UNIVERSITY OF TWENTE.

Master Thesis

MSc. Health Sciences - Optimization of healthcare processes

"How can collaboration between surgeons and purchasers be stimulated in the purchasing process to achieve cost savings and guarantee quality of the products?"

~ From a purchasers perspective ~

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Preface

This research is written for the Master Thesis for the study Health sciences at the University of Twente. This thesis is the effort of about six months writing and conducting research before and during the Covid-19 pandemic.

The subject of my thesis has been chosen based on my interest in healthcare purchasing and the dynamic between surgeons and healthcare purchasers in the purchasing process. Unfortunately, it was not possible to include more respondents since during the Covid-19 pandemic the respondents where to busy.

I would like to thank all the people that I was able to interview. I met many interesting hospital purchasers and a surgeon who gave me great insight. Furthermore, I would like to thank COPPA, Paul Gelderman, for their supervision and the opportunity to interview some of their hospital purchasers.

Lastly, I want to thank my thesis supervisors for giving me feedback and guidance while writing my thesis.

Barbara Tip

Enschede, 14 March 2021

Abstract

Purpose – The aim of this research is to develop a model that supports the collaboration between surgeons and purchasers in Dutch hospitals to guarantee quality and costs savings. A new collaboration model will be developed with different factors influencing the collaboration between surgeons and purchasers within hospitals.

Design/Methodology/Approach - This study is a qualitative case study of different hospitals located in the Netherlands. Seven semi-structured interviews were conducted with hospital purchasers and one surgeon in the Netherlands. They were asked if they collaborate often during the purchasing process. Hospital purchasers who worked often with surgeons during a purchasing process were interviewed to find out how they experience such a collaboration and what the SuccessFactors and barriers are for such a collaboration. One surgeon was interviewed to indicate their view on the collaboration.

Findings – In this study it became clear that two micro-interaction attributes influence the collaboration, namely human interactional attributes, and personal characteristics. Examples of human interactional attributes are communication, willingness to collaborate, trust and respect. Examples of personal characteristics are education, age and existing relationship with suppliers. These aspects can have a positive or negative influence on the collaboration. Furthermore, physical and organizational environment and organizational philosophy are the two attributes who are covered by the meso-interactional attributes. Examples of physical and organizational environment attributes are schedules, processes, communication tools. Besides, examples of organizational philosophy are open working climate, risk taking and freedom of expression. All the different aspect can have a positive and or negative influence on the collaboration between surgeons and hospital purchasers during the purchasing process. For example, when the hospital has an open working climate, it will have a positive influence on the collaboration. When the working climate is not open, it will have negative influence on the collaboration.

Research limitation – This study was carried out with a small research sample of six healthcare purchasers and one surgeon operating in the Netherlands. This limits the external validity of the findings since they might not be the same in other geographic areas in the world. This study could be expanded to other countries to validate the findings.

Originality/Value – There has been little research about the collaboration between healthcare purchasers and surgeons during the purchasing process yet and different scholars asked for further research. The developed collaboration model is new in its field. Next, all the different factors which have a positive or negative influence on the collaboration between surgeons and purchasers is a new aspect that got introduced to the research field which has not been assessed by other scholars.

Keywords – Hospital purchasing, collaboration, purchasing process, surgeons, personal characteristics, organizational philosophy, physical and organization environment, human interactional attributes.

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Introduction

The Dutch healthcare is becoming more and more expensive. In 2018, the total healthcare costs in the Netherlands where 100 billion euros, which amount to 22.8% of the gross domestic product. One of the highest expenses of the healthcare costs are the hospital costs, they accounted for 15.5 billion euros in 2018.(StatLine, 2019) The revenue of the Dutch hospitals, in fact, the costs for Dutch society to healthcare, increased in 2018 till 28 billion euros. Which is an increase of 4.2 percent. The expenses of hospitals also increased, with 4.6 percent, till an amount of 25.2 billion euros. The four most expensive types of care within hospitals are cancer care, heart vascular care, orthopedic and neurological care. In 2017, 4.9 billion euros has been spending on cancer care, 4.2 billion euros is spent on heart and vascular care, 2.7 billion euros on the orthopedic care and 2.0 milliard euros on neurological care (R. Statline, 2019)

Furthermore, the procurement costs of Dutch hospitals increased by 5.3 percent in 2018.(Lorenzo Lippolis 2019) The procurement costs of Dutch hospitals almost doubled in the past 10 years, to 8 milliard euros in 2015 and 11.0 milliard euros in 2018 (Lorenzo Lippolis 2019; StatLine, 2019). This growth is driven by expensive medicines, other medical products, and ICT. Purchasing costs will grow further due to technological innovations, homecare, and the increase in outsourcing. In the following 30 years, healthcare costs will increase to 19-31% of the gross domestic product. (van der Horst, 2011).

According to ZinData (2011), hospitals can save 10% on their purchasing costs per year. Because healthcare institutions do not have full insights into the direct and indirect costs, potential savings in procurement are not fully achieved. By organizing the purchasing of healthcare as good as possible within hospitals, the cost price of goods and services will decrease and will lead to savings and higher returns for the organization.(Hardt, 2007; van den Bemd, 2011; van Weele, 2008)

The purchasing process supports health care delivery and includes different activities related to purchasing and managing inputs(Lingg, 2016). The central role of purchasing in healthcare is translating the needs of the population into the provision of health services but also decreasing the purchasing costs. Considering the national health policy priorities and the cost-effectiveness of alternative interventions and products. The purchasing process includes the following phases: define specifications, supplier selection, contracting and negotiation, ordering, monitoring, follow-up and evaluating (van Weele, 2010).

In literature, different ways of organizing the purchasing process within a hospital as well as possible are described. They mainly focus on four different areas. The first stream of literature discusses hospital inventory outsourcing approaches with regards to supplier

integration. The second stream focuses on the bundling of purchasing volumes which leads to increasing purchasing power. The thirds section sheds light on specific upstream supply chain and implications for hospital buyers. Lastly, the fourth section gives an overview of demand forecasting which is relevant for hospitals and their supplier. (Volland, 2016).

The role of hospitals is shifting from a large employer to a director of care and (medical) technology. It is a new role, in which professional purchasing is essential for success. Hospitals are unprepared for this new role. They are lagging due to insufficient administrative attention, limited investments in quality and quantity of the purchasing function and insufficient collaboration with medical specialists(Strategists, 2017).

Ideally, the purchasing process and their decisions should be guided transparently, and money should be spent more efficiently. However, in most of the purchasing systems, the pressure to contain costs is high and physicians or end-users have different input into the process than buyers or administrators (Sanderson, 2015). One of the biggest challenges for hospitals in controlling the costs is creating incentives for surgeons to collaborate with hospitals and their purchasers (Healy, 2007).

Surgeons can influence the purchasing decisions within hospitals. Early involvement of surgeons in the purchasing process can lead to good decision making and it benefits the organization. Health care organizations that work with surgeon participation will experience faster changes and new initiatives. As surgeons become more engaged in purchasing they will look at the performance and financial criteria for each purchase (Company, 2017). Increased transparency by involving surgeons in the purchasing process has already been demonstrated to decrease purchasing costs (jackson, 2016; Croft, 2017).

Furthermore, Healy (2000) performed a study on the performance of the single-price/case-price purchasing program. This program is about involving surgeons in the purchasing process to decrease costs. As a result, from the early involvement of surgeons, the cost of hip replacement implants and knee arthroplasty implants decreased.

So, it is possible to involve surgeons in the purchasing process, maintain the quality of the product but also decrease the purchasing costs. However, the biggest challenge in controlling the costs is creating incentives for surgeons to cooperate with purchasers (Healy, 2007). Few is known about how to stimulate the collaboration between surgeons and purchasers to guarantee quality and achieve cost savings. The aim of the study is to develop a model that supports the collaboration between surgeons and purchasers in Dutch hospitals to guarantee quality and costs savings. The following research question has been formulated:

“How can collaboration between surgeons and purchasers be stimulated in the purchasing process in Dutch hospitals to achieve cost savings and guarantee quality of the products?”

~From a purchasers perspective~

How to stimulate collaboration, especially between surgeons and purchasers within a hospital have not been investigated thoroughly yet. But studies on the determinants and attributes of collaboration in normal industry have been conducted quite extensively (Block, 1998; Engoren, 1995; Schmitt, 1988; Whitten, 1998). However, how to stimulate collaboration and especially between purchasers and surgeons within hospitals to achieve cost savings and guarantee quality of the products is ‘new’. It is also ´new´ since the collaboration between purchasers and surgeons is a different field dan the collaboration within the ´normal ´ industry where purchasers must collaborate with the end-users. Since, the priorities within hospitals are different than the priorities within a normal company because in hospitals patients are involved. Patients are the ‘products’ where surgeons have to work with, and this is different than end-users who work for example with cars. Therefor it is relevant to perform this research on the collaboration within such a complex context. It is also new in its field since there are almost now studies available on the collaboration between surgeons and hospital purchasers, and how to stimulate this collaboration, the theoretical application of this study will be high.

Besides the theoretical application there is also a practical application. In a high-costs world such as healthcare, cost savings and increasing value has a high priority. It is estimated that the early involvement of surgeons in the purchasing process improves cost savings (Jackson, 2016; Croft, 2017). The outcome of the research question will provide insights for purchasers which factors to consider when they must collaborate with surgeons in the purchasing process. These factors may vary among different types of surgeons and purchasers. It may also be that these factors vary among various environments and the different levels of power that surgeons have. The outcomes of this research will be supporting COPPA and other purchasing departments and companies who must collaborate with different surgeons.

To answer the research question, first, the Dutch healthcare system will be explained. Thereafter, the purchasing process in the Netherlands, followed by different ways to decrease the purchasing costs. The chapters after that will explain collaboration in general and the expected factors that influence the collaboration between surgeons and purchasers. Finally, a model with an overview of different factors influencing the collaboration between surgeons and hospital purchasers, will be developed.

The increasing costs in Dutch healthcare

The Dutch healthcare is becoming more and more expensive. In 2018, the total healthcare costs in the Netherlands where 100 billion euros. To put the 100 billion in perspective, this amount equals 22.8% of the gross domestic product. As mentioned in the introduction, the highest expenses of the healthcare costs are the hospital costs, they accounted for 15.5 billion euros in 2018. (StatLine, 2019) The revenue of the Dutch hospitals increased in 2018 till 28 milliard euros, which is an increase of 4.2 percent.

Furthermore, more than half of the hospital expenses are spent on personnel costs namely 53%. The procurement costs of Dutch hospitals increased with 5.3 percent in 2018 till 11.0 milliard euros (Lorenzo Lippolis 2019). The procurement costs of Dutch hospitals almost doubled in the past 10 years, till 8 milliard euros in 2015 and 11.0 milliard euros in 2018 (Lorenzo Lippolis 2019; StatLine, 2019). This grow can be explained by the increasing costs of medicine, ICT and other medical products. Outsourcing, homecare, technological innovations are drivers for further increasing purchasing costs. In the following 30 years, the costs will increase till 19-31% of the gross domestic product. (van der Horst, 2011). The highest expenses of healthcare costs are the hospital costs, they accounted for 15.5 billion euros. The four most expensive types of care within a hospital accounted for 13.8 billion euros. The four most expensive types of care within hospitals are cancer care, heart vascular care, orthopedic care and neurological care. In 2017, 4.9 billion euros have been spent on cancer care, 4.2 billion euros is spent on heart and vascular care, 2.7 billion euros on orthopaedical care and 2.0 billion euros on neurological care. (Statline, 2019)

Hospitals can save 10% per year on purchasing costs. These savings are still not fully achieved because hospitals do not have full insight into de indirect and direct costs of products and services(ZinData, 2011). When the purchasing process of healthcare is organized as good as possible it will lead to decreasing costs of products and services and in the end to a higher return of the hospitals. (Hardt, 2007; van den Bemd, 2011; van Weele, 2008). The decreasing costs of services and products will not directly affect the quality of the products and patient care.

To understand how the purchasing process can be organized as well as possible it is important to understand how the healthcare system in the Netherlands is organized. The following chapter will describe the Dutch healthcare system. It will set out the different parts of the Dutch system.

The Dutch healthcare system

This chapter will describe the Dutch healthcare sector. The Dutch healthcare system can be characterized as hybrid. There are three different market players, namely healthcare providers, health insurers and insured people. They operate in three different markets namely for health insurance, for health service provision and healthcare purchasing (see Figure 1). In the health insurance market, insurers offer an insurance package that is obligatory for all Dutch citizens. The health services provision market is the market where providers offer care that patients can choose to use. Furthermore, the healthcare purchasing market is where the providers negotiate with the insurers on quality of care, price and volume. (M.Kroneman, 2016)

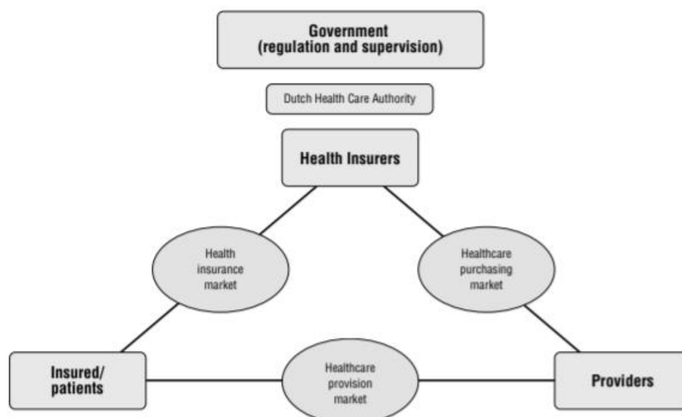


Figure 1; Dutch healthcare markets M.Kroneman,2016

This research will focus on the healthcare purchasing market. Within the healthcare purchasing market, hospitals are an example of providers. In 2018, the Netherlands has 79 healthcare organizations, covering a total of 134 outpatient clinics and 120 hospitals (Rijksoverheid, 2020). Hospitals provide secondary care, almost always after a referral from general practitioners, but also from emergency wards. Care is provided at both outpatient and in-patient departments. (Sheshabalaya, 2010)

Since 1990, decentralization and concentrations among health insurers and hospitals have been visible. The Netherlands implemented a system of regulated competition, in which healthcare provision is separated from healthcare purchasing. The healthcare providers compete to deliver services to people that are represented by healthcare purchases. They compete on a combination of quality and price. Professional purchasing of care is a key element for a system of regulated competition. Since the 1990s, many hospitals started to operate on a commercial basis within a competitive environment. (Josep Figueras, 2005b)

The Netherlands has an established system of corporate hospital providers. Most hospitals are privately owned and operate on a not-for-profit basis. These hospitals are permitted to make and retain surpluses. (Josep Figueras, 2005b)

To retain surpluses, it is important to have a well-established purchasing process. The purchasing process supports health care delivery and includes different activities related to purchasing and managing inputs (Myriam Lingg, 2016). The central role of purchasing in healthcare is translating the needs of the population into the provision of health services. Taking into account the national health policy priorities and the cost-effectiveness of alternative interventions and products(Myriam Lingg, 2016). Another role of purchasing is to decrease the purchasing costs to achieve savings and maintain the quality of the products (Carter, 2004). The purchasing process, where the focus of this study is on, is in the healthcare purchasing market (See figure 1). In this market, insurers purchase care from providers, but another way of purchasing in this market is that hospitals purchase products and services from different suppliers.

Now it is clear how the basis of the healthcare system is regulated in the Netherlands. It is important to understand the purchasing process in hospitals. The following chapter will describe the purchasing process in general. It will set out the different parts of the purchasing process and how they are applied in Dutch hospitals.

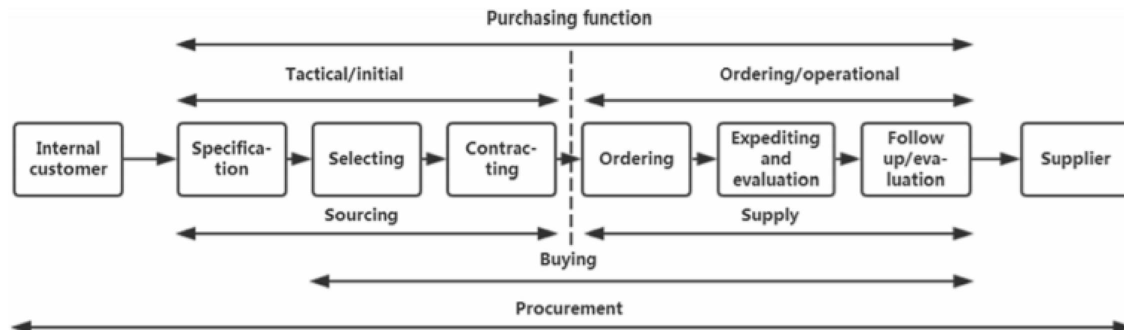
The purchasing process in Dutch healthcare

To answer the research question, it is important to understand the purchasing process. This chapter will describe the purchasing process in more detail. Especially the different steps of the process will be described since surgeons will collaborate with purchasers in one of the steps of the purchasing process.

Strategic purchasing is a key component for the improvement of health systems performance. Ideally, it brings a range of separate functions with the potential to improve efficiency, responsiveness, and effectiveness together. Furthermore, it can contribute to achieving the public health goals and social objectives of equity within the health care systems. In the Netherlands, purchasing is based upon a mix of private insurers and health funds. There is great competition between the purchasing organization. (Josep Figueras, 2005a). All the purchasing organizations work with the same purchasing process. This model is used by different organizations to optimally coordinate the purchasing process.

The purchasing process can be described based on the model of van Weele (2018).

Figure 2; The purchasing process taken from A. van Weele 2018



The added value of a purchasing model is the optimal coordination of the whole purchasing process. In the first phase, define specifications, the purchasing needs of the hospital will be established. Within this phase, the specifications of which products and services to purchase will be described (van Weele, 2018). It must be indicated which performance the product must deliver and what is expected from the supplier (Choi, 2004). Examples of specifications are quality requirements, logistics requirements, performance requirements and technical requirements. It is the task of the end-user to describe and develop the specifications of a certain product. In most cases, surgeons are the end-users. Within hospitals, composing the specifications of a certain product is the responsibility of the healthcare professional, in this case, the surgeons (van Weele, 2008).

After clearly describing the purchasing specifications and the purchasing needs, the purchaser can start with market orientation. In the second phase, suppliers will be assessed and selected. This is one of the most important phases of the purchasing process. Most common, tree till five suppliers are requested for a quotation. At the end of this phase, a supplier will be selected which can realize the most benefits for the organization.(van Weele, 2008)

The following phase consists of negotiation and contracting. Negotiations between the supplier and the organization will be about the price conditions, payment conditions, and purchase condition. Contracting is the main vehicle of purchasing, often contracting is considered synonymous with purchasing. The contract defines the relationship between the provider and the purchaser and is the most visible and practical part of purchasing. Contracting is a repeated process, with new contingencies arise and new agreements being reached. Thereafter, contract conditions will be established between the supplier and the organization. In these contracts, guidelines and protocols can be included to increase the quality of the product and the health services(Josep Figueras, 2005a). In the last phase, the supplier will be evaluated. Based on this evaluation, it can be chosen whether or not the next time contracting will take place with this specific supplier.(van Weele, 2008)

The purchasing process will differ between hospitals. But it is expected that within regular and academic hospitals, the purchasing of medical products goes through different parts of the organization. This means that all different departments within the hospital can purchase products. Furthermore, the strategic top of a hospital determines the purchasing strategy. This top consists of members of the hospital that are fully responsible for the business results of the organization. Within a hospital, the strategic top is the board of directors or the managing board. Often hospitals have also a centralized purchasing department. These departments purchase the products and services which are important for all the departments within the hospital. (Mintzberg, 2006)

Now it is clear how a purchasing process is organized, it can be stated that surgeons can collaborate with purchasers in the first phase of the process, namely where the specifications of the products will be defined. This is one way to decrease the purchasing cots, early involvement of surgeons, but there are more ways to achieve this. The following part will explicate what literature says about how the purchasing costs of a hospital can be decreased. Different ways of how to decrease the purchasing cost will be mentioned.

Different ways to decrease purchasing costs within the purchasing process in Dutch healthcare

This chapter will describe different ways to decrease purchasing costs within the purchasing process in hospitals. Hospitals are part of a complex supply chain including storage, purchase, distribution, inventory control and medical suppliers. Different factors increase the complexity of the hospital supply chain, including the large variety of items used by clinicians. (Rosales, 2014)

As mentioned before hospitals can save 10% per year on purchasing costs (ZinData (2011)). Hospital material management literature describes different ways to decrease these purchasing costs. They mainly focus on four different areas: inventory outsourcing, bundling volumes, upstream supply chain and demand forecasting. The first stream of literature discusses hospital inventory outsourcing approaches with regards to supplier integration. According to Rosales (2014) inventory availability is critical for patient care. However, a high inventory level increases costs and creates a significant financial impact on the hospital. Hospitals are investing in different technologies to avoid stock-outs and reduce costs of suppliers, for example, barcodes. Inventory outsourcing in healthcare is recently become more important, especially in practice where outsourcing concepts are widely applied(Vakharia, 2004). According to Kim (2005) hospitals can significantly reduce inventory stock, however, the supply chain integration might be hindered due to the absence of information sharing and missing collaborations with manufacturers.

The second stream focuses on the bundling of purchasing volumes which leads to increasing purchasing power. Ross (2009) focus on bundling new products with refurbished products to reduce material costs. They developed a mixed-integer program aiming to minimize purchasing costs. The model finds the most optimal purchasing strategy on which product to buy from which supplier.

The thirds section sheds light on specific upstream supply chain and implications for hospital purchasers. The upstream supply chain is the network of the suppliers of the company and its suppliers. It can be optimized by decreasing the number of suppliers and finding the best suppliers for the products which means the suppliers who provide the best price-quality for the products. Lastly, the fourth section gives an overview of demand forecasting which is relevant for hospitals and their supplier. (Volland, 2016). Demand forecasting in healthcare is difficult. The most difficult aspect is forecasting the number of patients searching for health services and the types of patients. Based on these predictions, the number of products that have to be purchased can be estimated (Cruz, 2013; Haijema, 2007; Hof, 2015). The four different areas

which describe different ways to decrease purchasing costs in a hospital are well known and researched. There is another way to decrease the purchasing costs within a hospital which is less known and little research is done. This way is about the early involvement of surgeons in the purchasing process, in the first phase; defining specifications.

When surgeons are involved in the first phases of the purchasing process it will lead to good decision making and it benefits the organization (Company, 2017). Besides, surgeons are often unaware of equipment costs they use regularly (Jackson, 2016). By informing surgeons of the cost of their equipment it will decrease the purchasing costs. The costs of instruments surgeons use accounts for around 50% of the cost of a case (Park, 2009). Increased transparency by involving surgeons in the purchasing process has already been demonstrated to decrease purchasing costs (Jackson, 2016; Croft, 2017).

Ideally, the purchasing process and their decisions should be guided transparently, and money should be spent more efficiently. However, in most of the purchasing systems, the pressure to contain costs is high and physicians or end-users have other input into the process than purchasers or administrators (Sanderson, 2015). The next section will describe the advantages of the early involvement of a physician in the purchasing process to decrease purchasing costs.

Early involvement of surgeons to decrease purchasing costs within in Dutch healthcare

This chapter will explain the advantages and the challenges of involving surgeons in the purchasing process.

Surgeons can influence the purchasing decisions within hospitals. Early involvement of surgeons in the purchasing process can lead to good decision making and it benefits the organization. Health care organizations that work with surgeon participation will experience faster changes and new initiatives. As surgeons become more engaged in purchasing they will look at the performance and financial criteria for each purchase (Company, 2017).

According to Company (2017), 66% of the surgeons in their study feel a responsibility to help bring healthcare costs under control. Their most important criteria for purchasing medical products are product quality and patient outcomes. More than 80% of the procurement officers and surgeons from the study of Company (2017) work in collaborative partnerships in purchase equipment, weighing economic and clinical value together. Furthermore, 43 % of the surgeons believe that they can use the instruments and implants from their choice when their procurement department improves quality and costs. The strongest existing relationship with a manufacturer is the highest-ranked purchasing criteria for 60% of the surgeons. Furthermore, 70% of the surgeons believe that best value for price paid is the most important purchasing criterion. When surgeons are early involved in the purchasing process will lead this to more positivity about their organization as a place to work. Surgeons who are not involved in the purchasing process are less positive about their working place (Company, 2017).

Healy (2000) performed a study on the performance of the single-price/case-price purchasing program. This program is about involving surgeons in the purchasing process to decrease costs. As a result, from the early involvement of surgeons, the cost of hip replacement implants decreased with 31.8% and knee arthroplasty implants with 23%.

Furthermore, involving surgeons in the purchasing process will lead to a better understanding of the cost of their equipment, leading to a decrease in the purchasing costs. The costs of instruments surgeons use accounts for around 50% of the cost of a case (Park, 2009). Increased transparency by involving surgeons in the purchasing process has also been demonstrated to decrease purchasing costs (Jackson, 2016; Croft, 2017).

When different parties must collaborate, there will be some challenges than can arise namely set-up costs, coordination costs, losing flexibility and control. To develop a collaboration between surgeons and purchasers there must be time invested in the process. To set this process up, it will cost a lot of money. Also, the coordination of the process will be

costly and when purchasers have to collaborate with surgeons, they will lose some control and flexibility. They will be dependent on the opinion and advice of the surgeons (Schotanus, 2007).

Summarizing, the advantages of early involvement of surgeons in the purchasing process are more positivity about the organization, a better understanding of the cost of the equipment surgeons use and a decrease in the purchasing costs.(Jackson, 2016; Croft, 2017; Park, 2009; Healy, 2000). The disadvantages are set-up costs, coordination costs, losing flexibility and control.

When surgeons are involved in the purchasing process, they must collaborate with the purchasers of the organization to achieve the cost and quality benefits. The following section will describe the general concept of collaboration to understand which attributes stimulate and hinder the collaboration between different professionals.

Collaboration

As mentioned in the section before, early involvement of surgeons in the purchasing process has different advantages and some challenges. The most important advantage is the decrease in purchasing costs. When surgeons are involved in the purchasing process, they must collaborate with the purchasers of the hospital. So, to understand how to involve surgeons in the purchasing process it is important to understand what the concept of collaboration is. This section will describe what the literature says about collaboration. Thereafter different ways to stimulate the collaboration between professionals will be described.

Different types of collaboration

Researchers suggest that the way toward building a culture of collaboration is not precise, it is to some degree natural, and requires a lot of training and sustaining(Schuman, 2006). It is important to start small and first learn to work together at a local level. Collaboration is a tool to achieve a common goal, but it cannot be used in every situation. It works best in groups where participants have the power to make final decisions and when creativity and innovation are desired (Hanson, 2000).

Furthermore, it is important to know what to gain from the collaboration and what the costs are (Hanson, 2000). Also, awareness of factors that lead to successful collaboration is desired. These factors are for example communication, attitudes, trust, environmental concerns and resources (Vangen, 2003; Schuman, 2006). Furthermore, the focus of collaboration must be long-term because it is a process that is based upon relationships and takes time to develop.

D. d' Amour (2004) developed a model of collaboration where the following types of collaboration where recognized: Collaboration in inertia, Collaboration under construction and Collaboration in action. Collaboration in inertia is characterized by the presence of conflicts and opposing forces. Continuity and efficiency are poor. The absence of negotiations and relationships are also characteristics of this type of collaboration.

The second type of collaboration is collaboration under construction. This type is characterized by a lack of consensus on issues that are still under negotiation leading to a limited scope of collaboration. Responsibility sharing is fragile which leads to room for improvement in service efficiency. (D. d Amour, 2005)

The last type of collaboration is collaboration in action. This is the highest-level of collaboration. The partners have created a stable form of collaboration immune to the uncertainty of health systems. It is characterized by a high level of responsibility-sharing and involves all participating parties. (D. d Amour, 2005)

When there arises a collaboration between purchasers and surgeons within a hospital it is important to get a type of collaboration that is close to collaboration in action. Within this type of collaboration, the participants share the same goal, have grounded trust and have a shared and consensual leadership. (D. d Amour, 2005). This research will focus on collaboration in action since this is the highest level of collaboration.

Collaboration in general

In literature, collaboration is defined in different ways. The most common concepts mentioned are power, partnership, sharing and interdependency (D. d Amour, 2005). Concerning the concept sharing, different authors wrote about shared responsibilities**,** shared decision-making, shared data and shared planning and intervention (Block, 1998; Engoren, 1995; Schmitt, 1988; Whitten, 1998). Walsh (1999)focused on how different professional perspectives are shared. These different ways of sharing can be observed in a collaborative undertaking.

Second to sharing, a partnership implies that two or more actors join in a collaborative undertaking characterized by collegial like a relationship that is constructive and authentic (Hanson, 2000). Such a relationship needs mutual trust, respect, honest and open communication (Pike, 1993; Siegler, 1994). Each partner must be aware of the values, perspectives and contributions of the other professionals (Walsh, 1999) Working in a partnership also imply that partners pursue specific outcomes and common goals (Block, 1998; Hanson, 2000)**.**

The third concept of collaboration is interdependency. This concept implies mutual dependence. Professionals are like actors who depend on one another (Whitten, 1998). So, collaboration requires professionals to be interdependent rather than autonomous. The interdependency arises from a common desire to address the product costs and customer's needs (Evans, 1994; Whitten, 1998). Synergy will emerge when both parties become aware of such interdependency and individual contribution will be maximized. Finally, interdependency will lead to collective action(D. d Amour, 2005).

Power is the last concept of collaboration. Power in this context is based on experience and knowledge rather on title and functions (Henneman, 1995). It is a product of the interactions and relations between different professionals. Furthermore, collaboration is also seen as a process that is always evolving, it is an interactive, transforming, interpersonal, and dynamic process (Hanson, 2000). This process involves negotiation, compromises, shared planning and

intervention (Block, 1998). Summarizing, the attributes of collaboration, in general, can be found in table 1.

Potential barriers of collaboration

Given the attributes of collaboration, it has its potential problems. What starts as a well-intentioned effort can lead to different conflicts (Kumar, 1996). Conflicts should be expected due to the very nature of a collaborative environment. When different professions start to collaborate, for example, surgeons and purchasers, different kinds of history, culture, values, attitudes, beliefs and customs will melt. Different challenges will accrue when professionals try to understand and appreciate these nuances (Hall, 2005). The power relations and ideological differences brought to collaboration from different professions can be potentially problematic(D. d Amour, 2005; K. Caldwell, 2003). Bals (2009) identified four different barriers of collaboration in marketing service procurement namely, lack of motivation, lack of awareness, lack of skills, lack of opportunity.

According to J.H. Love (2009)**,** potential challenges of collaboration are salary, prestige, level of authority add further challenges of managing collaboration especially in healthcare. Challenges mentioned by Lawlis (2014) are; status issues, language barriers, boundary disputes, reporting structures and service orientations. Other problems that can accrue are problems when there is territorialism and where confusion and role overlap exist (D. d Amour, 2005). So, a collaboration between different parties can lead to conflicts. Table 1 gives an overview of the different concepts of collaboration, the corresponding factors, and barriers.

Table 1; Attributes , SuccesFactors and Barriers of Collaboration in general

Concept	Explanation	SuccesFactors	Barriers
Power	Experience and knowledge rather on title and functions	- Interactions and relations	- Power differences - Status issues - Territorialism - Salary - Prestige - Level of authority
Sharing	Two or more people share the same responsibilities, concepts, planning etc.	- Responsibilities - Decision-making - Data - Planning - Intervention	Lack of; - Motivation - Awareness - Skills - Opportunity
Partnership	Constructive and authentic relationship	- Mutual trust - Respect - Honest - Open communication - Common goals	Different kinds of - History - Culture - Values - Attitudes - Beliefs
Interdependency	Collaboration requires professionals to be interdependent rather than autonomous	- Common desire to address the product costs and customer's needs - Synergy	Different kinds of - History - Culture - Values - Attitudes - Beliefs
Process	Collaboration is also seen as a process that is always evolving, it is an interactive, transforming, interpersonal, and dynamic process (M C Hanson, 2000).	- Negotiation, - Compromises - Shared planning and intervention(Block, 1998)	- Language barriers, - Boundary disputes, - Reporting structures - Service orientations

To decrease the complexity of the different factors, attributes and SuccessFactors, the next section will describe the key determinants of collaboration in general. It will give an overview of the different attributes, barriers and SuccessFactors distributed among the key determinants.

Key determinants of collaboration

To decrease the complexity of the different attributes, barriers and success factors, they will be summarized in different determinants. The three different determinants of collaboration that will be used in this study are macro-structural, meso-organizational and micro-interactional (Bourgeault, 2011). Macro-structural determinants refer to attributes beyond the organizational level, for example, professional, cultural, and social systems. The professional system refers to the outcomes of professionalization for example domination and control. It is the opposite of the collaborative concept of trust. Since macro-structural determinants refer to attributes beyond the organizational level, and are difficult to influence, the focus of this research will not be on macro-structural determinants.

The second determinant of collaboration is meso-organizational which comprise of the philosophy, team resources, structure, communication mechanisms and administrative support. Team resources refer to the provision of space to meet a person and the availability of actual time to interact. Communication mechanisms are for example policies and protocols, unified standards, and the implementation of a group session. Administrative support consists of the existence and provision of institutional leaders who can integrate new visions of collaborative practice. (Bourgeault, 2011) The attributes, barriers and SuccessFactors that are covered by this determinant are described in table 2.

Table 2; Attributes Meso-organizational

Attributes	**Barriers**	**SuccesFactors**
Participation in planning and decision making	Language barriers	Resources
Cooperative & intellectual endeavor	Reporting structures	Environmental concerns
Organizational philosophy	Service orientations	Communication
Team resources	Level of authority	
Communication mechanisms		
Administrative support		

The last determinant of collaboration is micro-interactional. It refers to the components of the interpersonal relationships of the members that collaborate. This determinant includes communication, mutual respect, willingness to collaborate and trust. Communication is the core competence of successful collaborative relationships. Mutual respect and trust require knowledge, effort and time and are the key interactional determinants. The willingness to collaborate can be stimulated by education but also personal maturity and previous experience. (Bourgeault, 2011) The attributes, barriers and SuccessFactors that are covered by this determinant are described in table 3.

Table 3; Attributes Micro-interactional

Attribute	Barriers	SuccesFactors
Trust & Respect	Power differences	Trust
Willingness to work together	Lack of motivation	Attitudes
Nonhierarchical relationship	Lack of awareness	
Knowledge and expertise	Lack of skills	
Sharing of expertise	Lack of opportunity	
Interdependency		

Based on the different determinants of collaboration a less complex model can be made. This model can be found in figure 3.

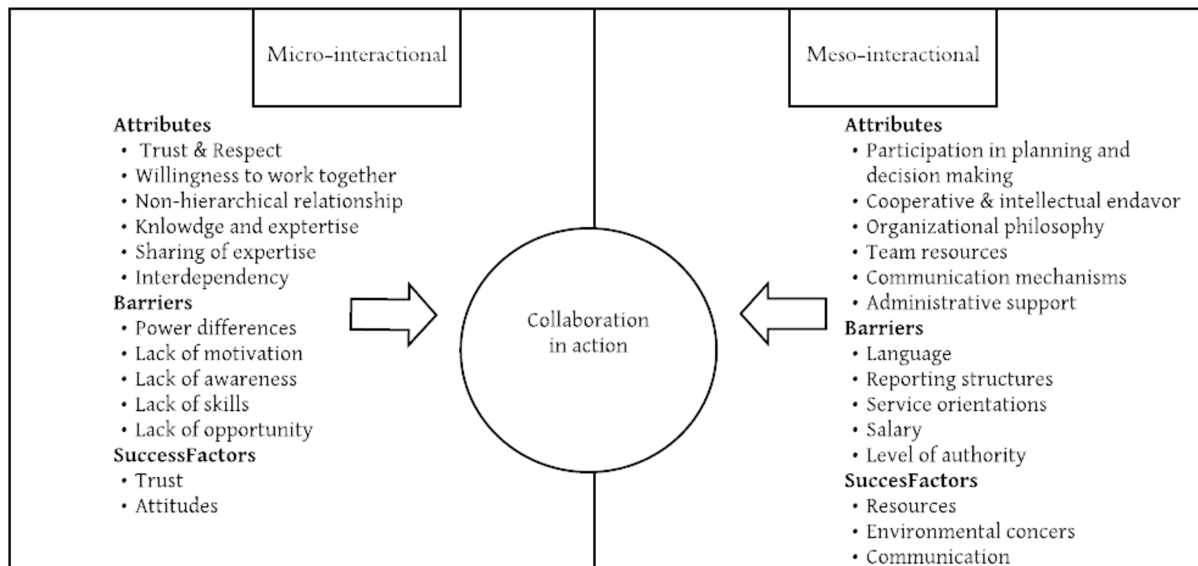


Figure 3; Findings from general collaboration (No focus on surgeons)

So, a general collaboration model is developed based on literature. The following section will describe what literature says about collaboration between surgeons and purchasers. Different propositions are developed, and at the end of the section, a collaboration model for purchasers and surgeons is described.

Collaboration between surgeons and purchasers

In the past sections, a model is developed for collaboration in general (See Figure 3). In this model two different dimensions are explained, namely micro-interaction attributes and meso-interactional attributes. The following section will explain what literature says about collaboration between surgeons and purchasers. Different propositions will be developed and will be divided among the micro-interactional attributes and the meso-interactional attributes. Examples of micro-interactional attributes that will be explained in this chapter are the personal characteristics and human interactions. Examples of meso-interactional attributes are the organizational philosophy and physical and organizational environment. At the end of this section, a model will describe the expected factors that will have an influence on the collaboration between surgeons and purchasers based on the information from literature. This model will be used as the base of the interviews.

Micro-interactional attributes

A factor described in literature, which could have an influence on the collaboration between surgeons and purchasers is their personal characteristics and their view on working together in the purchasing process. Personal characteristics is a broad concept and can consist of different factors. For example, the view of surgeons on the purchasing process. A big difference between the view of surgeons on collaboration and purchasers' view on collaboration is that surgeons' most important criteria for purchasing medical products are product quality and patient outcomes. Surgeons are the end-users and work with the patients. They have to do the operations and it is likely that they want the qualitative best products and not the most expensive products. Whereas purchasers look for most price advantages and the lowest costs (Company, 2017), since there main goal is to decrease the expenses of the hospital. The different views of surgeons and purchasers on the role of purchasing are likely a barrier in the collaboration between surgeons and purchasers.

Furthermore, some surgeons and purchasers but also hospitals can have an existing relationship with a manufacturer/supplier which is an example of personal characteristics. They already purchase the product from this supplier and have a strong relationship with them. Due to the strong relationship, the willingness to switch to another supplier will be less, even when they provide less expensive products for the same quality (Company, 2017). It is likely that the existing relationship between surgeons and suppliers will have an influence on the collaboration between surgeons and purchasers within the purchasing process. This also may have a negative influence on collaboration. The before mentioned factors are examples of personal

characteristics mentioned in literature. The factor personal characteristic can be assigned to the micro-interactional attributes mentioned in the section before. Based on this information the following proposition can be developed:

Proposition 1: The personal characteristics of the surgeons and purchasers will have an influence on the collaboration.

Another concept that also can be assigned to the micro-interactional attributes are the human interactions. These attributes include communication, willingness to collaborate and mutual trust and respect (Martin-Rodriguez, 2005). In healthcare, surgeons have distinct cultures because of their professional identity, specialized training, and roles and position within the healthcare system. When surgeons have to collaborate with purchasers, power differences, interprofessional role boundaries and conflicts between them can result (D. d Amour, 2005; Martin-Rodriguez, 2005; Kvarnstrom, 2008). Especially when surgeons think they have more power about the decisions concerning which products to choose then purchasers. Another conflict that can occur is the potential lack of respect, poor communication and trust (Varnstrom, 2008). According to Boyce (2006)**,** surgeons have a medical dominance over nursing and this may affect health professions in similar ways. Surgeons may think they dominate purchasers, this could lead to a negative effect on the collaboration. The effects of human interactions can be summarized in the undermentioned propositions.

Furthermore, mutual trust and respect are important aspects of collaboration. Alt-White (1983) found that in a situation where professionals must collaborate, surgeons have more trust in other professionals who are considered most competent and experienced. When surgeons and purchasers collaborate, the expectation will be that surgeons have less trust in purchasers when they are less experienced and vice versa.

When collaboration between surgeons and purchasers takes place, communication is required. Communication is considered as a key determinant of collaboration in health care teams because the development of collaboration depends on understanding the work and what the objectives are of the other professional (Mariano, 1989; Evans, 1994). Good communication also allows constructive negotiations, which is important in the first phase of the purchasing process where the requirements of the product and services are defined. Furthermore, communication is a driver for mutual trust, respect and sharing (Henneman, 1995). Mutual respect implies the recognition of the contribution of the professionals who are involved in the collaboration. Thus, lack of respect, understanding or appreciation of the contribution of the

surgeon or the purchaser is a real barrier to collaboration. Health professionals attach much importance to mutual respect (Stichler, 1995; Baggs, 1988). Communication is a key determinant of collaboration and is a driver for trust, respect and sharing.

So different aspects and factors of micro-interactional attributes are mentioned in literature. It is likely that these attributes can be covered by the human interactions, and that these interactions will influence the collaboration between surgeons and purchasers. Based on this information the second proposition can be developed:

Proposition 2: Human interactions (e.g., trust, respect, communication) have a large effect on the collaboration between surgeons and purchasers.

<u>Meso-interactional attributes</u>

The second attributes mentioned in the section before are the meso-interactional attributes. The first aspect that is covered by the meso-interactional attributes is the physical and organizational environment. When purchasers and surgeons must collaborate, the environment in which they operate can impact the degree of collaborative interactions. The environment includes physical spaces, schedules, processes, organized activities and communication tools (Martin-Rodriguez, 2005)**.** A strong relationship between the collaborating parties demands on the amount of time that is available for the professionals to share information, develop relationship and address issues .Mariano, 1989). Especially when surgeons must collaborate with purchasers, a big challenge is to find a moment when and where the collaboration can take place. Surgeons are often very busy with their 'own' work and often do not have enough time to schedule meetings. So the physical and organizational environment will have an influence on collaboration. An example from nursing indicates that by designing immersive workspaces that create team cohesion and improve space consideration will promote the collaboration between nurses (Gum, 2012)**.** It is therefore essential that hospitals provide time and opportunities for professionals to work together. Based on this information the following proposition can be developed:

Proposition 3: The physical and organizational environment (e.g., schedules, processes, communication tools) have a large influence on the collaboration between surgeons and purchasers.

Organizational philosophy is another concept that could have an impact on collaboration and can be assigned to the meso-interactional attributes. The hospital must support collaborative practice among surgeons and purchasers. For instance, freedom of expression, fairness and interdependence is essential for collaboration between these parties. An open working climate, risk-taking, trust and integrity foster collaborative attitudes between health care professionals and may also foster these attitudes between surgeons and purchasers (Evans, 1994; Stichler, 1995; Henneman, 1995). When hospitals do not support collaborative practice, it is likely that collaboration will not take place. Another factor that may stimulate the collaboration between surgeons and purchasers is the organizational structure. A successful collaboration between health care professionals requires a more horizontal structure instead of a traditional hierarchical structure (Henneman, 1995). When purchasers and surgeons collaborate they must understand the horizontal structure, it stands for open communication and shared decision-making (Evans, 1994).

When hospitals do support collaborative practice, administrative support is required (Stichler, 1995). The development of collaboration between surgeons and purchasers is facilitated by having leaders who know how to convey the new vision of collaborative practice (Stichler, 1995). According to Borril (2002) leadership is an important aspect of the collaboration between professional teams. So, the philosophy of an organization could influence the collaboration between surgeons and hospital purchasers. Based on this information the following and last proposition is developed:

Proposition 4: Organizational philosophy can either have a positive as a negative effect on collaboration.

In the theoretical section, different propositions are developed. Figure 4 will describe the different propositions, divided into micro and meso interactional attributes, which are expected to have an influence on the collaboration between surgeons and purchasers.

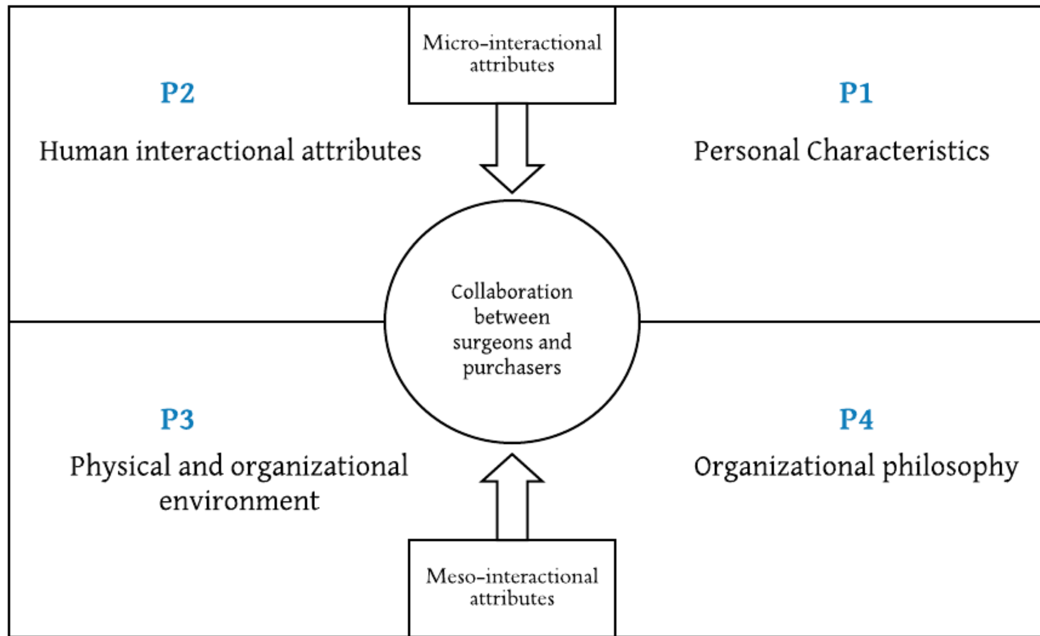


Figure 4; Expected effects on collaboration between surgeons and purchasers

Methodology

The aim of this study is to develop a model that supports the collaboration between surgeons and purchasers in Dutch hospitals to guarantee quality and costs savings. To develop a model, different ideas, and concepts of how to stimulate the different attributes of collaboration between surgeons and purchasers must be identified. In this chapter, data collection and the data analysis will be explained.

Research methodology: Qualitative research for testing propositions

Qualitative research is suitable for analyzing collaboration between surgeons and purchasers

To answer the research question; "*How can collaboration between surgeons and purchasers be stimulated in the purchasing process to achieve costs savings and guarantee quality of the products"* a case study will be used as the primary source in this study.

Quantitative research is associated with collecting numerical data via surveys (Bryman., 2012). Qualitative research is about collecting data from observations and interviews. It provides a inductive view by generating new theories out of research. The aim of such a research is to understand the social world by examining the different interpretations of people. (Bryman., 2012).

The most used data collection method for qualitative research are interviews (Taylor, 2005). Interviews can consist open and closed questions. Open questions can be valuable to learn more about how people think and feel about a certain situation. This way, the interpretations of surgeons and purchasers how to collaborate with each other could be investigated and discovered. The most popular method for data collection is semi-structured interviews because they are versatile and flexible (Bryman., 2012).

In this study the case study method is chosen for the following reasons; According to Yin (2009), a case study is suitable when the focus of the study is to answer 'why' and 'how' questions. Case study can be defined as studying multiple or single cases with the goal to generalize to a larger population (Gerring, 2004). Some might say that case studies are based on the researcher's interpretation and therefore are too subjective (Flyvbjerg, 2006) Case studies are beneficial because it supports the investigation of a certain phenomenon in real-life and helps to understand complex issues (Jack, 2008). In this research semi-structured interviews will be used to understand the collaboration between surgeons and purchasers.

Therefore, surveys will not be applicable to answer the research question because surveys are characterized by a systematic or structured set of data. The information will be collected about the same variables from at least two cases to compare between the different cases (Vaus, 2014). In this research the variables are not clear yet, the variables will be found based on the interviews. This is one of the reasons why a survey will not be applicable. When the model is defined, based on the interviews, a survey could be used the either confirm or reject the variables.

Furthermore, observations are also not applicable because observation techniques will observe the participants to collect data about a certain phenomenon. Most of the time, observations will be used to measure behavior and compare it with other cases (Altmann, 1974). Since this study is about finding factors that will influence the collaboration between surgeons and purchasers, observations and surveys will not be applicable. So, a case study with in-depth interviews will be most suitable for this study.

Semi-structured interviews based on theory

In literature is described that the result of a case study is very dependent on the quality of the interview protocol since this protocol will give a structure for the semi-structured interview (Kallio et al, 2006). Therefore, an interview protocol is created to guide the researcher during the interview process. This interview protocol can be found in Appendix 2. To kick off the interview, different introductory questions about the respondents were asked to get an idea of their background and if their suitable as a respondent for this interview, for example: *'Can you tell me a bit about your job and work experience?" "How long do you work as a healthcare purchaser?"*

In order to find more about drivers of collaboration between surgeons and purchasers, questions about their opinion concerning drivers and barriers for collaboration were asked. The questions that are asked in the interviews are based on the literature findings from the earlier chapters in this research. These questions are about SuccessFactors, drivers and barriers of the collaboration between purchasers and surgeons within a hospital. In the final question of the interview the interviewee had to name what they think are differences in collaboration between end-users and purchasers in business context, and collaboration between surgeons and purchasers within a hospital. The answers from the interviews can either be a confirmation or addition to the model that is made based on the literature (Figure 4).

The following section will introduce the research sample.

Sample definition and data collection

There are different methods to select the sample for the research. When selecting the research sample, the sample method must suit the assumptions and aim of the research (Palinkas et al, 2005). When selecting the participants for the research, they must also suit the assumptions and aim of the research. In this study, medical specialists and purchasers who work at Dutch hospitals will be included. Potential participants were messaged and asked to take part in this research. A total of 6 purchasers and 1 surgeon are included.

The primary data of this research will consist of approximately 7 in-depth semi-structured interviews with purchasers. All interviews are recorded and afterward transcribed into text documents. Thereafter the text documents are coded to identify the most important and most mentioned attributes regarding collaboration. The duration of each interview is approximately 30 – 45 minutes (see Table 4). The interview duration varies, ranging from 23:35 minutes to 49:22 minutes. It was notices that some interviewees shared more detailed information and were generally more talkative. Which explains the longer duration of some interviews. Overall, some interviewees were less invested in the interviews than others. This explains the shorter duration of some interviews. Another explanation of the differences in durations is that people speak with different speeds. Some interviewees did not have to think long for reply, and soke quick, resulting in an overall shorter duration.

Table 4; Qualitative sample overview

Respondent	**Function**	**Interviewed via**	**Duration**
1	Purchaser	Teams	44:51
2	Purchaser	Teams	36:21
3	Purchaser	Teams	41:54
4	Purchaser	Teams	49:22
5	Purchaser	Teams	31:15
6	Purchaser	Teams	31:33
7	Surgeon	Teams	23:35

Codes used to analyze the interviews

With permission of the interviewees, the interviews got recorded within Microsoft Teams and afterwards transcribed. The transcripts must be analyzed in order to develop concepts from qualitative data (Huq Khandkar, 2009). Bottom up, open coding is used to identify the different barriers, facilitators, and contact factors. So different codes were used and developed for the different factors. Thereafter it was checked if there was any overlap between the codes. The codes where at the end categorized and assigned to the different propositions leading to the final and most general codes:

P1: Rejection, P1: Acceptance, P1: No opinion, P2: Rejection, P2: Acceptance, P2: No opinion, P3: Acceptance, P3: Rejection, P3: No opinion, P4: Acceptance, P4: Rejection, P4: No opinion.

Since, it is recommended to code as soon as possible, shortly after the interviews took place, the interviews got coded (Bryman., 2012). At the beginning of the coding process, it is necessary to read the different transcripts multiple times in order to find the first connections. Thereafter the different codes were assigned to different parts of the transcripts. To check whether connections could be made, or codes should be added, the codes must be reviewed repeatedly. After the coding process, popular views and interpretations will be used to substantiate the propositions. The outliers, unusual responses and quotes that contradict to the other data will be used to discuss the different propositions. (Bryman., 2012)

Results: Testing the propositions with the findings from the interviews

This chapter will describe the results of the interviews per proposition. All interview transcripts can be found in Appendix 3.

During the interviews, it became clear that all the respondents collaborated with surgeons during a purchasing process. They all work within hospitals and have experiences in working with surgeons. It also became clear that, based on the coding, there were a lot of similarities with the factors mentioned in the before mentioned model. During the interview, different micro and meso-interactional factors where mentioned. Some examples of these attributes are the personal characteristics of surgeons (e.g., high age, type of specialism) and characteristics of the purchasers (e.g., high education, ego, knowledge). Furthermore, examples of meso interaction attributes mentioned by the respondents are open working climate and freedom of expression. Besides the micro and meso interactional attributes, there were no factors mentioned which are examples of macro-interaction attributes. The following section will describe in more detail what the respondents mentioned about the different attributes mentioned in the propositions. At the end of each proposition an overview with the different factors will be described.

This chapter will describe the results concerning the propositions 1 and 2 which belong to the micro-interactional attributes.

Findings proposition 1: The personal characteristics of surgeons and purchasers will have an influence on the collaboration.

All the respondents mentioned that the characteristics of surgeons and purchasers have an influence on the collaboration. Respondent 1 mentioned: *'The characteristics of surgeons differ between the types of surgeons and specialists".* During the interviews, it became clear that the characteristics of surgeons changed over the last years. Respondent 1 mentioned: *"10-20 years ago, the surgeons where more powerful than the purchasers and the surgeons act in that way."* Which means that the older surgeons act different than the younger surgeons. Respondent 2 agreed on that. He gave an example of a collaboration between them and orthopedics. *"We could save 30% if we switched to another implant supplier, but it was crucial that all the different orthopedics agreed on this. There were two older orthopedics who did not wanted to change from supplier. They mentioned, in about 3 years I will retire. I will not change to another supplier. You have to wait 3 years. If I change now it will have a negative influence on my patients."* In this example, they did not switch to another supplier, and did not save 30%, only because the older orthopedics did not want to change. After the 3 years, they still changed to another supplier and saved 30% and the quality of the products was still the same. Respondent

3 mentioned: *"There is some sort of distance between the surgeons and us, apart from the fact that they earn 6 times more than us. They see themselves as the real elite of the hospital. The surgeons are experts in their field and are ultimately responsible. Which gives them a really strong position."* So according to respondent 3 the characteristic, expert, has an influence on the collaboration within the purchasing process. Respondent 4 mentioned: *"The older surgeons are more secretive than younger surgeons. The younger surgeons are also more innovative than the older surgeons. The older surgeons are more used to the older relationships. They see themselves as the silverback gorilla and do not let others interfere in their business."* So the age of the surgeons has an influence on the collaboration between surgeons and purchasers. Respondent 6 mentioned: "*You notice that the older specialists are old school. And the younger specialists are much more involved in the purchasing process."* Respondent 5 mentioned that loud-mouthed surgeons always get what they want. This has a negative influence on the collaboration between the surgeons and purchasers since the purchasers will have less influence on these surgeons. Respondent 5 also mentioned the differences between specialism within a hospital and their willingness to collaborate. "*There are different types of specialisms where problems always occur, for example the anesthetists and cardiologists, since they are more dominant and quirkier and sometimes arrogant. Also, surgeons who are involved in academic research do not respect the rules and collaborate less with purchasers".* Respondent 6 also mentioned that anesthetists and cardiologists are difficult specialisms. Furthermore, the characteristics of purchasers have also an influence on the collaboration with surgeons. Respondent 5 mentioned: *"As a purchaser, you must be a salesman. You have to have a good chat."* According to respondent 6: *"As a purchaser, it is important to not have a big ego. You have to be very patient and you always have to involve the surgeons. Never make the mistake of making a decision without involving them. Ultimately, it is always about communication, always."* Respondent 2 mentioned: *"It is important to have a high education. Do not put a Mbo´er against a PHDer. You must have respect, trust and be smart. It is also important to be personal. I put my work in the background and my personal information in the foreground."* Respondent 3 mentioned: *"It is important to have enough knowledge about the products. Specialist purchasers are important. A good purchaser is a good salesman. It is important to have account skills".* Respondent 4 also mentioned these characteristics. So, different characteristics for surgeons and purchasers are mentioned by the respondents. They all mentioned that the characteristics have an influence on the collaboration between the surgeons and purchasers in the purchasing process. In general, younger surgeons are more innovative

and will more than older surgeons. So, there is sufficient information that **support** proposition 1. Table 5 gives an overview of the different characteristics mentioned by the respondents.

Table 5; Personal characteristics mentioned by the respondents that effects the collaboration between surgeons and purchasers

Personal Characteristics surgeons	Personal Characteristics purchasers
(-) High Age	(+) Act as a salesman/Account skills
(+/-) See themselves as expert	(+/-) Ego
(-) Loud-mouthed	(+) High education
(+/-) Depends on type of specialism	(+) Be personal
	(+) Knowledge about the product

(-) Negative influence, (+) positive influence, (+/-) could have positive and negative influence

Besides the personal characteristics mentioned in table 5, more factors were mentioned by the respondents. Respondents mentioned that years ago, purchasers had the image of Calimero. Surgeons looked at purchasers as not important people. The purchasing department was the department which only ordered products. Surgeons looked at purchasers in that way. Respondent 3 mentioned: *"You are only a small pawn and the surgeon think, there you have those people from purchasing again with their quotations. They saw us as Calimero's."* The past years, there changed a lot. Also, this year, with the Covid-19 pandemic, purchasers have a very important role. The purchasing department in hospitals is much more appreciated. Respondent 4 mentioned: *"During the Covid-19 pandemic, there was more appreciation for the purchasing department. Our department must purchase the personal protective equipment. ... they appreciated our more".* But there are still some surgeons who look down on purchasers. Which will have a negative influence on the collaboration between surgeons and purchasers. Respondent 5 mentioned that some surgeons look down on purchasers, but she also mentioned: *"You also let yourself be looked down on. It is also a matter of standing up a bit and not being intimidated. And of course, they find it super annoying when someone who has not studied medicine finds something about a product. Sometimes you are right after all. And that is always a very interesting discussion.* So, the view of surgeons on the role of purchasing will have an influence on the collaboration between surgeons and purchasers. When surgeons have negative view on purchasing the impact on the collaboration will also be negative. So, a factor that can be added to the personal characteristics which influences the collaboration is the view of surgeons on purchasing.

Another aspect which is frequently mentioned by the respondents is the relationship between surgeons and different suppliers. All the respondents mentioned that the surgeons have a relationship with suppliers. Also, the surgeon, respondent 7 mentioned: *"My relationship with the supplier is better than my relationship with the purchasers".* Different reasons are mentioned by the respondents, but the most mentioned reason is the amount of contact moments between the surgeons and supplier, and surgeons and purchasers. Respondent 1: "*The suppliers often have to explain the products, and give instructions. They also maintain their relationship with the surgeons. I think that, some suppliers see the surgeon more often than I see the surgeon. Because they are very often present at the workplace. And I only see a surgeon in the project group or when a process is started. And that is okay. Only the doctor must be aware of how such a process runs and what is important in it."* The suppliers visit the hospital and the OR's different times per month or even per week. Respondent 4 mentioned: *" I think more often than necessary. They are very often required for procedures. I think it is strange if you do 40 procedures a year, you can do it yourself after 4 procedures. But you still see that the supplier offers a lot of support and is there very often. ..... I understand from conversations that they are there very often."* Respondent 5 mentioned: *"So there are logical contact moments that the suppliers sometimes misuse."* Respondent 6 mentioned: *"There are suppliers who, have a bed in the OR here. They will never get away. Yes really.".* Besides the existing relationship between the supplier and surgeon, the relationship has changed over time. Some respondents mentioned that this relationship is less close than years ago. Suppliers used to give a lot of presents, but that is a lot less. Respondent 2 mentioned: *"There were certain money and stuff trips attached to it. That is a lot less now, but what you still see is that a lot is contributed to, for example, promotions. When a surgeon wants to do a doctorate, and often that promotion is related to a piece of technology, the supplier invites the surgeon to do the doctorate with them on the basis of the development of the product".* Suppliers have different tricks to improve their relationship with the surgeons, for example promotions. Respondent 3 agreed on this: *"Surgeons have often conducted research at a supplier to improve for example the implant, written dissertations, suppliers do this very cleverly of course, making the dependence much bigger".* Due to the existing relationship between the supplier and surgeon, the respondent's experiences that they are pushed in one direction, during the purchasing process, to one certain supplier, by the surgeon. The surgeons describe the requirements in such way that only one supplier remains. Respondent 3 mentioned: *"They describe the quality requirements in such a*

way that you only have 1 supplier. It is not possible to negotiate with different suppliers" Despite only one supplier remains, it is still possible for the purchaser to negotiate with the supplier. Respondent 4 mentioned: "*There is real negotiation. It is just, it is sometimes difficult because the surgeon's wish is fixed. You cannot get stuck with that negotiation. You cannot say if you do not come out, we will look further. That is not an option. You have to get a solution and look for common ground, that's what it actually comes down to. But what we often see is that savings are being made anyway."* Respondent 6 mentioned; "*when a surgeon is so committed to a supplier, you can try to counteract that, but is better to pay attention how to come to a favorable cooperation, also for the hospital. Then can be done in more ways than the prices."*

So, the relationship between the supplier and surgeons has an influence on the collaboration between the purchaser and surgeons. Most of the time it will have a negative influence since the surgeons push the purchasers in one direction, to the supplier and there is almost no room to negotiate. Figure 5 gives an overview of the different personal characteristics mentioned by the respondents which have an influence on the collaboration.

Table 6; Personal characteristics indeed influences the collaboration between surgeons and purchasers

Personal Characteristics surgeons	**Personal Characteristics purchasers**
(-) High Age	(+) Act as a salesman/Account skills
(+/-) See themselves as expert	(+/-) Ego
(-) Loud-mouthed	(+) High education
(+/-) Depends on type of specialism	(+) Be personal
(-) Negative view on purchasing	(+) Knowledge about the product
(+) Positive view on purchasing	
(-) Relationship with supplier	

(-) Negative influence, (+) positive influence, (+/-) could have positive and negative influence

As can be seen in table 6, there is enough information to **support** proposition 1. The green color, the plus icon, means a positive effect on collaboration. The red, minus icon, a negative effect on collaboration between surgeons and purchasers. The following chapter will describe the second proposition which belongs to the micro-interactional attributes.

Findings proposition 2: Human interactions have a large effect on the collaboration between surgeons and purchasers.

This chapter will describe different aspects of human interactions and their effect on the collaboration between surgeons and purchasers. During the interviews it became clear that these attributes include power, communication, willingness to collaborate and mutual trust and respect.

All the different respondents mentioned that the surgeons have more power than the purchasers and it influences the collaboration. However, they also mentioned that the surgeons have less power than 10-20 years ago. Respondent 1 mentioned: "*10-20 years ago, the surgeons were really in a position of power. And they purchased products without informing the purchasing department. Nowadays that is no longer possible. But it is very simple, the end-user determined.*" Respondent 1 indicates that the end-user, in this case the surgeons, are the persons who have the final word. Respondent 2 confirmed this. He says: " T*he board is still not in charge of the hospital. On paper, yes. But still, for the most part, the medical staff is really the one who has the final say. You see, especially with those older doctors that they see themselves more as the boss than the board.*" Respondent 6 explained that there is a lot of ego in a hospital. If you, as a buyer, cannot stand that ego, then you should not work there.
So, the respondents mentioned that the surgeons think that they have more power than the purchasers, or even the board. Some respondents explained different ways of dealing with these power differences. Respondent 3 says for example: *"I think it depends on how you position yourself. So, you should not go there as a Calimero. But that is different if the purchasing policy is approved by the board of directors, but also by the medical director. It also changes when there are financial problems. Then such a power relationship changes, they see you as a welcome addition.* So respondent 3 indicated that the financial status of the hospital also influences the power differences between the surgeons and purchasers. When the hospital experiences financial problems you see that the power differences will reduce. But overall, there is indeed still a power difference between surgeons and purchasers. And most of the time it has a negative influence on the collaboration. Respondent 4 mentioned: "*We could make considerable savings, but then the surgeon refused to cooperate. He did not want to test the products. You could simply save 18 thousand euros per year if that test were to pass. And this has been going on for 2 years now. In this case, the surgeon really has too much power. It has a negative influence on our collaboration*" So the first human interactional aspect which has an negative influence on the collaboration is power differences. These differences will reduce when the financial status of the hospital is bad.

Table 7: Power differences has a negative influence on collaboration

Human interaction attributes
(-) Power differences (is influenced by financial status of hospital)

(-) Negative influence, (+) positive influence, (+/-) could have positive and negative influence

Besides power differences, the amount of trust and respect is another attribute which is mentioned by the respondents. The expectation is that surgeons have more trust in other professionals who are considered most competent and experienced. When surgeons and purchasers collaborate, the expectation will be that surgeons have less trust in purchasers when they are less experienced and vice versa. During the interviews it became clear that purchasers already have a lot of trust and respect for the surgeons. Even if the surgeon is young and unexperienced, the purchasers always have respect and trust in them. So, based on the interviews, the trust and respect purchasers have in surgeons do not depend on the amount of work experience.

The respondents mentioned different ways of how they earn the trust and respect from the surgeons. Respondent 3 mentioned: *"As a purchaser you must have knowledge of the facts. You will never have their knowledge, but you must know the basis you are talking about. Specialism is important. Especially specialized purchasers."* During the interviews it became clear that it is important to have knowledge and skills as a purchaser in order to earn the respect and trust from the surgeons. Respondent 4 explained: "*It is not a market where you can clap a hand. You must have a certain level of knowledge. To be able to talk to them. It is important that they take you seriously. That they see that you add something to that. And that does not have to be just a negotiation result. But that can also just think out of the box. But also, for example, when you purchase a device, they only think of the device. And if you, as a buyer, indicate that maintenance must also be carried out. And you come up with that yourself, they also know that you really add something. And that creates trust and respect."* Respondent 5 also mentioned the importance of having enough knowledge and skills as a purchaser: *"I think it's about mutual respect. It's about immersing yourself in their profession. And then it is that we often have to delve into the specialism. And they are not in purchasing. We have academies or graduates at work. And I think you need that too. In fact, I think it can help enormously if you are academically trained and have more of that mindset. Doctors are all academies. They will then respect you more quickly."* So, the amount of trust and respect does not depend only on the amount of work experience. As a purchaser, you can earn the respect and trust from the surgeons when you have enough knowledge about the product to purchase, when you are high educated,

think out of the box and immerse in their profession. Trust and respect depends on more aspects, but is still has a positive influence on the collaboration between surgeons and purchasers.

Table 8: Mutual trust and respect have a positive influence on collaboration

Human interaction attributes
(-) Power differences (is influenced by financial status of hospital)
(+) Mutual trust and respect

(-) Negative influence, (+) positive influence, (+/-) could have positive and negative influence

Besides mutual trust and respect, the respondents mentioned that communication is a key determinant of collaboration and is a driver for trust, respect and sharing. All the respondents mentioned that good communication and willingness to collaborate are a driver for good collaboration. They mentioned, if the willingness to collaborate is high and how better the communication between the surgeons and purchasers, how better the collaboration is. So it is important to have good communication skills as a purchaser and that the willingness to collaborate is high. Respondent 3 explained: "*You must have certain social skills. So empathy, that can watch your surgeon's thoughts. What does he want. Ensuring that you are aligned within the possibilities that are available, but also within the hospital. Account management is 50% anyway. And that you know how to switch between the different interests. Board has an interest, medical staff, doctor and you have an interest too."* But it is also important for the purchasers, to the surgeons have good communication skills. They have to inform the purchasers what they are doing. Respondent 6 explained: *"Those men and women have a lot of knowledge and they go to a lot of different conferences. They know well ahead what they want to do in the future. When they only inform us when the patient is already in the operation room, then you get issues. So it is important to have good communication, be involved at the beginning of the process. But it is also important to involve the surgeons in the process. Never make the mistake to decide something without involving hem. Because then you are ready, and you can go home. Ultimately, it's always about that communication, always."* Based on the information from the different interviews it can be stated that communication and willingness to collaborate are factors that has a lot of influence on collaboration in general. It is also a driver for trust and respect. A respondent indicated that when there is no communication and no willingness to collaborate, there could not be collaboration, our trust and respect in each other.

Table 9: Good communication and willingness to collaborate have a positive influence on collaboration

Human interaction attributes
(-) Power differences (is influenced by financial status of hospital)
(+) Mutual trust and respect
(+) Good communication
(+) Willingness to collaborate

(-) Negative influence, (+) positive influence, (+/-) could have positive and negative influence

As can be seen in table 9, there is enough information to **support** proposition 2. The green color, the plus icon, means a positive effect on collaboration. The red, minus icon, a negative effect on collaboration between surgeons and purchasers. The following chapter will describe the two proposition which belongs to the meso-interactional attributes.

Findings proposition 3: The physical and organizational environment (e.g., schedules, processes, communication tools) have a large influence on the collaboration between surgeons and purchasers.

The different respondents mentioned indeed that organizational environment has a large influence on the collaboration between surgeons and purchasers. Most of the time collaboration does not work because the surgeons simply do not have enough time to schedule a meeting. Respondent 4 mentioned: *"I get the impression that they are very busy. As a result, I have more contact with a team coordinator or head of care. They speak for the surgeons, there is a kind of filter in between.".* Respondent 3 mentioned a solution for this problem, namely: *"It is better to meet 5 minutes once a week. Then that you have one hour consultation every quarter. You will lose your entire band if you meet one time per quarter".* Almost all the respondents also mentioned that the processes within the hospital are so developed that the surgeons and purchasers must collaborate. Respondent 6 mentioned: "*The process and policy is of course primarily designed to comply with the guidelines of the medical convenant. That we especially have to work safely. In addition, you want to prevent all kinds of products from entering the house that you do not know exist and that they have not been assessed for safety risks. That has been the main part of doing this. But in the end, of course, this resulted in quite good cooperation"* Other hospitals have a purchasing policy, or purchasing protocol to which everyone must adhere, and which says that the purchasers and surgeons have to meet and share their knowledge. It is not possible for a surgeon to purchase

products without involving the purchasing department. Respondent 1 mentioned: *"It is completely covered by procedures and the purchasing process. In fact, nothing can be purchased anymore, inside or outside the purchasing department. That is actually impossible."* Respondent 3 mentioned that academical hospitals must tender, which makes it more easy but general hospitals do not have to do that. *"You must have certain policy which also is approved by someone who managed the surgeons, for example a medical director."* Only one respondent mentioned that there is no stimulation from the hospital to collaborate with surgeons. Respondent 3 mentioned: *"No you had to do all that yourself. Set up that account management. It was stimulated a bit by the facility manager. But you have to do it yourself."* Respondent 7, the surgeon, mentioned: "*We have certain protocols and guidelines that we must adhere to. So if we want to purchase a new prosthesis, we have to contact the manager and he will contact purchasing. Or we can go directly to purchasing. In that sense it is stimulated because it is a way of working, and according to the guidelines. But time is not booked as standard in our agenda to work with purchasing".*

Furthermore, organized activities have a positive effect on the collaboration. Respondent 5 mentioned: "*training is a good example. We have consulted the RFE. We meet once a month in the evening. You meet each other over coffee. You have several inspiration sessions. Leadership Programs. things like that. And sometimes work groups. I am now in a working group and that is about value chains and the surgeons are also there. And sometimes you are indeed invited for a purchasing process that they have already been working on themselves. All these activities stimulate the relationship"* Besides the organized activities, some respondents mentioned that there is also the possibility to go as a purchaser to the OR's and watch what the surgeons do with the products. Respondent 2 mentioned: *" Very often I also go to the OR to see how they do certain things, why they do certain things. Then they can show that certain product are important. At that point, you also develop a relationship with the surgeon, and he knows he is being taken seriously."* Respondent 4 also got invited to go to the OR's and watch the operation, but he simply does not have the time for it. *"it is always an agenda issue".*

So in almost all the different hospitals, the collaboration is stimulated by the processes and policies. Some of the respondents did not experiences this stimulation. Furthermore, there must be enough time for purchasers and surgeons to collaborate more, in some hospitals there are different activities and meeting where surgeons and purchasers meet each other. So, it can be stated that physical and organizational environment (e.g., schedules, processes, communication tools) have a large influence on the collaboration between surgeons and purchasers.

Based on the different statements from the respondents, there is a certain degree of **support** for proposition 3.

Table 10: Physical and organizational environment influences collaboration between surgeons and purchasers

Physical and organization environment
(+) Physical spaces
(+) Schedules
(+) Processes
(+) Organized activities
(+) Communication tools

(-) Negative influence, (+) positive influence, (+/-) could have positive and negative influence

As can be seen in table 10, there is enough information to **support** proposition 3. The green color, the plus icon, means a positive effect on collaboration. The red, minus icon, a negative effect on collaboration between surgeons and purchasers. The following chapter will describe the last proposition which belongs to the meso-interactional attributes.

Findings proposition 4: Organizational philosophy can either have a positive as a negative effect on collaboration.

It is expected that the organizational philosophy of the hospital influences the collaboration between surgeons and purchasers. For example, freedom of expression, open working climate. All the respondents mentioned that there is no culture of fear. Respondent 3 mentioned: *"There is no culture of fear, but you have to be tactical".* Which means that it is possible to say everything you want as a purchaser, but you have to do it in a tactical way to get the surgeons on your side. Freedom of expression, open working climate or culture of fear is a part of the horizontal structure of a hospital. It is expected that a horizontal structure instead of a traditional hierarchical structure will have a positive effect on the collaboration between surgeons and purchasers. When purchasers and surgeons collaborate, they must understand the horizontal structure, it stands for open communication and shared decision-making. Different respondents mentioned indeed that open communication and shared decision-making has a positive effect on the collaboration. Most of them experienced it too. But there are also respondents who still experiences some traditional hierarchical structure, for example the power differences, but also the different cultures per department. Respondent 4 mentioned: *"In our hospital you see that the culture decides. Some departments are very much looking for cooperation with purchasing. Purchasing is important to them. and others see you more as a kind of burden oh dear, purchasing should also say something about it. it is also somewhat determined by culture. That's what my feeling says."* Based on the information from the respondent above, and the already early mentioned aspect from the different respondents about power differences, open communication, respect, and trust. A horizontal organizational structure has a positive effect on the collaboration between surgeons and purchasers within hospitals.

Table 11; A horizontal organizational structure has a positive effect on the collaboration

Organizational philosophy
(+) Horizontal organizational structure

(-) Negative influence, (+) positive influence, (+/-) could have positive and negative influence

Besides the horizontal organizational structure another organizational philosophy aspect mentioned by the respondents is involving a professional with knowledge and leadership skills. It is expected that the development of collaboration between surgeons and purchasers is facilitated by leaders who know how to convey the new vision of collaborative practice. The different respondents mentioned that there is almost always a third person involved in the collaboration. For example, the board of directors, head of surgeons, managers and so on. Respondent 6 indicated that they collaborate more with the budget holder then the surgeons.

The surgeons are a part of the budget holders in that hospital. But these budget holders cannot make decisions without the support of the surgeons. Furthermore respondent 2 mentioned also different professionals who are involved in the collaboration, namely: *"Orthopedists, team manager OR surgery, often participated in the negotiations. So we collaborate with the person who is very close to the orthopedists. Her employees work also at the OR table. And such a team manager is a leader the collaboration. Under no circumstances should you do it alone, I think. When it comes to support and commitment and how you come across to the supplier."* These persons are involved to ensure that the collaboration, and the purchasing process, will proceed successfully. Respondent 1 mentioned: *"Sometimes you notice that the surgeon wants the best. He wants the expensive watch, and the trick is of course to find out whether you really need it. And that is a teamwork, and you have to play it together. And that generally works well. And that is why it is very good that there are experts who can ask critical questions."* Sometimes these persons have so much influence, that the success of the collaboration depends on them. Respondent 4 mentioned: "*The head of care is an important one for us. We have seen when a new head of care came up, who very much believed in cooperation with purchasing. Then you also see that everyone is cooperating. So it is not so much the specialist, but it is the head of care that determines whether it will be successful. If they do their best to actively involve purchasing, things will work out."* Other aspects mentioned by the respondents which have an influence on the collaboration and belongs to the organizational philosophy are freedom of expression, fairness, interdependence, open working climate and risk taking. Based on the information from the interviews and from the literature in this research the figure 11 can be developed.

Table 12; Organizational philosophy attributes have an positive influence collaboration between surgeons and purchasers

Organizational philosophy
(+) Horizontal organizational structure
(+) Professional with knowledge and leadership skills involved
(+) Freedom of expression
(+) Fairness
(+) Interdependence
(+) Open working climate
(+) Risk taking

(-) Negative influence, (+) positive influence, (+/-) could have positive and negative influence

Final model: Support collaboration between surgeons and purchasers

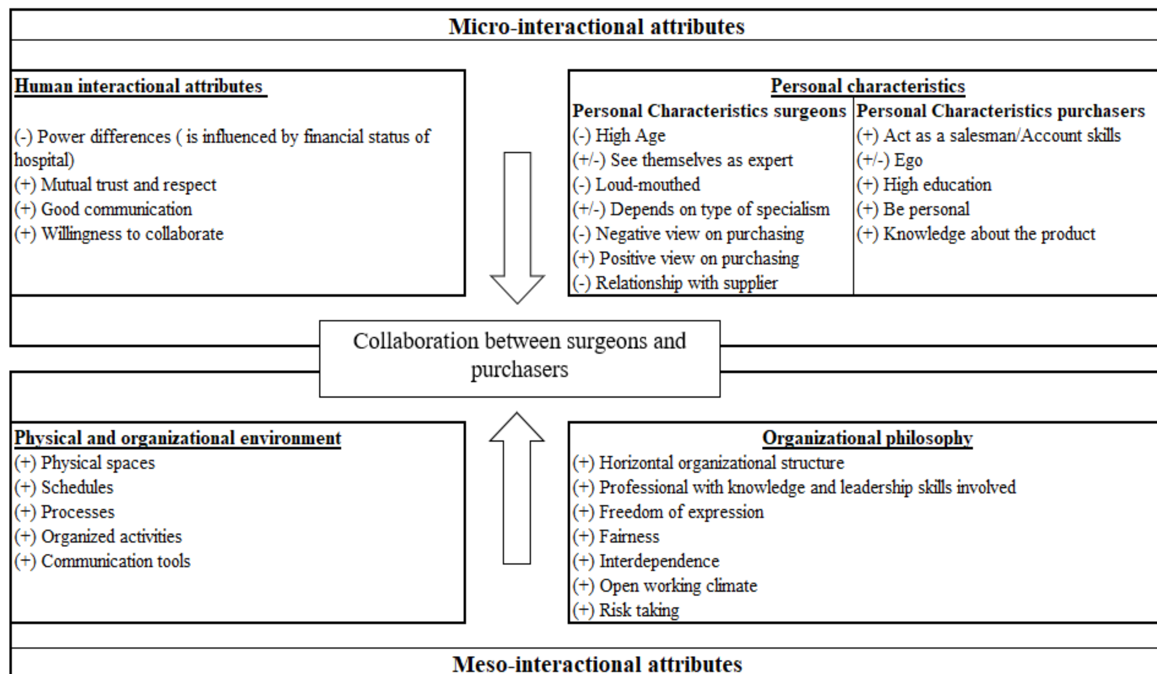


Figure 5; Different aspects that influences the collaboration between surgeons and purchasers

(-) Negative influence, (+) positive influence, (+/-) could have positive and negative influence

Figure 5 shows the final model with all the different aspects which influence collaboration between surgeons and purchasers during the purchasing process. A bigger version can be found in Appendix 4. Based on the interviews, it became clear that all the 4 aspects have a certain influence on the collaboration. The green color, the plus icon, means a positive effect on collaboration. The red, minus icon, a negative effect on collaboration between surgeons and purchasers.

Discussion, implications, limitations, and recommendations for future research

The aim of this study was to develop a model that supports the collaboration between surgeons and purchasers in Dutch hospitals to guarantee quality and costs savings. In this thesis, a new model is developed which shows the different factors that influences the collaboration between surgeons and hospital purchasers.

The study from Company (2017) mentioned that surgeons can influence the purchasing decisions within hospitals. The early involvement of surgeons in the purchasing process can lead to good decision making and it benefits the organization. Health care organizations that work with surgeon participation will experience faster changes and new initiatives. Other studies mentioned that by involving surgeons in the purchasing process, the purchasing costs decreases (jackson, 2016; Croft, 2017). So during the interviews it became clear that different respondents involve surgeons in the purchasing process but it is sometimes really challenging. When they do involve the surgeons, it is possible to decrease the purchasing costs of the products. However, the biggest challenge in controlling the costs is creating incentives for surgeons to cooperate with purchasers (Healy, 2007). Few is known about how to stimulate the collaboration between surgeons and purchasers to guarantee quality and achieve cost savings. This research gives really insights in how to stimulate these collaboration and which factors have a positive and/or negative influence on the collaboration.

Furthermore, different studies are available on the concept collaboration (D. d Amour, 2005; K. Caldwell, 2003: Hall, 2005; Kumar, 1996). These studies describe different Success factors, barriers and attributes of collaboration in general. This study confirmed most of the early mentioned factors which have an influence on collaboration, for example trust, respect, organizational structure etcetera. Not all the early mentioned attributes mentioned in literature are mentioned by the respondents and included in the model. But the big difference between this study and the early mentioned studies is that these factors are specific for surgeons and health care purchasers and the way how these attributes influence the collaboration is unique in its field.

Theoretical and practical relevance of the research findings

This paper aims to clarify some questions regarding the development of a collaboration model for healthcare purchasers and the different attributes which have an influence on their collaboration with surgeons within the purchasing process. Findings of this thesis have academic relevance since it adds to the research of other scholars who research collaboration in general, collaboration between end-users and purchasers, collaboration within hospitals during the purchasing process. The general collaboration attributes, mentioned in figure 3, are early mentioned in literature and well known. These attributes are not fully applicable for the situation concerning the collaboration between surgeons and healthcare purchasers since surgeons and the working climate within hospitals is different from the 'normal' industry. Surgeons are in this case the end-users and differ from end-users in the 'normal industry' since surgeons have a lot of power, are risk averse and their focus is most on quality and helping the patients. Since surgeons differ from other end-users, the expectation in this study was that the attributes which influences the collaboration between surgeons and purchasers differ from the attributes who are important during a collaboration between a purchaser and an end-user in the 'normal industry'. And indeed, it became during the interviews clear that the personal characteristics of surgeons have a big influence on the collaboration, as well as power differences, type of specialism etcetera. It also became clear that the characteristics of purchasers have a big influence on the collaboration. As a healthcare purchaser working with surgeons, it is important to be high educated, act as a salesman, do not have a big ego and be personal. This are specific attributes which where not studied and identified before. Another interesting attributes which influence the collaboration is power differences. During the interviews it became clear that surgeons often have more power than purchasers. Most of the time, the power differences have a negative influence on the collaboration. An aspect which influences the power differences, is the financial status of the hospital. During the interviews it became clear that when the financial status of the hospital is bad, the power differences between surgeons and purchasers decreases. Which means that the collaboration between surgeons and purchasers increases when the financial status of the hospital is bad. This finding is also new in this field. Furthermore, the four different categories, personal characteristics, human interactional attributes, physical and organizational environment, and organizational philosophy, divided over micro- and meso-interactional attributes, which influences the collaboration between surgeons and purchasers is new to this field of research. As mentioned before, there are different studies available on collaboration in general (D. d Amour, 2005; K.

Caldwell, 2003: Hall, 2005; Kumar, 1996) but not on the collaboration between surgeons and purchasers.

The findings of this research have also practical implications. As mentioned before, early involvement of surgeons in the purchasing process could lead to decrease in purchasing costs and better quality of the products. When purchasers have to purchase products, which will be used by the surgeons, they have to collaborate with the surgeons. The model developed within this research can be used by the purchasers when they have to collaborate with surgeons. They can use the different attributes mentioned in the model and their different influences to make a collaboration successful. For example, product knowledge, purchasers have to delve into the products they have to purchasers in order to have enough knowledge about the product. When the surgeons notice that the purchasers have enough knowledge they will have more respect and trust in the purchaser and it is likely that this will stimulate the collaboration between them.

Limitations and further research

In addition to the strength of this research is also naturally has its weaknesses. This study was carried out with a small research sample of 6 hospital purchasers and 1 surgeon operation in the Netherlands. This limits the external validity of the findings since they might not be the same in other geographic areas in the world. This study could be expanded to other countries to validate the findings.

Further, it would be interesting to find out, how different surgeons experience the collaboration between them and healthcare purchasers. Since it became clear during the interviews that the type of surgeon has an influence on the collaboration. To use the developed model for surgeons and purchasers in the best way, it is recommended to investigate how different types of surgeons experience the collaboration with healthcare purchasers. When their view on collaboration is indicated the model can be updated and will possibly be more accurate.

Furthermore, in this research the focus was on collaboration in action. As mentioned before there are different types of collaboration. It is recommended to investigate if the dynamic between surgeons and healthcare purchasers is different when the stage of collaboration is different. It is likely that per type of collaboration, different attributes are important.

Out of this research, the following questions came forward and are interesting for further research:

- Which factors are important for surgeons when they collaborate with healthcare purchasers?

During the interviews it became clear that the type of surgeon has a influence on the collaboration. Orthopedics and vascular surgeons are harder to collaborate with than gynecologist since some surgeons are more positive than others. Combining this information with the early mentioned question the following research question came forward:

- Will these collaboration factors differ between the different types of surgeons?

To investigate if the developed collaboration model in this research stimulates the collaboration between surgeons and healthcare purchasers in practice it is interesting to give an answer to the following question:

- Stimulates the developed model in this research the collaboration between surgeons and purchasers in practice?

As mentioned before, collaboration has different stages. This research focuses on collaboration in action. It is interesting to investigate if there are different attributes important in the different stages of collaboration. So, the following question came forward in this study:

- Which attributes are important per stage of collaboration and when are these types of collaboration necessary?

It would be interesting to see if future scholars pick the ideas up in further research.

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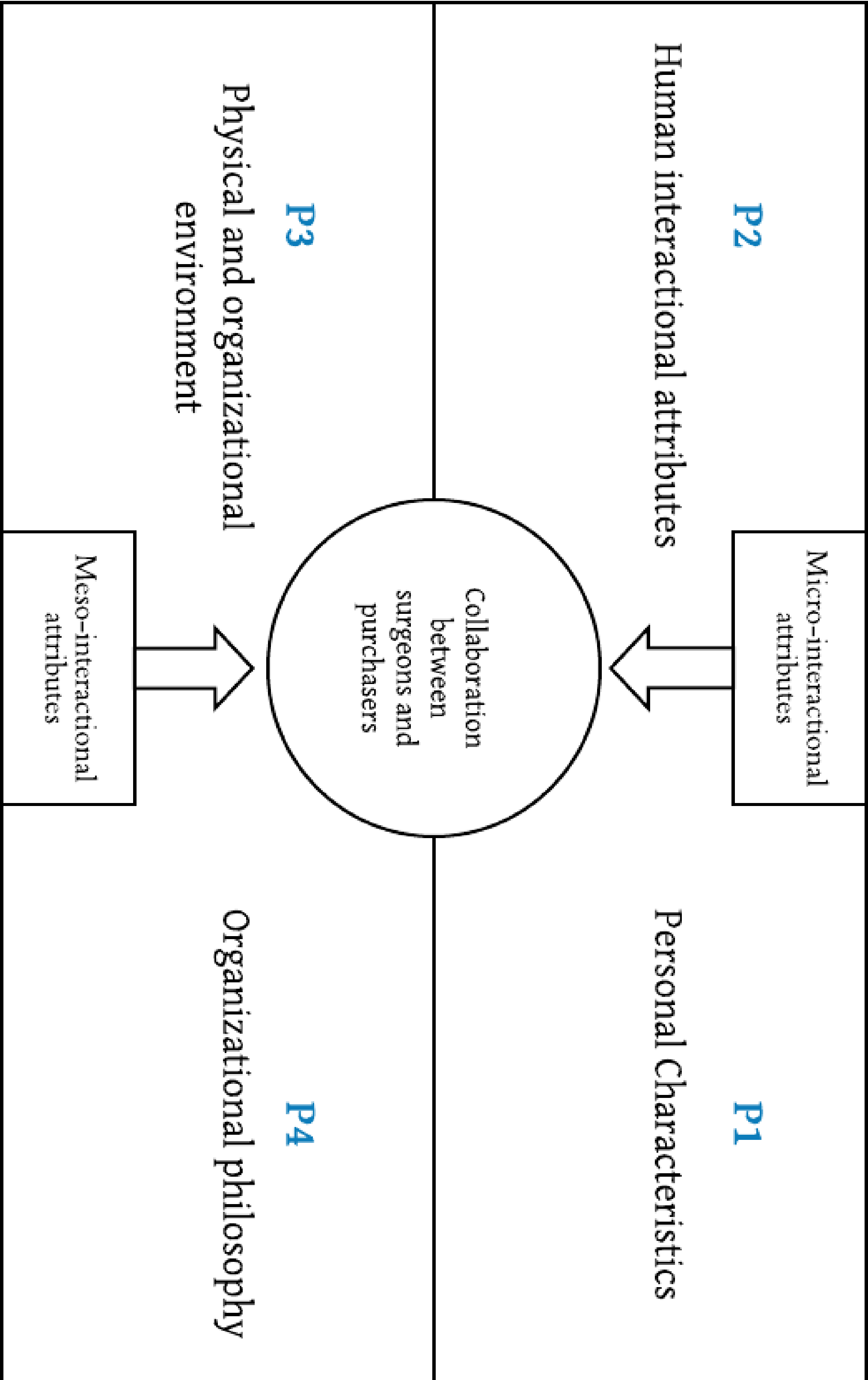
Appendix 1: The model with different propositions



Appendix 2: Interview protocol

Collaboration between surgeons and purchasers

1. Instruction to the interviewer
   a. Opening
   I would like to thank you once again for being willing to participate in the interview aspect of my study. As I have mentioned to you before, my study seeks to understand which factors will influence the collaboration between medical specialists and purchasers in the purchasing process in order to reduce price and maintain quality. Our interview today will last approximately 45 minutes during which I will be asking you about you opinion concerning the collaboration with medical specialists. Before we begin the interview, do you have any questions? [discuss questions] If any questions arise at any point in this study, you can feel free to ask them at any time.
   b. Anonymity of the respondents
2. Explain the goal of the interview
   a. Explain goal of the research
3. Personal questions to be asked
   a. Personal information respondent
      - Can you describe your job?
      - How long do you work here?
      - Do you often collaborate with medical specialists?
      - When? Why? How?
4. What are, in your opinion, the advantages and disadvantages of collaboration with medical specialists within the purchasing process?
   a. Do you experience these advantages/disadvantages?
   b. [When they have no idea, explain the advantages/disadvantages from literature]
5. Key question themes
   a. Do you see the added value of collaboration with medical specialists?
      - Why? Why not?
   b. What do you think are success factors for collaboration within the purchasing process?
      - Why?
      - [Discussing different success factors]
   c. What do you think are barriers for collaboration within the purchasing process?
      - Power difference?
      - Time?
      - Organizational support?
      - [Discussing different barriers]
6. Which kinds of techniques or tricks do you use to improve the collaboration with medical specialist? to have more “say” and convince the medical practitioners better
7. What do you think are the differences in collaboration with the end-user within business context and hospitals?
8. Space for recording the comments
9. Thank respondent for time and effort

Appendix 3: Interview transcripts
Not available.

Appendix 4: Final model