Balancing the Supplier-Hospital-Physician Relationship: A Multi-Case Study Research

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ABSTRACT,
The procurement process of physician preference items (PPIs) is known as expensive activity for hospitals. Together, PPIs account for one-third of overall hospitals supply expenses. Clear evidence on how to align the procurements' preferences with the physicians' preferences is missing. Therefore, the goal of this study was to find how the purchasing department can gain physicians commitment to better align the purchasing strategies. The supplier-hospital-physician relationship was studied by means of 9 interviews with 10 interviewees in total. The interviewees consisted of both physicians and purchasing managers in Dutch hospitals. Two distinct questionnaires were applied in the interviews. One questionnaire based on physicians, the other based on purchasing managers. This provided for a complete view on both parties involved. The results from the interviews were quite corresponding, as both parties indicated that they do not have a big issue with the misalignment between the purchasing department and physicians, but improvements on collaboration and communication would be useful. After analysing the results, four general solutions to the misalignment could be given, namely increasing transparency in terms of price, results, and added value, increase collaboration and communication with physicians, invest in sustainability, and implement gain sharing as a strategy. Next to that, a misalignment on sustainability was found between physicians and purchasing which should be investigated further.

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Keywords
Physician Preference Items (PPI) - Healthcare Purchasing - Supplier-Hospital-Physician Relationship - Cost Containment - Hospital Supply Expenses.

1. INTRODUCTION

The alignment of the physicians' preferences for medical devices and procurement department requirements is a known issue in health care systems. The procurement process of these devices is an expensive activity for hospitals. Supply expenses account for the second largest cost category for hospitals, just behind labour expenses (Abdulsalam & Schneller, 2019). Health care systems lack in encouraging the development of lower-cost methods of care and are unsuccessful to promote efficiency and quality (Robinson, 2008). These vulnerable systems have been particularly active in the medical device industry. The medical device industry produces for instance knee and hip joints, spine disks and surgical components, and vascular stents. These high-cost and high-quality devices are frequently referred to as Physician Preference Items (PPIs) (Robinson, 2008). PPIs are items which are strongly preferred by physicians and play a key role in purchasing and hospital expenses (Nyaga & Schneller, 2018). These items are mostly used in the orthopaedic, neurosurgery, cardiovascular surgery, and interventional cardiology services. Together, they account for a large share of hospital revenue and earnings (Robinson, 2008).

A study by Robinson (2008) suggests that PPIs account for one-third of overall hospital supply costs. Hospital supply costs are escalating while demand is rising even more. One example is the market for hip and knee replacements, which has shown a 50 percent increase on hip replacements and 40 percent increase in knee replacements from 2000 to 2004 (Montgomery & Schneller, 2007). These statistics from the National Centre for Health Statistics (NCHS) are expected to grow even more in the next twenty-five years, with an extraordinarily expected increase of 673 percent on knee implants (Montgomery & Schneller, 2007). These statistics highlight the importance of a focus on cost containment from physicians, to relieve the pressure from rising demands and costs on hospitals.

The dilemma for hospitals is that there is a misalignment of its physicians' and the hospitals' interests, represented by the purchasing department. Hospital procurement managers frequently have limited influence on the procurement of PPIs. They often lack the knowledge and clinical expertise that surgeons have, and thus rely on surgeons' preferences and judgement in procurement. This is a problem, as physicians are frequently not interested in cost-containment methods and hospital value (L. Burns, Housman, Booth, & Koenig, 2009). Moreover, physicians may be resistant towards the hospitals' procurement goals and regulations, and often reluctant to switch devices (Robinson, 2008).

Physicians' preferences are firstly caused by their strong affinities with device suppliers. Physicians often have strong affinities with the manufacturers of medical devices. These strong relationships develop because of the close ties that establish in the operating room (Robinson, 2008). Added to that, physicians are trained in the OR to use specific devices, which builds a certain loyalty towards their vendor's technology. This loyalty extends as far back as the surgeons' residency training. They are therefore reluctant to switch to new vendors. Studies by Scannell and Bedell (2008) and Miksic, Reicin, Yik, and Roman (2005) show that implementing change in the devices used is a slow process which can even take 5 to 15 years (L. Burns et al., 2009). Surgeons' decisions are therefore based on personal experience and their assessment of a patients' interest, not related to costs (Montgomery & Schneller, 2007). Lastly, another influence on physicians' preferences is the absence of information on medical devices (Robinson, 2008). Most innovations on these types of devices are introduced as an incremental modification from current devices, while on the contrary they represent major technological innovations. Information gaps on new devices are not limited to performance, they also include price. Price and performance transparency are thus important to support the comparison of products on best-available prices across competitors, and to make the best decisions in procurement (Robinson, 2008).

Overall, clear evidence on how to align the hospitals' preferences with the physicians' preferences is missing. However, it is difficult to obtain physicians' commitments aiming to align the purchasing strategies established by the procurement department. Therefore, this study seeks to fill the gap in posing the following research question: *"How can the Purchasing department gain physicians' commitment to better align the purchasing strategies?"*. Prior studies have frequently examined the source of physician preference items and hospital supply costs (Abdulsalam & Schneller, 2019; L. Burns et al., 2009). From these researches, evidence suggested that PPIs cause for one of the highest hospital supply expenses (Robinson, 2008). What has not been addressed in prior research, are the strategies which can be used by hospitals to gain physicians interest in cost containment. Especially not by examining both surgeons' and purchasing managers' interests. This study thus investigates how to gain physicians commitment towards purchasing strategies, by means of interviewing both surgeons and purchasing managers from Dutch hospitals. This points to the academic relevance of this research, as it will provide insights not investigated before and can be helpful for the practical application of this studies' insights. Practically, this research is relevant to both physicians, purchasing managers, and eventually the patients as well. The suggested strategies in this research will positively influence hospitals who implement these strategies. It will provide for better collaboration and balance between both departments. This in turn will improve the departments' way of doing business and eventually improve the patient's care. Hospitals will overcome purchasing difficulties and reduce overall supply expenses, while still respecting physicians' preferences.

To answer the research question, first, the concept of healthcare purchasing will be explained. Thereafter the suppliers-hospital-physicians relationship is presented through introducing physician preference items, main purchasing strategies, and the dynamic between purchasing department and the physicians. This is followed by explaining the methodology and data collection methods. Finally, an advice on the different strategies to gain physicians commitment to better align purchasing strategies, will be developed.

2. THEORETHICAL FRAMEWORK

2.1 Healthcare purchasing

Purchasing is a core activity in most industries and a key driver of organizational performance. In recent years, it has developed from a traditional operational function to a strategic function, where purchasing is more present in strategic activities and decision-making (Arantes, Alhais, & Ferreira, 2022). It is thus important that the purchasing strategy should be aligned with the hospitals' own strategy. The World Health Organization (WHO) has defined strategic purchasing as a process beyond a passive allocation of funds to healthcare providers. It should create a constant search for the best interventions to purchase, the best vendors, and the best payment mechanisms (Sanderson, Lonsdale, & Mannion, 2019). In most hospitals, all different departments can purchase products. The purchasing strategy to do so is determined by the strategic top of the hospital. This strategic top within hospitals is the board of directors, that is responsible for the activities and results of the organization (Mintzberg, 2006).

Compared to other industries, healthcare supply chains show significant differences and challenges (Abdulsalam & Schneller, 2019). Other industries gain a strategic advantage through supply chain integration. Healthcare supply chains, however, are more fragmented and complex, and show little improvements on costs and quality. This complexity is caused by the intense interactions with the different hospitals' stakeholders. Hospital supply chains cope with both medical and nonmedical stakeholders, such as manufacturers, distributors, and insurers. Added to that, healthcare supply chains are often outsourced to distributors or Group Purchasing Organisations (GPOs) which creates challenges for inventory management and logistics (Abdulsalam & Schneller, 2019).

The healthcare sector faces multiple challenges, the biggest challenges being their total expenditures, and the trade-off between quality and efficiency. Many industry leaders are looking for ways to reduce healthcare expenditures, possibly through purchasing. In 2019, the Netherlands spend 10.2% of its gross domestic product (GDP) to healthcare (CBS, 2020). This shows the importance of the healthcare industry in the Dutch economy. Supply expenses account for roughly 15% of total hospital costs. Related supply expenses add another 15% to this, making total supply expenses about one third of hospital costs (L. R. Burns & Briggs, 2020). Although healthcare supply is important, the total costs should be managed. However, reducing purchasing costs and thus increasing efficiency might negatively influence the quality of the devices and medicines, and threaten the patient's life. This shows the importance of the balance between efficiency and quality, and the trade-off to be made (Arantes et al., 2022).

Now that the purchasing process in hospitals is clear, it is important to elaborate on the supplier-hospital-physicians relationship. The following chapter will describe the concept of physician preference items and the dynamic between purchasers and physicians. It will set out the different purchasing strategies and current mechanisms used to cope with physicians' preferences.

2.2 Supplier-hospital-physician relationship

2.2.1 Physician Preference Items

Physician Preference Items (PPIs) are defined as high-quality high-cost devices, which physicians have a strong preference to (Nyaga & Schneller, 2018). These physicians influence the hospital's choice in purchasing these items. Their preference is however not based on costs, but rather on habits, product technology, and relationships with vendors (L. Burns et al., 2009; Nyaga & Schneller, 2018). PPIs therefore play a key role in hospital expenses. Research by Robinson (2008) argued that PPIs account for one-third of the total hospital supply expenses and expenses are still rising. Hence, management of preference items is important to manage the hospital's efficiency and financial state.

PPIs mostly occur in implantable devices such as knee, hip, and spine implants. However, physician's preferences also occur with more regular used items such as gloves (Nyaga & Schneller, 2018). Physicians decide whether a patient receives devices, and which ones. The purchasing department has little influence on this decision, and are frequently overruled by physicians because of lack of knowledge and clinical expertise (L. Burns et al., 2009). Because physicians are not aware of or concerned about the economic effects of these decisions, the hospital's profit depends heavily on their decision to either use a basic or improved device (Robinson, 2008).

Hospitals face difficulties in managing PPIs because of multiple reasons. One reason is the physicians' weak business affinities with their hospitals (Robinson, 2008). Physicians may be reluctant towards and unmotivated to reach the hospitals' goals. On the contrary, physicians do have strong affinities with manufacturers and distributors. These close ties develop because of product development and working together in the operating room. Surgeons are often trained to work with certain devices, which dates as far back as their surgeon's residency training (L. Burns et al., 2009). This reflects their reluctancy to switching vendors and is the reason why preferences change very slowly.

Another reason why managing PPIs is difficult is the absence of information on devices' performance and prices (Robinson, 2008). Firstly, information on the performance of devices is missing. Innovations on devices are often introduced as incremental modifications from current devices. New devices may only come to the attention of management when it is presented to the committee of their clinical peers. This committee makes it hard to switch devices, as any attempt puts the clinical decision of their peers in question. Meanwhile, some innovations on devices are major technological improvements which show significant safety and effectiveness (Robinson, 2008). Secondly, information on price is also missing. Hospitals face difficulties in establishing the price of devices before they are used and billed. Even though hospitals use GPOs to gain insight into prices paid by other hospitals, they lack information on average and best-available prices across vendors. Because price and performance information is missing, physician preference items are harder to manage, as reluctance to change devices continues to grow (Robinson, 2008).

2.2.2 Purchasing strategies in healthcare sector

Purchasing is said to have a big influence on organizational performance, just as hospital performance (Arantes et al., 2022). However, not all purchases or relationships with suppliers should be treated in the same way. Research by Dyer, Cho, and Chu (1998) suggested that organization's should avoid a "one-size-fits-all" strategy, and use a categorical approach instead. Hospitals handle this through multiple approaches, one of which are the Purchasing Portfolio Models (PPMs).

The procurement of hospital supplies, such as medicines and devices, is a process which requires a large variety of resources (Arantes et al., 2022). It carries risks such as finance, time, and storage as most products are fragile, require control, and have a short shelf life. This requires the need for a strategy that can cope with these risks well. PPMs can be a useful tool to segment medicines into categories, to help managers align the hospitals' strategy with the purchasing strategy. The main advantage of using PPMs is encouraging to take different actions for each group of suppliers, by understanding the strategic importance of the items. By analysing the categories, organizations can avoid breaches in supply, improve their bargaining power, and manage the relationship with suppliers (Medeiros & Ferreira, 2018). Kraljic's matrix was found to be the most important purchasing portfolio model (Medeiros & Ferreira, 2018). Kraljic classified items according to two dimensions: (i) impact on profit and (ii) the supply risk. After that, the items are categorized into the four categories: strategic, leverage, bottle neck, and routine. The strategic category includes items with a big impact on profit and which are difficult to acquire, such as Physician Preference Items (PPIs). These four categories help managers to develop the most suitable purchasing strategies considering their supply risk and strategic impact (Arantes et al., 2022).

Despite the positive results from PPM approaches and the attention from researchers, the application of PPMs in healthcare has been restricted (Arantes et al., 2022). Portfolio models have received a lot of criticism, as a result of the subjectivity of purchasing managers, and difficulties in implementation of the portfolios (Medeiros & Ferreira, 2018). In time, this led to under-investigation of the models and a need for different approaches.

An approach which hospitals currently do use for purchasing is the use of purchasing alliances, also known as Group Purchasing Organizations (GPOs) and joint procurement (Nollet & Beaulieu, 2003). Alliances started operating in the 20th century and were used nationally in the early 2000s (L. R. Burns & Briggs, 2020). Purchasing alliances were introduced to reduce the increasing healthcare costs and to maintain the quality and prices (Judge, 2001). In practice, alliances are shared services which bundle different hospital purchases to achieve economies of scale. This creates a bargaining power to increase sales volume, lower vendor prices and increase efficiency. GPOs also account for value chain alliances between hospitals and their vendors. This reduces and mediates, the tight hospital-vendor trading relationship. Next to reducing hospital supply costs, GPOs have other functionalities such as negotiations of contracts, benchmarking with other hospitals, data analytics, and operational improvements (L. R. Burns & Briggs, 2020).

2.2.3 Dynamic between purchasing department and physicians

The dynamic between the purchasing department and physicians in a hospital is complex. Hospitals depend on their physicians, as physicians control hospital admissions and thus the flow of money. Physicians largely control decisions on treatments and which devices to use (Montgomery & Schneller, 2007). This creates a conflict of interest between physicians and purchasing managers in a hospital. Physicians may have a certain opinion and preference on which devices will be procured, which may differ with that of purchasing managers. These opinions may come from professional norms, relationships with vendors, and standards, while purchasing managers are more focused on costs and efficiency (Nyaga & Schneller, 2018). The greater the relationship between the physician and vendor, the more problems will be encountered. It will be more difficult to maintain a competitive environment among suppliers, and to introduce lower-cost alternatives to physicians (Atilla, Steward, Wu, & Hartley, 2018). Switching devices will therefore also be more difficult.

According to research by Solomon (1986), physicians are seen as surrogate buyers. Surrogate buyers are professionals who exert their power to influence buying decisions, based on their training and certification (Aggarwal, Cha, & Wilemon, 1998). This causes agency problems between the actual purchasing manager and the surrogate buyer. Surrogate buyers highlight the importance and power of the various supply chain actors, including the physicians and users themselves (Nyaga & Schneller, 2018). The difficulties that hospitals face because of surrogate buyer power, extent beyond financial problems to a shift in control of hospitals (Robinson, 2008).

2.2.4 Hospitals' efforts to gain physicians commitment

Hospitals have made various efforts to align the hospital with the surgeons more closely. Several cost-containment strategies have been pursued by hospitals. However, the effectiveness of these strategies has not been investigated thoroughly (L. Burns et al., 2009). According to Matson and Whitt (2005) the most common strategies used are having price ceilings, limiting number of vendors, competitive bidding, information sharing across hospitals, demand matching, and gain sharing. Various studies have investigated the effectiveness of these strategies, from which limiting the number of vendors and having price ceilings appeared the most prevalent ones (Miksic et al., 2005; Scannell & Bedell, 2008).

Gain sharing as a strategy has recently gained more attention as well. In gain sharing, hospitals work together with the physicians to save costs. The savings will be split equally between hospital and physicians. With this, both parties enjoy benefits from the savings (L. Burns et al., 2009). According to research by Ketcham and Furukawa (2008), gain sharing has succeeded in negotiating lower prices from vendors through joint hospital-physician bargaining.

Other hospitals have tried to manage costs on PPIs by apply strategies for non-PPI supplies (Montgomery & Schneller, 2007). Several strategies have been put into practice, among which the use of creative contracting with suppliers through GPOs and using multidisciplinary teams. Using GPOs however appeared unsuccessful as physicians' preferences still varied greatly among the different physicians. Multidisciplinary teams assess products through pharmaceutical and therapeutics (P&T) committees. These committees investigate devices on effectiveness, safety, and costs, to specify which devices the hospital will include (Montgomery & Schneller, 2007). The use of multidisciplinary teams also has its limits, as there is less research on equivalencies for PPIs and less time to bring new devices to the market.

All in all, hospitals seem to have weak leverage over physicians and their preference items (L. Burns et al., 2009). Approximately one third of the respondents to an industry study from Scannell and Bedell (2008) have no strategies implemented to manage physician preference items. Next to that, hospitals lack consistent standards to influence product choice of PPIs. Other industries have standards by which their products must meet certain criteria and rules. The healthcare industry however has not implemented such criteria (Montgomery & Schneller, 2007). Furthermore, hospitals lack systems for capturing data of the devices used by physicians (L. Burns et al., 2009). Together, this leads to the complexity of managing PPIs. Even when strategies are implemented in a hospital, it is dependent on the physicians' willingness to accept new ideas whether they are successful (L. Burns et al., 2009).

2.3 Synthesis

The literature provided important information on purchasing in healthcare, the supplier-hospital-physician relationship and physician preference items. Key takeaways from this are the challenges that healthcare faces and their way of coping with these challenges. Healthcare copes with ever increasing supply expenses, that is greatly influenced by physician preference items (Robinson, 2008). These PPIs are difficult to manage because of education, habits, relationships with vendors, and missing information of price and performance of products (L. Burns et al., 2009; Nyaga & Schneller, 2018). Hospitals currently try to manage PPIs through Group Purchasing Organizations and joint procurement (Nollet & Beaulieu, 2003). This is however seen as rather difficult, as physicians have close relationships with vendors, and enforce their preferences of medical devices (Montgomery & Schneller, 2007). Hospitals have used other strategies to gain physicians commitment as well. However, non of these strategies has shown to been rather effective, and the goal of gaining physicians commitment has not been reached yet.

Now that it is clear what role physicians play in the procurement process, and what their influence is on hospitals' results and profit, it can be stated that change is needed. Hospitals are in need of strategies to minimize the influence of physicians on

purchasing. The following research will investigate this further to clarify strategies to gain physicians commitment.

3. DATA AND METHODS OF ANALYSIS

The methods section provides information on how the research is designed and how data will be collected, with the purpose to answer the research question.

3.1 Research Design

This paper analyses how to gain physicians' commitment towards purchasing strategies. A qualitative interview-based research design was used to gather a deeper understanding of physicians' preferences and the procurement process. To improve the validity of the study, the research design draws upon perspectives from both physicians and purchasing managers, from different hospitals in The Netherlands.

The interview questionnaire is based on the literature of physician preference items and the supplier-hospital-physician relationship and can be found in Appendix 1. Two distinct questionnaires were applied in the interviews. One questionnaire contained physician specific questions, the second contained procurement manager specific questions. The questions were then categorized in different themes, starting with context questions, followed by physicians' involvement questions. The prepared questions include questions on types of medical supplies, prices of devices, and the procurement process and physicians' involvement in it.

The results of the interviews are used to form an initial answer to the research question. With these results, hospitals will be able to respect and maintain both departments' wishes, while also gaining physicians commitment towards hospitals' strategies. Ultimately, this will be an advantage to both parties involved.

3.2 Research Participants

To answer the research question, semi-structured interviews with both physicians and purchasing managers at different hospitals are executed. The interviewees should be employed at a hospital that performs surgery. This is important as the physician preference items are mostly used in surgery, and initial preference is developed in the operating room (L. Burns et al., 2009; Robinson, 2008). The aim was to recruit 10 participants. Consequently, the interviews were conducted with 6 purchasing managers and 4 physicians from different hospitals. The table of participants can be found in Appendix 2. This table shows the respondents and their function in the hospitals. The interviews were conducted during May 2022. There were 3 different participating hospitals. Next to that, among the participants were also two purchasing managers from company D, which provides the procurement for hospitals that have outsourced their purchasing department. This could give a new perspective on the supplier-hospital-physician relationship and the problem of managing PPIs. The interviewed purchasing managers should either have first-hand information and experience on the purchasing process or be an experienced physician at the hospital. The selected participants were employed as strategic buyers and purchasing managers. The selected physician participants are a trauma surgeon, a gastrointestinal liver doctor and a rheumatologist.

3.3 Data Collection

The data is collected as primary data. The interviews conducted are semi-structured. Therefore, both the interviewer and interviewee had the opportunity to go off-script and to add relevant information, by asking additional questions and elaborate on relevant questions more. The two questionnaires were applied in the interviews, which lead to a more complete view from both parties involved. The interviews were held in Dutch, which provided the opportunity to elaborate on answers more and to collect deeper information. The interviews were held both online and in person and lasted around 20 minutes each.

The interviews were all recorded with permission of participants and stored safely. Afterwards, the interviews were transcribed and analysed. To interpret the qualitative data, the transcripts needed to be structured and organized through coding. This was done through a two-step coding process, consisting of open coding and axial coding. First, general open codes were added to the relevant fragments of text from separate interviews. Next, these open codes were compared and combined into overarching, axial, codes. This results in the main categories used in this study. The tables with axial codes of the interviews can be found in Appendix 3. These codes are used to form the results of this study.

4. RESULTS

This chapter describes the results of the interviews regarding how to gain physicians' commitment towards hospitals' strategies. The literature showed that there was a misalignment between the physicians' and the hospitals' interests, represented by the purchasing department. This leads to ever increasing hospital supply costs (Robinson, 2008). The results show how both physicians and purchasing managers view this problem, and what they feel is needed to overcome this problem. Section 4.1 describes the main problems encountered between physicians and the purchasing department. Section 4.2 describes mechanisms used to gain commitment from physicians towards hospitals' strategies and possible solutions. The results are all based on the interviews.

4.1 Main problems encountered

The results of this section are focused on the main problems between physicians and purchasing managers. This can lead to a better understanding of the situation and can provide insights where both departments can improve.

Table 1 shows the results of the interviewees describing the problems between physicians and purchasing managers. These results indicate that there are currently no major problems between both departments. To elaborate on that, they explain that the younger generation of doctors is more open to innovations and change than the older generation. Next to that, most interviewees indicate that the collaboration between physicians and purchasing is mostly good, and the procurement of new products is done in good consultation, as physicians hold most knowledge on their products. However, the respondents point out that when problems do occur, this is due to a lack of communication and collaboration between both departments. Problems that were mentioned include physicians questioning the decisions made by purchasing, physicians putting purchasing under pressure to buy certain products, or threaten to go to the board. In addition to this, respondent 8 from company D mentioned that because they have an outsourced purchasing department, they experience more communication and collaboration problems between the departments. They mentioned: "Physicians just want everything, rather today than tomorrow. …We can suggest alternatives, but the decision is really made by the physician". Next to this, they mention: "We are too far away from the physicians to make a change, I rather think that is the role of the medical director".

Table 2, respondents 3, 5, and 8, mention the problems regarding a switch of products and medical devices. Respondents 5 and 8 both mention that the burden of switching devices lies upon the

physicians, while they do not get the benefits out of it. This makes them reluctant to switch devices. They mention that this could be solved by investing a part of the gained savings into the department that was affected by it. In this way, they get something in return for their efforts. Aligned to that, respondent 3 mentioned a problem of the trial period of new products. The introduction of new medical products is considered as ineffective, as the trial period is based on time. As a result, physicians might not have used the introduced device properly in the short period of time. This leads to physicians choosing their older, preferred items, instead of the newly introduced ones and makes them reluctant to switch devices. This respondent mentions that a trial period based on number of times used could solve this problem. With this, physicians can get used to the new product, and compare both products equally. This leads to a fair judgement of product, and an increase in chance of switching devices.

In addition to this, multiple participants addressed a problem on sustainability. These results are shown in table 3. This is an unexpected result from the interviews, as the demand for sustainable products was not mentioned by the literature before. The physicians mentioned a growing demand for sustainable products. Respondent 7 was the first to raise the issue of sustainability. He emphasized: “In the future, physicians would want to work with environmental-friendly suppliers, suppliers who recycle their products”. He commented “The environmental aspect will play a bigger role in the next choice of material. … Us surgeons will definitely take this into consideration in the tender next year”. He also mentioned that the OR is the biggest polluter of the hospital, and hospitals pollute more than aviation. Considering this, it is surprising to see that there is not yet supply of sustainable products. The participants mention that this could be caused by a lack of consciousness by the purchasing department on material use and waste. This indicated that there is another misalignment in the interests of physicians and purchasing. The participating purchasers indicated however that the procurement of sustainable products has just come to their attention and needs to be investigated further. One reason that was mentioned for the lack of supply of sustainable products, are the rules and regulations that purchasers must deal with when it comes to packaging or shipping.

4.2 Current mechanisms and possible solutions to main problems

The results from questions regarding possible solutions to gaining physicians commitment can be categorized into four solutions: increase price consciousness with physicians, increase cooperation between both departments, show results and create transparency on the usefulness of purchasing, and practical solutions. These results are divided into four tables.

Table 4.1 consists of the results on increasing price consciousness. These results show that labelling products with their price could be useful in creating price awareness, and eventually lower costs. This can be done in the operating room as well, by displaying the prices of the devices used on a screen. It is said, by both physicians and purchasing managers, to create higher price consciousness. Respondent 1 suggests that acting on price can be applied through a bottom-up strategy, via surgical assistants in the operating room. Respondents 1 and 8 mentioned that creating price consciousness with both surgeons and surgical assistance, will eventually lead to them being more critical of the devices used and make better decisions regarding the value for money. Respondent 5 suggests that physicians should be more responsible of, and criticized on, their budgets, instead of the medical manager. This could lead to an increase in price consciousness.

Table 4.2 shows the results of increasing cooperation between physicians and purchasing managers. Participants indicated that the collaboration between both departments is mostly good, but improvements would be useful. The results show that problems between both departments can be reduced by good consultation, setting agreements prior to procurement decisions, and listening to each other. Respondent 5 suggested a bigger connection between the departments, as they are dependent on each other but currently not cooperating. Physicians should be included in all possible changes and costs and asked for feedback. Next to that, respondents 2 and 6 show that it is important to enthuse physicians in participating in cost containment efforts. When asked whether physicians feel they have time to participate in cost containment efforts, they responded that it is needed for their own benefit as well. They also have interest in devices of good quality but are aware of the need for cost containment. Therefore, their own efforts are needed to realize this. In addition to this, respondent 3 mentioned that the efforts of physicians to cost containment should come from an intrinsic motivation to change and their responsibility as a physician.

Table 4.3 shows the results of creating transparency on the usefulness of purchasing and showing the cost containment results. Seven out of nine respondents mentioned that it is important to show the added value of purchasing to physicians, by presenting the results of their savings and creating transparency on the costs of devices. The results show that when physicians become more aware of the benefits of purchasing, this could greatly improve the collaboration between both departments. Respondent 2 suggested that purchasing should create higher visibility of their department. Respondent 7 confirms this statement when he called the cooperation with purchasing “self-evident” and the department as “somewhere in a corner, in a corridor, where you never have to be”.

Table 4.4 shows the results of the practical solutions to current problems. One respondent suggested the previously mentioned solution of changing the trial period based on time, to a trial period based on number of times used. This respondent expects this to increase the chances of switching devices. Another respondent suggested that it is important to give product expert people the task of purchasing, instead of people who only have knowledge on money. Respondents 4 and 8 indicate that purchasing should suggest alternative products more proactively, as physicians might not always know all possible alternatives and lack information regarding new products. Lastly, five out of nine respondents mention that a meeting twice a year on the agreements and plans, would help to improve the departments individually, but also their collaboration.

5. DISCUSSION

This chapter discusses the results from the interviews even further. It will interpret the results and compare the findings to the literature. This will create a deeper understanding of the findings, to eventually draw complete and concrete conclusions on. The discussion starts by comparing the results from the interviews with the literature. Subsequently, it provides an initial advice, based on the results, on how purchasing can gain physicians commitment to the purchasing strategies.

Firstly, a surprising result of the main problems encountered was that there were no clear problems. In contradiction to the literature, both physicians and purchasing managers mentioned that physicians do not have that much influence on their preferred items anymore. The literature mentions that physicians can choose their own devices and bypass the purchasing department in purchasing products (L. Burns et al., 2009). However, times

have changed and the freedom of physicians choosing their own devices has become more limited. The results confirm that times have changed, as the interviewees do indicate that the older generation of doctors is less willing to invest in cost containment efforts than the younger generation. They are trained to provide the best care, without having to worry about costs. They explain however, that the younger generation of doctors is more willing to invest in cost containment efforts themselves and have less power over the purchasing department. The results show that currently, physicians can only indicate their preferences to the purchasing department. In addition to this, physicians must substantiate why they need that specific item, and follow a list of regulations before the items can be used. Therefore, the procurement of new medical devices always goes in agreement with the purchasing department, and physicians cannot bypass them. This development initially helps the purchasing department in gaining physicians commitment, as they must work and communicate together more to get their preferred devices.

It appears that the investigated hospitals do not seem to have a big problem of misalignment between the physicians and purchasing department. However, both parties indicate that the departments still lack collaboration and communication. This might be noted by the lack of meetings and contact between department members. Considering this, together with the lack of visibility of the purchasing department, it might suggest that there is a siloed culture in healthcare organizations. A siloed culture indicates that departments of organizations work isolated from the other departments, without sharing their knowledge and information (Meneses & Caseiro, 2018). The departments should be integrated and operate interdependently, however a siloed culture hinders this. Especially in healthcare a high level of cooperation between departments is needed, to provide the best care for patients. Furthermore, the results of the outsourced procurement department show that the distance between both department causes for greater procurement and interpersonal problems. This finding adds a new perspective on the collaboration and communication problems. It appears that procurement experiences less problems in purchasing itself, as they can objectively purchase the products. However, they have no connection to the physicians, which allows the physicians to have free choice of medical devices. This eventually leads to the difficulties of managing PPIs and causes for high supply expenses.

All in all, an advice can be given based on the findings of a siloed culture and the outsourced procurement department. The investigated literature in this research does not provide information on a silo culture in organizations. Therefore, an advice can only be given based on our findings. As both physicians and purchasers mention that they do not have enough transparency in each other's departments and lack collaboration, it is suggested to increase the transparency on both departments' way of working, their goals, and most importantly their results. The purchasing department should increase their visibility and highlight their added value to physicians. This becomes even more important when the purchasing department is outsourced. The outsourced departments should create higher visibility to build a connection with the hospitals and physicians. Creating visibility and highlighting the added value can be done by incorporating frequent meetings in their routine, to discuss their information and knowledge. This will increase cross-functional integration and interdependency of both departments. Eventually, this might increase physicians' motivation to collaborate in cost containment efforts, as they become more aware of their part and added value in cost containment.

The literature mentions that missing information on price and performance of medical devices leads to difficulties in managing PPIs (Robinson, 2008). This is confirmed by the results, as purchasing managers indicated that the knowledge of devices lies with the physicians, and not with them. Purchasing managers thus rely upon the physicians before the products can be purchased. As a result, physicians can emphasize their preferences more and choose their preferred items above others. Furthermore, the results show that besides purchasing, physicians are also missing information on price and performance. Even though physicians have more knowledge on their devices used, they might not know all alternatives available. Purchasing however does have knowledge on the alternatives. It might be useful for purchasing to recommend alternatives more proactively and to share their knowledge. The above suggested strategy can also be applied in this case. Creating transparency among both departments' results can be helpful in sharing knowledge and will solve the problem of missing information in both departments. To achieve this, physicians and the purchasing department should have more short consults throughout the year to share knowledge and suggestions on alternative products. Next to that, it might be useful to provide the purchasing department with some training on the medical devices used. With this, purchasing managers will gain a deeper understanding of the products used, and decrease the knowledge gap between physicians and purchasers.

The literature mentions the currently used cost containment strategies. The most used cost containment strategies were price ceilings, limiting number of vendors and competitive bidding (Matson & Whitt, 2005). Next to that, the literature mentions that GPOs seem to be ineffective, as physicians' preferences still varied greatly among the different physicians (Montgomery & Schneller, 2007). What can be interpreted from this, is that the strategies used were mostly focused on price limitations and changes among the procurement process and department. However, the results from the interviews show that the changes that both departments need, lie within increasing the collaboration between both departments and communicating more. This suggested strategy can therefore be seen as a contribution to the existing strategies, as it affects and improves both departments equally. It is suggested to have frequent meetings throughout the year, on the progress and changes that are suggested by purchasing. As the results also mention that it is not favourable to have more and longer meetings, it is suggested to only have one meeting quarterly. This will not disrupt the departments in their daily tasks but can still have the desired effect of increasing collaboration. Next to that, it is not recommended to use outsourcing. However, when hospitals do use GPOs and outsourcing of the purchasing department, it is important to highlight their visibility and to communicate even more.

Something that is suggested by both literature and results as an effective strategy in cost containment efforts, is gain sharing. In gain sharing, both physicians and hospitals equally enjoy the benefits of their savings (L. Burns et al., 2009). The results mentioned that physicians only feel the burden of switching devices, without receiving the benefits of it. This keeps physicians from switching devices. When physicians themselves do get rewarded for switching devices, they have a higher incentive to commit to purchasing strategies. Therefore, it is suggested to implement gain sharing more in hospitals' strategies. This can be done by investing the savings back into the department which has put effort in the savings in the first place. The savings can for example be invested in new equipment for which the department initially had no budget.

Next to the findings on the supplier-hospital-physician relationship, the results of the interviews showed another surprising gap between purchasing and physicians which was not mentioned by the investigated literature. This gap is formed by a different view on sustainability. On the physician side there is demand for more sustainable products and less waste, as this was clearly indicated by multiple interviewed physicians. Physicians mention that they have a clear view on all packaging that comes with the products, and purchasing does not. This unnecessary waste motivates physicians to invest in sustainable products and packaging. Despite that, the supply of these products is not supported by purchasing and still under-investigated by hospitals. One reason mentioned for this are the rules and regulations that purchasing must follow, regarding packaging and transfer of products. Next to that, sustainable products increase costs, which is not preferred by hospitals. These higher costs, rules, and regulations, make it difficult for purchasing to comply to the demands of physicians. To close this gap, it is suggested for hospitals to invest in research on sustainability in hospitals. Both students and professors can play a significant part in investigating this. Next to that, it is suggested to invest in overall sustainability and sustainable products more. Eventually both parties will benefit from it, as the results indicated that the operating room (OR) is the biggest polluter of the hospital. Therefore, improving this will benefit the hospital in reaching their corporate sustainability goals. Next to that, it will close the gap between purchasing and physicians more. This, in turn, creates a higher incentive for physicians to commit to purchasing strategies, as their demand for sustainable products has been heard and acted upon.

Lastly, the interviews pointed to another interesting fact. What was surprising to see, was that both departments were aware of the lack of communication and collaboration between the departments, and the lack of visibility of purchasing. However, they were not inclined to act on this problem. This might indicate that both departments lack an intrinsic motivation to change. While on the contrary, they did indicate that change is needed. The results suggested that it might be the medical directors' responsibility to implement change, not the purchasing departments' responsibility. Therefore, it is important to consider who will be responsible for implementing the change. The literature mentioned that the purchasing strategy is determined by the strategic top of the hospital (Mintzberg, 2006). Therefore, it is suggested that the implementation should come from outside the departments and from the board of directors, as they have initiated the change and they can exert their power over the departments to change.

5.1 Practical Recommendations

After making suggestions based on the results and literature, it is important to highlight what hospitals can implement practically to gain physicians' commitment towards purchasing strategies. Firstly, it is important to decide who is responsible for the implementation of the strategy. Practically, it is useful to make this the responsibility of the hospital's board or medical director. They have set the goals and thus have a greater motivation to change. They should communicate and implement the strategy and monitor the changes. Next to that, what is suggested to do is having planned meetings between both departments. During these meetings, it is suggested to communicate the vision, mission, and goals of the departments. Both parties should share their expectations of each other, to decrease the chances of surprises in the collaboration. Next to that, both departments should share their knowledge and ideas on current and future projects. To communicate this all clearly, it is important to determine the best form of communication, such as e-mail, phone, or face-to-face. Strong cross-team communication is important for the departments to collaborate, so having clear expectations on this can be helpful in achieving strong communication.

Some other practical implementations that are suggested to be made is investing in sustainability. This can be done in terms of research and new sustainable equipment. Hospitals should determine what waste can be eliminated from the supply chain and which suppliers are leading in providing sustainable products. Hospitals can reinvest the savings gained from purchasing into sustainable products. In this way, they invest their own savings into the future of the hospital and listen to the wishes of their physicians.

6. CONCLUSION

This research aimed to provide an answer to the research question: *"How can the Purchasing department gain physicians' commitment to better align the purchasing strategies?"*. The answer to this research question shows how hospitals can better align both physicians' and purchasing managers' interests, and eventually reduce supply expenses. Moreover, the findings contribute to the current literature by investigating both parties involved, thus physicians and purchasing managers, and provides new insights on their collaboration.

To conclude, an answer to the research question will be given based on the investigated literature and results from interviews. Firstly, the main problems encountered are a lack of communication and collaboration between both departments, an ineffective trial period of new medical devices, and a lack of incentives for physicians to switch medical devices. Considering this, to gain physicians' commitment to better align the purchasing strategies, the purchasing department should increase transparency in terms of price, results, and added value, increase collaboration and communication with physicians, invest in sustainability, and implement gain sharing as a strategy. The findings for the given strategy seem quite evident and simple, however to this day, no initiative to change has been taken by the departments. The responsibility of implementing change might be assigned to a department higher up the corporate ladder, such as the board of directors.

Added to the above, the given strategy uses some practical implementations in the hospitals. Hospitals need to incorporate frequent meetings between purchasing and physicians, to discuss their information, knowledge, and ideas. It is suggested to do short consults between both departments, as physicians have indicated that they have little time outside their daily activities. Next to that, a valuable addition to the purchasing department could be a training on the medical devices used in the hospital, to increase their knowledge on the products used. Furthermore, hospitals should invest in sustainability and sustainable products more, as demand among physicians is rising. The gained savings from purchasing can be invested back into sustainability, to invest in their own future as a hospital.

All in all, this research also has its limits. It does not provide with an unambiguous conclusion, as it needs more research to ask further questions. Further questions that need to be investigated will concern how this new policy will be implemented and furthermore, who will be responsible for implementing the policy. As mentioned previously, it would be important to consider whether this would be the responsibility of a policy-making body such as the hospitals' board. Both departments are lacking motivation to change their current way of working, therefore it would be suggested to allocate this task to the board. The board has a higher power to implement and sustain change and could therefore be useful in supporting the change of the department's way of working.

To conclude, this research has provided an initial answer to the research question: *"How can the Purchasing department gain physicians' commitment to better align the purchasing strategies?"*. This answer is based on the investigated literature and results from the interviews conducted. However, this research still has its limitations and further research is suggested to improve the findings and suggested strategy.

6.1 Limitations

Some limitations must be kept in mind when interpreting the results. Having investigated the possible solutions to the supplier-hospital-physician relationship, it is unclear whether this advice will lead to success. This is an important practical limitation to hospitals trying to gain physicians commitment towards purchasing strategies more. At all times, the hospital should bear in mind that this strategy will not guarantee for better alignment of physicians based on this study. Therefore, it might be valuable to investigate the effects of implementing this strategy on physicians' commitment and hospitals performance.

Furthermore, the interviews conducted were semi-structured, which gave the opportunity to ask further questions during the interview and elaborate on answers more. However, this comes with a variable questioning bias, as the questions might be changed from one interview to the next, based on prior interviews. This might push interviewees in an answer direction they were not inclined to go or put ideas and problems inside their mind. This bias could be reduced by standardizing the interview questionnaire in future research. Moreover, this research is limited by the small sample size of 10 interviewees. This might lead to hasty generalization of the results, as it is possible that the problems found do not occur in other Dutch hospitals. Generalization towards other countries is not possible due to potential differences between the healthcare systems in different countries.

6.2 Future Research

An important finding in this study is the misalignment of purchasing and physicians on sustainability. It is suggested to conduct further research on sustainability in hospitals. The interviewees in this research indicated that this is an upcoming problem. However, this research is only based on four different hospitals with 4 physicians and 6 purchasing managers. Therefore, the misalignment on sustainable products should be investigated on a larger scale, within multiple hospitals. It is suggested to start this research with Dutch hospitals first, before investigating it on an international scale. By doing further research, it is important to find the source of the misalignment and the magnitude of the problem. It could also be useful to research what the current barriers to implementing and using sustainable products are. All in all, the future research is needed to find a solution as to how hospitals can balance physicians' demand and purchasing's supply on sustainable products.

Furthermore, the findings on a siloed culture within hospitals is important to investigate. This result was not investigated by the literature in this research, but it was indicated by the results. Research on silos in organizations has already been done. This provides for an opportunity for hospitals to learn from this, and benchmark themselves against other organizations and hospitals. Therefore, future research is important to investigate whether hospitals suffer from a siloed culture, and what mechanisms exist to reduce a siloed culture in organizations. This could then be incorporated into hospitals who have a siloed culture.

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8. APPENDIX

8.1 Appendix 1: Interview Questionnaire

Questionnaire Purchasing Managers

1. What is your function/role in the procurement process?
2. What types of medical supplies does your organization purchase?
3. Could you describe the procurement process, please?
4. Who is involved in the acquisition of medical supplies?
5. Please, describe the role of the physicians in the procurement process
6. Are the physicians free to choose the brands of the medical supplies (especially prothesis and expensive items)?
7. Who is concerned about the final criteria for suppliers and what are these criteria?
8. Have you, as a medical buyer in your organization, experienced any problems with physicians choosing their own medical supplies
9. Do the physicians collaborate to contain costs in the purchasing department?
    - Follow up question: Could you explain, please, as to why (not)?
    - How do they collaborate to contain costs?
10. How do you think physicians could collaborate with cost containment efforts in the purchasing department more?
11. What do say is needed to change in the purchasing department to gain physicians' commitment towards cost containment more

Questionnaire Physicians

1. Do you participate in the purchasing process for expensive items, such as prothesis, cardiac stents, etc.?
2. Do you know the prices of these items?
3. How are your preferences over certain suppliers determined?
4. Why do you prefer certain brands of suppliers over others?
5. Please describe your relationship with suppliers.

6. Would you be willing to change for another supplier? Please, explain.
    - If relevant: Why are you not willing to change suppliers?
7. How do you think you could collaborate with cost containment efforts in the purchasing department?
8. How would you feel more committed and motivated to collaborate with the purchasing department strategies such as costs reduction, for example?
9. How do you experience the current collaboration between purchasing and physicians, and, if necessary, how do you think it should be improved?

8.2 Appendix 2

Overview of Participants

Respondent	Gender	Hospital	Function
1	M	B	Purchasing Manager (and trained physician)
2	M	A	Purchasing Manager
3	M	A	Physician (Gastrointestinal Liver)
4	F	B	Physician (Rheumatologist)
5	M	B	Purchasing Manager
6	M	C	Purchasing Manager
7	M	B	Physician (Trauma Surgeon)
8	M	D	Purchasing Manager
9	F	D	Purchasing Manager
10	F	A	Purchasing Manager

8.3 Appendix 3

Interview Codes

Codes	Times used
Solutions	56
Influence physicians on purchasing	51
Cost containment	32
Switching	28
Criteria suppliers	23
Sustainability	18
Price consciousness	9
Relationship suppliers	9

8.4 Table 1: Problems experienced by purchasing managers

Interviewee	Heeft u als medische inkoper in uw organisatie problemen ondervonden met artsen die hun eigen medische benodigdheden kiezen?	Codes
1	"No"	
1	Most people have been working here for a number of years, so to speak, and in general things always go through me if they want to go differently. So I never feel like they are being bypassed	
2	But no real problems, because that is often just done in good consultation. So you often agree in advance with a doctor what your plan is and what you are going to do. So you will not easily be faced with surprises at the end, because you already determine a strategy in advance."	Influence physicians on purchasing; problems
3	So we don't have a permanent collaboration with purchasing here, except of course that collaboration that ensures that material is available in the department.	Influence physicians on purchasing
4	In itself, from what I see from the committee, I think that cooperation is quite okay.	Problems
5	It does happen, yes. Well, in that questions are still being asked about yes, do we really need this device, for example, or can it also be cut down a notch?	Problems
5	And that kind of discussion, which the buyers in particular also think: yes, if you look at the Eisen program, then the Mercedes will also suffice. In this case, the buyer did ask critical questions about it, do we just have to have that lamborghini? So that, yes, that, that's definitely something going on.	Problems
6	No, certainly not, that is completely curbed in the Netherlands. Doctors have nothing more to say about it, but they have to be able to argue well why they want something.	Influence physicians on purchasing
6	Yes, and only a doctor who yells from that company I must have this and nothing else, was not discussed.	Influence physicians on purchasing
6	Yes, putting a lot of pressure on you, questioning yourself as a manager, threatening to go to the board because they couldn't do business with you	Influence physicians on purchasing, problems
7	But if there are niche products, i.e. products that another supplier has, and our own supplier does not, or that are better, or that have an advantage in some other way, then we are free to use what remains in that limited part. to make our own choice.	Switchen, Relatie leveranciers
7	No, notably that's almost the opposite now.	Relatie leveranciers
7	We have few problems with our purchasing in that regard, and that is mainly because for a large part of our product range, there are long-term agreements. A new appointment is made once every five years and then you know where you stand.	Oplossingen
8	Yes, yes, doctors all want Ferraris, preferably today and not tomorrow. Yes, sometimes that is the case, but we also notice that the reality among young doctors is getting better. Yes, they are also interested in innovation , but also often ask the question of okay, this really fits what we want to do. Traditionally it was real, yes they want everything.	Influence physicians on purchasing
8	Yes, but facilities and medical are really different. I think that as a facility there is less to gain for the managers, in terms of candy prices and gifts, but that is really more the case with medical, so I think it really depends on each department differs and in function.	Influence physicians on purchasing
8	And yes, there you actually see that doctors simply have a very strong preference for certain products, or suppliers. Hey, products can simply be because they simply find it more pleasant."	Influence physicians on purchasing
8	And that's the following: you ask a specialist to change something, so to speak. So he might get a new learning curve there, he has to start working with new stuff again and basically he gets the misery. And often we do that change because we think we can derive a financial advantage from that and that we will get all those hospitals in line. And high in volume, better prices. Only that financial advantage benefits the hospital and not the specialist. So he has to do the work and then maybe we can get two or three euros out of something. Yeah, he doesn't feel that."	Influence physicians on purchasing
8	Well, they can exert influence there. But what we do have, every hospital has a material advisory committee, so when they plan to change a product, they first have to ask the material for permission. advisory committee. And as soon as they have given permission, we can start the process to convert an article."	Switching,Influence physicians on purchasing
8	No, so they are less concerned with that. Sure and you really do see a distinction between the older generation and the younger generation. The younger generation is a little more aware of costs, the environment and the impact that all of this has. And the older generation , who is really trained with care. Yes, they provide the best care and in the time that these people were trained, costs were not an issue	Cost containment

8.5 Table 2: Problems with switching medical devices

Interviewee	Response	Codes
3	In any case, I have submitted the request to the producer. I say I want everyone doing this procedure, so you have a total of five people, a box of each piece, three or five of, that could be a catheter or a guidewire or a stent, and every medical professional gets that box and finish that box. Then at least you just have a set number of times that you just really use those stuff that you can really get a feel for, well, that's also something I can work with or not.	Solutions
3	I expect that, at least that's my idea, yes, that that will help, in any case also to actually make that switch once. Because you often see that people still work with it for just a month and then they continue to opt for that old material.	Switching, solutions
3	So changing materials is something you just have to take seriously. Because people feel familiar with something. Yes, and that is a feeling, which is not always based on facts or on research, but it is an important feeling and a doctor should always feel safe in a procedure.	Switching
3	But I often see that things go wrong during the introduction, because then the introduction is actually not enough, they have not been able to taste or test the material enough, and then again they opt for materials that they know.	Solutions, Switching
5	The disadvantages that do not fall with that person.	Budget
8	So we are now more often at the table with hospitals to say yes, if we start such a large project, we cannot simply agree in advance that the moment a significant saving can be achieved, that part of it will benefit the department.	Solutions
8	Then you could say: OK, then we will use part of the savings that we realize for that purpose, so that you can eventually get those people involved in your process.	Solutions

8.6 Table 3: Sustainability

Interviewee	Response	Codes
1	And the regulations are not always unambiguous. So even if I would like something to be reusable, there are sometimes certain rules from the government to do something.	Sustainability
1	So it is difficult to deviate from that and we do not do that. Insofar as it is desired, that you can also take this into account. But sometimes there are certain rules that you have to comply with. Yes, but I think that is definitely something you should also pay attention to when purchasing	Sustainability
1	A doctor likes it if the suppliers have a storage location in the Netherlands. Why? On the one hand, it is of course fast here. On the other hand, it is annoying if you have to have a screw come from the south of France for one screw. Yes, there will undoubtedly be something else in the truck, but of course that doesn't feel completely sustainable. So those are things you might want to pay attention to in different ways.	Sustainability
3	What is important in the past year is that we also look at not only the costs, but also the packaging material and the environmental impact. That's really a new point of attention when purchasing material.	Sustainability
3	No. And as far as I know not yes, maybe it is, but I have not yet heard from the purchasing department that there are initiatives or proposals to use materials that are less harmful to the environment.	Sustainability
3	No, I don't know whether purchasing is actually aware of how much packaging materials are used. Of course, when we unpack such a thing, we see a package and another package and another package and a big manual that you don't read. So yes, it contains an enormous amount of materials that are harmful to the environment. Yeah, so we just see that every day.	Sustainability
6	Yes, sustainability is certainly important, but that's another thing, it's still in its infancy	Sustainability
6	And yes, I think it's very necessary when you consider how much plastic and rubbish comes from hospitals. Hey, where in the past people worked with cloths, which were washed, there is still a lot to gain. And I think that science, students and the like can contribute a lot to, well, nobody in those hospitals understands it. You need real scientific research for that.	Sustainability
6	Yes, and if you look even further, you know sustainable in hospitals, we should start turning off the lights on time everywhere. And don't leave the equipment on all day if it's not necessary.	Sustainability, Solutions
7	So in the hospital we have actually gone down the road in the past two years, I think, that yes, we actually just want to work circularly. And we are working on many things, including products. So, what will become more important in the future, and you can already notice that, is that we want manufacturers who work green, who show that they are concerned with the environment, who recycle, there is of course a lot packed in plastic.	Sustainability
7	I think that the environmental aspect that goes into the next choice of material really does play a role. Yes, and it will never get cheaper. That often becomes slightly more expensive. And then the hospital can simply determine what they are willing to pay to be able to work as well as possible.	Cost Saving, Sustainability
7	Only you now notice in the hospital on the work floor that there are a lot of teams that are already a bit further ahead than the hospital policy. But as surgeons we will certainly include that in the tender next year.	Sustainability, Influence of physician purchasing
8	And therefore a lot of attention is paid to sustainability within hospitals. So the role of ZXL in this is something that really only really gets off the ground or is important in the last few months. You can really notice that, especially for hospitals, and that also affects our purchasing policy.	Sustainability
8	Yes, sustainable purchasing, sustainable products, sustainable services, so actually, yes, that is really starting to happen. But yes, you notice that they have to catch up there. There was actually very little in the area of sustainability. Yes, so that's a good development.	Sustainability
8	Yes, it is also a quest in how you can find each other in this. Look, that is, of course, everyone is quick to say: yes, those plastic mountains, those waste mountains. But of course there are also a lot of laws and regulations attached to it. So it's not that easy to do that. Anyway, sustainability is of course much more than just the environment and energy and things like that.	Sustainability
8	You notice, say that it is really high on the agenda at the administrative level, but that it is still trickling through very slowly and then you see some initiatives there, say individually.	Sustainability
8	The sustainability policy is not yet very much reflected in the procurement for medical technology. I must say that very clearly, because that is really different from, for example, the facility processes, for which much more is known.	Sustainability
8	They don't know that yet either, so some are now writing it and so you really need a policy, if you want to be able to build on that and then departments will do it individually. But you actually have to take this up hospital-wide and it will only really get going now. So that really needs time, yes.	Sustainability

8.7 Table 4.1: Solutions Increasing Price Consciousness

Interviewee	Response	Codes
1	But yeah, what I think would work well, as the literature also shows, is you could say you put a price on everything, and you could go so far as to have someone say, well, I'm pulling open a pack of stitches and that costs a tenner.	Solutions
1	I think it's just important to keep a very critical eye on what you use and when, and I think that could be done much more from the bottom up, if you involve surgical assistants. And I certainly also think with developments such as green ORs and the like, that you say yes, but things like that could also come to the fore a little more. Yes, so I think you can have a bit of awareness in particular.	Solutions
5	That you give the doctor more responsibility for the budget and that you assess it accordingly.	Doctor responsible for budget, Solutions
7	Now look very carefully at price-quality.	Solutions, Cost Saving
7	That they do want to weigh up the costs-benefits.	Solutions
8	There are systems where you can scan your products during an OR. Well, in one thing that is very easy. Hey, you immediately registered and you may immediately have order lists of what needs to be supplemented.	Solutions
8	But it shows the costs of the products they consume. It actually just says OK on very large screens and then somewhere in the bottom right corner there is a list of products that they consume, with the price behind it at the bottom of the line.	Solutions

8.8 Table 4.2: Solutions increasing cooperation between physicians and purchasing managers

Interviewee	Response	Codes
1	This has been carefully thought through beforehand, by the OR and the people standing at the operating tables, as well as the operating assistants and the orthopedic surgeons. So, in principle, by agreeing this well in advance, you prevent surprises from arriving.	Solutions
2	So I think, if you can show that and make it known to the departments of he, you can purchase this and we do this, and because of that you can do this and this again, then I think you will get them excited to be active there too. to think along.	Solutions
5	Listening carefully to doctors and also and yes, really having a conversation with them like yes, what are we looking at?	Solutions
5	In any case, I think it is important that we ensure that there is as much connection as possible between the doctors, or the nurses who ultimately have to make the decision, and the buyers.	Solutions
5	Carefully followed a process and that also simply depends on the purchaser who supervised it, who drew up the Eisen program very well and also carried out the assessment together with doctors, in which the costs are also clearly included.	Solutions
6	Put it in writing, give feedback, I've now made a story out of it, we'll discuss that for a while. When you see him in your department and say: do you have five minutes? Do you have any comments on it, have you worded things well, like that.	Solutions
6	You have to do most of it in the corridors and confirm in writing and ask for written confirmation.	Solutions
6	Yes, and you know, you also involve the doctor in that. I'm in your, say, area of barrels now working on other materials for bonding. And now you know how that is. Usually they said, okay, I get it, I know now, huh. That does not need to be discussed at all and sometimes she said: well, I would like to hear more about it, so we will arrange a meeting with infection prevention together.	Solutions

8.9 Table 4.3: Solutions Creating Transparency and Showing Results

Interviewee	Response	Codes
2	So I have also given presentations between the year when they have a board meeting. This often includes medical managers. These are specialists, department managers. And then you show what purchasing has arranged or does for them. And when they see that, they also become aware of, say, the added value of purchasing and then they are also more willing to work together, I think.	Solutions
2	And I think if you as a purchasing department can do that even more, so show your added value and increase your visibility, and not present yourself as an obstacle or a paper tiger that someone still has to go through, but really as an added value for the hospital.	Solutions
2	Perhaps it is important to occasionally show more of the added value of purchasing. Because they often see purchasing more as an obstacle to overcome than something to work with.	Solutions
2	Because then they really see that it really benefits them at the end of the ride.	Solutions
2	Visibility. So you have to make yourself visible as a purchasing department.	Solutions
3	Okay, so it's not that procurement could create more insight, or in the numbers and results that would help? Speaker 2: Yes, definitely, because yes, you do need that. It is important to provide insight into what the costs are.	Solutions
3	I think the role of procurement is awareness, but in the end the intent must, the incentive must come to the doctors.	Cost containment, solutions
3	Yes. The role of purchasing is mainly to provide awareness and figures, and the role of the doctor is ultimately to use the best products in the best possible way.	Solutions
4	I think that most doctors are actually quite motivated to do so and I myself would always like to understand how does that matter? So how or how much does that matter? Yes, yes, you actually need the numbers anyway, or if so.	Solutions
4	Seeing more of the impact of it too	Solutions
4	So you know, that's what we're going for and I think procurement can really play a good role in that to proactively say yes, but you know, this is there and this could bring these benefits. Is that something else to think about?	Solutions
6	Yes, well if doctors have a little look at the importance of money and an importance of finances. And bundling things like that, and also wanting to have a bit of input, but then leave the elaboration of the finances and the like to a manager who is good at it.	Solutions
6	If they had some insight into that from you, this will deliver, and then no very long stories, just telegram style, hey just put it in writing for me, and sometimes I still had a question. We usually didn't have a meeting about that, that just doesn't work.	Solutions
7	I think we work very well with that. I think, like that contract, which will be signed next year, for those new trauma products. We are involved in this and that is done in consultation with the purchasing department, so we do not determine that alone, the purchasing does not determine alone, it concerns several segments. Yes, so I think what the hospital can do very well is provide us with insight into the costs, which is very important.	Solutions
7	You really have to give information about that, but you also have to, yes, be open about that, that we don't go for inferior products.	Solutions
8	Yes, okay, okay that way, so basically, say by showing those missed savings, you get a bit of awareness and transparency about the numbers and results, and that would help convince them maybe.	Cost containment, solutions

8.10 Table 4.4: Practical Solutions

Interviewee	Response	Codes
3	In any case, I have submitted the request to the producer. I say I want everyone doing this procedure, so you have a total of five people, a box of each piece, three or five of, and every medical professional gets that box and finishes that box. Then you at least have a set number of times that you really use those stuff where you can really get a feeling, well, that's also something I can work with or not.	Solutions
3	I expect that, at least that is my idea, that it will also help to actually make that switch once. Because you often see that people still work with it for just a month and then they continue to opt for that old material.	Switching, Solutions
3	But I often see that things go wrong during the introduction, because then the introduction is actually not enough, they have not been able to taste or test the material enough, and then again they opt for materials that they know.	Switching, Solutions
4	So it is sometimes better indeed to have an independent group of doctors look at it than just the doctors who would like to buy it themselves. Because yes, that's difficult to always remain completely objective.	Solutions, Cost containment
4	I think that what could be improved is purchasing itself could also be a little more proactive, for example with alternatives. Because now a request is rather sent by the doctor, and that is of course also good, because he has a plan what he wants with it. On the other hand, as a doctor you don't always know everything or what is on the market, or that sort of thing.	Solutions
6	Yes, put people on procurement who are real product experts. You see more and more that people were appointed in purchasing departments who only knew about money. And who then link that to the hospital's production figures, but who did not see the usefulness of the resources at all, especially in hospitals, it is of course very important that you really know which products you are talking about.	Solutions
6	Yes, so you have to look outside your department, even if you're purchasing and operating things, where else are those products used? You can actually expect that from managers who work together in a meeting context.	Solutions
6	Just look outside your own field as a buyer.	Solutions
6	Yes, and if you look even further, you know sustainable in hospitals. We need to start turning off the lights on time everywhere. And don't leave the equipment on all day if it's not necessary.	Sustainability, Solutions
7	We have few problems with our purchasing in that regard, and that is mainly because there are long-term agreements for a large part of our product range. A new appointment is made once every five years and then you know where you stand.	Solutions, Problems
7	So I think that cooperation is already there alone, yes, you could possibly sit down together once a year to discuss what is going on and take a look in each other's kitchen. Because yes, I actually have no idea how that purchasing department works and vice versa. I think the purchasing department has no idea how we handle our products. So if you see and speak to each other more often, you get a little more understanding for each other's points of view	Solutions
7	If you have two departments that are separate from each other, but are related to each other, yes, start drinking a cup of coffee with each other and thus thinking about 'how does that work now?' And maybe you can join us for a day? That's especially important when things don't go well. But it is in any case, it is of course not self-evident that things will continue to run smoothly.	Solutions
8	We can propose an alternative. Hey, of course we are regularly approached by all kinds of parties who say Joh hey, you use product A, I have product B, and that differs by 10 percent and we can suggest that, but in the end that choice simply lies in the hospital.	Solutions, Cost containment