentioned by all interviewees was too high costs of the purchase. The purchasing departments must carefully manage their budgets, which makes the cost of items a crucial factor in their decision-making process.

“We compare the price (of the purchase) with the prices of the products they are using now, and if the price is way higher than with the current products, we decide that we are not going to buy the product.” -PURCHASER 1A

All interviewees noted that another reason to not to purchase a new product might be that medical device is not necessary or needed. Sometimes, a medical professional may attend

As mentioned before, all the interviewees consider if the purchase is necessary. If the product seems unnecessary, that can be a reason for all the interviewees to not proceed with the purchase. According to Purchaser 1A, a possible reason for not buying a product or entering into an agreement with a new supplier could be that the hospital already has an existing fixed-term contract, leaving no room for another contract with a different supplier. In such situations, the hospital is bound by the current contract, even if they wish to engage with another supplier. They can only consider a new contract once the fixed-term period has expired. Purchaser 1C explained that the hospital prefers purchasing products from suppliers they already have contracts with. This is because the hospital is familiar with these suppliers and knows what to expect from them.

Purchasers 2A and 3A shared that hospitals may hesitate to purchase a new product if it is too advanced and uses high technology. According to 2A, hospitals want to be innovative while avoiding risks associated with uncertainties. Sometimes, hospitals prefer to wait for other hospitals to try out new technology rather than being the first to adopt it. This is because the clinical benefits of a new product may only be evident after some time has passed. Therefore, hospitals may not always want to be early adopters of innovations. However, Purchaser 3A mentioned that academic hospitals are often more eager to be the first to adopt new technologies, while non-academic hospitals may adopt them later.

6.2 Purchasing behavior and decision-making

This chapter presents the research findings to answer the sub-questions *RQ2: "How does their decision-making process work?"* and *RQ3: "Who are the groups and individuals taking part in the decision-making processes?"*. In this sub-chapter, the empirical findings are represented by first exploring the characteristics of decision-making process and purchasing behavior. After that, the key factors influencing decision-making are examined, as well as the groups and individuals involved in the decision-making process.

When making purchasing decisions, it is important for buyers to prioritize meeting the needs of end-users. To accomplish this, they listen to end-users, clinicians', feedback, and purchase accordingly. However, there may be instances where it is unclear whether a purchase is truly

necessary. In these situations, buyers must consider what is best for the hospital as a whole. This can be challenging, as individuals within the hospital may have different priorities and may not consider the bigger picture.

“The big thought should be what is the best for this hospital, not what is best for me.”
– PURCHASER 1C

When it comes to making new purchases, there are several factors that influence the decision-making process. Typically, clinicians will ask their purchasing department to buy a specific product. As mentioned earlier, in many cases, clinicians attend events, seminars, or conferences, or they consult with colleagues or industry experts, such as Key Opinion Leaders (KOLs). These external influences often drive the desire to purchase innovative new products. On the other hand, if a clinician has a problem or need in their clinical procedure and seeks out a solution, this can be considered an internal need to purchase. These types of purchases are driven by the individual's own thoughts and feelings.

“Sometimes they (doctors) have congress meetings and then then the doctors come to me, and they say ‘We saw this firm talking about the new medical device. We would like to try that. How can we start it up?’” -PURCHASER 2B

Based on the interviews conducted, it was discovered that the groups or individuals involved in the purchasing decision-making process vary within each purchase. In each interviewed hospital, a multidisciplinary team usually participates in the decision-making process. This team typically includes both purchasers and end-users of the product. The level of

involvement depends on factors such as the department for which the purchase is intended to and who the end-user of the product will be. Purchasers 1A, 1B, and 1C in academic hospitals stated that the department manager and purchasers are typically involved, with a multidisciplinary team also playing a role. In some cases, representatives from the other departments may also participate if the product is intended for that department. In non-academic hospitals, both purchasers and end-users are typically involved in the decision-making process. The decision-making process seems to be similar between academic and non-academic hospitals, as both require the participation of purchasers and end-users. Table 8 below outlines the groups and individuals typically involved in the decision-making process.

Table 8. Who are the groups or individuals usually involved in the decision-making process?

<i>Purchasing decision-making</i>	<i>1A</i>	<i>1B</i>	<i>1C</i>	<i>1D</i>	<i>2A</i>	<i>2B</i>	<i>2C</i>	<i>3A</i>	<i>PropFreq</i>
Purchasers	x	x	x	x	x	x	x	x	100%
The end-user of the product				x	x	x	x	x	63%
Multidisciplinary purchasing team		x	x	x	x		x		63%
Manager of the business unit or department	x	x	x		x				50%
Someone from the certain business unit or department	x							x	25%
Project group	x								13%
Budget holder						x			13%

When it comes to who has the final say on a purchase, the interviewees explained that there is no single answer. It depends on who is involved in the decision-making process and it varies for each purchase. Typically, buying groups are made up of multiple individuals and purchasing teams are multidisciplinary. The final decision-maker could be the manager of the business unit or the end-user, and sometimes the decision is made collectively by the purchasing group. Ultimately, who has the final say, depends on the specific purchase and the individuals involved in the decision-making process.

6.3 Purchasing process

After conducting the interviews, it was found that the procurement process generally follows a similar procedure within the interviewed Dutch hospitals. However, the most significant differences are between academic and non-academic hospitals, particularly when it comes to purchases that exceed the limit where academic hospitals must adhere to the European tender law. While the procurement process itself tends to be similar across all hospitals, some variations can be observed in factors such as supplier selection and decision-making criteria. For a more visual representation, the main steps in purchasing high-tech medical devices in the interviewed Dutch hospitals are displayed in Figure 3 below.

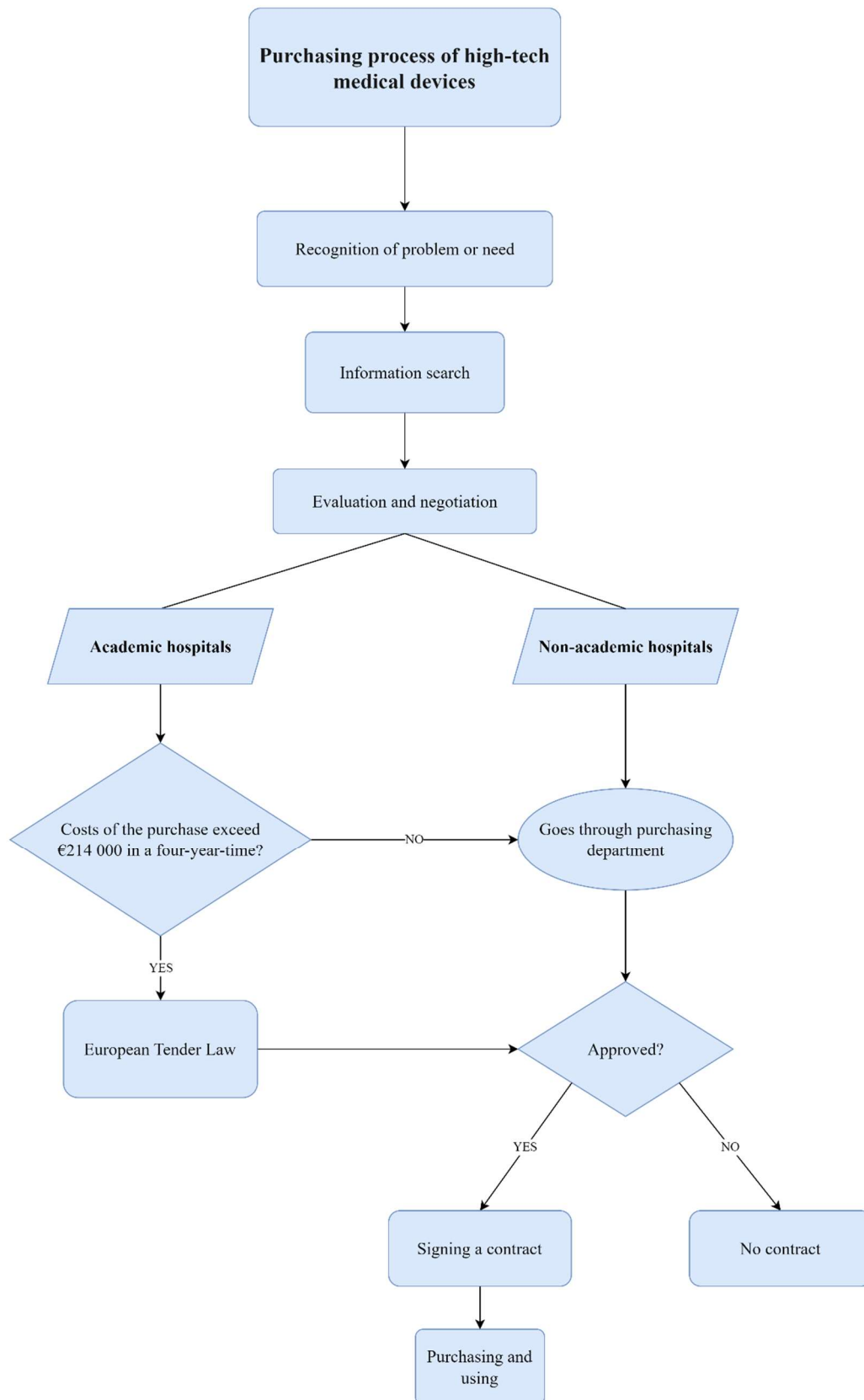


Figure 3. Purchasing process

The procurement process is a crucial step in the interviewed hospitals, and it typically begins with the recognition of a problem or need. The need to purchase is typically initiated by a clinician, such as a doctor. Once the need has been established, the information search phase begins. During this phase, hospital purchasers scour the internet and consult with other clinicians, suppliers, or hospitals to gather information about the device in question.

When evaluating potential devices, the purchasers usually consider two critical factors: price and quality. These two aspects are closely scrutinized as they directly impact the hospital's budget and the quality of care provided to patients. Once the information gathering phase is complete, the purchasing department moves on to the evaluation and negotiation phase. However, in this phase, the purchasing process sees a significant change between academic and non-academic hospitals. As mentioned earlier, if the estimated costs of the purchase are over €214,000 within a four-year period, academic hospitals must comply with the European tender law while making the purchase. In cases where the costs are lower, the purchase will only go through the purchasing department. Purchases in non-academic hospitals always go through only the purchasing department. During the evaluation and negotiation phase, the purchasers assess and negotiate the potential purchasing contracts and discuss the products and suppliers with other hospitals. They also request quotes from potential suppliers and may request trial periods to test the device in their clinical environment. After the approval of the purchase, the hospital can move forward with signing a purchasing contract, and ultimately acquiring and using the product.

Overall, the procurement process is a complex and detailed process that requires careful consideration and evaluation of numerous factors. By following the right steps and taking the time to make the right decisions, hospitals can ensure that they purchase the best possible devices to provide top-quality care to their patients.

7 Discussion

The aim of this research was to gain a better understanding of how Dutch hospitals purchase high-tech medical devices focusing on low-cost purchases. Additionally, the aim was to find out how does the decision-making process work and who are the groups or individuals involved in the decision-making process. The findings of this study can provide valuable insights for B2B marketers to tailor their sales and marketing approaches, helping supplier organizations establish their presence in the marketplace. This research is relevant as the healthcare sector is continuously evolving, and companies are striving to introduce new products into the medical technology market.

This chapter presents the significant outcomes obtained from the interviews conducted with four academic and three non-academic hospitals in the Netherlands, along with one interviewee from a group purchasing organization. Furthermore, the theoretical contributions, limitations, managerial implications, and potential areas for future research based on the findings are represented.

According to the research, both academic and non-academic hospitals have similar purchasing processes for high-tech medical devices. They follow similar procedures and consider similar factors when selecting new suppliers and products for purchase. Although there are minor differences, their processes are mostly alike. However, if the cost of a purchase exceeds a certain limit, academic hospitals must follow the European tender law, whereas non-academic hospitals are not required to do so.

As mentioned in the research findings, hospitals share information with each other about products and suppliers. All the individuals interviewed revealed that purchasers work closely with various stakeholders throughout the procurement process. These stakeholders include product users, suppliers and their sales representatives, as well as purchasers from other hospitals in the Netherlands. Such cooperation greatly affects purchasing decision-making. Therefore, it was discovered that word-of-mouth (WoM) is crucial and has a significant impact on purchasing decisions. Hospitals rely on and trust the feedback of other hospitals

and industry players, and they willingly share information about products and suppliers with each other. Hence, it is crucial for suppliers to maintain a good reputation in the market.

The process of purchasing medical devices in Dutch hospitals typically begins with a clinician requesting a specific product from the purchasing department. As experts in their field, clinicians possess invaluable knowledge of how medical devices function and can provide critical input into the purchasing decision-making process. In both academic and non-academic hospitals, a request from an end-user is the primary factor that triggers the need for purchasing a new medical device. In the medical industry, it is common for clinicians to be inspired to purchase new products after attending events where for instance Key Opinion Leaders (KOLs) have presented them. These respected experts often endorse certain devices, which can influence clinicians' decisions and lead them to choose the same products. Therefore, the findings show that KOLs play a crucial role in the level of interest that clinicians exhibit towards a particular medical device. KOLs might influence clinicians to the extent that they may request the purchasing department to acquire the device. This highlights how important it is for medical device companies to identify and work with KOLs in their respective fields.

It is worth noting that supplier companies may also directly contact purchasers or end-users, which can raise the need for a purchase. During interviews with purchasing departments, it was evident that meeting the needs of clinicians is a top priority, as their opinions are highly valued. These professionals are the ones who will be using the equipment and their feedback is crucial in ensuring that the hospital has the necessary tools to provide the best possible care to patients. However, not all requests are fulfilled. Each purchase is carefully evaluated for its necessity and cost-effectiveness. Purchasing departments are tasked with ensuring that hospital budgets are allocated appropriately and that every purchase provides value for money. As such, while the opinions of clinicians are highly valued, each request must undergo a rigorous evaluation process to determine whether it is truly necessary and will provide benefits to patients and the hospital as a whole.

When searching for new suppliers and products, purchasers in both academic and non-academic hospitals prioritize price and quality. Other important factors include the

availability of alternative solutions in the market, product suitability, and the sustainability of the purchase. It is worth noting that sustainability has become an increasingly important consideration in the healthcare and medical technology industry and is therefore a hot topic among purchasers and hospitals. When it comes to purchasing new products, many Dutch hospitals often prioritize quality over price. Of course, budget is also a consideration to ensure the purchase is financially feasible for the hospital. According to all the interviewees, the decision-making process was influenced by three key factors: price, quality, and necessity of the purchase. In addition to these, adhering to regulations, domesticity, and sustainability were also important considerations. During the interviews, it was discovered that hospitals had various reasons for not purchasing new medical devices. The most common reasons mentioned were the high cost and the lack of necessity for the device. Interestingly, it was also found that some hospitals considered certain devices too advanced for their needs and therefore chose not to invest in them.

From the interviews conducted, it was discovered that the individuals and groups involved in the decision-making process vary based on several factors. The decision-making team varies depending on the product, end-user, and departments. Nevertheless, it is typical for both academic and non-academic hospitals to have at least purchasers and often end-users involved in the decision-making team.

Overall, the process of buying high-tech medical devices in academic and non-academic hospitals seems to be quite similar, following similar procedures. However, a significant difference arises in high-cost purchases, where academic hospitals must procure them through the European tender law. One interviewee mentioned that non-academic hospitals can be viewed as individual businesses that can make their own purchasing decisions, while academic hospitals must comply with the European tender law.

The commissioning company was looking for ways to introduce a new high-tech medical device into the market. Research indicated that other suppliers often directly contact hospital purchasers and clinicians to showcase their innovations. Therefore, it may be beneficial for the commissioning company to reach out to hospital purchasers in a similar way. Additionally, other suppliers participate in industry-related events and conferences to

showcase their medical devices and engage in discussions with clinicians and purchasers, which can be an effective marketing strategy for the commissioner as well. The company could also identify and work with KOLs to enhance its marketing strategies. Additionally, the commissioner company holds a strategic advantage by operating in the Netherlands. During interviews, some buyers mentioned that they prioritize domestically-made products when considering new purchases. Thus, it is important for purchasers that suppliers manufacture and supply their products within the Netherlands.

One interesting observation was that the hospital purchasers and clinicians establish strong relationships with suppliers and their sales representatives. The suppliers visit hospitals, and purchasers visit suppliers. Moreover, many purchasers prefer to purchase from suppliers they have previously worked with. Therefore, building connections and maintaining close contacts is crucial in the sales and purchasing of medical technology. The study also revealed that some hospitals are hesitant to be the first to try out new products, indicating a desire to minimize risks. Consequently, it is crucial for purchasers to know the suppliers and their salespeople well to establish trust and increase the likelihood of cooperation between the hospital and the supplier.

A suggestion for the commissioning company to enter the MedTech market could be to target non-academic hospitals as the initial market entry strategy. This approach would bypass the need to comply with the European tender law, as purchasing decisions in non-academic hospitals are made by their respective purchasing departments, which was found to be not as complicated as the European tender law, based on the interviews. However, if the company intends to sell the device to academic hospitals, it could be beneficial to initially sell only small patches of the device so the purchase would not have to be taken through the tendering process. Also, selling small patches of the device initially to non-academic hospitals might also boost the likelihood of success as it could ultimately lead to larger patches being purchased by these hospitals in the future. Some of the interviewed Dutch hospitals prefer to purchase products from a supplier which is already in a partnership with the hospital. They are also more likely to purchase from suppliers they already know and that are already in their purchasing system. The interviews with purchasing professionals highlighted the importance of having a local supplier, located preferably within the

Netherlands, where the commissioning company is based. This could be an advantageous aspect for the commissioner when selling medical devices to Dutch hospitals. Another possible strategy for selling the medical device is to target kit manufacturers, who can bundle the device with other items used for specific procedures and then sell it to hospitals. This approach could potentially increase the chances of successful sales.

An interesting finding observed from the interviews was that some clinicians are more open to adopting new technologies and innovations. These forward-thinking doctors are keen on incorporating cutting-edge technology into their practices as soon as possible, as it can significantly enhance their professional reputation. This trend suggests that they may be the ideal early adopters of the unique technology offered by the commissioner company. To capitalize on this opportunity, the company could strategically highlight the novelty and advanced nature of their product in their marketing efforts. By emphasizing that their product is new to the market and utilizes the latest technology, they may generate more interest from hospitals that are keen on experimenting with and potentially acquiring the product. Nevertheless, it is important to note that some hospitals are more cautious and would prefer not to be the first to adopt new technologies. Such hospitals may prefer to wait for other healthcare providers to test it out first and determine its effectiveness in a clinical setting before considering its purchase.

7.1 Theoretical contributions

This research adds significant value to the existing literature on organizational decision-making and buying. Its findings support the theories of Lilien and Wong (1984), Johnston & Lewin (1996), and Bunn (1993), which suggest that multiple individuals are typically involved in the decision-making process in organizations. The research also confirms that conflicting priorities and interests can arise within a single process when multiple individuals are involved, as proposed by Johnston & Lewin (1996) and Bunn (1993). Additionally, the study highlights the complexity of the organizational buying process, which requires various activities to be performed by different members of the purchasing organization, such as gathering relevant information, developing selection criteria, and making final decisions among different options.

The study aligns with Lilien's (2016) theory that B2B purchasing typically involves organizations and several individuals with diverse backgrounds and motivations for purchases. It emphasizes the importance of understanding how organizations purchase products or services, not only for successful marketing but also for effective communication with other organizations.

This research builds upon the six buying decision approaches outlined by Bunn in 1993. Specifically, it focuses on the buying process for high-tech medical devices in Dutch hospitals, which primarily falls into three distinct categories: 4 – Judgmental New Task, 5 – Complex Modified Rebuy, and 6 – Strategic New Task. It is crucial for organizations to understand these categories to be able to make informed decisions related to organizational decision-making and purchasing. Additionally, this study confirms that healthcare organizations must follow certain regulations, such as the MDR regulation, when purchasing medical devices. (The European Parliament & The Council of the European Union, 2017).

The findings of this study mainly coincide with the previous research. This study confirms that the organizational purchasing process is a complex and multidimensional process involving multiple people in the decision-making process. Overall, this study provides a comprehensive and informative analysis of the various factors that come into play when making purchasing decisions. As such, it is of significant value to organizations looking to enhance their marketing and communication strategies and make more strategic decisions.

7.2 Limitations and managerial implications

This study had several limitations that must be taken into consideration. Firstly, the use of online video calls for interviews required more preparation and time, resulting in a lower number of interviews compared to those conducted through online survey interviews. As a result, the number of interviewees was relatively small, leading to a limited sample size. Secondly, the answers obtained from the respondents were specific to their respective organizations. With a larger number of respondents, the responses could have been more generalized to cover a wider range of Dutch hospital organizations. Thirdly, it should be noted that some respondents may not have provided all possible answers, as the interview

questions did not offer predefined response options. However, the interviewees expressed the most important and significant factors that they deal with in their work. Lastly, it is worth noting that the interviews were conducted in a foreign language online, which may have led to misunderstandings on both sides. These limitations must be taken into consideration when interpreting the results of this study.

This study offers valuable insights for managers in the medical technology sector. It sheds light on how Dutch hospitals purchase medical devices and the decision-making processes involved. This information is particularly useful for MedTech suppliers looking to sell their products to these healthcare organizations. The findings can help vendors develop effective sales and marketing strategies. Additionally, the research can be utilized in sales training for salespeople, as it provides insights on how other suppliers and salespeople approach Dutch hospitals' purchasing personnel and clinicians.

Additionally, suppliers need to provide interesting products that fit to the requirements of the hospitals and purchasers. Through this study, managers can gain valuable insights into the priorities of Dutch hospitals' purchasing departments when it comes to selecting new suppliers and purchasing products. This information can then be used by suppliers to tailor their products and develop effective marketing and sales strategies. Armed with this information, suppliers can create products that cater to these specific needs and develop marketing and sales strategies that align with hospital requirements. This is a crucial step in establishing long-term partnerships and ensuring successful product adoption in the healthcare industry. Overall, the study provides valuable insights into the inner workings of hospital procurement processes and offers guidance for suppliers looking to enter and succeed in this competitive market.

7.3 Suggestions for future research

As sustainability becomes increasingly important in the healthcare industry, it would be beneficial to delve deeper into the impact of sustainability on decision-making and how hospitals integrate sustainability principles into their operations. This could prove to be a

fascinating topic for future research and could provide valuable insight into the ways in which healthcare professionals make decisions and prioritize environmental concerns.

Another intriguing area for exploration could be the influence that patients have on the medical devices and products used in their procedures. Specifically, researching how much impact a patient's request to use a new product could have on the clinician and the hospital's purchasing decisions would be insightful. Patients could be seen as customers who seek to improve the quality of their care by requesting the use of a more advanced or innovative medical device. The potential impact of these requests on the hospital's purchasing decisions could be significant.

Furthermore, an interesting avenue for future research could be the perspective of supplier organizations on the selling process when targeting Dutch hospital organizations. This research could provide a more comprehensive understanding of the selling and purchasing processes involved in medical device procurement. By including the supplier's perspective, this research could offer valuable insights into the factors that influence purchasing decisions and the ways in which suppliers can effectively market their products to hospitals.

8 Conclusions

This research focused on B2B procurement in Dutch hospitals, providing valuable insights into the complexities of their purchasing processes that were previously lacking in academic literature. The most significant contribution of this research is its development of new academic knowledge on B2B purchasing within the healthcare procurement context, specifically in the Netherlands. Furthermore, this study reaffirms previous research on organizational purchasing, highlighting the importance of multiple stakeholders being involved in the decision-making process. Overall, this study provides valuable insights into the intricate world of B2B procurement, particularly within the healthcare industry.

The research questions in this study were as follows: “*RQ1: How do Dutch hospitals purchase high-tech medical devices?*”, “*RQ2: How does their decision-making process work?*”, and “*RQ3: Who are the groups and individuals taking part in the decision-making processes?*”. All the research questions were answered, and therefore the research successfully achieved its empirical objectives. The findings of the study identified the steps in the purchasing process and key decision-making factors of the interviewed Dutch hospitals. It also identified the groups and individuals involved in the decision-making process.

The findings revealed that the purchasing procedures of the interviewed Dutch hospitals are relatively similar, especially for low-cost purchases. The procurement process involves four stages: problem or need recognition, information search, evaluation, and negotiation, and purchasing and using. The decision-making process involves several individuals from different functions in the organization and differs for each purchase, which is consistent with previous academic literature. Moreover, the decision-making process takes several aspects into account, with price and quality being the most significant factors, followed by sustainability and product suitability. Therefore, all three research questions were answered in this study.

To ensure that future research on this topic is thorough and accurate, it is important to consider the limitations of this study. Firstly, the scope of this study was limited to the

business-to-business (B2B) context, and therefore cannot be extrapolated to the business-to-consumer (B2C) context. This is an important consideration as there may be significant differences in the way that businesses interact with consumers as opposed to other businesses. Secondly, this research was conducted in the medical technology industry, which is a highly specific industry that may have unique characteristics that do not apply to other industries. This is an important factor to consider when trying to generalize the results of this study to other industries.

Additionally, it is important to acknowledge that the study only focused on the interviewed purchasing departments within the hospitals. It is possible that other hospitals' purchasing departments may have different operations or requirements when it comes to purchasing decisions. Therefore, the findings of this study may not be applicable to other departments within the same hospital, let alone other hospitals or healthcare organizations. Finally, it is important to note that the study had a relatively small sample size of only eight professionals. While the responses of these professionals may be valuable and informative, it is possible that their answers are specific to their organization and industry and may not be applicable to other organizations or industries. As such, it is important to exercise caution when attempting to generalize the findings of this study.

The results offer valuable insights for medical technology suppliers, enabling them to plan their marketing and sales activities more effectively, ultimately enabling them to penetrate the medical technology market successfully. The results of this research can also benefit hospitals by helping them enhance their purchasing strategies. As a result, they can procure the latest and most innovative medical technology while efficiently managing their budget. Furthermore, it offers resources for training in marketing and sales.

The research also contributes significantly to the medical technology field by providing a deeper understanding of hospitals' procurement processes. This understanding can help hospitals improve their procurement processes, making them more efficient and relevant in the current landscape. Furthermore, the research indicates that there is potential for hospitals to collaborate and centralize their purchasing processes, which could lead to the standardisation of these processes across the industry. The societal significance of this

research is broad, as it provides a basis for analysing and comparing purchasing processes not only in Dutch hospitals but also those outside of the Netherlands. Overall, the findings of the study have practical implications for the medical technology industry and can promote better purchasing practices, ultimately benefiting healthcare providers and patients.

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Appendix 1. Interview questions

1. Could you please explain your purchasing process for a new high-tech medical device from a new supplier when the costs of the purchase remain low?
2. Where does the need to purchase a new medical device come from?
3. How do you find out about new medical devices on the market?
4. Where do you search for information of new products and suppliers?
5. Could you please describe which are the most important factors you consider when looking for information and choosing a product or a supplier? Which elements are you taking into consideration?
6. Could you please outline your decision-making process for approving the purchase?
7. What would be the reasons you would not purchase a new high-tech medical device?
8. What are the factors influencing purchasing decision-making?
9. Do you usually want to have a trial period of a new product before making the final decision to purchase?
10. Who are the groups or individuals involved in the decision-making process?
11. Who makes the final decision?