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Improving purchasing performance of the UMCG

Developing a checklist to identify opportunities for improvement to the health
care purchasing process

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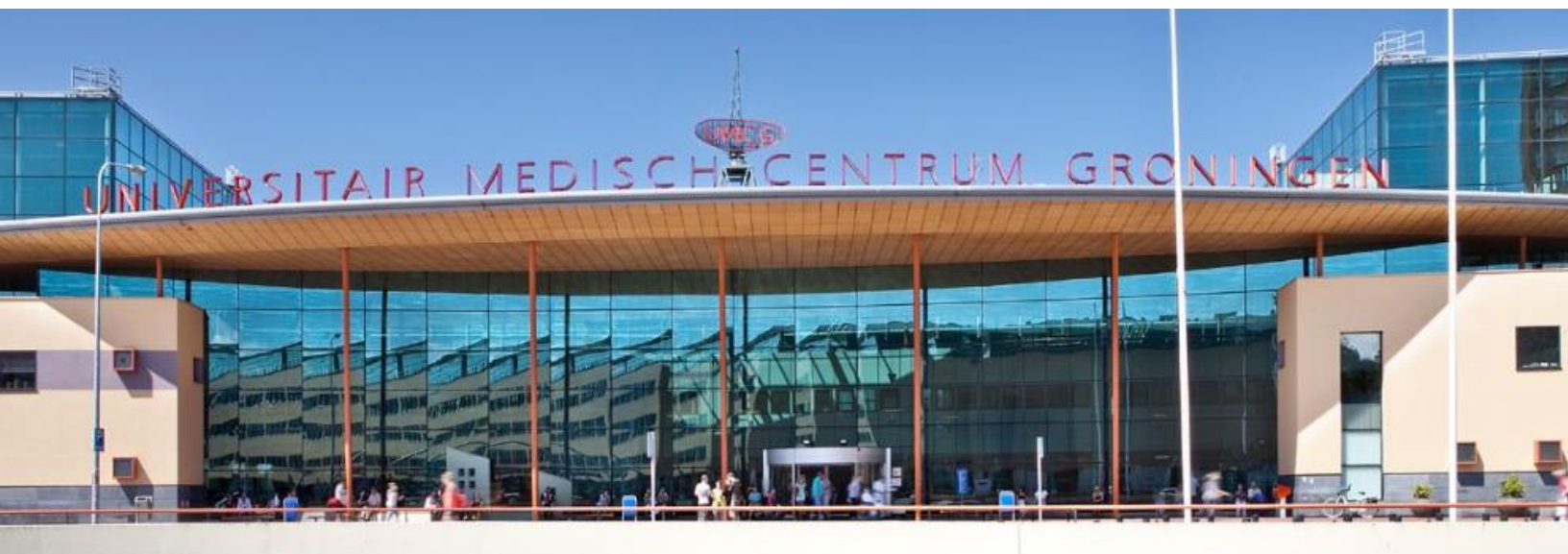
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Groningen, March 2016
Irene Hovius

Management Summary

The purpose of this research is to identify improvement opportunities to the purchasing process of the University Medical Center Groningen (UMCG) in order to increase the purchasing performance.

Problem identification

The Purchasing Department of the UMCG is responsible for acquiring products and services from external sources, generating an annual spend of € 150 million. However, insight into and control over the purchasing situation are currently lacking, especially for the laboratories. The need to improve the performance of the purchasing process is present, most improvement potential is expected at the strategic and tactical levels of purchasing. Therefore, the research goal is:

Identifying points for improvement focusing on the strategic and tactical levels of purchasing, for the Purchasing Department of the UMCG, to increase purchasing performance.

Method

First, currently used purchasing performance measurement methods and results are brought into view. Second, a literature review to identify possible improvement opportunities to the purchasing process in health care is performed. Third, interviews with staff members at the UMCG are conducted to determine the applicability of the points from literature, specifically for the laboratories, and to identify additional points. Fourth, a comparison with other UMCs is drawn to learn how other hospitals score on the identified points for improvement, with a focus on the laboratories. And to determine how these UMCs have tried to improve their purchasing performance.

Main findings

First, concerning purchasing performance, room for improvement is identified regarding both current performance measurement methods and results. A spend analysis shows that several large and many tail suppliers (90%) are present for the laboratories. While the focus on the large suppliers has to increase, the number of small suppliers could be reduced to generate savings. Especially in the product category Chemicals, with a large volume, savings could be realized by decreasing the scattered spend among small suppliers. The annual vendor rating is not reliable due to errors in the objective criteria. The results of the rating are not acted upon by the purchaser due to the unreliability of the results and the large number of suppliers rated. The customer satisfaction survey is oriented at the operational purchasing process and actions upon the results are limited. For most of the operational performance indicators measured, the norm is not met nor are activities to meet these norms in place.

Second and third, based on the literature review, 38 improvement opportunities to the health care purchasing process are identified (see Table 8 at page 22-23). These points are divided into 11 categories, ranging from a more strategic, overarching level to practical issues concerning control and evaluation. With the interviews at the UMCG, the applicability of most of these points to the purchasing process at the UMCG is confirmed. The most relevant points, according to the interviewees, can be divided into three groups:

- ***A strategy and policy, accompanied with clear guidance***
A documented purchasing strategy and policy should be in place, to provide clarity to the staff members concerning the developments at the Purchasing Department. The interviewees perceive a lack of guidance from the management; the purchasing manager should focus on mentoring staff and strategic leadership.
- ***Creating an overview of and insight into the current purchasing process***
Currently, the purchasing situation is not comprehensible, leading to a lack of control. The roles and responsibilities of staff members need to be reviewed, including the numerous operational activities performed by purchasers. In addition, contract management has to be performed to create insight into supplies, suppliers and current contracts. Plus, early involvement of the department has to increase and purchasing planning has to improve to gain control of the purchasing situation. Lastly, the interviews confirm

that performance measurement methods and results have to be improved, and a regular spend analysis implemented, to reduce tail suppliers and generate savings.

- ***Increased differentiation in purchasing***

Active differentiation in the purchasing process per product category is needed to use the scarce resources best. Using a purchasing portfolio the purchasing strategy, relations with suppliers and type of negotiation should be adapted per product category. In addition, the purchasing process should be formalized for products of low cost and low complexity.

The points focusing on defining the outlines of the purchasing process, such as dividing responsibilities among the staff, having a clear strategy in place and performing contract management, are considered highly relevant. The results of the interviews indicate that currently this framework, the prerequisites for the purchasing process, is insufficient. This is confirmed by the additional points brought up by the interviewees, these additional points focus on the organization of purchasing at the department. These points are not only valid for the purchasing area of laboratories, but for all areas of purchasing.

Fourth, the interviews at the Amsterdam Medical Center, University Medical Center Utrecht, and Radboud University Medical Center led to the formulation of eight additions to already formulated points and nine new points. A total of 55 points for improvement is now present, see Table 1 at page iv. The results of the interviews indicate strong similarities in the improvement opportunities relevant to the UMCs. The UMCs are all in a greater or less degree struggling with similar difficulties.

Recommendations

This research led to the formulation of points for improvement to increase the purchasing performance at the Purchasing Department of the UMCG. Recommendations for the Purchasing Department of the UMCG, are formulated based on the applicable points for improvement. Important recommendations include, creating clear outlines to the responsibilities and tasks of the different staff members. A review of these responsibilities is needed to overcome the current ambiguity, shared responsibilities and outdated division of work between purchasers and administration employees. Another important recommendation is to improve purchasing planning by increased contact and a purchasing calendar, to prevent purchasers being taken aback by requests of internal customers. Also, we recommend purchasers of the UMCs to collaborate to solve common difficulties and to share information on (public) tenders.

The next step for the UMCG is to implement the recommendations. This could be a hurdle at the UMCG, especially for the points with a large impact, affecting the way of working and the organization at of department. During the interviews, it came forward that decisiveness and taking responsibilities are considered to be insufficient at the Purchasing Department of the UMCG. For successful implementation of the recommendations, responsibilities need to be taken and it has to be assured points are acted upon in order to improve performance.

List of all improvement opportunities

In Table 1 below, all 55 identified opportunities for improvement are listed. The first 38 points are based on the literature review, the additions to these points identified with the interviews are marked with a plus. Point 39 to 46 are identified based on the interviews at the UMCG. Point 47 to 52 are identified based on the interviews at the other UMCs, and point 53 to 55 are additional points identified by the purchasers at these UMCs.

Table 1, all points for improvement listed

Category	No.	Opportunity for improvement
Role & organization of purchasing	1	Top management has to recognize the relevance of purchasing and integrate the purchasing function with strategic planning of the overall organization (Kamann, 2007; Knoppen & Saens, 2015).
	2	Consider organizing the purchasing function centrally, while the ordering process is decentralized, creating a hybrid structure of the purchasing function (Laios & Xideas, 1994; Knoppen & Saens, 2015).
	3	Participate and be actively involved in purchasing alliances, this a valuable procurement strategy to contain costs and increase quality for Dutch hospitals. Distinct choices about involvement in these organization should be made (Burns & Lee, 2008; Schotanus & Telgen, 2007; Li, 2012).
Strategy, policy, guidelines and procedures	4	A structured, clearly documented purchasing strategy and policies should be in place in line with the organizational strategy, the policies, and processes of the rest of the organization (Gonzalez-Benito, 2007; Caniato, 2014; Ellram & Carr, 1994).
	5	The purchasing department has to be involved in organization-wide strategic planning and formulate long-term plans for the development of the department (Gonzalez-Benito, 2007).
	6	Clear, sustainable and up to date purchasing procedures, regulations and recommendations on the different steps of the purchasing process have to be available (Laios & Xideas, 1994; Perner et al., 2014; Husted & Reinecke, 2009; Pohl & Forstl, 2011).
The staff, changing roles and education	7	Invest in continuous learning and training programs for the purchasing staff on business, interpersonal and technical skills (Knoppen & Saens, 2015; Humphreys).
	8	The purchasing manager should report to top management, increasingly focus on mentoring staff, strategic leadership, updating purchasing processes in the light of development and create awareness of the importance of purchasing towards management (Humphreys et al., 2003, Koppen and Saens, 2015; Gelderman & Van Weele 2005).
	9	Purchasers should spend little time on low-value purchases but focus on tactical purchasing, on long-term relationships with suppliers and be involved in strategic decisions (Trent & Monczka, 1998; Cousins et al., 2006).
	9+	Actively shift operational activities from the purchaser towards administration employee at the UMCG.
	10	Administration employees should be in charge of the day-to-day purchasing and handle the operational process (McCue & Gianakis, 2001; Kamann, 2007).
	10+	Examine the possibility to shift responsibilities from purchasers towards administrative staff, or even internal customers in case of asking for low value tenders
Performance and management info	11	Review roles and responsibilities of different types of staff members to prevent shared, outdated and unclearly described responsibilities and tasks (Kamann, 2007; Humphreys et al., 2003).
	12	Implement a well thought-out set of performance indicators to measure, monitor and improve purchasing performance. (Pohl & Forstl, 2011; Trent & Monczka, 1998).
The use of ICT	13	Purchasing management information should be gathered and accessible to the purchasers (Ruiter et al., 2011; Trent & Monczka, 1998; Pohl & Forstl, 2011).
	14	An ICT system, comprising e-procurement system, has to be increasingly implemented for the (decentralized) operational purchasing process, the administrative and transactional processes, the awarding tenders process and planning and increase purchasing control (Laios & Xideas, 1994, Ruiter et al., 2011, Parikh & Joshi, 2005; Van Poucke et al., 2014).
Restructuring the purchasing process	15	Formalize the purchasing process for low cost, non-complex and high-frequency products while assuring a flexible, tailored approach for complex products of low frequency (Laios & Xideas, 1994; Parikh & Joshi, 2005; Perner et al., 2014).
	16	Consider purchasing cards for internal customers ordering non-complex, low-cost purchases from selected vendors (Palmer, 2000; Avery, 2005; Parikh & Joshi, 2005).
	17	Assure complete and accurate specifications when purchasing services, a fit with in-house capabilities. And close involvement of all parties (Van der Valk & Rozemeijer, 2009; Perner et al., 2014).
	18	Formalize the purchasing process of services with checklists, formal contracts and policies to prevent over-embeddedness (Perner, Werr, & Bianchi, 2014; Husted & Reinecke, 2009).

Purchasing portfolio and sourcing	19	Use a purchasing portfolio to determine a suitable purchasing strategy and a distinctive approach to supplier management, for different product categories (Kraljic, 1983; Gelderman & Van Weele, 2005).
	20	Consciously decide whether to source local or global for categories of supplies, find a balance (Schiele, Horn, & Vos, 2011; Holweg, Reichhart, & Hong, 2011).
	21	Assure the in- and outsourcing decisions are up to date and focus on the long term. (Roberts, 2001; Moschuris & Kondylis, 2006).
Managing the supply base, contracting and negotiating	22	Perform market research to be informed about the market, potential suppliers, possible supplies fitting the requirements and to anticipate costs. (Kakwezi & Nyeko, 2008; Van Poucke et al., 2014).
	23	Balance the amount of suppliers in the supply base for each product category (Ates et al., 2015; Humphreys et al., 2003; Swinder & Seshadri, 2001).
	24	Invest in and manage long-term collaborative buyer-supplier relationships with selected suppliers (Trent & Monczka, 1998; Cousins et al. 2006; Ates et al. 2015).
	25	Perform contract management, including handling changes in contracts, monitor spend and performance of contract, keep track of end date while assuring high contract coverage (Knoester, 2005; Van Poucke, 2014)
	25+	Determine whether increased visibility of the purchaser at the laboratories could contribute to a decrease in the amount of unknown contracts to the Purchasing Departments
	26	Communicate concluded contracts to the internal customers it may concern (Ruiter et al., 2011)
	27	Conclude long-term contracts and framework agreements if applicable to realize savings through bundling demand and decreasing indirect costs (Arney et al., 2014; Ruiter et al., 2011; Trent & Monczka, 1998).
	28	In the process of negotiations, purchasers have to be aware of the type of product that is being purchased to choose the most suitable form of negotiation. (Swinder & Seshadri, 2001; Trent & Monczka, 1998, Gelderman & Laeven, 2005)
Communication is key	29	Assure frequent, clear and open communication with suppliers, internal customers, other supporting departments and within the purchasing department (Kumru & Kumru, 2013; Kakwezi & Nyeko, 2008; Swinder & Seshadri, 2001; Kumar & Ozdamar, 2005; Wen-li, 2003).
Internal marketing of purchasing	30	Align with the internal customers to determine needs and wishes through structure communication and building relationships (Janipha et al., 2015; Gonzalez-Benito, 2007).
	31	Assure involvement of the internal customer in the purchasing process, by the purchasing department. (Janipha et al., 2015).
	32	Internal customers should be made aware of the purchasing policies and processes they are involved in (Ruiter et al., 2011; Gonzalez-Benito, 2007).
	33	For complex products or large amounts of money, the purchasing department has to be involved in the purchasing process at an early stage by the internal customer (Humphreys et al., 2003; Van Poucke et al., 2014).
	33+	Determine whether regular newsletters and/or presentation at the laboratories can contribute to timely involvement, in addition to the current visits at the UMCG.
Control & Evaluation	34	Improve purchasing planning by looking into budgets of departments to be aware of large projects coming up (Telgen 1994; McCue & Gianakis, 2001).
	34+	Identify whether the approach towards improving planning in place at the AMC (estimation of needs and aggregating of demand) or UMCU (strict annual planning reserving capacity), are also suitable for the UMCG.
	35	Increase the control over and insight into the purchasing spend by performing a spend analysis (Telgen, 1994; Ruiter et al. 2011).
	35+	When performing the regular spend analysis, consider sending a survey among the laboratory managers to identify areas in which several suitable suppliers are present and public tenders could be issued.

Control & Evaluation	36	Perform a defensible, structured vendor rating to gain insight into the performance of suppliers (Leenders & Schiele, 1999, Ruiter et al., 2011).
	37	Be aware of and try to improve internal customer satisfaction, have close relationships with customers (Kakwezi & Nyeko, 2008; Van Poucke et al, 2014).
	38	Keep track of delivery times, include these in contracts and contact suppliers in case the delivery times are not met (Ruiter et al., 2011).
Additional points identified by the UMCG staff	39	Standardization of laboratory supplies could and should be pursued. In case of the laboratories, assistance could be provided by the staff advisors.
	40	Compose a list with agreed discounts to prevent differences between tenders and invoices, as long as clear contract are not in place.
	41	Document which information about the emergency delivery the administration staff has to retrieve from the customer, to prevent passing on general remarks.
	42	The Intranet is an important source of information for internal customers, this information should be kept up to date.
	43	The current division into the purchasing areas created an unequal workload. A new division might be needed, per supplier instead of internal department to equalize the workload.
	43+	Consider an increase in the capacity available for laboratory purchases at the Purchasing Department.
	44	Clear outlines for the activities of the purchaser are needed. The current situation in which internal customer can approach purchasers with all requests is considered unsustainable.
	45	The lack of a uniform way of working (especially important for the administration staff) should be resolved by attaining to agreements, the team leaders should see to this.
	45+	Consider rotating administrative staff members and purchasers over the different areas of purchasing to increase flexibility and uniformity.
Points identified by comparing the UMCs	46	Improved guidance, management and decisiveness, of the head and team leaders of the Purchasing Department, should be addressed.
	47	Provide training and demonstrate search techniques to the laboratories and create clear product categories in GHX in order to stimulate the use of GHX to eventually relieve the purchaser.
	48	Consider returning orders to internal customers that are not placed through GHX but other channels, in case the internal customer is able to order the product through GHX.
	49	Consider implementing a monetary threshold under which the internal customers and/or administration employees can autonomously purchase, to save the purchaser time.
	50	Investigate whether it is useful to include administrative staff in public tenders and projects to assure an outcome that can be met on the level of operational purchasing.
	51	Consider an increased use of Bio-Connect for suppliers out of Europe delivering exotic supplies to save time for the Purchasing Department.
Additional points identified by the purchasers of the UMCs	52	Consider issuing public tenders for the laboratories for PCR plastics, oligo's or pipet tips to generate savings.
	53	Exchange (price) information, market knowledge and experiences with specialized products and expensive equipment among the UMCs to increase purchasing performance.
	54	Purchasers could regularly place an order through the (decentralized) order system to identify improvements to the ordering process.
	55	Consider bundling laboratories in order to centralize use and the purchasing of supplies, which could increase standardization.

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1. Introduction: research background and research framework for improving the purchasing performance at the UMCG

This chapter describes the context of this research, the research description, the research (sub) questions and the plan of approach. The research is conducted for the University Medical Center of Groningen (UMCG). The UMCG is one of the eight University Medical Centers in the Netherlands. It is one of the largest hospitals in the Netherlands and the largest job provider in the north of the Netherlands with over 12,000 employees (Aartsen, Kuipers, Snapper, & van der Zee, 2014).

1.1 Research context: purchasing at the UMCG

The UMCG has a central Purchasing Department that is responsible for purchasing all supplies and services needed in the hospital, ranging from coffee cups to the latest medical technology. The Purchasing Department advises the internal customer on the supplies and services purchased but is not in control of the internal customer's budget. The yearly purchasing spend routed through the Purchasing Department is approximately 150 million, 30% of the total spend of the UMCG. The products and services purchased enable the execution of the care process, research and education, and facilitation processes at the UMCG (Bax H., 2010).

The Purchasing Department is led by the purchasing manager, the head of the department. He is supported by two team leaders, one for tactical purchasing and one for operational purchasing. The tactical team leader manages two clusters with purchasers, the Facilitating and Medical Supporting cluster and the Medical cluster. Nine purchasers are working at the Purchasing Department, each focuses on a specific topic or department, within one of the clusters, for which supplies and services are purchased. The cluster Facilitating and Medical Supporting comprises the area of purchasing supplies for the laboratories. The UMCG comprises many laboratories, approximately a total of 50 clinical and research laboratories. One senior purchaser and two administration employees are responsible for this area of purchasing.

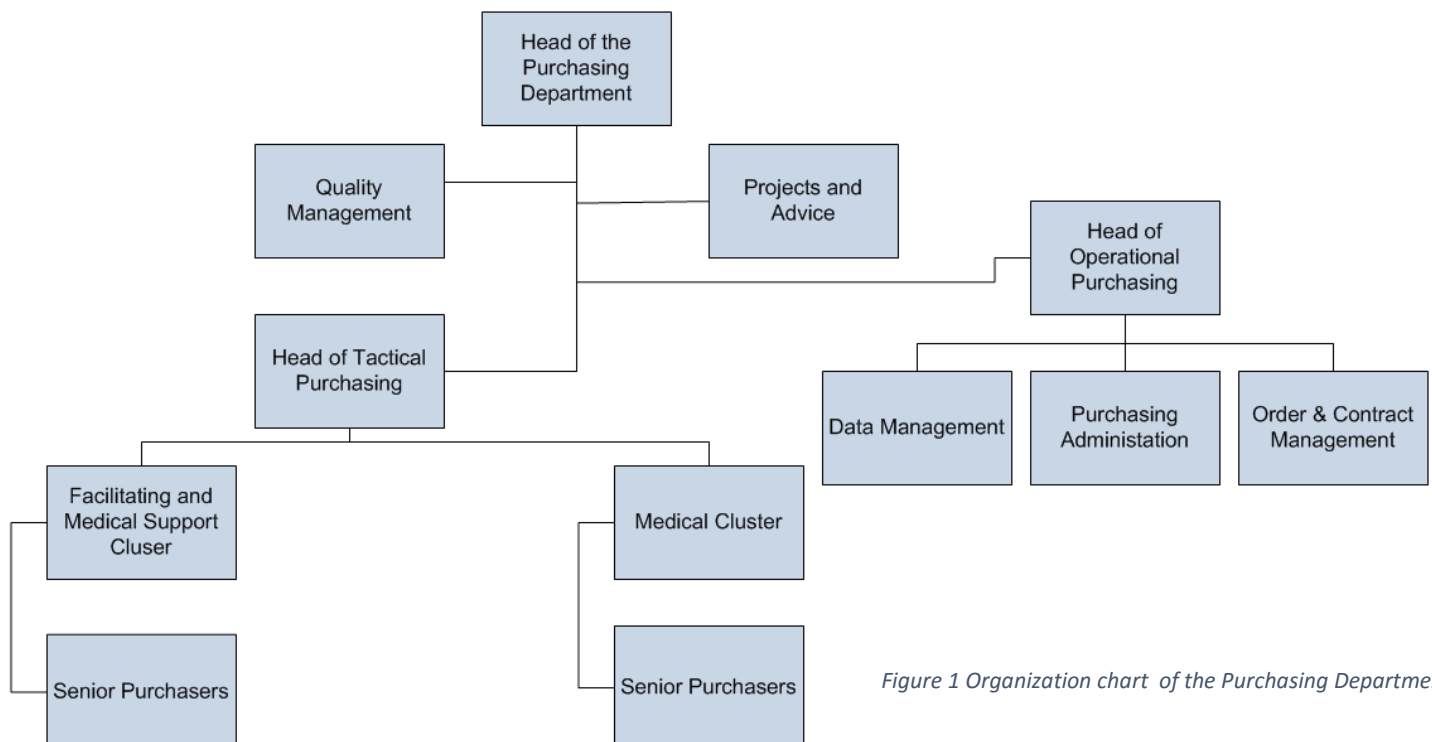


Figure 1 Organization chart of the Purchasing Department

1.2 Research framework: the most important problems identified

This section gives an overview of the most important problems at the Purchasing Department. The identification of these problems leads to a research question and research set up that provide the structure of this report.

1.2.1 Problem Identification: playing a changed game with dated rules

At the Purchasing Department difficulties are encountered. Research is requested, specifically into the area of purchasing laboratory supplies, by the head of the department, Hans Bax. Previously the research laboratories at the UMCG handled their own purchasing, since several years these supplies are purchased with the involvement of the Purchasing Department. The additional workload has been added to the responsibility of one purchaser, previously responsible for purchasing for the clinical laboratories. According to this purchaser the addition of these laboratories to the responsibility of the Purchasing Department has not been performed in an orderly fashion. Insight into and an overview of which supplies are ordered, at which prices, through which contracts, from which suppliers is incomplete. Management information that can create sufficient insight and contribute to the overview is insufficient and difficult to work with due to old and incompatible ICT systems. While extra responsibilities, the research laboratories, have been added, the demand from customers evolved and increased due to technological development though the working methods and organizational structure of purchasing remained the same. The current purchasing process does not lead to a comprehensible situation in which a clearly defined set of products is purchased via clear contracts with a set of specified suppliers.

The experienced problems at the UMCG are present concerning strategic purchasing, at an overarching level, and tactical purchasing, in specifying the need till contracting suppliers. Operational difficulties are also present, such as price differences between tendered prices and invoices and the delay of orders. However, the head of the Purchasing Department expects most improvement potential at the strategic and tactical level. Therefore, this assignment focuses on the levels of tactical and strategic purchasing of the laboratory supplies.

At the Purchasing Department of the UMCG, it is expected that improvements can be made in the purchasing process for the laboratories to increase purchasing performance. Purchasing performance can be defined as “the extent to which the purchasing function can realize its predetermined goals at the sacrifice of a minimum of the company’s resources” (Van Weele, 2010, p.60). The purchasing performance includes the effectiveness, reaching wanted results, and efficiency, achieving desired results with little waste, of the purchasing process (Mouzas, 2011). The Purchasing Department is eager to review critically the current practice of purchasing laboratory supplies and identify the improvement potential to increase purchasing performance.

1.2.2 Research definition: identifying opportunities for improvement to increase purchasing performance

Purchasing connects external suppliers with the internal customers at the hospital, creating and delivering value (Moeller, Fassnacht, & Klose, 2006). It is the responsibility of the purchasing department to purchase all supplies and services required at the hospital (Kumru & Kumru, 2013; Kumar & Ozdamar, 2005). Traditionally, the National Institute of Governmental Purchasing (NIGP) (1989) defined public purchasing as “the function of responsibility for the acquisition of equipment, materials, supplies, and services”. In this research, the term “purchasing” is used consistently to indicate all activities performed to fulfill the strategic, tactical and operational purchasing process. This purchasing process in which the supplies and services are purchased for a hospital can be modeled in different ways, but the purpose is the same; the internal customer has to be provided with supplies of high quality, at a reasonable price, at the right time (Kumru & Kumru, 2013; Laios & Xideas, 1994; Murray M., 2013; Weele, 2005).

In the past years, the organization and performance of public procurement have become an increasingly important topic to both practitioners and researchers (Husted & Reinecke, 2009; PIANOO/NEVI, 2009; Schneider & Wallenburg, 2013). Purchasing is a large expense at Dutch hospitals. According to NEVI (2011), about 25% of the total hospital budget is spent on purchasing. A large expense as purchasing gains interest of policy-makers and the public because

of the need to decrease health care costs while assuring high quality. It is to a greater extent realized that, besides generating savings, purchasing has more potential. Successfully organizing the purchasing function can decrease strategic vulnerability, assure constant supply and increase flexibility in purchasing (Ruiter, Buijs, Bakker, & van den Bemd, 2011). These points indicate the large impact that the purchasing function can have on organizational performance if organized properly. This awareness of the importance of purchasing also penetrated into the UMCG.

The purchasing process in health care is not as mature as the process in the private sector. The performance of the purchasing process in health care is, on average, lower and improvement potential is present (PIANOo/NEVI, 2009). The need to further increase the purchasing performance of Dutch hospitals is acknowledged by Berenschot and NEVI (2011). At the UMCG, several initiatives are already present, such as Vendorlink, focused on measuring purchasing performance and is one of the first steps towards improving performance.

The importance and measurement of the purchasing performance are extensively discussed in the literature (Neely, Gregory, & Platss, 2005; Pohl & Frostl, 2011; Easton, Murphy, & Pearson, 2002). Performance measurement systems are designed, and key performance indicators are listed, to measure and monitor the performance of purchasing (Arah, Westert, Hurst, & Klazinga, 2006; USAID, 2012). Most measurement systems do not directly indicate which points of improvement should be addressed once the performance is measured. Therefore, this research focuses on directly identifying improvement opportunities in health care purchasing and formulating points for improvement. By improving the efficiency and effectivity of the purchasing process, performance could be increased. A list of points for improvement to improve the strategic and tactical purchasing process will be composed. The list, with a focus on purchasing laboratory supplies, is the starting point for further improving purchasing performance at the UMCG. Composing such a list contributes to the existing knowledge on possible improvement opportunities to the purchasing process. Such an integral list is currently non-existing. Most literature focusses on certain aspects of improving the purchasing performance, such as group purchasing organizations or using purchasing matrixes, instead of the entire purchasing process. This research adds an integral list with points for improvement based on literature, drafted in cooperation with and tested by practitioners.

1.3 Objective and research questions

In this section, the research objective will be addressed and the research questions formulated.

Objective

The goals of this research can be formulated as follows:

Composing a list of points for improvement focusing on strategic and tactical levels of purchasing, for the Purchasing Department of the UMCG, to increase the purchasing performance.

To reach this objective, the current purchasing performance will be critically reviewed. A combination of literature and interviews will lead to the composition of the list with points for improvement applicable to the Purchasing Department. These improvement opportunities are assumed to increase purchasing performance by means of an increased efficiency and effectiveness.

Main question

The main question focuses on compiling a list with improvement opportunities for the purchasing process of the laboratory supplies at the UMCG.

Which improvement opportunities can be identified, at the levels of the strategic and tactical purchasing process, that contribute to a better purchasing performance for the laboratories of the UMCG?

This is a relevant main question to the UMCG, the awareness that the purchasing process for the laboratory supplies could and should be improved through a critical review, is present. Activities at the strategic level, comprising purchasing policies, procedures and goals, and tactical level, including specifying the need, selecting and contracting of suppliers, will be investigated. Eventually, the improvement potential of the purchasing process will be identified.

Sub-questions

In the first place, the current situation at the UMCG is brought into view. With the performance measurement currently performed, a complete picture is painted to understand where improvement possibilities can be found.

- 1) What do the methods and results of the currently used performance measurement indicate?

A literature review is conducted to identify improvement opportunities for a purchasing process based on academic and gray literature.

- 2) Which improvement opportunities to the purchasing process in health care can be identified based on a literature review?

With a combination of information from the staff of the Purchasing Department at the UMCG, internal information, and staff from other UMCs, external information, the applicability of the improvement opportunities from literature is determined. Also, additional improvement opportunities are determined based on their daily experience.

- 3) Which identified improvement opportunities apply to the Purchasing Department and which additional points can be identified by the staff of the UMCG?
- 4) Which differences and similarities show, and which additions to the list of improvement opportunities can be made, by comparing the purchasing process, applicable points for improvement and organization of the UMCG to other UMCs?

1.4 Methodology: situation analysis, a literature review and interviews

This section describes the approach of this research to answer the main question and the methods that are used.

In the first place, the current situation has to be brought into view.

1. An overview of the current purchasing function is created by gathering available documentation and gaining insight into daily practice by meeting with staff members.

2. Documentation and the quality manager are consulted to gather information concerning performance indicators. Data concerning the spend, vendor ratings, and customer satisfaction will be gathered to determine current performance.

A structured literature review on possible improvements to the health care purchasing process should lead to a theoretical framework. An elaborated version of the method for the literature review can be found in Appendix II.

3. A literature review is performed to identify the improvement opportunities at the levels of the strategic and tactical purchasing process that could contribute to an increased purchasing performance in health care.

The applicability of the improvement opportunities from literature to the UMCG is determined by interviews with the purchasing staff of the UMCG and complemented by points from their experience. The elaborated method for these interviews can be found in Appendix IV.

4. Interviews are conducted with the purchasing staff at the UMCG to determine the applicability of the points from theory to practice and find additional points.

Next, interviews are conducted at other UMCs to draw a comparison with the UMCG. The elaborated version of the method can be found in Appendix IV as well.

5. Interviews with purchasers are conducted at the University Medical Center of Utrecht (UMCU), Radboud University Medical Center and Amsterdam Medical Center (AMC), to identify differences between the strategic and tactical purchasing processes at the UMCs, to determine the applicability of the points for improvement and lessons the UMCG can learn.

2. Purchasing Performance Measurement

This chapter discusses the current methods and results of performance measurement at the Purchasing Department. At the UMCG, several initiatives are present to measure, monitor and eventually improve the purchasing performance. A start has been made with performing a spend analysis, a yearly vendor rating takes place, customer satisfaction surveys are conducted, and key performance indicators are measured.

2.1 Composition and performance of the spend

In this section the spend analysis that has partially been performed at the UMCG is looked into. A brief analysis, focusing on the spend of the laboratories, will be performed to create more insight into the current situation.

2.1.1 Introduction to the spend analysis

According to Telgen (2004), a periodical spend analysis can serve as a first step in professionalizing the purchasing function. Such a quantitative analysis can create insight into the current purchasing situation, including an overview of the number of suppliers, the number of bills, the purchasing volume and the average amount of bills and purchasing volume per supplier or per product category. A spend analysis can, among others, serve to reduce material and service costs through informed strategic sourcing, meet legislation concerning public tenders and develop an informed purchasing strategy. Supplier and contract optimization and management could take place, creating a purchasing portfolio and grouping products (PIA, 2005; Public Procurement Practice, 2012; Telgen, 2004).

A spend analysis comprises several steps (Public Procurement Practice, 2012). First, all the right data has to be identified and gathered. A start is made with the spend analysis at the UMCG, all orders that are placed in 2014 using the system of the Purchasing Department are transferred into Excel. The gathered data is unfortunately limited, instead of using the billing information from the Financial Department, data from the Purchasing Department is used. Purchases made without the involvement of the Purchasing Department are currently not included in the spend analysis. It is expected that these transactions are present though the magnitude and frequency of these purchases will remain unknown. Next, the analysis consists of selecting and sorting the data to create insight into the purchasing volume per product category and per supplier. The gathered data for the spend analysis has already been cleansed, doubles are removed, and errors are corrected. Because the spend analysis is not the main focus of this assignment and the magnitude and the quality of the data are limited, an overview will be created, but a thorough analysis will not take place. Due to the focus of this research on the laboratories, the spend analysis is performed focusing on spend of the laboratories.

2.1.2 Results of the spend analysis

General Information

Table 2 displays some general figures on the spend for all areas of purchasing combined, and the area of purchasing for the laboratories, in 2014.

	All purchasing areas	Laboratories
Total spend (€)		
Number of suppliers		
Order lines		
Average value order line (€)		

Table 2, General results

From Table 2 it can be deduced that the spend of the laboratories represents 18% of the total spend, while the amount of suppliers of the laboratories is 26% of the total amount of suppliers. The average value of an order is 29% lower for laboratory supplies than for overall supplies, and the number of order lines is relatively high compared to other supplies. Hence, for the laboratories, relatively many suppliers are frequently delivering orders with a relatively low value.

Analysis per product category for the laboratories

In this section, the spend per product category for the laboratories is analyzed. The AOC-codes (Algemene Object Classificatie) included in the data are used to determine the different product categories. For example, all antisera ordered at the hospital can be found under one AOC code. Using this knowledge, a broad overview of spend per product category is created. Due to the limited time and data, it is in this research not possible to break down the product categories further. The results of the analysis per product category can be found in Table 3 below.

Product category	Total Value	Percentage of total (%)	Amount of Suppliers	Number of suppliers with 80% spend	Suppliers with 80% spend	Average spend	Percentage of tail suppliers	Average spend tail
Chemicals		46,08%	219	20	9,13%	€ 347.750	90,87	€ 9.115
Test kits, reagents		12,41%	65	9	13,85%	€ 204.921	86,15	€ 11.040
Antisera		11,04%	61	16	26,23%	€ 103.391	73,77	€ 9.712
Material removal		7,05%	180	37	20,56%	€ 28.667	79,44	€ 1.936
Storage		6,47%	55	9	16,36%	€ 110.161	83,64	€ 4.869
Pipet tips		4,66%	32	8	25,00%	€ 88.662	75,00	€ 7.208
Petri dishes		3,12%	33	7	21,21%	€ 68.477	78,79	€ 4.332
Culture media		1,68%	12	1	8,33%	€ 293.244	91,67	€ 2.200
Analysis equipment		1,66%	27	3	11,11%	€ 84.487	88,89	€ 2.582
Calibrators		1,48%	12	5	41,67%	€ 46.752	58,33	€ 6.638
Vials		1,33%	27	7	25,93%	€ 28.785	74,07	€ 2.567
Filters		0,85%	14	4	28,57%	€ 31.288	71,43	€ 3.656
Laboratory animal		0,68%	6	3	50,00%	€ 36.699	50,00	€ 6.018
Cell counting		0,49%	12	4	33,33%	€ 20.945	66,67	€ 1.030
Radioactive		0,45%	3	1	33,33%	€ 75.300	66,67	€ 4.924
Beakers		0,11%	8	2	25,00%	€ 9.979	75,00	€ 290
Enzymes		0,04%	5	3	60,00%	€ 2.251	40,00	€ 753
Electrophoresis		0,02%	6	4	66,67%	€ 708	33,33	€ 196
Rest		0,00%	3	2	66,67%	€ 108	33,33	€ 0
Total								

Table 3, Results per product category

Table 3 shows that, by far, the largest category of spend are Chemicals, ■■■ million of the total ■■■ million is spent on chemicals. Orders are placed at relatively many suppliers, over 90% are tail suppliers. Of the large suppliers, some are wholesalers. The categories of Test kits and Antisera are largest after the chemicals with respectively ■■■■. For Antisera, 80% of the spend is spread over a larger group than 20% of the suppliers. It seems that fewer tail suppliers are present for Antisera than for Test kits. For Material removal relatively many suppliers are known, compared to the other categories. ■■■■ million is scattered over 180 suppliers. The average spend on tail suppliers is low compared to other categories. For the category of Petri dishes this is also seen, for ■■■■ euros of spend, 33 suppliers are known. For categories with relatively little spend, such as Culture Media and Analysis equipment, it can be seen that a very small amount of suppliers, respectively 1 and 3, provide 80% of the spend.

In conclusion, 70% of all spend for the laboratories is on chemicals, Test kits/Reagents and Antisera. These are, because of their volume, interesting categories to investigate for potential savings. In these large amounts of spend, improved contracts, reduction of suppliers and standardization are expected to be possible. Other categories are less interesting in order to generate savings, only a small portion of the spend is located here. Still, optimizing this spend is expected to generate savings as well. For the categories with one or only several suppliers responsible for over 80% of the spend, it should be investigated whether the internal threshold for multiple tenderers or the European threshold are exceeded. Exceeding these thresholds bears risks.

Analysis per supplier for the laboratories

Based on the spend data, different suppliers can be distinguished. Of the 332 suppliers for the laboratories, 34 suppliers are responsible for 80% of the spend. So 10,3% of all suppliers provide 80% of the spend. The 34 largest suppliers are listed in Table 4 below.

Table 4 is removed due to confidentiality.

Table 4, The largest suppliers

The 34 largest suppliers provide for a value ranging from 2.5 million to 117,000 euros, the combined value for these suppliers is 15.2 million, and the average value is 447,000 euros. The remaining, smaller suppliers represent a spend of 3.7 million, with an average value of 12,000 euros. A large difference is present between the average value of a top and a tail suppliers, indicating scattered purchasing in the tail. Of these 34 largest suppliers, 29 suppliers provide supplies in more than five product categories. Some of these suppliers are wholesalers.

In conclusion, the Pareto rule is not applicable to the suppliers delivering to the laboratories. Several large suppliers and relatively many tail suppliers (90%) are present. The large suppliers are identified with this zero-measurement, purchasers should focus on these suppliers. The most significant effects on expenses can be made at these large suppliers; this is where the money goes. Therefore, good deals and volume discounts have to be assured with these suppliers. The number of small suppliers should be reduced, the high number of these suppliers generates a lot of work for little spend. With a reduction of these suppliers, indirect purchasing costs will decrease. Also, logistic costs will decrease by fewer deliveries and invoices. Hence, each group of suppliers requires a different approach, close contact, partnerships and a focus has to be on the large suppliers while reducing the tail suppliers.

2.2 Vendor rating of laboratory supplies

In this section, the vendor rating as it is performed at the UMCG is discussed. The results will be explained and difficulties encountered discussed with a focus on the suppliers rated for the laboratories.

An annual vendor rating is in place at the Purchasing Department in which the top 20% spend suppliers, hospital-wide and under contract (67%), are included. In 2014 this resulted in including 133 suppliers in the rating, to which internal customers added 55 suppliers that are considered important by their departments. The selected suppliers are rated based on two objective criteria, price and delivery reliability, and several subjective criteria such as customer orientation and quality of the product. Based upon these criteria suppliers receive an A-label for a score above 6.4 and a B-label for a score below 6.4.

In Table 5 below, results of the vendor rating of 2014 are displayed.

Results vendor rating	Overall	Laboratory
Amount of rated suppliers	188	87
Average score	7.1	6.6
Suppliers with one grade below 6.4	19%	32%
Suppliers with a B-label	7%	24%

Table 5, Vendor rating

Table 5 shows that

the amount of rated suppliers for the laboratories, in comparison to other areas of purchasing, is relatively high considering the magnitude of the spend and amount of suppliers for the laboratories (see 2.1.2). This high number can be explained by the CCKL certification of the laboratories. This certification assesses the quality of the laboratories against various international standards (Raad voor Accreditatie, 2015). To receive this certification, the laboratories add suppliers to the vendor rating of the Purchasing Department. The laboratories do not take action upon the results of the rating, but the suppliers need to be rated in order to receive the certification.

The average score of all suppliers is a 7.1, whereas for the laboratories the average score is a 6.6. The lower score can be attributed to the values of the objective criteria, for the subjective criteria most suppliers score well. The high number of low grades and B-label suppliers of the laboratories, in comparison to the other areas of purchasing, can be explained by the methods of determining price differences and delivery times. Each year, the prices of products have to be adapted. Despite requests, not all suppliers (timely) provide correct prices. Even if the information is provided, it takes significant time to alter the data in the system of the UMCG. In case products are ordered before new prices are set, price differences arise. Plus, slight errors might appear during the transcription of the data, this is not all automated, leading to more price differences. It is therefore important to realize where a price difference

comes from; not all price differences are due to differences between agreed prices and the prices on the invoice and should be blamed on the supplier. The same holds for the delivery times, if the supplier does not provide correct delivery times, the outcomes of the vendor rating are not accurate. Plus, in the current information system of the Purchasing Department it is not possible to set exact delivery times in days. If the system cannot accurately keep track of the delivery times of the supplier, the reliability of this data for the vendor rating can be questioned.

Officially the purchaser for the laboratories has to meet with all B-label suppliers. Due to the high number of suppliers receiving a bad score and the questionability of the reliability of these scores, these meetings do not take place in practice. For the other areas of purchasing it is easier to meet with B-label suppliers, there are fewer suppliers. Despite the low score on the objective criteria, internal customers often indicate to be satisfied with their suppliers. The price differences and delivery times do not cause extra work for the laboratories. The Purchasing Department is entrusted with solving price differences and checking upon delivery times, taken up considerable time.

In conclusion, for the laboratories relatively many suppliers are rated, which can be explained by the CCKL certification of the laboratories. Relatively many suppliers score low on the objective criteria, though the reliability of these scores should be questioned. The low scores for objective criteria can partially be explained by the methods of determining price differences and delivery times. The purchaser for the laboratories is unable to meet all suppliers receiving a bad score due to the relatively large amount of visits that should be paid. Hence, the usefulness of the current vendor rating for the laboratories is doubted.

2.3 Internal customer satisfaction

In this section, the methods to measure customer satisfaction and their results are discussed.

Several tools are available at the UMCG to gain insight into the satisfaction of the internal customer. In the first place, complaints are registered. Less than five complaints, concerning the service of the Purchasing Departments, are received in the past years which is below the norm defined at the UMCG.

Second, every two or three years an internal customer satisfaction survey is performed. The respondents, staff members of the UMCG in contact with the Purchasing Department, receive a survey with questions determined by the quality committee.

Table 6 displays some figures concerning the customer survey.

Customer survey	Figures
Last sent survey	2013
Amount of surveys sent	400
Response rate	47,1%
Average grade final evaluation	7.1

The survey focuses on the reachability of the department by phone, the response to [Table 6, Customer survey](#) questions, the processing time of orders and the information provided on deviating delivery dates. The questions focus mostly on the operational purchasing process. The last three questions are only filled in by managers and focus on account management and whether wishes are fulfilled.

Based on the results of the survey an analysis and action plan are formulated, the motivated responses of the respondents are taken into account. For example, the reachability of the Purchasing Department showed room for improvement, actions to improve the reachability are taken such as the introduction of a service line. The information provided to customers in case of a deviating delivery, optimizing the intranet site of the Purchasing Department and order processing time are issues that internal customers rate relatively low but these are not yet acted upon.

In conclusion, two methods are in place at the UMCG to gain insight into customer satisfaction. The response rate for the survey is quite well, 47.1% and with a final evaluation of a 7.1, customers seem generally satisfied with the Purchasing Department.

2.4 Key performance indicators

In this section the performance indicators in place at the Purchasing Department are discussed.

Since 2006 several performance indicators are in place in order to measure performance of processes at the Purchasing Department. The currently measured performance indicators, their scores and corresponding norms can be found in Table 7.

Performance indicator	Score (2014)	Norm
Suppliers contracted in the top 200 spend	67%	80%
Order processing time		
- standard	95%	95% within 5 days
- non-standard	67%	95% within 5 days
Time to solve price differences	64%	80% within 5 days
Emergency deliveries per year	861	1000
B-label suppliers (%)	25%	20%
Average score vendor rating	75%	80% with an 7.0
Average score internal customer satisfaction	7.1	7.5

Table 7, Performance indicators

Table 7 shows that for most of the performance indicators the corresponding norm is not yet achieved. Though, improvements in the scores have been made since 2006. For example concerning the suppliers contracted and the amount of urgent deliveries. In 2006, only 22% of the top 200 suppliers was contracted, and the amount of urgent deliveries decreased from 350 to 210 per quartile since 2006.

The performance indicators are derived from the internal customer satisfaction. This resulted in practical, operational performance indicators. Annually the results of the performance indicators are communicated to the staff, actions taken upon the results of the performance indicators are unknown.

In conclusion, performance indicators for the purchasing process are in place at the Purchasing Department focusing on the operational purchasing process. For most performance indicators, the norms are not yet achieved since the measurement started in 2006, indicating room for improvement.

3. Literature review to identify improvement opportunities for the purchasing process

A literature review is conducted to identify improvement opportunities to the purchasing process of a large health care facility that can contribute to an increased purchasing performance. The improvement opportunities are divided into different categories, as defined in Appendix II. Some opportunities are quite broad and encompass large parts of the purchasing process or the structure of the process, other focus on a specific part of the process, such as negotiating or contracting. Each subparagraph of the review is concluded with a summarizing proposition for a possible improvement. All together, these propositions comprise the developed checklist. After some concluding remarks, a clear overview of the identified improvement opportunities is provided in Table 8.

3.1 Improvement opportunities to the purchasing process

3.1.1 Role and organization of purchasing

The organization of the purchasing function of a public institution should start with the selection of an organizational strategy. Organizational goals have to be set. Does the organization strive for operational excellence, low costs or product leadership? For hospitals such as UMCG, operational excellence, customer intimacy and product leadership are often considered most important (Kamann, 2007). It is crucial that general management is involved and recognizes purchasing to be of importance to the organization (Ellram & Carr, 1994). If purchasing is regarded as a passive, administrative function rather than a strategic function, the benefits that strategic involvement of purchasing can generate are limited. General management should regard purchasing of equal importance as other functions (Gonzalez-Benito, 2007; Knoppen & Saens, 2015).

Proposition 1. Top management has to recognize the relevance of purchasing and integrate the purchasing function with strategic planning of the overall organization.

The organization of purchasing

A relatively practical point concerning the organizing of purchasing, is whether to perform the purchasing process at a central purchasing department, or to decentralize the purchasing process. According to Knoppen and Saens (2015), decentralization, the degree to which the purchasing tasks and authorities are delegated to other departments, should not be stimulated. The purchasing function should be performed at a central, specialized department with skilled employees for the most effective purchasing function (Knoppen & Saens, 2015). Cost benefits, a stronger negotiation position, benefits of learning and experience are generated when purchasing is centralized (Knoppen & Saens, 2015). On the contrary, Van Weele (2005) argues that decentralizing the purchasing function has important advantages and should be taken into consideration. Examples of advantages of decentralization are stronger internal customer orientation, faster responses, and less bureaucratic procedures which create operational flexibility. Disadvantages are also recognized, such as the dispersed purchasing power, a lack of uniform handling towards suppliers and limited chances of building expertise on purchasing (Weele, 2005).

Criteria such as the level of expertise required, the purchasing requirements, customer demands and supply market structure influence whether central or decentralized purchasing is most suitable. An increase in hybrid structures of organizing purchasing is seen, combinations of central and decentral purchasing gain popularity (Johnson & Leenders, 2004). The central purchasing department should be involved in purchasing complex products, manage relations with suppliers and perform negotiations. According to Laios and Xideas (1994), decentralizing the ordering function to the internal customer is associated with better performance, which could also be successful in hospitals. The internal customer should gain autonomy and increased control over their own budget.

Proposition 2. Consider organizing the purchasing function centrally, while the ordering process is decentralized, creating a hybrid structure of the purchasing function.

Collaborations in purchasing in health care

In the Netherlands over twenty purchasing alliances in healthcare are present. The largest is Intrakoop, of which most Dutch hospitals including the UMCG, are members (Intrakoop, 2012). The advantage of a purchasing cooperation is bundling of experience, knowledge and volume, to realize cost reductions and/or quality improvement (Burns & Lee, 2008; Li, 2012). A large survey conducted among hospital materials executives shows that product standardization and joining a Group Purchasing Organization (GPO) are effective strategies leading cost reductions (Schneller, 2010). Joining a GPO can also contribute to increased quality of the products purchased, lower transaction costs and decrease the workload of individual health care facilities (Schotanus & Telgen, 2007). However, there are downsides to the use of GPOs. The most fundamental controversy is whether GPOs actually contribute to reduced purchasing costs (Hu & Schwarz, 2011). GPOs often require significant setup and coordination costs, plus there are indications that GPOs in the United States decrease competition between suppliers thereby decreasing innovation. Also, the use of GPO restricts flexibility in purchasing and creates a loss of control (Schotanus & Telgen, 2007).

However, in Dutch health care, mutual competition between health care facilities is (as for now) relatively low. The external environment and organizational structures are alike. Therefore GPOs are an interesting concept. With the common goal; taking care of the patient in the best way possible with the available means, the largest advantage of proven cost reduction of the GPO outweigh the disadvantages and difficulties in many situations (Schotanus & Telgen, 2007). According to the Dutch Minister of Economic Affairs, purchasing cooperation between hospitals should be stimulated in the Netherlands. Demand should be bundled, leading to volume discounts, exchanging market information and experience to further professionalize health care purchasing (Verhagen, 2012).

Proposition 3. Participation and active involvement in a purchasing alliance is a valuable procurement strategy to contain costs and increase quality for Dutch hospitals.

3.1.2 Strategy, policy, guidelines, and procedures

The contribution of strategic purchasing to overall organizational performance is widely acknowledged. An organization should have a purchasing strategy in place to deliver best value for money (Arney, Yadav, Miller, & Wilkerson, 2014; Gonzalez-Benito, 2007; Murray G., 2002; Swinder & Seshadri, 2001). This purchasing strategy has to be structured, clearly documented and communicated to the purchasing staff (Ruiter, Buijs, Bakker & Van den Bemd, 2011). To prevent pitfalls such as lack of scope, scale and unaligned incentives that are encountered when translating the strategic intentions into practice (Knoppen & Saens, 2015).

Strategic alignment and a fit with the organization

To achieve an increased purchasing performance, strategic alignment of purchasing with the organizational objectives should take place (Caniato, 2014; Gonzalez-Benito, 2007). For an effective purchasing department, there has to be a fit with the policies, organization and processes of the rest of the organization. It might seem obvious that purchasing strategy and goals should be in line with organization strategy and goals, but a study of Kamann et al. (2007) reveals this is often not the case. If the purchasing goals and strategy are shaped in accordance with the organizational environment, not only the purchasing performance will increase, the organizational processes are also positively influenced. To effectively organize this aligned purchasing process, guidelines, regulations and recommendations on the different steps of the purchasing process should be composed (Kamann, 2007).

To achieve the alignment of organizational and purchasing strategy, purchasing professionals should be involved in organization-wide strategic planning and formulate a long-term plan for the direction of development of the purchasing department. The organizational strategy should be communicated towards purchasing professionals and all internal customers involved; they should be acquainted with the organizational goals and strategy (Gonzalez-Benito, 2007; Ruiter et al., 2011).

Proposition 4. A structured, clearly documented purchasing strategy and policy should be in place in line with the organizational environment.

Proposition 5. The purchasing department should be involved in organization-wide strategic planning and formulate long-term plans for the development of the department.

Documented, up to date guidelines and procedures

Research performed by Laios and Xideas (1994) indicates that the current purchasing procedures should be critically reviewed since these are often not up to date. The procedures might have to be altered, or new ones created, to assure clear procedures are in place for all phases of the purchasing process. Not only should the documented procedures and process be up to date, but they should also be transparent and sustainable (Husted & Reinecke, 2009; Perner et al., 2014; Pohl & Forstl, 2011). Ruiter et al. (2011), suggest to implement tools and templates for purchasers to manage the purchasing process. This is expected to increase purchasing performance.

Proposition 6. Clear, sustainable and up to date guidelines and procedures to support the purchasing process should be available.

3.1.3 The staff, changing roles and ongoing education

Ongoing education and training

With the constant changing environment and the high pace at which technology develops, the purchasing staff should be able to expand and up-date their knowledge. The learning capabilities of the purchasers heavily influence the potential contribution of purchasing to the organizational performance. A well-trained purchaser will communicate better, outside the limits of conventional transactional-oriented price and availability information (Knoppen & Saens, 2015). Three main skill areas can be identified in which training is required, according to Humphreys et al. (2003). These areas are business skills, interpersonal skills, and technical skills. To create an efficient and effective purchasing process, purchasers have to possess and update these skills.

Proposition 7. Invest in continuous learning and training programs for the purchasing staff on business, interpersonal and technical skills.

Roles and (overlapping) responsibilities of the staff

Due to the development of new technologies, fast changing markets and the increase in collaborative arrangements, the roles and responsibilities of the purchasing staff are subjected to change (Humphreys et al., 2003). Reviewing current responsibilities and tasks is relevant to assure an efficient and effective purchasing process, to which managers, purchasers and administration employees contribute (Cousins, Lawson, & Squire, 2006)

First of all, the function of a purchasing manager. A redefinition of the role of the purchasing manager is needed according to Humphreys et al. (2003). The strategic role of the purchasing manager, and the influence the purchasing manager can have on the management of a hospital, are key factors for purchasing success. The purchasing manager has the responsibility to emphasize the contribution of purchasing to overall performance and the strategic role of purchasing to general management (Gonzalez-Benito, 2007; Knoppen & Saens, 2015). Updating process and strategy based on developments is a core task of the purchasing manager to stimulate purchasing performance. A high level of knowledge is required, to set and maintain standards regarding purchasing practice and assure training and development of the purchasing staff. The focus of the purchasing manager should be on mentoring and coaching staff, strategic leadership, cooperating with other departments and updating purchasing processes in the light of developments (Humphreys et al., 2003; Ruiter et al., 2011). The head of the department reporting directly to general management indicates a highly developed, professionalized purchasing function (Gelderman & Van Weele, 2005).

Proposition 8. The purchasing manager should report to top management, increasingly focus on mentoring staff, strategic leadership and create awareness of the importance of purchasing towards management.

Also, the skills required of a purchaser have changed over the past years. Strategic and value adding tasks have become more important since the 1990s. Purchasers should no longer spend a disproportionate part of their time on low-value purchases. Because of the increased responsibilities concerning projects and public tenders, the time spent on low-value purchases should decrease. In order to do so, information systems that allow users to order from selected suppliers, should be implemented leading to less operational work for the purchaser concerning these day-

to-day purchases (Trent & Monczka, 1998). Instead of the role of buyer, focusing on price and quality, purchasers have to compose and manage long-term agreements between buyers and suppliers (Cousins, Lawson, & Squire, 2006). The skills of planning, evaluating, implementing and controlling purchasing and supplier strategies have become more important to purchasers (Gelderman & Van Weele, 2005).

The tasks and responsibilities of purchasers and administration employees have become less clearly defined and require more flexibility (Humphreys et al., 2003). According to McCue & Gianakis (2001), partly the same activities are performed by the purchaser and administration staff, while the scope of their function differs. A purchaser should focus on tactical purchasing and be involved in strategic decisions. While the administration staff has the responsibility for the day to day handling of purchasing. Overlap, as indicated to be present concerning negotiations and supplier relations should be prevented (McCue & Gianakis, 2001). These shared responsibilities for several tasks create ambiguity and do not lead to an efficient and effective purchasing function. The roles and responsibilities of the different staff members should be clearly defined and attuned to one another for a successful purchasing process (Husted & Reinecke, 2009). It is important to be open to a redefinition of tasks, obligations and the methods used (Kamann, 2007).

- Proposition 9.** Purchasers should spend little time on low-value purchases but focus on the tactical purchasing process and long-term relationships with suppliers.
- Proposition 10.** Administration employees should be in charge of the day-to-day purchasing and handle operational purchasing.
- Proposition 11.** Review roles and responsibilities of different types of staff members to prevent shared, outdated and unclearly described responsibilities and tasks.

3.1.4 Performance and management information

A trend is seen as purchasing managers are including continuous improvement into the strategic purchasing process. To facilitate continuous improvement regarding costs, quality, and time-related capabilities, purchasing performance has to be measured and monitored in Dutch hospitals (Ruiter et al., 2011). Many health care facilities are already measuring (aspects of) the purchasing performance with performance indicators, as is the UMCG. According to Trent (1998), measuring and evaluating purchasing performance periodically based on performance indicators contributes to an increased purchasing performance (Neely, Gregory, & Platts, 2005; Trent 1998). Often the focus of performance measures is on financial performance, like cost savings. However, the intangible performance measures, such as the quality of goods, timely delivery, and customer satisfaction, are of equal importance according to Kakwezi (2008). From the measured performance indicators, management information can be deduced. This should be accessible to purchasers through tools and templates, to manage the purchasing process based on information. (Ruiter et al., 2011).

Besides performance indicators focusing on different aspects of the purchasing process, special purchasing performance measurement systems (PPMS) have been designed for health care. The PPMS are developed to measure, monitor and improve purchasing performance over time with financial and non-financial performance measures (Pohl & Forstl, 2011). Based on the areas of focus of the PPMS, important topics measured to increase purchasing performance can be identified. According to Pohl and Forstl (2011), areas of focus of a PPMS are transparent and sustainable purchasing processes and measuring internal customer satisfaction. Important indicators in the PPMS are, the percentage of items purchasing through e-purchasing, measuring supplier performance regarding delivery, quality of supplies and flexibility and the satisfaction of suppliers. Another important indicator is whether the outcomes of the purchasing performance are discussed in the management team. This indicates the awareness of the importance of purchasing to the organization (Pohl & Forstl, 2011).

- Proposition 12.** Implement a well-thought out set of performance indicators to measure, monitor and improve purchasing performance.
- Proposition 13.** Purchasing management information should be gathered and be accessible to purchasers.

3.1.5 The use of information technologies

Regarding the implementation and use of ICT in health care, improvement opportunities can be identified (Parikh & Joshi, 2005; Van Poucke, Van Weele, & Matthyssens, 2014, Scalise 2005). The operational purchasing process should be automated, a system aimed at supporting the time-consuming administrative processes is needed. In addition, tactical purchasing should be supported by ICT systems to increase the professionalism of the purchasing process. Such a system should support the awarding of tenders, assist in planning and provide purchasers with management information, at the UMCG this could improve transparency of the purchasing process and increase control. ICT systems, such as e-procurement systems, can increase the value the purchasing department adds to the organization by streamlining processes and eliminating non-value-adding activities. In case of a successful ICT system facilitating decentralized ordering, operational activities can be transferred to users decreasing the workload of administration employees. With clear, accessible contracts in place, an internal customer could purchase directly from contracted suppliers using the e-procurement system providing them with increased control. This could positively influence internal customer satisfaction (Van Poucke et al., 2014; Laios & Xideas, 1994). Concerning ICT, the goal of a purchasing department should be the successful implementation of an enterprise resource planning system (ERP) to facilitate and automated internal purchasing process (Ruiter et al., 2011).

Proposition 14. An ICT system, comprising e-procurement, should be (increasingly) implemented to support purchasing processes and increase purchasing performance.

3.1.6 Restructuring the purchasing process

Formalizing the purchasing process

Earlier on the importance of up to date procedures to structure the purchasing process was emphasized. However, too many regulations and a formal purchasing process might not lead to an optimal situation. Therefore, a distinction should be made in the purchasing process between products of high and low complexity (Laios & Xideas, 1994). The purchasing process should be formalized for products of low complexity, a relatively low price, low variability and high frequency. Formalization will, for these products, decrease direct transaction costs. Selection will be simplified by providing checklists, preferred suppliers and applying selection criteria (Pemer, Werr, & Bianchi, 2014). Formalization will minimize transactions and switching costs because of the long-term contracts and reduced risks due to trust-based relations. The standard purchasing process that works well for complex purchases, generates too much overhead and administrative costs for these non-complex, low-cost purchases. Long-term agreements, clear contracts and information systems can, in this case, contribute to purchasing performance to prevent delays, errors and poor vendor participation (Parikh & Joshi, 2005).

On the contrary, a more flexible structure is needed for products of high technical complexity, purchased with a lower frequency such as expensive equipment. The expertise of end users and purchasers has to be combined to assure purchasing of the right supplies in each case (Laios & Xideas, 1994). These purchases might need a customized, more flexible approach. In case of a public tender process, it might be best to generate a rigorous process. With a transparent, fair and objective process, the best candidate can more easily be selected while minimizing the risks of complaints and lawsuits (Husted & Reinecke, 2009).

Proposition 15. Formalize the purchasing process for low cost, non-complex and high-frequency products while assuring a flexible, tailored approach for complex products of low frequency.

The purchasing card for small purchases

Across various industries the interest in the use of purchasing cards for small purchases has risen. The idea is simple, let employees use purchasing cards to buy necessities without having to go through all steps of the purchasing process. The burden on the purchasing department is decreased, and money is saved by eliminating paper requisitions, orders and invoices for minor transactions (Palmer, 2000; Avery, 2005). In the case study of Parikh and Joshi (2005) the overhead costs decreased by 45% with the use of the purchasing cards with a limit of 1500 euros to

spend on items from a catalog. Advantages for the internal customer are shorter requisition lead-time and less administrative time spent on contacting the purchasing department, empowerment of the employees which lead to higher satisfaction and flexibility of ordering directly from suppliers. The purchaser has more time to focus on large purchases and invest in strategic alliance with major suppliers. On the other hand, misuse of the card can take place and purchasers might feel less in control of the purchasing process. To prevent fraud, a limit on the amount of transactions per day or a spending limit per billing cycle can be set (Parikh & Joshi, 2005). Evaluating and monitoring the purchases made with the card is necessary, but management has to be willing to loosen control to achieve improved efficiency and reduced expenses (Palmer, 2000).

Proposition 16. Consider purchasing cards for internal customers ordering non-complex, low-cost purchases from selected vendors.

Purchasing services

The expenditure of organizations on services has risen and the opportunity to generate savings through a more effective purchasing process is large (Van der Valk & Rozemeijer, 2009; Perner et al., 2014; Bryntse, 1996). According to Van der Valk and Rozemeijer (2009), there is a substantial difference between purchasing services and supplies. The characteristics of services, intangibility, heterogeneity, simultaneity, and perishability, affect the purchasing process in a way that purchasing supplies does not. Therefore, the purchasing process could be slightly adapted in case of purchasing services. In the first place, the selection of a service might be more complicated because of the difficulties in evaluating a purchase in advance or hindsight. Thus, 'staff competencies' and 'customer skills' should be added to the purchasing criteria to assure a fit with the in-house capabilities (Van der Valk & Rozemeijer, 2009). Because of the perceived risk that appears due to the services being abstract and difficult to compare to others, a relational and trust-based purchasing approach should be used (Perner et al., 2014). The purchaser should assure the specifications are accurate and complete to make sure the relatively intangible service meets the expectation of the user. To make buyers become explicit about their expectation of the service in an early stage, detailed information about the service could be requested from the supplier. Because of the difficulties concerning quantifying services regarding costs and managing demand of a service, close interaction between the supplier, purchasing department and internal customer is needed (Van der Valk & Rozemeijer, 2009).

A danger in purchasing services is 'over-embeddedness', organizations tend to stick with a service supplier because of the present relationship. Because the service is abstract and therefore difficult to compare and evaluate, switching service suppliers does not occur frequently. To prevent this, the purchasing process for services could be formalized (Perner et al., 2014). In the first place, policies and guidelines, such as checklists, formal contracts, and recommendation on how to select service suppliers or how long a contract should last, should be formulated. These policies and checklists will support purchasers and managers with professional purchasing of services. Second, preferred suppliers for services should be listed. The purchasers are restricted to preselected suppliers and contracting will be more effective because of centrally negotiated contracts. Both measures can increase purchasing performance (Perner et al., 2014)

Proposition 17. Assure accurate and complete specification when purchasing services, a fit with in-house capabilities and close involvement of all parties.

Proposition 18. Formalize the purchasing process for services with checklists, formal contracts and policies to prevent over embeddedness.

3.1.7 Purchasing portfolio and sourcing

Apart from separate processes for purchasing services instead of supplies, and complex purchases versus less complex purchases, another distinction can be made. A distinction concerning different categories of spend can be made based on profit impact and the supply risk. This is described by Kraljic (1983), who developed a model for purchasing portfolios that has become a standard in the past decades. The Kraljic matrix can be of help in differentiating the purchasing strategies and supplier management required by each purchasing category from the

overall purchasing strategy. To do so, the purchased items are placed into four categories, leverage items, strategic items, noncritical items and bottleneck items. In case of leverage items, the buyer can exploit the purchasing power. Noncritical items, routine items, should be ordered through an efficient process. The purchasing approach should aim at reducing transaction costs. For bottleneck items, risks should be prevented by volume assurance and searching alternative suppliers and products. For strategic items, a collaborative interaction between buyer and supplier is required (Kraljic, 1983). Each quadrant requires a different strategy, it is therefore important purchasers are aware of the position of a product in the portfolio (Gelderman & Van Weele, Purchasing Portfolio Models: A Critique and Update, 2005).

Even though differentiation in managing supplier relationships might be needed, purchasing portfolio models are criticized. It is argued that complex business decisions cannot be made based on a portfolio analysis comprising only two basic dimensions. According to Dubois & Pedersen (2002), vital aspects of the buyer-supplier relationship are ignored by the portfolio model of Kraljic (1983) such as the interdependencies between products and the context of networks. In addition, a lack of proactive thinking about how to change the existing reality and measurement issues, are points of criticism (Olsen & Ellram, 1997). Gelderman and Van Weele (2002) acknowledge the limited presence of empirical evidence on the usefulness of purchasing portfolio models. However, according to case studies across various industries, position and professionalism of purchasing are positively influenced by the use of purchasing portfolio models. The purchasing portfolio model of Kraljic (1983) helps to differentiate between important and less important suppliers, and the allocation of scarce resources can be improved (Gelderman & Van Weele, 2005).

Proposition 19. Use a purchasing portfolio to determine a suitable purchasing strategy and a distinctive approach to supplier management for different product categories.

Balancing international and local sourcing

Many organizations engage, to a certain extent, in international sourcing. International sourcing is an important tactic to support the strategies of cost reduction, quality, and innovation (Schiele, Horn, & Vos, 2011). The advantages of international purchasing, like cost reduction, should be weighed against the disadvantages, such as increased delivery uncertainty, the risk of reduced quality, delivery cost and reduced flexibility to react to customer demand (Holweg, Reichhart, & Hong, 2011). Local sourcing might lead to positive public relations since it demonstrates investment in the community, greater certainty, and predictability of delivery times. However, local sourcing could also be less efficient than the large multinational and lead to a false sense of security in local business (CIPS, 2014).

Proposition 20. Consciously decide whether to source local or global for categories of supplies, find a balance.

The strategic issues of in and outsourcing

Another decision concerning sourcing is whether to in or outsource certain functions. This is considered a top management issue with long term impact. Outsourced functions in health care are among others information technology, finance, food services, housekeeping and support services (Moschuris & Kondylis, 2006). Growth is expected in health care outsourcing and health care purchasing managers should carefully examine whether outsourcing would be a successful strategy for their organizations. With outsourcing, the activities that remain in the organization, the provision of health care, can become the focus of strategic attention (Roberts, 2001). According to Moschuris & Kondylis (2006), reasons for outsourcing in health care can be the reduction of costs and enhancing efficiency, conserving the organizational resources for use where these are most effective. With outsourcing, for example, food services, a hospital can take advantage of the supplier's expertise, economies of scale and the supplier can add value by providing integrated services for clients. Benefits can include increased productivity, quality, and profitability. The greatest risk purchasing managers should be aware of are possible loss of control and flexibility, the supplier not performing as expected, internal skills that might have contributed to organization success getting lost and supplier management taking much time (Roberts, 2001). Assuring information exchange and regular contact between managers, will increase early detection of difficulties and contribute to rapid solving of problems.

(Moschuris & Kondylis, 2006). According to Roberts (2001), the in and outsourcing decisions should be aligned with the strategic goals of the organization, a structured, documented process based on facts should be in place. In conclusion, it has to be determined in which cases outsourcing is a viable strategy for non-core activities, weighing the pro's and con's, this decision should be up to date and focused on the long term.

Proposition 21. Assure in- and outsourcing decisions are up to date and focus on the long term.

3.1.8 Managing the supply base, contracting and negotiating

Market research

An important task of the purchaser proceeding the actual purchase, it performing market research. To deliver high-quality service to the internal customer, market orientation has to be built by performing market research. Market research should be performed to be informed about the competitiveness of the market, potential suppliers, to foresee costs and identify supplies that fit the requirements (Kakwezi & Nyeko, 2008; Van Poucke et al., 2014).

Proposition 22. Perform market research to be informed about the market, potential suppliers, possible supplies fitting the requirements and to anticipate costs.

Balancing the amount of suppliers in the supply base

The changing role of purchasing from a clerical to a strategic function contributed to an increased importance of the supply base. The supply base is the total number of suppliers actively managed by the organization through contracts. From these suppliers, supplies and services are purchased. The structure of the supply base can contribute to the overall success of the organization (Ates, Wynstra, & van Raaij, 2015). The supply base consists of two important strategic aspects. One, the number of suppliers and, two, the way in which these suppliers are organized and the relation with the suppliers. Concerning the number of suppliers, a reduction of the amount of suppliers contracted is perceived in the past decades (Moeller, Fassnacht, & Klose, 2006). Having a smaller supply base has advantages such as volume discounts, decreased administration costs, and easier coordination. Swinder and Seshari (2001) showed that reducing the supply base is followed by a drop in price and an increase in quality of supplies. A compact supply base enables purchasers to focus and increases purchasing efficiency (Swinder & Seshadri, 2001; Humphreys et al., 2003), enables collaborative relationships which increase trust and stimulate sharing of information and increases supplies motivation to invest in the organization (Ates et al., 2015, Humphreys et al., 2003). One could say that if the amount of suppliers with which the organization is in touch is less, the degree of innovation might decrease. Companies that could introduce their innovative products to the hospital might have been removed from the supply base (Ates et al., 2015). On the other hand, with a few suppliers the exchange of ideas is stimulated and with these suppliers a buyer-supplier relationship can be developed (Ates et al., 2015).

Reducing suppliers can lead to a situation in which single sourcing emerges, which does restrict the flexibility of the buyer. For certain products single sourcing might be favorable, for other products such as products with low technical complexity and a focus on costs, multiple sourcing can be preferred. Therefore, a balance between these two approaches should be sought depending on the type of products that is purchased and the desired type of relationship with the supplier (Ates et al., 2015). Each purchase category, a set of products and services purchased from the same market with similar product and spend characteristics, should have its own supply base (Husted & Reinecke, 2009). The structure of the supply base, the type of sourcing, contract duration and information sharing, should differ along with the purchase category. The bottleneck, leverage, non-critical and strategic items as proposed by Kraljic (1983), should to be treated differently.

Proposition 23. Balance the amount of suppliers in the supply base for each product category.

Collaborative interaction strategy

Since the 1990s, the importance of suppliers has increased because of the need to control costs and be able to rely upon suppliers (Trent & Monczka, 1998). This resulted in the formation of buyer-supplier relationships, which are

crucial for successful purchasing. A collaborative relation increases the bonding between buyer and supplier, both parties will invest in the long-term relation increasing purchasing performance (Swinder & Seshadri, 2001). Both a higher level of supplier integration and close relations with suppliers are associated with a more developed purchasing department and better purchasing performance. This supplier integration comprises partnerships with suppliers, such as the relations with Medtronic and Siemens at the UMCG.

Besides stimulating an increase in product quality, frequent information exchange, reduction of lead times and formation of long lasting relationships (Cousins et al., 2006), cost uncertainty will also be reduced because of the incentive to lower prices to seclude sales (Ates et al., 2015). It should therefore be stimulated in health care to form these collaborative interaction strategies with suppliers. According to a benchmark performed by Berenschot and NEVI (2011), the notion that strategic relations with suppliers should be build is slowly rising.

Proposition 24. Invest in and manage long-term collaborative buyer-supplier relationships with selected suppliers.

Contracting

Contracting is part of the tactical purchasing process, during which different types of contracts can be concluded. To achieve best value for money in the purchasing process, it is important that contract management is performed (Murray M., 2013). Contract management can be defined as, the process of systematically managing contract creation, execution and analysis to maximize operational and financial performance and minimize risks. The goal is to effectively use the contract against low costs (CIPS, 2007). With contract management in place, drafting, awarding and monitoring of contracts can take place, supplier performance can be monitored, relationships can be managed and planning based on contracts can take place. Risks, costs, and time spent on administration and ad-hoc decisions can be reduced. The costs and obligations of the organization are made insightful. To implement contract management, the use of contract management has to be communicated to all involved employees, contracts should be gathered, a database created, procedures written and clear, standard contracts designed (Knoester, 2005).

In health care the pressure to reduce costs, increase performance and implementation of new regulatory requirements, led to an increased importance of effective contract management (CIPS, 2007). Due to the General Data Protection Regulation (GDPR), expected to be adopted soon, developments are visible in contracting. At the UMCG, all contracts are currently gathered and assessed before the new legislation is in place. Purchasers should be involved in contract management, to increase purchasing performance. It is important that purchasers communicate concluded contracts towards internal customers, to increase the use of such a contract (Ruiter et al. 2011).

Contract coverage indicates the amount of purchasing volume covered by contracts, the part of the spend that results from the contracts. A high contract coverage is associated with a more developed purchasing department; it indicates a higher control over the purchases and the organization. In addition, if the purchasing spend is increasingly routed through contracts, better prices and supplier service level can be negotiated and supply risks reduced, according to Van Poucke et al. (2014). With a contract in place, a purchaser at a hospital can fulfill the intermediate role between supplier and internal customer best.

Proposition 25. Perform contract management including handling changes in contracts, monitor spend and performance, and keeping track of the end date while assuring high contract coverage.

Proposition 26. Communicate concluded contracts to the internal customer it may concern.

Contract duration is an indicator of a professional purchasing organization. Short-term contracts, imply regular negotiations and switching costs which are less efficient and therefore less pursued (Trent & Monczka, 1998). Pre-negotiated long-term contracts are preferred, since these contribute to cost reductions, in contrary to maverick buying which negatively influences costs. With long-term contracts for frequent purchasing orders, timeliness can be improved and the risk of a stock-out reduced by preventing the repetition of drawing up specifications, negotiating and selecting supplier (Arney, Yadav, Miller, & Wilkerson, 2014). Another advantage is the possibility to aggregate demand from internal customers while remaining flexible on the quantity and delivery schedule. Pre-established frameworks contribute to achieving greater value for money and improved purchasing efficiency, according to Arney

et al. (2014). On the other hand, shorter contracts do provide the advantage of flexibility and might be preferred for routine purchases for a shorter period of time in which fixed prices are agreed upon (Monczka, 2010).

The effect of contract duration on savings and customer satisfaction is stronger for strategic purchasing categories, as defined in the Kraljic matrix. For non-critical items, long term contracts are less useful since the purchasing strategy should, for these items, focus on efficient processes with an accurate operational system and quick delivery (Kraljic, 1983). Because of the laws and regulations applicable to a public hospital, contract duration might be a difficult issue for purchasers. Contracts with a too long duration might not be allowed, because open competition is restricted during the period of the contract. Therefore, the legislation in place has to be examined to determine how framework agreements could be used (Arney et al. 2014). Per product category and situation it should be determined which form of contract is most suitable.

Proposition 27. Conclude long-term contracts and framework agreements if applicable to realize savings through bundling demand and decreasing indirect costs.

Negotiation in the purchasing process

One of the steps in the tactical purchasing process, closely related to contracting, is negotiation, of which different forms can be identified. The cooperative negotiation process focusses on solving problems and calls for open and accurate information exchange with suppliers and an atmosphere of trust (Swinder & Seshadri, 2001). The competitive negotiation, in contrary, can have an atmosphere of aggressive price competition, little flexibility and time pressure. Cooperative negotiations aim at a win-win situation. This is likely to increase supplier loyalty, the supplier will be motivated to provide supplies of good quality and deliver on time. If complex products of high quality are purchased, cooperative negotiations should be performed to achieve increased purchasing performance (Swinder & Seshadri, 2001). Competitive negotiations pressure the supplier to make concessions to maximize the hospital's position. This type of negotiation can be effective for commodity items. Especially if switching costs between suppliers are relatively low, the process of bargaining can be a competition (Gelderman & Laeven, 2005).

In order to realize good outcomes in negotiations, the preparation of negotiations is important. The relationship with the supplier, the goals of the negotiation, possible alternatives, expected outcome and consequences should be considered. The portfolio analysis of the Kraljic matrix, aiming at minimal risk and maximal buying power, can be used to determine which type of negotiation is most suitable for different supplies and services (Gelderman & Laeven, 2005). For leverage items, such as electricity, other negotiations should be used than for strategic items (CIPS, 2013). However, according to a case study of Gelderman and Laeven (2005) for leverage products, both competitive and cooperative negotiation can successfully be pursued, it is not that simple.

Proposition 28. In the process of negotiating, purchasers should be aware of the type of products that is being purchased to determine the most suitable form of negotiation.

3.1.9 Communication is key

The staff members of the purchasing department have to communicate with suppliers, internal customers, other supporting departments and internally at the department. First, frequent and clear communication with suppliers is necessary to reduce order cycle time and costs while increasing supply assurance. Improved communication contributes to increased purchasing performance (Swinder & Seshadri, 2001; Wen-li et al., 2003). Insufficient communication can be problematic because misunderstandings easily appear. Communication increases both parties' understanding and encourages problem-solving. When communicating with suppliers, the purchasing department should be careful with multiple parallel communication lines. The danger is in ignoring the full scope of the relationship with a supplier and the appearance of miscommunications. A solution could be to place the responsibility of communicating with a supplier at one purchaser (Knoppen & Saens, 2015). Second, the purchasing department is working for the internal customers of the hospital. Therefore, communication between the purchasing department and the internal customer is crucial. Feedback from the internal customer should be used to determine

whether the wishes and needs of the customer are fulfilled with current practice (Kumar & Ozdamar, 2005). In addition, Kumru and Kumru (2013), identify improving communications with internal customers as a measure to prevent missing information, unclear tender documents, underreporting and late involvement in the purchasing process (Kumru & Kumru, 2013). Third, the purchasing department has to communicate with other supporting departments at the hospital, such as the logistic center and the financial department. Clear and frequent communication is a prerequisite for a steady collaboration with these departments, which contributes to purchasing success (Kakwezi & Nyeko, 2008). Fourth, internal communication of the purchasing department has to be paid attention to. Communication is needed to assure smooth collaborations between staff members and be aware of each other's affairs. An environment has to be created in which open and clear communication within the purchasing department is stimulated to prevent misunderstandings and assure efficient purchasing (Knoppen & Saens, 2015).

Proposition 29. Assure frequent, clear and open communication with suppliers, internal customers, other supporting departments and within the purchasing department.

3.1.10 Internal marketing of purchasing

Since the purchasing department serves the internal customer, involving the customer in the purchasing process is important. In fact, according to Janipha et al. (2015), involvement of the internal customer in the purchasing process positively impacts the quality of supplies and services. What is more, professionalizing the purchasing function, by means of standardization, process improvement, and performance management, is only possible with commitment of the internal customer (Ruiter et al., 2011). Especially in large projects, lively participation of the internal customer is necessary. The internal customer has to draw up accurate specification documentation to assure receiving the right supplies. Plus, the experiences of the internal customer can contribute to recommendations on improving the purchasing process (Janipha et al., 2015). Crucial for internal customers to be involved with the purchasing department, is awareness of the relevant purchasing policies and processes in place (Gonzalez-Benito, 2007).

The needs the purchasing department has to meet, differ per internal customer. To advise and assist each department correctly, a close relation between the purchaser and the internal customer is necessary. Such a relation will positively affect customer satisfaction (Van Poucke et al., 2014). According to Van Poucke et al., (2014), wishes of the customers have to be identified, since these will differ per customer and type of product purchased, to be acted upon. Fulfilling wishes stimulates trust and the sharing of information with the purchasing department, which contributes to the performance of the purchasing department (Van Poucke et al., 2014; Kakwezi & Nyeko, 2008).

Proposition 30. Align with the internal customers to determine needs and wishes through structured communication and building relationships.

Proposition 31. Assure Involvement of the internal customer in the purchasing process, by the purchasing department.

Proposition 32. Internal customers should be made aware of the purchasing policies and processes they are involved in.

Involvement of the purchasing department by the internal customer

It is not only up to the purchasing department to involve the internal customer in the purchasing process, but it also works the other way around. To assure best value for money, it is vital that the purchasing department is involved by the internal customer at whom a need emerges. Especially in case of complex products, large amounts of money involved or a product crucial to the customer. Through early involvement of the purchaser, their expertise can be put to use most effectively (Humphreys et al., 2003; Ruiter et al., 2011), the purchaser can successfully manage the supply relationship throughout the stages of the purchasing process and thereby control the information flow (Knoppen & Saens, 2015). According to Van Poucke et al. (2014), the moment at which the purchasing department is involved in the purchasing process, at the level of specifications, supplier selection or contracting, is one of the indicators of a professionalized purchasing function. At what time the purchasing department is involved, relates to the role purchasing fulfills in the organization. Through early involvement of the purchasing department single sourcing strategies can be used and long-term supplier relations can be build, that are related to decreasing purchasing costs

(Van Poucke et al. 2014). For less complex, non-expensive products early involvement is less relevant. The purchasing process will take less time, possible suppliers might already be known or a contract might be in place.

Proposition 33. For complex or expensive purchases, the purchaser has to be involved in the purchasing process at an early stage by the internal customer.

3.1.11 Increased control, evaluation and expedite

According to Telgen (1994), to increase control over the purchasing activities two approaches should be combined. In the first place the departmental budgets should be looked into, to improve planning in the purchasing department. To achieve best value for money, the purchasing department should be (made) aware of the upcoming projects from different departments and involved in an early stage. Often, purchasers are involved late by the customer and the degree to which the demand is forecasted is low. This leads to difficulties for the purchasing, fluctuations in the amount of work are present (McCue & Gianakis, 2001). Based on budget information it can be deduced when large projects or tenders are coming up. Second, a spend analysis should be performed to increase insight into the current spend and seek potential to increase the performance of the spend (Telgen, 1994). Purchasing management information on spend is in many health care facilities currently not available, according to the benchmark of Berenschot and NEVI (2011).

Proposition 34. Improve purchasing planning by looking into budgets of departments.

Proposition 35. Increase control over and insight into the spend by regularly performing a spend analysis.

According to Berenschot and NEVI (2011), a defendable, structured vendor rating should be performed at health care facilities. With a vendor rating the process of expediting, assessing and adjusting the performance of suppliers can be realized. Leenders and Schiele (1999) also acknowledge the opportunity to add value to the purchasing process through a dependable supplier evaluation.

Proposition 36. Perform a defendable, structured vendor rating to gain insight into supplier performance.

The service quality of the purchasing department is indicated by the internal customer satisfaction, the degree to which internal customer are satisfied with the purchasing practices, results, purchasers knowledge, and competence. This perceived quality of purchasing is important to the department; it is a prerequisite to be able to deliver the wanted quality to customers. Therefore, internal customer satisfaction should be measured and acted upon (Kakwezi & Nyeko, 2008; Van Poucke et al., 2014).

Proposition 37. Be aware of and try to improve internal customer satisfaction.

A large challenge concerning control are the delivery times. In many hospitals the delivery times are only checked in case the internal customer starts to ask questions about the delivery date of their product, so-called exception expediting. The purchasing department should be more proactive about monitoring the delivery times. The delivery times should be mentioned in the contract with a supplier, if so, the purchasing department can take action when a supplier delivers late. Late deliveries can be very inconvenient to internal customers and should be prevented to assure satisfied internal customers (Ruiter et al., 2011).

Proposition 38. Keep track of delivery times, include these in contracts and contact suppliers in case the delivery times are not met.

3.2 Concluding remarks

In the section above, possible points for improvement to the health care purchasing process of a large health care facility are discussed. The points, resulting from the literature review, are divided into different categories some with a wider scope and more widely acknowledged than others. To provide a clear overview of the points, these are listed in Table 8 below.

3.3 An overview of the opportunities for improvement

Table 8 below lists the categorized opportunities for improvement, as identified as propositions in the literature review. An overview of possible improvements is hereby generated. A comparison of the identified points is made with the MSU+ model, to assure no topics or points were missing, see Appendix II at page 65. In the next chapter, the applicability of these general points for improvement to the current situation at the UMCG is determined.

Category	No.	Opportunity for improvement
Role & organization of purchasing	1	Top management has to recognize the relevance of purchasing and integrate the purchasing function with strategic planning of the overall organization (Kamann, 2007; Knoppen & Saens, 2015).
	2	Consider organizing the purchasing function centrally, while the ordering process is decentralized, creating a hybrid structure of the purchasing function (Laios & Xideas, 1994; Knoppen & Saens, 2015).
	3	Participate and be actively involved in purchasing alliances, this a valuable procurement strategy to contain costs and increase quality for Dutch hospitals. Distinct choices about involvement in these organization should be made (Burns & Lee, 2008; Schotanus & Telgen, 2007; Li, 2012).
Strategy, policy, guidelines and procedures	4	A structured, clearly documented purchasing strategy and policies should be in place in line with the organizational strategy, the policies, and processes of the rest of the organization (Gonzalez-Benito, 2007; Caniato, 2014; Ellram & Carr, 1994).
	5	The purchasing department has to be involved in organization-wide strategic planning and formulate long-term plans for the development of the department (Gonzalez-Benito, 2007).
	6	Clear, sustainable and up to date purchasing procedures, regulations and recommendations on the different steps of the purchasing process have to be available (Laios & Xideas, 1994; Perner et al., 2014; Husted & Reinecke, 2009; Pohl & Forstl, 2011).
The staff, changing roles and education	7	Invest in continuous learning and training programs for the purchasing staff on business, interpersonal and technical skills (Knoppen & Saens, 2015; Humphreys).
	8	The purchasing manager should report to top management, increasingly focus on mentoring staff, strategic leadership, updating purchasing processes in the light of development and create awareness of the importance of purchasing towards management (Humphreys et al., 2003, Koppen and Saens, 2015; Gelderman & Van Weele 2005).
	9	Purchasers should spend little time on low-value purchases but focus on tactical purchasing, on long-term relationships with suppliers and be involved in strategic decisions (Trent & Monczka, 1998; Cousins et al., 2006).
	10	Administration employees should be in charge of the day-to-day purchasing and handle the operational process (McCue & Gianakis, 2001; Kamann, 2007).
	11	Review roles and responsibilities of different types of staff members to prevent shared, outdated and unclearly described responsibilities and tasks (Kamann, 2007; Humphreys et al., 2003).
Performance and management info	12	Implement a well thought-out set of performance indicators to measure, monitor and improve purchasing performance. (Pohl & Forstl, 2011; Trent & Monczka, 1998).
	13	Purchasing management information should be gathered and accessible to the purchasers (Ruiter et al., 2011; Trent & Monczka, 1998; Pohl & Forstl, 2011).
The use of ICT	14	An ICT system, comprising e-procurement system, has to be increasingly implemented for the (decentralized) operational purchasing process, the administrative and transactional processes, the awarding tenders process and planning and increase purchasing control (Laios & Xideas, 1994, Ruiter et al., 2011, Parikh & Joshi, 2005; Van Poucke et al., 2014).
Restructuring the purchasing process	15	Formalize the purchasing process for low cost, non-complex and high-frequency products while assuring a flexible, tailored approach for complex products of low frequency (Laios & Xideas, 1994; Parikh & Joshi, 2005; Perner et al., 2014).
	16	Consider purchasing cards for internal customers ordering non-complex, low-cost purchases from selected vendors (Palmer, 2000; Avery, 2005; Parikh & Joshi, 2005).
	17	Assure complete and accurate specifications when purchasing services, a fit with in-house capabilities. And close involvement of all parties (Van der Valk & Rozemeijer, 2009; Perner et al., 2014).

	18	Formalize the purchasing process of services with checklists, formal contracts and policies to prevent over-embeddedness (Pemer, Werr, & Bianchi, 2014; Husted & Reinecke, 2009).
Purchasing portfolio and sourcing	19	Use a purchasing portfolio to determine a suitable purchasing strategy and a distinctive approach to supplier management, for different product categories (Kraljic, 1983; Gelderman & Van Weele, 2005).
	20	Consciously decide whether to source local or global for categories of supplies, find a balance (Schiele, Horn, & Vos, 2011; Holweg, Reichhart, & Hong, 2011).
	21	Assure the in- and outsourcing decisions are up to date and focus on the long term. (Roberts, 2001; Moschuris & Kondylis, 2006).
Managing the supply base, contracting and negotiating	22	Perform market research to be informed about the market, potential suppliers, possible supplies fitting the requirements and to anticipate costs. (Kakwezi & Nyeko, 2008; Van Poucke et al., 2014).
	23	Balance the amount of suppliers in the supply base for each product category (Ates et al., 2015; Humphreys et al., 2003; Swinder & Seshadri, 2001).
	24	Invest in and manage long-term collaborative buyer-supplier relationships with selected suppliers (Trent & Monczka, 1998; Cousins et al. 2006; Ates et al. 2015).
	25	Perform contract management, including handling changes in contracts, monitor spend and performance of contract, keep track of end date while assuring high contract coverage (Knoester, 2005; Van Poucke, 2014)
	26	Communicate concluded contracts to the internal customers it may concern (Ruiter et al., 2011)
	27	Conclude long-term contracts and framework agreements if applicable to realize savings through bundling demand and decreasing indirect costs (Arney et al., 2014; Ruiter et al., 2011; Trent & Monczka, 1998).
	28	In the process of negotiations, purchasers have to be aware of the type of product that is being purchased to choose the most suitable form of negotiation. (Swinder & Seshadri, 2001; Trent & Monczka, 1998, Gelderman & Laeven, 2005)
Communication is key	29	Assure frequent, clear and open communication with suppliers, internal customers, other supporting departments and within the purchasing department (Kumru & Kumru, 2013; Kakwezi & Nyeko, 2008; Swinder & Seshadri, 2001; Kumar & Ozdamar, 2005; Wen-li, 2003).
Internal marketing of purchasing	30	Align with the internal customers to determine needs and wishes through structure communication and building relationships (Janipha et al., 2015; Gonzalez-Benito, 2007).
	31	Assure involvement of the internal customer in the purchasing process, by the purchasing department. (Janipha et al., 2015).
	32	Internal customers should be made aware of the purchasing policies and processes they are involved in (Ruiter et al., 2011; Gonzalez-Benito, 2007).
	33	For complex products or large amounts of money, the purchasing department has to be involved in the purchasing process at an early stage by the internal customer (Humphreys et al., 2003; Van Poucke et al., 2014).
Control & Evaluation	34	Improve purchasing planning by looking into budgets of departments to be aware of large projects coming up (Telgen 1994; McCue & Gianakis, 2001).
	35	Increase the control over and insight into the purchasing spend by performing a spend analysis (Telgen, 1994; Ruiter et al. 2011).
	36	Perform a defendable, structured vendor rating to gain insight into the performance of suppliers (Leenders & Schiele, 1999, Ruiter et al., 2011).
	37	Be aware of and try to improve internal customer satisfaction, have close relationships with customers (Kakwezi & Nyeko, 2008; Van Poucke et al, 2014).
	38	Keep track of delivery times, include these in contracts and contact suppliers in case the delivery times are not met (Ruiter et al., 2011).

Table 8, opportunities for improvement

4. Identifying applicable and additional opportunities for improvement at the UMCG

4.1 Introduction to the interviews

Interviews, with staff members of the Purchasing Department, are conducted for two purposes. First, the listed points for improvement based on the literature review are discussed with members of the staff of the Purchasing Department. Based on the interviews, it can be determined which points from literature are applicable to the situation at the UMCG. Second, the staff will be asked to come up with points for improvement specific to the UMCG that have not been listed. It is expected that based on the daily experience of the staff, additional points for improvement can be named.

In this chapter, first, the method for the interviews will be addressed shortly and the review of the list by the department head and the tactical team leader are discussed. Next, the results of the interviews with the staff members are elaborated on per category of points for improvement. Comparisons between the results of the interviews and the available documentation at the Purchasing Department (see Appendix III) are made, to determine discrepancies. In addition, the points proposed by the staff members are discussed. Eventually, a list of points for improvement applicable to the Purchasing Department of the UMCG is presented.

4.2 The method for interviews with the staff of the Purchasing Department

An interview protocol is written in order to systematically perform the semi-structured interviews with the different staff members. This protocol can be found in Appendix IV. The type of interview performed will be explained in the protocol, the preparation discussed, the selection of staff members interviewed commented on, the structure of the interviews explained and the points discussed are listed.

4.2.1 A review of the list with opportunities for improvement

To determine the more and less relevant points for improvement listed, the department head and the team leader tactical purchasing reviewed the list before the start of the interviews. Based on their recommendations, an emphasis is placed on certain points and others are addressed shortly. All points will still be addressed during the interviews, but a first impression of the relevance of the points will be present with this review. In addition, not all points on the list are equally relevant to the different staff members; the administration staff is not involved with the strategy while a purchaser is not involved in expediting. Therefore, a selection is made of the relevant categories that will be addressed per type of staff member interviewed. The points for improvement addressed can be found in the interview protocol, Appendix IV, the points considered more important by the head of the department and the team leader are bold.

Based on the review, the following remarks concerning the points for improvement can be made. In the first place, many of the points from literature are considered applicable to the purchasing process at the UMCG. The points concerning the organization of the department, the allocation of responsibilities to purchasers and administration employees are considered very relevant. In addition, the points concerning differentiation apply to the Purchasing Department, and specifically to the laboratories. These focus on purchasing differently for technically complex products of low frequency and products of low costs, complexity, and high frequency. However, also differentiation in relationships with suppliers, types of negotiation and a purchasing portfolio to differentiate purchasing strategy per products category are considered relevant. The points concerning the ICT are relevant, however with an Enterprise Resource System (ERP) which should be implemented in May 2017, many difficulties are expected to be resolved. The points related to contracting and contract management are relevant, a project is currently performed to gather all contracts to create insight into concluded contracts. Plus, alignment with internal customers and planning of projects and (public) tenders are emphasized.

The review by the department head and the tactical team leader indicates that the points concerning recognition of the importance of purchasing and provided training are considered less relevant. In their opinion, these points are already sufficiently present. As are the points concerning internal communication, clear guidelines, and regulations to structure the purchasing process, the use of purchasing cards and purchasing differently for services.

4.3 Results of the interviews with the staff of the Purchasing Department

This section provides an overview of the results of the interviews per category of point for improvement, as identified in the literature review.

The role and organization of purchasing

Concerning the recognition of the relevance of purchasing by top management and the role the Purchasing Department fulfills at the hospital, the team leaders, and department head are quite satisfied. The department head is in the position to exert influence, reports to the financial directors and meets with members of the board of the hospital. On the other hand, the interviewed purchasers indicate that the Purchasing Department is mostly considered important due to the savings that can be realized. The additional value presented to the organization by the Purchasing Department could be exploited better. Purchasing is too often seen as a hurdle to take.

Regarding the central organization of purchasing combined with decentralized ordering, this division is (partially) present at the UMCG. The Purchasing Department is in charge of the purchasing process, supplies and services purchased have to run through the central Purchasing Department. Currently, GHX, a system to automate the supply chain, is used as a decentral ordering system in which one or several staff members at a department can place orders. In case of the laboratories, unfortunately not each laboratory can access or is willing to use GHX. Another difficulty is that suppliers cannot selectively choose which articles are displayed from their assortment on GHX and which are not. This causes internal customers to order supplies through GHX while contracts with other suppliers for these products might be in place. It is agreed that all employees responsible for ordering should be able to enter the system, and clear outlines on what can be ordered through GHX are needed. The interviewed purchasers and administration staff indicate that the use of a system such as GHX should be stimulated. This reduces the workload of the Purchasing Department, making room for other activities.

The Purchasing Department is involved in several purchasing alliances. The most recent addition, the membership of Einkaufsgemeinschaft Kommunaler Krankenhauser (EKK), is considered a relatively concrete membership because it is result oriented and a vision is determined. For other alliances the Purchasing Department participates in, the usefulness is doubted by several interviewees. Though the initial idea might have seemed interesting, in their daily work the alliances have not proven to be useful to the purchasers. Clear choices should be made into which alliances time should be invested. It is pointed out that a purchasing alliance should not be a goal in itself, but a means to generate advantages.

Policy, direction of development, organization & goals

The head of the Purchasing Department is responsible for the strategic purchasing process at the UMCG. This includes determining the purchasing strategy, the organization of purchasing, formulating purchasing policy and goals. While the awareness of the importance of strategic purchasing at the UMCG has increased, a documented strategy, policy and goals, are not yet present. A clear and structured purchasing strategy should be in place according to all interviewees. A fit for the upcoming strategy and policy with the organizational strategy is sought, using the mission, vision, ambitions and goals of the UMCG for the coming years. Input for the strategy is provided by the team leaders, purchasers indicate the wish to be more closely involved in the development of the strategy and policy. It is also mentioned that communication of the current state of the policy should be improved, the staff is curious about the state of the policy. Information about the upcoming strategy and changes in policy remains rather vague, which is disapproved of because the strategy and policy are expected to change the work of staff members.

One of the points for improvement concerns development of long-term plans for the department which is considered a responsibility of the department head. Concerning the long-term development of the organization, the Purchasing

Department was involved in drafting the Route 2020, the organization-wide vision document. This is considered useful, since the Purchasing Department can, once involved, contribute to achieving the goals of Route 2020.

Another point for improvement applicable to the Purchasing Department, is the availability of clear guidelines, regulations, and procedures to structure each step of the purchasing process. The department head and the tactical manager are of the opinion the outlines of the purchasing process are sufficient, this is currently not the largest challenge. Concerning the details, difficulties are acknowledged, parts of the documentation are outdated and should be rewritten. However, the purchasers are of the opinion that the guidelines differ from practice and changes in the process have not been documented. An important observation raised is that the outlines do not fit the situation (anymore), it might be clear on paper but differences with practice are present.

The staff, roles, responsibilities, and education

Concerning the points on continuous training and education for the staff, a clear distinction between the department head and the staff is seen. While the department head is satisfied, most of the purchasers and administration employees indicate that few opportunities for training or opportunities to visit conferences are provided. It is realized that time and money have to be freed for training, this is not always possible. The administration staff feel as if they are not stimulated to develop themselves. The team leaders indicate that with the upcoming changes, it is important to prevent knowledge gaps from appearing. The necessary education has to be timely assured, shifting responsibilities will require training of the staff.

Both team leaders, purchasers and administrative staff consider it important that the department head focusses on strategic leadership and determines the direction in which the department is heading. With the upcoming major changes such as the implementation of the Electronic Health Records (EHR) and the ERP and many retirements, processes at the department will be affected. Guidance and clarity, currently not considered sufficient, are expected from the department head, communicated towards all employees. The outlines of the different jobs have faded over time, it is considered the responsibility of the department head to provide the clear directions that are longed for.

A set of points for improvement focusses on the organization of the Purchasing Department, responsibilities, and activities of the different staff members, which is considered highly relevant by all interviewees. At the level of the tactical purchasing process for the laboratories, differences between documentation and practice are present. The purchaser is often not involved in specification and selection phase, but rather late in the purchasing process. While negotiations are performed, contracts are regularly not concluded. The purchaser does not have the time to maintain supplier relations, perform market research, propose standardization, evaluate policy effectuation or work on contract management.

The interviewees agree that purchasers are currently too much involved in the operational purchasing process, the purchaser performs administrative tasks. Authorization of orders, updating purchasing documentation, handling price differences, problems with billing and asking for tenders should not be performed by a senior purchasing. The purchasers would like a financial threshold under which the administration staff has more responsibility and can order supplies themselves. The purchasers indicate that their time could be spent better, on large projects and public tenders which require their expertise and consume much time. Separating the operational and tactical purchasing levels, different roles and entrusting the administrative staff with more responsibilities are considered possible solutions. The purchasers are of the opinion that if 'their' administration employee generates an order, the purchaser can rely on this information. Skills and the time spent on authorization and autographs could be spent better.

An important observation raised, is that the work of the purchaser has changed in the past years. The evolving European tender laws, the increase in projects, and technological developments wanted at a UMC, influence the way of working. The purchaser is responsible for issuing European (public) tenders when the estimated contract value for the contracted period exceeds the determined threshold. The purchaser assists in composing the program of requirements, determining selection and awarding criteria and publishing the tender documentation. Issuing public

tenders consume much time. However, the function descriptions and scope of the function have not been adapted to the current situation.

As for the administration employees, many administration employees have years of experience. The administrative staff of the laboratories clearly indicates the willingness to take more initiative and responsibilities. In the current situation, the administrative staff can order autonomously in case of an emergency delivery or through GHX, but otherwise they are dependent on the purchaser which slows the purchasing process. The administrative staff shows a willingness to take over tasks from purchasers, such as asking for tenders and meetings with internal customers. With clear guidelines and discussion up front, responsibilities could be transferred to the administrative staff with the implementation of the ERP.

All interviewees indicate that shared responsibilities between purchasers and administration employees exist. On paper, a separation is present between responsibilities, in practice there is not. According to several interviewees, this is partly due to the long time people worked at the department. Outlines slowly faded and people started to play by their own rules. A gray area emerged for which it is not clear who is responsible, this differs per purchaser and administrative staff members. Differences of opinion are present concerning the responsibilities, up to date, clear outlines are needed that create clarity.

Measuring and monitoring performance

The opportunities for improvement focusing on management information and performance indicators apply to the Purchasing Department. As is acknowledged during one of the interviews, in the first place the mindset concerning monitoring and improvement has to change. The transparency and trust, necessary to create an environment in which performance is discussed, are lacking. The current performance indicators, focusing on operational matters, should be complemented by indicators at a higher level according to the purchasers. Besides the yearly overview the purchasers indicate not to be involved with the performance indicators, evaluation and actions on the operational indicators seem to be missing. Not all purchasers have a need for other indicators, if certain information is required, they look it up themselves. However, performance data and management information are in the current situation relatively difficult to access, with the new ERP this will hopefully improve.

The use of ICT

Concerning the improvement opportunities in the area of ICT, the UMCG is about to make major changes. An ERP should be implemented in May 2017, replacing many of the outdated systems in place at the Purchasing Department. The control of the purchaser might decrease since not all purchases will have to be approved of any longer. Therefore, clear agreements have to be made in contracts on what suppliers offer and when prices are allowed to increase. If not, contracts can easily be violated, and prices can increase unnoticed. Internal customer will have more possibilities to order their supplies through this system, which is considered great for the many laboratories across the hospital. Changes in the way of working are expected, not-automated activities at the Purchasing Department will disappear.

Restructuring the purchasing process

Formalizing the purchasing process for non-complex products is considered an applicable point for improvement by all interviewees. The purchasers emphasize that, with clear outlines, they could be less involved in purchasing the simple, standard products. It is expected that formalization will be stimulated by the new ERP. The idea of a financial threshold before a purchaser is contacted might be useful. Though the Purchasing Department provides a service to the internal customers, even if the product might not be expensive it could be important to the customer. Therefore, assistance in purchasing should always be available if a customer asks for it.

Purchasing cards are considered less relevant. Because of current GHX and future ERP system in which the authorized internal customer can place orders from the departmental budget, purchasing cards are not required. A threshold per order, or per period of time can be set by the department head in GHX. In practice, these limits are often not set. The selected staff members are clearly trusted, the largest pitfalls are building up an unnecessary stock or ordering a faulty product due to a typo. Concerning the specifics of purchasing services instead of supplies, this seems less

relevant for the UMCG. For the laboratories not many services are bought, nor is the purchasing process considered different from purchasing supplies. Formalization is also considered less relevant for services due to the low frequency.

Purchasing portfolio and sourcing

The differentiation in purchasing supplies based on a portfolio is considered relevant by the interviewees. For the laboratories, this differentiation is currently not actively worked on. The purchaser does not have time available to actively differentiate and it has little priority, the purchasing process is functioning in its current state. For the medical cluster purchasers are more aware of the type of products purchased, strategic or leverage products, and try to treat the supplier accordingly. The purchasers acknowledge that active differentiation could also be made concerning investing in the collaborative relationships with suppliers. Actively managing supplier relations is not performed by the purchaser, though this is described in the function description, due to a lack of time and a lot of suppliers present.

Decisions on local and global sourcing should be made consciously, per category of supplies. For certain specific supplies, there is little choice in the matter. For categories of supplies for which several options are present, advantages and disadvantages should be weighed. Concerning in and outsourcing, this is not very relevant for the laboratory supplies but is relevant to other areas of purchasing. The policy and current considerations concerning these decisions should be communicated.

Managing suppliers and contracts

The interviewees acknowledge that market research is not required for all purchases; internal customers and purchasers are familiar with the suppliers. However, for less common or new products, market research should be performed according to the interviewees. Advantages could be achieved in these cases if more knowledge about the supplier market is present. Though market research is in the scope of the purchasers' function, the purchasers indicate that time for market research is often not available. Sometimes market knowledge is lacking, both on the side of purchasing and the internal customer resulting in suboptimal purchasing performance. In these cases, purchasers want to free time to be able to perform market research.

For both the medical area of purchasing and for the laboratories, the supply base has to be balanced. The interviewees indicate that a reduction of suppliers is necessary and possible. Reducing suppliers is officially in the scope of the purchasers function, in practice, the purchaser does not have time available to do so. For the laboratories, especially for the research laboratories, (exotic) products are ordered from many small suppliers. These suppliers do not gain focus when savings have to be realized, due to the limited amount of money spent at the individual suppliers. However, in total a significant amount is spent at these small suppliers, and it is expected that savings can be realized if these suppliers are reduced. Indirect costs of purchasing are relatively high for these suppliers of small spend because of the need to create suppliers in the IT system and contact these suppliers for relatively small amounts of spend. Reducing these suppliers is difficult. However, intermediate firms such as Bio-connect, serving as a contact between small firms abroad and the hospital, can contribute to a solution. A difficulty is that the internal customer pays for the handling and shipping fees while they do not pay for time spent by the purchasing department generating a new supplier and working with small suppliers. The intermediate firms provide an overlapping assortment, and the administration staff would like to reduce the amount of these large firms.

Negotiations are mainly performed by the purchaser, sometimes in collaboration with the internal customer if product specific knowledge is needed. Diversification in negotiation styles with different types of supplies is expected to lead to advantages. For the laboratories there is currently no time available to do so, it is not a priority. Due to many long-standing relations and standard discounts, the degree of negotiations differs per supplier.

Due to the General Data Protection Regulation (GDPR), aimed at strengthening data protection within the EU, contract management at the UMCG is receiving increased attention. Currently, actual contracts are not consistently concluded with suppliers, discounts are arranged or prices are agreed on. 'Contract control' is performed, instead of contract management, as the time approaches that a contract is about to end, the purchaser receives a notification.

Concluding contracts for the laboratories is complicated, due to the large amounts of money spend in this area of purchasing, for many supplies public tenders should be issued. However, issuing tenders takes much time. For both the medical area of purchasing and the laboratories, issuing these public tenders is preferably avoided. The purchasers acknowledge it is important to perform contract management, however this will also take much time. In case contract management is added to the responsibilities of the purchaser, other issues will be neglected. Compliance to the concluded contracts with clear agreements on prices is considered important. Investing in selected long-term collaborative supplier-buyer relationships and concluding long-term contracts and blanket contracts are considered points for improvement at the UMCG. A differentiated approach to suppliers is needed, time has to be made available to select and invest in such relationships. However, partnerships with suppliers might be complicated because of the obligation to perform public tenders. Long-term and blanket contracts can also turn into public tenders, the purchasers are careful not to generate too much work for themselves.

Communication

Besides the department head, all interviewees consider the internal communication an area in which improvements should be made. The team leaders indicate that communication between the administration staff and purchasers should improve. The hallway is, in some cases, considered a line across which communication is minimal. This leads to inefficient and ineffective processes. The purchasers indicate that information from the two team leaders towards two teams of purchasers and administrative staff is not provided at the same time, which is confusing. The administrative staff and purchaser for the laboratories all indicate that collaboration and communication among them functions well.

With the Supply Chain Management project, a project to increase supply chain performance at the UMCG, alignment of the supporting departments is stimulated. The quality of communication with suppliers, differs per supplier. Because of the current division in areas of purchasing, suppliers are in multiple areas and therefore contacted by different purchasers. Some interviewees consider these multiple lines of communication disadvantageous; miscommunication easily arises if a supplier has to contact different purchasers for the different supplies sold.

Communication with the internal customer is experienced as sufficient though it could be improved by clear order confirmations. The regular visits of the purchasers to the internal communication contributes to clear communication. The internal customers, generally, know when and how to contact the Purchasing Department. Alignment with the internal customer in determining needs and wishes and involving customers in the purchasing process is worked on.

Internal marketing of purchasing

For specialized products, internal customers often determine the desired product and have a supplier in mind, at the time a purchaser is contacted. This is often the case for the laboratories, products such as viruses and chemicals are very specific. It is considered difficult to conclude contracts for these specific products, due to the amount of money spent public tenders might be needed. The multiple suitable suppliers needed for such a public tender are not always present in the market. Currently, not many contracts are concluded for such products, price agreements are made.

Many long-standing relations between purchasers and customer are present. Most internal customers are also aware of the purchasing policies and processes. Occasionally the internal customer is not aware that a public tender has to be performed. Internal customers are involved in the purchasing process, the customer determines which product is required from which supplier. Being involved in the purchasing process for products or equipment with a large spend at a late stage, is undesirable for the purchasers. This causes pressure and much ad hoc work for the purchasers. The general opinion is that the Purchasing Department should sell itself more to the customers.

Control and evaluation

The order manager performs the execution of the expedite step in the purchasing process. In case a supplier has not delivered supplies past the delivery date, the supplier is notified by the order manager. In the current system the delivery dates cannot be set precisely, with the new ERP per supplier, per product this should be possible which is expected to improve expedite.

Purchasers are regularly taken aback by an internal customer with a request that requires a lot of their time. Large projects and public tenders cannot always be foreseen. The interviewees acknowledge this situation is inconvenient and should be improved. Insight into the budget of the departments is not expected to be a solution since the departments shift their budgets and change their plans. Regular visits to internal customers could help with seeing large purchases coming. However for the laboratories there are many internal customers, visiting them all takes time. Currently, the purchaser for the laboratory manages to visit the laboratories once per quartile. Even if internal customer are visited and the purchaser is aware of a public tender that has to be issued, customers often present the purchaser with the required information to issue the public tender late and expect it to be completed soon. Purchasers are taken aback by these requests from customers and method to plan these time-consuming activities is longed for.

The satisfaction of the customer is considered important to all interviewees. For the department the insight into the customer satisfaction through the survey is useful, for individual purchasers it is considered less important. The purchasers are of the opinion that the questionnaire could be useful, but the purchaser should already be aware of how his or her internal customer values their work.

A spend analysis is partially performed at the department and has to be finished. The purchasers would like to have insight into the spend per cost center and supplier. This can create insight into the current situation, how much money is spent at which suppliers for which products is considered useful information.

Once a year a vendor rating, a control of the performance of active suppliers regarding products and services delivered, is performed. The vendor rating is currently not considered effective for the laboratories. Purchasers responsible for other areas of purchasing indicate that they are often already aware of the performance of their suppliers. Some purchasers do not have suppliers scoring low and do therefore not discuss the results. If the purchaser is convinced the results of the vendor rating are correct, the results are acted upon. For areas other than purchasing acting upon the results is easier, the amount of suppliers rated in these areas is less.

4.4 Additions from the staff

At the end of the interview, each interviewee was asked to name additional improvement opportunities based on their daily experience. This resulted in the following opportunities for improvement.

Standardization

The issue of standardization is not explicitly on the list but is considered important when purchasing laboratory supplies. Many different articles, such as disposable plastics, are used in all laboratories across the hospital with little standardization. Standardization of these supplies, such as pipette tips and plastic trays, is expected to lead to cost reductions. Since supplies are used for different purposes at the different laboratories, product knowledge is needed to standardize. Proposing standardization of products is officially in the scope of the purchasers function, in practice the purchaser does not have time available to do so. With the help of the staff advisors, currently only available to the medical cluster, products could be standardized for the laboratories as well and the amount of suppliers reduced. A difficulty arising is that if supplies are standardized, the yearly spend might exceed the threshold for a public tender. This makes it unattractive to standardize.

Proposition 39. Standardization of laboratory supplies could and should be pursued. In case of the laboratories, assistance could be provided by the staff advisors.

List with agreed discounts

It is suggested to compose a list with all the agreed discounts with suppliers. As long as clear contracts are not in place, these discounts can be used by the administrative staff to determine the right price for supplies. This implicates that all discounts need to be documented. Such a list could prevent price differences between tenders and invoices from occurring.

Proposition 40. Compose a list with agreed discounts to prevent differences between tenders and invoices, as long as clear contracts are not in place.

Emergency deliveries

Concerning the emergency deliveries at the UMCG, the amount of emergency deliveries and the associated costs could be decreased (further). This can be achieved by asking the internal customer clearly what they mean by 'emergency delivery'. Does this mean the order has to be processed right away, or should a courier be sent to get the product? Asking these questions to determine how quickly the product is needed is also required to prevent confusion in subsequent stages of the purchasing process. A supplier or order manager do not know how to handle a request with 'emergency delivery' on it, and will interpret this by their own definitions. It is suggested to clearly document which information should be discovered, to assure uniformity in handling emergency deliveries.

Proposition 41. Document which information about the emergency delivery the administration staff has to retrieve from the customer, to prevent passing on general remarks.

The importance of Intranet

A lot of information about the Purchasing Department and their activities can be found on the Intranet. It is an important source for internal customers. One of the interviewees emphasized the importance of the Intranet and up to date information on it. Outdated information on the Intranet leads to more emails and phone calls to the department.

Proposition 42. The Intranet is an important source of information for internal customers, this information should be kept up to date.

The organization of the Purchasing Department

Several proposed points for improvement address the organization of the Purchasing Department, these points are listed below.

The different purchasing areas and their unequal workload

Multiple interviewees mention that the purchasing area for the laboratories is large compared to other areas of purchasing, especially after the addition of the research laboratories. Because of the large amount of laboratories spread all over the UMCG, it is unknown for how many laboratories the purchaser is exactly responsible. The current segregation of internal customers and responsibilities into the different areas of purchasing is considered very strict. An unequal workload is present among the purchasers. Several interviewees propose a new division of the areas of purchasing within the department. Instead of these shredded areas of purchasing that do not follow the sector structure of the hospital, the purchaser could be assigned to a set of suppliers. The parallel communication lines between purchasers and suppliers will be prevented and the workload can be equalized. It is argued that a purchaser can have a specialty, but should be able to purchase supplies for all internal customers.

Proposition 43. The current division into the purchasing areas created an unequal workload. A new division might be needed, per supplier instead of internal department to equalize the workload.

Ambiguous outlines for purchasers

In the current situation, the outlines of their work are unclear to the purchasers. At the moment, requests from internal customer are rarely turned down which results in a lot of (ad hoc) work. A practical framework indicating when a purchaser should be involved, is missing. Clear definitions of their responsibilities have to be defined. When can internal customers approach the purchaser? When the purchaser already issues multiple public tenders simultaneously, can another purchaser help? In addition, purchasers are not sufficiently aware of one another what they are working on.

Proposition 44. Clear outlines for the activities of the purchaser are needed. The current situation in which internal customers can approach purchasers with all requests is considered unsustainable.

Lack of a uniform way of working

Multiple interviewees indicated that a lack of a uniform way of working for the purchasers and administrative staff is present. Especially for the administrative activities a uniform way of working should be possible, most activities are quite standard. In practice, many of the administration employees handle daily situations differently. This leads to confusion within the department, with suppliers and internal customers and decreases the efficiency of the process. It shows in small things, such as the way in which price differences are resolved, how long order forms are left on desks before being processed and how prices are requested from suppliers. Per area of purchasing many exceptions to the general procedures are present. Efficiency and effectiveness of the purchasing process are expected to improve if the uniformity in the way of working is increased. Even within the administration for the laboratories, performed by two employees, differences in the way of working can be observed. This can and should be uniform, standard requests should be handled using the same method.

Proposition 45. The lack of a uniform way of working (especially important for the administration staff) should be resolved by attaining to agreements made, the team leaders should see to this.

Guidance and management

The purchasers and administration staff clearly indicate a need for more guidance and management from the team leaders. According to the function description, the team leaders should coach employees in performing their work, provide professional support, provide a constructive dialog with other staff members and discuss the staff members' progress. The team leaders should distribute the available capacities over the public tenders and projects and participates in these. These activities are not perceived to be sufficiently performed in practice according to the

purchasers and administration employees. It is also indicated that if changes are made, such as in a procedure, the team leaders should see to it that all staff members act on these changes. As one of the interviewees indicated; the rules are in place for a reason, so stick to the rules or document a change.

Several interviewees indicate a lack of decisiveness, someone with the power to take action seems to be missing. This also shows in case of the Lean Six Sigma project recently finished at the department. The results are clear and the bottleneck is identified, but evaluation of the results or action taken upon the results are not known to be present. This is considered frustrating, projects and initiatives to improve are present but in the end, daily matters are not affected. The purchasers and administration staff are of the opinion team leaders should act more forcefully against staff members changing the rules they work by. These staff members should be pointed at their responsibilities, the procedures and rules made. The general impression is that the team leaders are occupied with many issues, except for leading their teams.

Proposition 46 Improved guidance, management and decisiveness, of the head and team leaders of the Purchasing Department, should be addressed.

4.5 Overview of the points for improvement applicable to the UMCG

In Table 10 below, an overview of all points for improvement is provided. The points for improvement from literature are listed, complemented with additional points from the staff. Each point has been scored, based on the interviews. The score can indicate that this point is already covered at the UMCG or is not relevant. In case the point for improvement is considered relevant, it can a little relevant because it is already partially present, relevant or very relevant and should be worked on. An explanation of all possible scores is given in Table 9.

SIGN	MEANING
O	relevant but present, should not be worked on
-	not relevant, should not be worked on
±	relevant, partially present but could be improved
+	relevant, should be worked on
++	Very relevant, should be worked on soon

Table 9

Category	No.	Opportunity for improvement	General opinion	Opportunity applicable to the Purchasing Department of the UMCG
Role & organization of purchasing	1	Top management has to recognize the relevance of purchasing and integrate the purchasing function with strategic planning of the overall organization. (Kamann, 2007; Knoppen & Saens, 2015)	±	Purchasing is discussed in high regions of the management, more emphasize on additional value of purchasing to overall performance besides cost reduction might be required.
	2	Consider organizing the purchasing function centrally, while the ordering process is decentralized, creating a hybrid structure of the purchasing function. (Laios & Xideas, 1994; Knoppen & Saens, 2015).	±	It is considered important to preserve the centralized organization and increase the decentralize ordering under clear conditions.
	3	Participate and be actively involved in purchasing alliances, this a valuable procurement strategy to contain costs and increase quality for Dutch hospitals. Distinct choices about involvement in these organization should be made (Burns & Lee, 2008; Schotanus & Telgen, 2007; Li, 2012).	+	Make more substantiated choices about which alliances to participate in. A clear goal of the collaboration should be present.
	4	A structured, clearly documented purchasing strategy and policies should be in place in line with	++	Relevant point, an elaborate strategy for the coming four years is currently worked on by

Strategy, policy, guidelines and procedures		the organizational strategy, the policies and processes of the rest of the organization (Gonzalez-Benito, 2007; Caniato, 2014; Ellram & Carr, 1994).		the department head and eagerly awaited. The sufficient strategic fit with the organization will be emphasized.
	5	The purchasing department has to be involved in organization-wide strategic planning and formulate long-term plans for the development of the department (Gonzalez-Benito, 2007).	+	Closer involvement of purchasers and communication about strategy and long-term plans could be improved.
	6	Clear, sustainable and up to date purchasing procedures, regulations and recommendations on the different steps of the purchasing process have to be available (Laios & Xideas, 1994; Perner et al., 2014; Husted & Reinecke, 2009; Pohl & Forstl, 2011).	±	On the one hand not considered the largest challenge, mostly present. On the other hand, documents need to be updated to create a better fit with current practice.
The staff, changing roles and ongoing education	7	Invest in continuous learning and training programs for the purchasing staff (Knoppen & Saens, 2015; Humphreys).	o/+	Clear disagreements on this point, several staff members indicate a lack of required education. With the upcoming changes and expected shifts in activities such as managing complaints and keeping the Intranet up-to-date are considered important by many.
	8	The purchasing manager should report to top management, increasingly focus on mentoring staff, strategic leadership, updating purchasing processes in the light of development and create awareness of the importance of purchasing towards management (Humphreys et al., 2003, Koppen and Saens, 2015; Gelderman & Van Weele 2005).	++	Team leaders, purchaser and administrative staff indicate a lack of guidance, mentoring and strategic leadership. With the upcoming changes, the staff feels as if left in the dark. The purchasing manager does report to top management and creates awareness of the importance of purchasing.
	9	Purchasers should spend little time on low-value purchases but focus on tactical purchasing, on long-term relationships with suppliers and be involved in strategic decisions (Trent & Monczka, 1998; Cousins et al., 2006).	++	All interviewees agree that the purchaser's time could be spent better. Less operational activities, more time for projects, public tenders, and large purchases.
	10	Administration employees should be in charge of the day-to-day purchasing and handle the operational process (McCue & Gianakis, 2001; Kamann, 2007).	++	The function of the administration staff is expected to change with the ERP, a move towards assistant purchaser is encouraged. More initiative and responsibilities should be placed upon the administration, accompanied by clear rules and communication up front.
	11	Review roles and responsibilities of different types of staff members to prevent shared, outdated and unclearly described responsibilities and tasks (Kamann, 2007; Humphreys et al., 2003).	++	Shared responsibilities are recognized, function descriptions are outdated and practice differs from the documentation. Clear, documented reallocation of responsibilities is necessary.
Performance and management information	12	Implement a well thought-out set of performance indicators to measure, monitor and improve purchasing performance. (Pohl & Forstl, 2011; Trent & Monczka, 1998).	+	Current performance indicators are mostly operational, and therefore not of much use to the purchasers. Additional indicators are needed, clear evaluation of results and actions taking upon the results.
	13	Purchasing management information should be gathered and accessible to the purchasers. (Ruiter et al., 2011; Trent & Monczka, 1998; Pohl & Forstl, 2011).	+	Management information is currently difficult to access, attention should be paid to useful and accessible management information when implementing the ERP.

The use of ICT	14	An ICT system, comprising e-procurement system, has to be increasingly implemented for the (decentralized) operational purchasing process, the administrative and transactional processes, the awarding tenders process and planning and increase purchasing control (Laios & Xideas, 1994, Ruiter et al., 2011, Parikh & Joshi, 2005; Van Poucke et al., 2014).	+	The ERP should be up and running in May 2017, replacing many old, incompatible systems. Suppliers should be able to upload an assortment, based on contracts concluded with suppliers, and internal customer can order through a web shop like environment. Changes in the purchasing process are foreseen.
Restructuring the purchasing process	15	Formalize the purchasing process for low cost, non-complex and high-frequency products while assuring a flexible, tailored approach for complex products of low frequency (Laios & Xideas, 1994; Parikh & Joshi, 2005; Perner et al., 2014).	++	Relevant point, clearer outlines are needed. This can save the purchaser time for less complicated and expensive products and contributes to the autonomy of the internal customer.
	16	Consider purchasing cards for internal customers ordering non-complex, low-cost purchases from selected vendors (Palmer, 2000; Avery, 2005; Parikh & Joshi, 2005).	-	Not relevant, with the current system of GHX and in 2017 the ERP, internal customer can place (small) purchase orders based on the budgets of their departments.
	17	Assure complete and accurate specifications when purchasing services, a fit with in-house capabilities, and close involvement of all parties (Van der Valk & Rozemeijer, 2009; Perner et al., 2014).	-	Less relevant for the UMCG. Not many services are purchased for the laboratories.
	18	Formalize the purchasing process of services with checklists, formal contracts and policies to prevent over embeddedness (Perner, Werr, & Bianchi, 2014; Husted & Reinecke, 2009).	-	Not considered relevant, because of the small amount of services purchased.
Purchasing portfolio and sourcing	19	Use a purchasing portfolio to determine a suitable purchasing strategy and a distinctive approach to supplier management, for different product categories (Kraljic, 1983; Gelderman & Van Weele, 2005).	+	More differentiation in determining the right purchasing strategy for different purchasing categories is considered relevant. This is currently not focused upon.
	20	Consciously decide whether to source local or global for categories of supplies, find a balance (Schiele, Horn, & Vos, 2011; Holweg, Reichhart, & Hong, 2011).	±	Make increasingly substantiated choices for different categories of supplies. For very specific products this might be irrelevant, little choice in suppliers is available.
	21	Assure the in- and outsourcing decisions are up to date and focus on the long term. (Roberts, 2001; Moschuris & Kondylis, 2006).	-	Less relevant for the laboratories, few services are purchased in this area of purchasing.
Managing suppliers and contracts	22	Perform market research to be informed about the market, potential suppliers, possible supplies fitting the requirements and to anticipate costs. (Kakwezi & Nyeko, 2008; Van Poucke et al., 2014).	+	Is considered relevant, purchasers should be freed from other activities to be able to spend (more) time on market research. Market knowledge is now (sometimes) lacking.
	23	The amount of suppliers in the supply base should be balanced for each product category (Ates et al., 2015; Humphreys et al., 2003; Swinder & Seshadri, 2001).	+	Targeted reduction of the suppliers is necessary and possible. Increased use of biotechnical firms such as Bioconnect, could be profitable. Currently active reduction is not pursued.
	24	Invest in and manage long-term collaborative buyer-supplier relationships with selected suppliers (Trent & Monczka, 1998; Cousins et al. 2006; Ates et al. 2015).	+	Considered important, currently not enough time is available to invest, more differentiation in the approach of suppliers should take place
	25	Perform contract management, including handling changes in contracts, monitor spend and	+	Considered important and currently worked on, obliged by GDPR. With many suppliers

		performance of contract, keep track of end date while assuring high contract coverage (Knoester, 2005; Van Poucke, 2014)		actual contracts are not in place, price agreements have been made. Tracking coverage and assuring high compliance is considered important.
	26	Communicate concluded contracts to the internal customers to whom it may concern (Ruiter et al., 2011).	++	Concluded contracts should be communicated to the internal customers it concerns.
	27	Conclude long-term contracts and blanket contracts where applicable, realize savings through bundling demands from internal customers and decrease indirect costs (Arney et al., 2014; Ruiter et al., 2011). (Trent & Monczka, 1998).	±	Long-term contracts could increasingly be concluded, bundling demands is possible and can decrease indirect costs. However, concluding contracts for a purchasing area such as the laboratories can result in issuing additional tenders, which is time consuming.
	28	In the process of negotiations, purchasers should be aware of the type of product that is being purchased to choose the most suitable form of negotiation. (Swinder & Seshadri, 2001; Trent & Monczka, 1998, Gelderman & Laeven, 2005)	+	Increased differentiation of the approach of a supplier in negotiations is expected to lead to advantages. Currently purchasers do not have time to do so, many long standing relations and discounts are in place.
Communication is key	29	Assure frequent, clear and open communication with suppliers, internal customers, other supporting departments and within the purchasing department (Kumru & Kumru, 2013; Kakwezi & Nyeko, 2008; Swinder & Seshadri, 2001; Kumar & Ozdamar, 2005; Wen-li, 2003).	+	Overall, communication could be improved. Internally between team leaders, purchasers and administrative staff more effective communication is needed. Communication with the internal customer is, overall, experienced sufficient. A project aimed at cooperation between supporting department is performed and contributes to better communication. The quality of communication with suppliers, differs per supplier. The parallel lines of purchasers with suppliers are considered disadvantageous by several interviewees.
Internal marketing of purchasing	30	Align with the internal customers to determine needs and wishes through structure communication and building relationships (Janipha et al., 2015; Gonzalez-Benito, 2007).	±	Meetings between purchasers and internal customer regularly take place, long-standing relationships are build.
	31	Assure involvement of the internal customer in the purchasing process, by the purchasing department. (Janipha et al., 2015).	o	The developing need of customer is the start of the purchasing process, therefore the customer is involved in the process.
	32	Internal customers should be made aware of the purchasing policies and processes they are involved in (Ruiter et al., 2011; Gonzalez-Benito, 2007).	o	Most customers know when and how to contact the purchaser.
	33	For complex products or large amounts of money, the purchasing department has to be involved in the purchasing process at an early stage by the internal customer to assure best value for money (Humphreys, et al., 2003; Van Poucke et al., 2014).	+	Is considered relevant, customers can be unaware of having to issue a public tender or get too focused on one supplier, the purchaser should be involved at the right time.
Control & Evaluation	34	Improve purchasing planning by looking into budgets of departments to be aware of large projects coming up (Telgen 1994; McCue & Gianakis, 2001).	++	Planning has to be improved, this has been an issue for a long time. Insight into budgets is not the solution, shifts in budgets take place and plans change.

	35	Increase the control over and insight into the purchasing spend by performing a spend analysis (Telgen, 1994; Ruiter et al. 2011).	+	It is considered relevant to create insight into spend per supplier and cost center; a regular spend analysis is longed-for.
	36	Perform a defendable, structured vendor rating to gain insight into the performance of suppliers (Leenders & Schiele, 1999, Ruiter et al., 2011).	±	A yearly vendor rating is performed, for the laboratories the results are less than for other areas of purchasing, see Section 2.2.
	37	Be aware of and try to improve internal customer satisfaction, have close relationships with customers (Kakwezi & Nyeko, 2008; Van Poucke et al., 2014).	+	Considered relevant, a customer satisfaction questionnaire is performed regularly. See Section 2.3.
	38	Keep track of delivery times, include these in contracts and contact suppliers in case the delivery times are not met (Ruiter et al., 2011).	±	Suppliers that deliver late, according to the information available at the UMCG receive a warning from the order manager. Expediting can be improved with the ERP, detailed data on delivery dates should be available.
Additional points identified by the staff				
Standardi- zation	39	Standardization of laboratory supplies could and should be pursued. In case of the laboratories, assistance could be provided by the staff advisors.	+	
Discounts	40	Compose a list with agreed discounts to prevent differences between tenders and invoices, as long as clear contract are not in place.	+	
Emergency deliveries	41	Document which information about the emergency delivery the administration staff has to retrieve from the customer, to prevent passing on general remarks.	+	
Intranet	42	The Intranet is an important source of information for internal customers, this information should be kept up to date.	±	
Organization of the department	43	The current division into the purchasing areas created an unequal workload. A new division might be needed, per supplier instead of internal department to equalize the workload.	+	
	44	Clear outlines for the activities of the purchaser are needed. The current situation in which internal customer can approach purchasers with all requests is considered unsustainable.	++	
	45	The lack of a uniform way of working (especially important for the administration staff) should be resolved by attaining to agreements, the team leaders should see to this.	+	
	46	Improved guidance, management and decisiveness, of the head and team leaders of the Purchasing Department, should be addressed.	+	

Table 10, applied points for improvement

4.6 Concluding remarks

It can be concluded, based on the results of the interviews with staff members of the Purchasing Department, that many of the points for improvement from literature apply to the current situation.

While strategic purchasing has increased in importance, the head of the department has not yet finished a documented purchasing strategy and policy. The interviewees consider finishing and implementing this strategy and policy highly relevant. Also, one of the most relevant points for the UMCG concerns the different roles and responsibilities of the staff members. Purchasers could spend their time differently, focusing on tactical purchasing and performing less operational activities. While negotiations are performed, contracts are regularly not concluded. The purchaser does not have the time to maintain supplier relations, perform market research, propose standardization, evaluate policy effectuation or work on contract management. Issuing public tenders and projects consume a lot of the purchaser's time, which is insufficiently present. A discrepancy between the documentation and practice of a purchaser's function is present. This discrepancy is confirmed by the administration staff, who could increasingly be in charge of the operational purchasing process. A review of tasks and responsibilities is needed at the Purchasing Department.

In addition, the purchasing process could be restructured, formalization of the purchasing process for low-cost, little complexity and high-frequency products, could take place. Subsequently, differentiation could take place in the purchasing strategy based on product categories. Differentiation in negotiation and relationships with suppliers could also take place. Next, the amount of documented contracts has to increase, contract insight is lacking and contract management could be performed to a larger extent. In addition, reduction of the amount of suppliers to the laboratory in the supply base, combined with standardization could lead to advantages. Plus, measurement, of the purchasing process with performance indicators, the vendor rating, the customer satisfaction survey and spend analysis could be improved. Another important point concerns planning, identifying the plans of a customer concerning the procurement of expensive equipment is needed to prevent purchasers to be taken aback by time consuming projects.

Most additional points identified by the staff, focus on the organization of the Purchasing Department. These points indicate missing outlines to the purchasing process and an unequal workload. A serious issue is the insufficient guidance, in order to implement the points for improvement, decisive management is needed.

5. Comparing the Purchasing Departments of the UMCs

5.1 Introduction into the interviews

Eight University Medical Centers are located in the Netherlands and united in the NFU, the Dutch Federation of University Medical Centers. These hospitals all have a slightly different organization of purchasing, purchasing processes and distributions of responsibilities. A comparison of the UMCs is therefore expected to lead to insights into possible improvements for the Purchasing Department of the UMCG. To get insight into the situation at other UMCs, interviews are conducted with purchasers for the laboratories at the University Medical Center of Utrecht (UMCU), Amsterdam Medical Center (AMC) and the Radboud University Medical Center. The relevance of the formulated points for improvements and actions that are taken to achieve these points will be determined, identifying differences with and opportunities for the UMCG.

The method for the interviews will be addressed shortly. Next, the results of the interviews are compared, and opportunities for improvement relevant to all UMCs are discussed. Subsequently, specific opportunities for improvement for UMCG, in comparison to the other UMCs are addressed. Then, the additional points as identified by the interviewees are discussed. Throughout the chapter additions to propositions and new propositions are formulated.

5.2 Method for interviews

The interview protocol, which can be found in Appendix IV, contributes to systematically performing the semi-structured interviews with the purchasers at the different UMCs. The structure of these interviews is slightly different from the interviews performed at the UMCG. After an explanation of the research, the organization of the visited department, the structure and functions are discussed to develop an understanding of background. Subsequently, the interviews are continued with the familiar questions concerning the points for improvement. The most relevant points, those determined to be applicable for improvement at the UMCG are selected to be discussed with the UMCs, and can be found in Appendix IV. These points show the largest room for improvement at the UMCG and a comparison with other UMCs on these points is therefore expected to be most useful.

5.3. Relevant points to all four UMCs

The interviews show clear agreements on points for improvement that are relevant to both the UMCG, UMCU, AMC and Radboud. These points are discussed below.

Reduce the amount of operational activities

All purchasers claim to be involved in too many operational activities. The need to reduce time spent on these activities is present. Though all purchasers indicate that the Purchasing Department provides a service to the internal customer, this service should not suffer from reducing operational activities at the purchaser. At the UMCU purchasers actively shift operational matters to the administrative staff that do not require the knowledge of the purchaser. Issues with invoices, GHX or generating reports from SAP care control, can also be performed by the operational staff. This is easier said than done, the operational purchasers are often swamped with work.

Addition to proposition 9.
Actively shift operational activities from the purchaser towards the administration employee at the UMCG.

Performance indicators

A set of performance indicators is measured at all four UMCs. Though, all purchasers indicate that these performance indicators focus on the operational purchasing process and are therefore of little use to them. The need to define and implemented performance indicators related to tactical and strategic purchasing processes is present at all hospitals.

Purchasing portfolio and increased differentiation

Most purchasers indicate to be aware of the type of product purchased, such as a strategic or a leverage item according to the Kraljic matrix. However, this knowledge could be put to use better during the purchasing process to achieve increased purchasing outcomes. Differentiation in purchasing strategy and supplier management, based on different types of product purchased, is insufficiently present according to the purchasers.

Performing market research

All purchasers acknowledge the importance of performing market research, though often too little time is available to do so. At the Radboud, market research is performed for at least 80% of the public tenders.

Reduction of suppliers and standardization of supplies

All purchasers acknowledge that (too) many suppliers deliver to the laboratories. An overview of these suppliers is incomplete in all four UMCs. Active reduction is not taking place, this takes a lot of time and effort. Due to validation and testing procedures, laboratories cannot easily switch suppliers which slows down the standardization of supplies and reduction of suppliers. All hospitals are careful in generating new suppliers if the product could also be ordered from a known supplier, this is preferred.

Insight into concluded contracts

At all four hospitals, it is realized that insight into present contracts is important. Even though contract registration is taking place, the overview of all contracts is expected to be incomplete. Contracts concluded by the laboratories without the involvement of the Purchasing Department, remain unknown. At the AMC, the visibility of the Purchasing Department is increased by meetings at laboratories, to decrease the amount of contracts unknown to the Purchasing Department. Contract compliance is not yet successfully measured at the hospitals.

Addition to proposition 25.

Determine whether increased visibility of the purchaser at the laboratories could contribute to a decrease in the amount of unknown contracts to the Purchasing Departments

Internal marketing of purchasing

All purchasers emphasize that the laboratories are used to a lot of autonomy and often involve the purchaser at a late stage in the purchasing process. Timely involvement of the Purchasing Department into the purchasing process has to increase. The AMC organizes presentations and meetings with laboratory managers to increase the awareness of the importance of early involvement. Regular visits to all laboratories are not taking place. The UMCU used to regularly visit all laboratories were paid until several years ago. Currently no time is available for these visits. The amount of purchases in which the department was involved early on, increased due to these visits. A relationship was built, and trust was created, since the visits are not being paid anymore a decrease in early involvement is noticed. The UMCU proposes regular newsletters on successful public tenders and large projects, to increase the visibility and early involvement of the Purchasing Department.

Addition to proposition 33.

Determine whether regular newsletters and/or presentation at the laboratories can contribute to timely involvement, in addition to continuing the current visits at the UMCG.

Purchasing planning

At all four hospitals, planning the purchasing process is considered difficult. Purchasers are often taken aback by requests from internal customers. Visiting internal departments and trying to plan large purchases based on departmental budgets, is not considered sufficient. Shifts in budgets continuously take place, creating a difficult situation for the purchasers in which many large purchases remain unplanned.

At the AMC, the purchasers for the laboratories try to estimate which laboratories might need the same new piece of equipment in the coming year, such as microscopes. These departments are contacted and the purchaser tries to bundle the demand to get a better deal with a supplier. In addition, the laboratories possibly needing this new equipment are brought into contact with each other. Discussion takes place which contributes to purchasing more suitable equipment of high quality due to the exchange of knowledge. According to the purchaser at the AMC, the

experience with aggregating demand and trying to work ahead, is more successful than trying to follow departmental budgets.

At the UMCU, annual purchasing plans are made in which the internal customer indicates how much capacity of the Purchasing Department expects to need in the coming year. If internal customers fail to mention projects, tenders or large investments, the purchasers might not have time to assist and the customers have to wait. For relatively small purchases capacity is always freed, but large purchases should be planned based on the annual plans. Over the years, internal customers got used to this approach and 50% of the projects and public tenders are planned well ahead.

To overcome the difficulties in planning at the Radboud, the purchaser would like to implement an investment calendar. Departments should fill out the calendar to indicate their plans concerning purchasing expensive equipment, projects and public tenders that are coming up. Such a calendar should enable bundling demand and planning well ahead.

Addition to proposition 34.

Identify whether the approach towards improving planning in place at the AMC (estimation of needs and aggregating of demand) or UMCU (strict annual planning reserving capacity), are also suitable for the UMCG.

Concluding remarks

All four UMCs, in a smaller or larger degree, have to work on the issues discussed above. This confirms the relevance of the earlier identified improvement opportunities for the UMCG, as listed in Table 10 at page 33-37. Based on the experiences of the AMC, UMCU and Radboud additions to the formulated propositions for UMCG are made.

5.4 Room for improvement, specifically at the UMCG

The points at which the UMCG, compared to the other UMCs, shows room for improvement are discussed in this section. Possible methods to reach these improvements, as used in the other UMCs, are shortly mentioned. For improvements that are not addressed before, new propositions are formulated. For points that are already mentioned in the previous chapters, additional points are suggested.

A documented purchasing strategy

A documented strategy and long-term plans for the department, in line with the organization, are present at the AMC, UMCU, and Radboud in contrary to the UMCG. The purchasers indicate to have been consulted during the development of the purchasing strategy.

The use of ICT

In contrary to the UMCG, the AMC, UMCU and Radboud have an up to date ICT system in place supporting the purchasing process. At the AMC and UMCU, SAP care control is used to gather management information, to expedite and perform contract management.

Decentralized ordering

Like in the UMCG, the AMC and UMCU use GHX as a decentralized order system for internal customers, in combination with the central organized purchasing function. Both at the AMC and UMCU, all laboratories have access to GHX. Respectively 60-70% and 90% of all orders are placed through GHX, directly at a supplier. It is emphasized that the use of GHX had to be stimulated through training, demos and information on how to search in GHX, to reach these percentages. A lot of time is spent on establishing the assortment, creating clear product categories in GHX and increasing the awareness of contracted suppliers and their products among customers.

Proposition 47. Provide training, demonstrate search techniques to the laboratories and create clear product categories in GHX in order to stimulate the use of GHX to eventually relieve the purchaser.

The UMCU is relatively strict, in case internal customers order a product through a free text request that can also be found on GHX, the request is returned. With the use of the decentralized ordering system, all purchasers are considered to be relieved and able to focus on specialize purchases.

Proposition 48. Consider returning orders to internal customers that are not placed through GHX but other channels, in case the internal customer is able to order the product through GHX.

A monetary threshold

At the AMC, UMCU and Radboud a monetary threshold is in place above which the purchaser has to be involved in the purchasing process. Below the threshold, internal customers are allowed, but not obliged, to handle their own purchasing. For spend below this threshold, purchasers do not have to sign off on the purchases, in contrary to the UMCG. This threshold is set at 10,000 euros for all three hospitals. If an order is placed with a value over 10,000 euros, the purchaser is notified and will look into the purchase.

Proposition 49. Consider implementing a monetary threshold under which the internal customers and/or administration employees can autonomously purchase, to save the purchaser time.

Formalization

The purchasers at the AMC, UMCU and Radboud indicate that formalization of the purchasing process took place indirectly, because of the use of the decentralized order system. Products of low costs and little technical complexity are purchased through the decentralized system with minimal involvement of the purchaser. While for complex, expensive purchases the purchaser is involved, and flexibility in the purchasing process is preserved.

Responsibilities administrative staff

At the AMC, UMCU and Radboud the administrative staff has more responsibilities than at the UMCG. The administrative staff at the AMC and Radboud ask for tenders in case the expected spend is below 10,000 euros. At the UMCU, the administrative staff also draws up contracts, generates reports and is increasingly involved in purchasing projects, the contracting stage and meetings with suppliers. This contributes to the performance of the purchasing process. The administrative staff has insight into the effect of decisions on the operational purchasing process and can assure that the practical, operational issues are taken care of. This decreases the eventual workload according to the purchaser at the UMCU. At the UMCU, internal customers are stimulated to ask for tenders themselves, especially for exotic supplies. This shifts the tasks of asking for tenders from the Purchasing Department to the internal customer.

Addition proposition 10. Examine the possibility to shift responsibilities from purchasers towards administrative staff, or even internal customers in case of asking for low value tenders.

Proposition 50. Investigate whether it is useful to include administrative staff in public tenders and projects to assure an outcome that is realistic on the level of operational purchasing.

Contract Management

In contrary to the UMCG, contract management takes place at the AMC and UMCU. The purchaser and the contract owner receive a reminder in case a contract is about to end. Actions are taken upon this reminder before the contract expires. At the UMCU, the amount of expired contracts and contracts being processed is measured with SAP. It was tried to measure and monitor the use of contracts. This turned out to be complicated. Contracts often encompass more than one product category, which led to difficulties in gaining insight into the actual spend through a contract. These efforts have been ceased.

Bio-Connect

At the AMC, UMCU and Radboud, the services of Bio-Connect are actively used to prevent generating new suppliers, which saves the Purchasing Department time. The UMCU is most strict; exotic products from suppliers out of Europe are ordered through Bio-Connect. Overall, internal customers consider it worth the fee to assure that the supplies are routed through Bio-Connect and delivered correctly.

Proposition 51. Consider an increased use of Bio-Connect for suppliers out of Europe delivering exotic supplies to save time for the Purchasing Department.

Performing a regular spend analysis

Regular spend analyzes are performed at the UMCU, the results are included in the annual purchasing plans. It is monitored whether contracts are in place for each product category and changes in spend are explained. The Radboud also performed regular spend analyzes, focusing on the spend of each laboratory to identify improvements. At the AMC a management trainee performed a spend analysis, providing insight into the large spend on chemicals. Based on different categories of spend, a survey was sent to the laboratories to determine in which categories multiple suppliers providing good qualitative supplies are available. Upon the feedback of the laboratories public tenders were issued for these chemical product categories. This resulted in successful public tenders and identifiable savings.

Addition proposition 35.

When performing the regular spend analysis, consider sending a survey among the laboratory managers to identify areas in which several suitable suppliers are present and public tenders could be issued.

Issuing public tenders

Instead of active reduction, the AMC and Radboud issued public tenders in areas in which many suppliers are present. By routing significant spend through these public tenders, it is expected that the number of suppliers will decrease. At the AMC relatively small public tenders are issued in competitive markets to get bottom prices per product category. The public tenders have so far been issued for PCR plastics, oligos, and pipette tips. For the PCR plastics, a cost reduction of over 50% is reached through this public tender. At the Radboud one large public tender is issued for many plastics. With the limited amount of suppliers that can fulfill this tender, the competition for the public tender is lower. However, standardization across the hospitals is increased, and logistic costs are decreased because one large supplier will provide many supplies.

Proposition 52. Consider issuing public tenders for the laboratories for PCR plastics, oligo's or pipet tips to generate savings.

Uniform way of working

At the UMCU, it is acknowledged that a uniform way of working is insufficiently present, as in the UMCG. To increase the uniformity among the administrative staff, the staff members are rotated between the different areas of purchasing. By partially working for another team, the uniformity is expected to increase. At the AMC and Radboud a uniform way of working is present, staff members can substitute for each other.

Workload

At the AMC, UMCU and Radboud, more FTEs are available for purchasing laboratory supplies than at the UMCG. At the UMCU and Radboud, more diversification in the roles is present. Distinctions are made in junior, tactical and strategical purchasers, creating different functions with separate responsibilities. Most capacity, in proportion to the magnitude of the purchasing area, seems to be present at the Radboud. At the Radboud, staff members are present that focus solely on large purchasing projects and public tenders, taking over responsibilities from the purchasers. They do not have operational responsibilities or internal customers. They perform projects and public tenders at the hospital, often in department exceeding domains. Also, the area of purchasing for which a purchaser is responsible rotates at the Radboud. Over time, purchasers learn to purchase for the laboratories but also for medical departments or ICT.

Addition proposition 45.

Consider rotating administrative staff members and purchasers over the different areas of purchasing to increase flexibility and uniformity.

Addition proposition 43.

Consider an increase in the capacity available for laboratory purchases at the Purchasing Department.

Concluding Remarks

Based on the interviews, several opportunities for improvement already listed are confirmed, such as the relevance of performing a spend analysis, the need to increase decentralized ordering. New propositions are formulated based on improvement at the other UMCs that could be useful at the UMCG as well. The comparison also indicated that the UMCG is ahead of the AMC, UMCU and Radboud concerning the regular visits paid to internal customers, a yearly vendor rating and a regular customer satisfaction survey.

5.5 Additional points identified by the purchasers

At the Radboud the purchaser suggested to communicate with other UMCs more frequently to exchange information about and experiences with certain products and equipment. In case one of the UMCs is about to purchase certain expensive equipment for the laboratories, the performance of the purchasing process might be increased if other UMCs were asked about their experiences concerning this type of product or equipment. Perhaps they had recently bought comparable equipment or have experiences with the product. Tenders for accurate prices and market knowledge could be exchanged.

At the AMC, the purchaser emphasizes the importance of a purchaser placing an order through the decentral ordering system once in a while. Despite purchasers being involved in purchasing all day, they barely ever place an order. Therefore, the purchasers are not aware of the issues the internal customer comes across when placing an order. The experiences of the purchaser should be used to optimize the ordering process, such as creating clear product categories in GHX.

At the UMCU, the laboratories are spread over different divisions and department, as in the UMCG. The purchaser indicates that this spreading of the laboratories is a disadvantage in the shared use of equipment. If laboratories were more bundled based on, for example, areas of expertise, it would be easier for laboratories to share equipment. Centralization of the use, and thereby purchase of for example kits would increase chances of standardization.

The following propositions can be formulated;

Proposition 53 Exchange (price) information, market knowledge and experiences with specialized products and expensive equipment among the UMCs to increase purchasing performance.

Proposition 54 Purchasers could regularly place an order through the (decentralized) order system to identify improvements to the ordering process.

Proposition 55 Consider bundling laboratories in order to centralize use and the purchasing of supplies, which could increase standardization.

6. Conclusion and Discussion

This chapter presents the conclusions to the performed research and critically evaluates the results in a discussion.

6.1 Conclusion

This research investigates the purchasing process at the UMCG, focusing on the purchasing process for the laboratories. The main question is the following:

Which improvement opportunities can be identified, at the levels of the strategic and tactical purchasing process, that contribute to a better purchasing performance for the laboratories of the UMCG?

To answer the main question, the purchasing process and current performance are researched, a literature review into possible improvements is performed, the applicability of these improvements to the UMCG is determined by interviews and a comparison with other UMCs is drawn.

Current performance of the purchasing process

Based on the spend analysis it can be concluded that for the laboratories relatively low-value products are rather frequently ordered at several large and numerous tail suppliers (90%). The focus on these large suppliers has to increase, the largest effects on expenses can be made at these suppliers. While the number of small suppliers should be reduced, because these suppliers generate a lot of work for little spend. Especially in the largest product category, Chemicals, savings can be generated through reduction of suppliers and standardization of supplies.

From the annual vendor rating, it can be concluded that a lack of insight into and control over the spend is present, only 67% of the largest 200 suppliers is contracted. The results of the current rating for the laboratories cannot be relied upon due to the errors in the objective criteria. Relatively many suppliers are rated for the laboratories (87 of 188), though the low results are not acted upon by the laboratories, the vendor rating is solely used as a proof of rating to receive the CCKL certification. Due to the unreliable scores and a the large number suppliers rated, the purchaser is unable to successfully act upon the results. Therefore, the usefulness of the current rating is questioned.

The customer satisfaction survey lacks questions about the tactical and strategic purchasing process. In addition, the results cannot be broken down to identify satisfaction of individual purchasers or areas of purchasing, proving only a general impression of the satisfaction. Even though the action plan based on the survey does not seem to be acted out, overall customers are satisfied.

From the performance indicators measured, it can be concluded that the norms for most indicators are not met. The performance of tactical and strategic levels is not measured by the current indicators, which is necessary to increase performance according to Kumar and Ozdamar (2005). Actions, taken upon performance indicators not reaching the norms, are not taken.

Overall, it can be concluded that the methods and results of current performance management show room for improvement. Regarding performance management, the interviews at the UMCG and other UMCs indicate that purchasers consider insight into the spend useful, value the implementation of a regular spend analysis and can generate savings based on this analysis. The interviews at the UMCG show that purchasers do not act upon the vendor rating, it is unreliable, nor do they consider current performance indicators useful, mostly operational indicators are used. The customer satisfaction survey is considered sufficient but less important. By maintaining relations with the internal customers, purchasers should already be aware of the satisfaction of customers. The interviews at the other UMCs show that the UMCG is front runner in the use of customer satisfaction survey and a vendor rating. The other UMCs do not yet have such methods in place. Still, current performance measurement methods and results at the UMCG need to be improved and a regular spend analysis has to be implemented.

Improvement opportunities from literature

With the literature review, a total of 38 points for improvement to the purchasing process in health care is identified. These points are divided into eleven categories, ranging from 'Role and organization of purchasing' to 'Control and evaluation'. The complete list can be found in Chapter 3.3, page 22-23.

Applicability of the improvement opportunities from literature to practice

Based on the interviews at the UMCG it can be concluded that most opportunities for improvement identified in the literature review apply to the Purchasing Department of the UMCG. The following points are most relevant according to the interviewees:

- **A strategy and policy, accompanied by clear guidance**
A documented purchasing strategy and policy should be in place, to provide clarity to the staff members concerning the developments of the department. The interviewees perceive a lack of guidance from the management, and would like the purchasing manager to increasingly focus on mentoring staff and strategic leadership to overcome this.
- **Creating an overview of and insight into the current purchasing process**
The current purchasing situation is not comprehensible, leading to a lack of control. The roles and responsibilities of staff members need to be reviewed, including the numerous operational activities performed by purchasers. In addition, contract management has to be performed to create insight into supplies, suppliers and current contracts. Plus, early involvement of the department in the purchasing process has to increase, and purchasing planning should improve to gain control of the purchasing situation. Lastly, performance measurement has to be improved, and a regular spend analysis implemented, to reduce tail suppliers and generate savings.
- **Increased differentiation in purchasing**
Active differentiation in the purchasing process per product category is needed to use the scarce resources best. Using a purchasing portfolio, the purchasing strategy, relations with suppliers and type of negotiation should be adapted per product category. In addition, the purchasing process should be formalized for products of low cost and low complexity.

The additional opportunities for improvement suggested by the staff members focus mostly on the organization of the department and indicate the need for a reorganization. An unequal division of the purchasing areas, unclear outlines to activities of purchasers, a lack of a uniform way of working and a lack of leadership are perceived. Based on the interviews eight points are added to the list with points for improvement, resulting in a total of 46 points.

The results show that the framework in which the purchasing process takes place, the prerequisites for an efficient and effective purchasing process, are currently insufficient. Due to a missing strategy and departmental goals, unclear outlines of responsibilities, insufficient insight into supplies, suppliers and contracts, outdated ICT systems, unequal workloads and difficulties in planning, the purchasing processes are disturbed. This applies not only to the laboratories, but to all areas of purchasing and forms a large problem at the Purchasing Department. Formulating concrete points for improvement to the purchasing process is difficult due to the insufficient framework. To increase the performance of the purchasing process for the laboratories with small improvements, the prerequisites have to be in order first.

A comparison with other UMCs

Based on the interviews at the AMC, UMCU and Radboud it can be concluded that the hospitals experience similar difficulties, such as purchasing planning and reduction of suppliers, and have common opportunities for improvement. The degree to which the hospitals have worked out their common issues and their approaches differ, therefore the hospitals could learn from one another.

Differences in relevant points are also present, in comparison the UMCG is running behind on some points. These include moving responsibilities from purchasers to administration employees and internal customers, and increasing decentralized ordering using a monetary threshold. These points also showed to be relevant from the interviews at the UMCG, and are emphasized in comparison with the other UMCs.

Based on the interviews at the AMC, UMCU and Radboud eight additions to already formulated points for improvement and nine new points for improvement are formulated, resulting in a total of 55 points. With this research, a structured list with applicable and useful points for improvement to the purchasing process for laboratory supplies at the UMCG is formulated. Recommendations are formulated on these points, which can be found in Chapter 7, page 51.

6.2 Discussion

This section discusses our research in which improvement opportunities to the purchasing process of the UMCG are identified.

Discussing the findings

This study shows that many improvement opportunities identified from literature, apply to the UMCG. The interviews indicate the importance of a documented strategy, long-term goals aligned with the organization and the focus of the purchasing manager on strategic leadership and mentoring staff to prevent a lack of guidance. This highly relevant, though insufficiently present points at the UMCG create difficulties. This confirms the findings of Humphreys et al. (2005) and Gonzales-Benito (2007), that management needs to focus on strategic leadership and that alignment of organizational and purchasing strategy is essential.

While literature shows disagreements on the issue of centralizing or decentralizing the purchasing function, our interviews show that a decentralized ordering function combined with a central organization of purchasing, is successful at the UMCs. This study complements the findings of Laios and Xideas (1994) for the UMCs, that purchasing tasks should be decentralized to local units. It counteracts the findings of Knoppen and Saens (2015), that purchasing has to be centralized to increase performance though learning and cost benefits.

Our results indicate that the purchasing processes for products and services, do not differ much in health care. All purchasers do not consider it useful to have an adapted purchasing process for services, because purchasing products and services are handled comparably. This counteracts the findings of Valk and Rozemeijer (2009) and Perner et al. (2014). Services should receive the same high level of attention as products, a specialized process and possible formalization are not necessary according to the purchasers.

Furthermore, the interviews clearly show that all four UMCs struggle with comparable difficulties. All UMCs struggle with reducing the operational activities performed by the purchasers. Our results show that a review of tasks and responsibilities, as proposed by McCue & Gianakis (2001), is needed in health care to find a new balance between purchasers and administration staff. In addition, this study shows that all UMCs struggle with reducing the amount of suppliers in the supply base. This confirms the findings of Ates et al. (2015), that a balance has to be sought regarding a suitable number of suppliers. For the UMCs this means a reduction of suppliers is needed, because many small suppliers, consuming relatively many resources but delivering little value are present.

The results from the interviews at all UMCs emphasize the importance of the findings of Pohl and Frost (2011), that purchasing performance measures not only serve to measure and monitor. With merely a complete set of indicators in place, performance does not yet improve. Evaluation, feedback, and actions upon the results are necessary to increase performance through the indicators at the UMCs (Pohl and Frost, 2011).

While Janipha et al. (2015) emphasize the importance of involving customers in the purchasing process, our results indicate it is the other way around. The need emerges at a customer, who is therefore involved. It is more difficult to get an internal customer to involve the Purchasing Department, emphasizing the claim of Van Poucke et al. (2014). This brings us to the issue of early involvement and planning of purchases, a struggle at all UMCs. Insight into budgets

and regular meetings with internal customers, as proposed by McCue and Gianakis (2001), are insufficient according to our results, indicating that additional measures are needed in all UMCs.

Propositions with a large impact

Several proposed points for improvement can have quite a large impact on the purchasing process and outcomes, such as formalization of the process for low costs, low complexity products and using a purchasing portfolio. In case of formalization many, logical arguments and clear advantages are presented, among others by Parikh and Joshi (2005). While the authors do discuss internal obstacles and power struggles, the considerable amount of time and effort to develop and implement formalization is mostly neglected. It is concluded that the business process for small purchases “can easily be adopted by most other organizations” (Parikh and Joshi, 2005, pp. 1058). This counteracts with the results of our research; significant changes have to be made to the purchasing process consuming a considerable amount time and effort.

Another point influencing the way of working of the purchaser, is using a purchasing portfolio. All interviewed purchasers indicated using a purchasing portfolio is highly relevant to increase the purchasing performance, though using a portfolio takes time. While it is emphasized that using the purchasing portfolio techniques require skill (Gelderman and van Weele, 2005), the amount of time required to actively use the portfolio by purchasers remains underexposed in literature. This also applies to differentiation in the types of negotiations performed, determining the most suitable form and preparing the negotiation takes time. Though, this is not addressed by Gelderman and Laeven (2005). This study shows that the willingness to formalize, the use of purchasing portfolio’s and differentiation in negotiation tactics is present at the UMCs. An important aspect of these improvements to be successful in practice, the considerable amount of time it takes, remains underexposed in literature.

Private v.s. public literature

As described in Appendix II at page 65, articles focussing on the private instead of the public sector are included in the literature review. Even though Laios and Xideas (1994) and Husted and Reinecke (2009) argue that articles focusing on the private sector are (partially) applicable to the public sectors as well, biased points for improvement might be present. The results from the interviews indicate this is the case for, among others, the point for improvement concerning purchasing cards. The use of purchasing cards is not useful for public hospitals with many internal departments, all in charge of their own budget. Ordering through an ICT system for decentralized purchasing is preferred, because a clear web environment can be created displaying suppliers and supplies selected by purchasers. Such environments are generally in place at the UMCs, optimizing their use is more useful than introducing the purchasing card. This counteracts the findings of Parikh and Joshi (2005) and Avery (2005), who argue the success and growth potential of the purchasing card in both private and public purchasing. Perhaps the use of purchasing cards is outdated, many of the studies and success Parikh and Joshi (2005) refer to, date from before 2000.

Furthermore, this research shows that innovative and unique suppliers providing specialized supplies are often required, especially for laboratories. The point concerning balancing multiple and single sourcing, as discussed by Ates et al. (2015) based on private purchasing is, therefore, less important to the UMCs. The same holds for global versus local sourcing. This point is also formulated based on private purchasing by Schiele et al. (2011) and Holweg et al. (2001). With a limited number of suppliers available, for product categories such as chemicals and viruses, it is not relevant to balance multiple and single sourcing or global and local sourcing. As the interviews show, the decision whether to route these specific supplies through wholesalers is more relevant.

This research shows that contracting at all four UMCs is influenced by legislation concerning European public tenders, a significant difference between private and public purchasing. While increasing contract coverage and duration positively influence purchasing performance in private purchasing (Van Poucke et al., 2014), it creates a dilemma for public purchasing. Our findings indicate that purchasers are careful concerning bringing spend under contract because the threshold for public tenders is easily exceeded. Moreover, issuing public tenders takes a considerable amount of time. Therefore, the purchaser is careful not to generate too many public tenders. In addition, not for all

product categories, public tenders can be issued. Multiple suppliers providing the requested supplies of high quality have to be present in the market. However this is not always the case. This creates a difficult position for the purchaser; abide the law and issue a public tender that is likely to fail, or keep the price arrangement in place for the internal customer to order their specific supplies through small suppliers. We wonder how this could be handled best. The points for improvement concerning contracting, based on the private sector, are therefore only partially applicable to the UMCs.

Further, the results of the interviews indicate that the prerequisites, the framework for the purchasing process at the Purchasing Department of the UMCG is insufficient. The magnitude of these difficulties and the dissatisfaction concerning the organization by the staff, was not anticipated. In case the extent of these difficulties was known, the research might have been more focused on solving one of these difficulties, such as improving the planning or reducing suppliers.

Our results indicate that the UMCG is running behind on several issues, compared to the other UMCs, such as contract management, decentralized ordering and the use of Bio-Connect. This does not mean that the UMCG is running behind in general. The UMCG also has a head start at other points, such as the vendor ratings and customer satisfaction surveys. Though the points that the UMCG is running behind on, are quite extensive points and therefore we recommend to improve these as soon as possible.

Limitations

Several limitations to this research can be identified, in the first place concerning the literature review. Though the literature review is extensive, it is possible that relevant articles, including points for improvement, are missed. The review was performed by only one researcher, who determined which articles were included. As discussed before, literature focusing on private purchasing instead of public purchasing is used to build the review as well. This led to biased points for improvement, not all of these biased points might have been identified.

Limitations concerning the interviews can be identified as well. Not all staff members at the Purchasing Department could be interviewed due to the available time. Therefore, the trustworthiness of the results is questionable. By considerably selecting critical staff members and all staff members involved in purchasing laboratory supplies, information should be as complete as possible. The validity and reliability of the interviews are tried to assure with the method used, see Appendix IV. Also, not all UMCs could be visited in the scope of this research. The UMCs that are selected, are assumed to be representative for all UMCs in the Netherlands.

Further research

Further research at the UMCG could focus on the outlines that are missing, the prerequisites of the purchasing process. This includes creating clear outlines the responsibilities of the staff members, and designing and implementing contract management. These are challenges for the UMCG, the organization of the Purchasing Department will be affected. Changes and shifts in responsibilities will have to take place to create a more structured, comprehensive purchasing process. It would be interesting to research how the missing outlines should be filled in to increase performance.

Many of the points for improvement that are identified as relevant at the UMCG, require further research. Suitable methods to reduce suppliers for public hospitals could be researched, or methods to improve purchasing planning at the hospital. Planning is an issue at all visited UMCs and the solution from literature, increased insight through the budgets, is insufficient. It could also be researched to which extent decentralized purchasing is successful and how this could be implemented at the UMCG. In addition, research concerning the practical implementation of formalization of the purchasing process and use of the purchasing portfolio could be performed. These points are relevant but implementation and use cost considerable time.

This research shows that the situation and experienced difficulties are quite similar for all visited UMCs. On the one hand, this might decrease the learning potential among the hospitals, they seem to be in the same position without finding solutions to their problems. On the other hand, the hospitals could cooperate to resolve their common issues.

In the light of further research, it would be interesting to determine how comparable, not directly competing UMCs can collaborate in solving their similar difficulties.

Generalizability

With this research, only a part of the reality is researched. Four out of eight UMCs are included with a focus on purchasing laboratory supplies. The UMCs show differences, in the organization of purchasing processes, though the results do indicate points for improvement that could be useful to all four UMCs. All visited UMCs experience difficulties with purchasing planning, operational activities performed by purchasing, reducing the amount of suppliers and differentiating in purchasing strategy and supplier management, based on different types of product purchased. That the UMCs encounter the same difficulties, indicates that they might not be that different at all. The points for improvement focusing on common issues formulated specifically for the UMCG, could be useful in the other UMCs and hospitals in the Netherlands as well.

The composition of the list with improvement opportunities to increase purchasing performance at hospitals, contributes to existing knowledge. Such an integral list is currently non-existing. Most literature focusses on certain aspects of improving the purchasing performance, such as purchasing alliances or using purchasing matrixes, instead of the entire purchasing process. This research adds an integral list with points for improvement based on literature, drafted in cooperation with and tested by practitioners. While the points that are identified to be relevant for the UMCG are not generic for each hospital, the list with the 55 points from literature is generically applicable.

7. Recommendations

7.1 Introduction

This research aims to identify improvement opportunities to the purchasing process, that contribute to an increased purchasing performance at the Purchasing Department of the UMCG. With a combination of current performance measurement methods and results, a literature review, interviews with staff members of the Purchasing Department and interviews at other University Medical Centers, applicable points for improvement are identified. In this chapter, recommendations on how to increase the purchasing performance at the UMCG are made, specifically for the laboratories, based on the proposed points for improvement.

To clearly present the recommendations, four categories of recommendations are defined. First, recommendations on generating outlines to the purchasing process, the prerequisites of a successful purchasing process, are discussed. Second, recommendations concerning the ICT systems and ordering processes are identified. Third, recommendations concerning the activities of the purchasers are formulated. Fourth, recommendations towards performance measurement methods and results are discussed.

For each category, the most important recommendations are shortly presented after which all recommendations in the category are discussed individually. We tried to formulate the recommendations as concrete as possible, however, due to a lack of clear outlines and structured processes at the Purchasing Department, this is difficult. If outlines to a process are missing, a process cannot be optimized; the outlines have to be determined first. Plus, substantial changes will take place at the Purchasing Department, one-third of the staff will retire in the coming five years and the implementation of the ERP will influence the way of working. It is certain that these changes will have a large impact, it is however, hard to foresee what the impact will be exactly, this increases the complexity of defining concrete recommendations.

7.2 Recommendations on the outlines of the purchasing process

To improve the prerequisites, the outlines of the purchasing process, the following recommendations are formulated.

We recommend to finish the purchasing strategy and policy, determine clear outlines for responsibilities of the different staff members and implement contract management to structure the purchasing process. Concerning the workload and capacity, we recommend to increase the flexibility of the staff, purchasers should be able to take over work from each other, and add extra capacity to the area of purchasing for the laboratories.

The purchasing strategy, policy and structured processes

We recommend to finish the elaborate, documented strategy and policies for the Purchasing Department as soon as possible and communicate these to all concerned. This should overcome the currently perceived lack of clarity and guidance, indicating the direction into which the department is heading. The strategy should be in line with the organizational strategy, policy, and processes. Upon this strategy and policy, clear purchasing procedures and guidelines should be based, structuring the purchasing process. This should create outlines to the purchasing process, provided clarity and stimulate a uniform way of working, which are currently insufficiently present.

Clear outlines of responsibilities

We recommend reviewing the responsibilities and tasks of the different staff members to overcome current ambiguity and shared responsibilities. First of all, for the purchaser. We advise that the purchasers are freed from the many operational activities that do not require their specialized knowledge. Responsibilities could be transferred to the administration staff or internal customers, such as asking for prices. Also, certain responsibilities could be automated with the coming ERP, such as authorization. This generates time for the purchasers to increasingly focus on high-value purchases, market research, long-term relations with selected suppliers and projects and public

tenders. These are important aspects included in the purchasers function, time has to be freed to spend on these matters.

Second, we propose that the administration staff becomes in charge of the daily purchasing process and less dependent on the purchaser. For the laboratories the administration staff welcomes extra responsibilities. Tasks such as asking for tenders, writing up contracts, generating reports, visiting laboratories, could be transferred to the administration staff, creating the function of a purchasing assistant like in the Radboud. Consider including administrative staff in public tenders and projects, as in the UMCU, to include an operational view on matters.

Third, the purchasing manager and team leaders are recommended to increasingly focus on mentoring staff, strategic leadership and updating the purchasing processes to overcome the lack of guidance, mentoring and leadership currently experienced. This critical review of responsibilities will lead to substantial changes at the Purchasing Department, which is necessary to increase purchasing performance.

Contracting

To overcome the current lack of insight into the purchasing situation, we strongly recommend to clearly document the contracts and price arrangements that are concluded. We advise that contract management is performed, after all contracts and price arrangement are gathered. The overview of present contracts has to be kept up to date; someone has to be made responsible for this task. The expiration of contracts should be monitored and acted upon by the purchasers and the compliance should be monitored. It should be included in contracts how often and when increases in price are allowed and which supplies the supplier exactly offers through e-procurement. We recommend increasing the different types of contracts concluded and to communicate blanket contracts to internal customers, to raise awareness of possible contracts customers can use. A balance has to be sought between price arrangements, contracting and issuing public tenders. By concluding contracts, it should be closely monitored whether the threshold for issuing public tenders is approached. Not issuing public tenders, if the threshold is exceeded, has risks. We recommend that these are taken into account when it is decided not to contract or issue a public tender.

List the discounts

As long as contract management is not in place and insight into present contracts is lacking, a list of current discounts could be composed and distributed. Using these discounts when ordering supplies, the frequently occurring price differences can be prevented, saving the Purchasing Department much extra work.

Increasing flexibility

With a fixed capacity but fluctuating amounts of unplanned activities, we recommend that purchasers are able to take over work from other purchasers that are occupied, as in the UMCU. Increased flexibility is required, especially for purchases on the edge of multiple purchasing areas. A purchaser could have a specialty, but assistance to other areas of purchasing should be provided. We also recommend that the flexibility is increased among the administration staff, by working part-time for another area of purchasing. This leads to two advantages. One, in case an administration employee is absent, others can fill in, the speed of the purchasing process increases and becomes more customer friendly. Two, the work can be divided more equally among the staff members without redefining the purchasing areas. This will contribute to a uniform way of working with standard procedures. For this to work at the UMCG, the atmosphere has to change. Staff members need to be willing to help each other out, instead of strictly adhering to their own tasks.

Workload

In comparison to the other UMCs, the area of purchasing laboratory supplies at the UMCG is provided with relatively few FTEs. It is acknowledged that purchasing laboratory supplies is a large responsibility, involving many complicated suppliers and supplies. It could be recommended to add more capacity to the area of purchasing laboratory supplies, only one purchaser works part time for this area. Shifting tasks the purchaser currently performs to the administrative staff, another (part-time) purchaser for the laboratories or a staff member available for projects and public tenders could decrease the pressure and improve the quality of the work.

Prevent knowledge gaps

With the substantial amount of retirements in the near future, knowledge gaps have to be prevented at the Purchasing Department. We recommend to facilitate the transfer of knowledge, training has to be timely provided to new staff members. In case of the staff members that are not being replaced, their tasks should be smoothly distributed to other staff members. The know-how and years of experience have to be transferred to prevent processes from simply stopping.

7.3 Recommendations concerning ICT and the ordering process

Closely connected to the recommendation focusing on the outlines of purchasing, are recommendations concerning ICT and structuring the ordering process.

First of all, we recommend to implement the ERP as soon as possible; the current incompatible, slow ICT systems have to be replaced. We also recommend to optimize the use of GHX, all internal customer should have access and the use of GHX should be stimulated. We recommend implementing a monetary threshold, under which the purchaser does not have to be involved in the purchasing process, and increasing the use of Bio-Connect, to save time and resources.

Enterprise Resource Planning

The UMCG is running behind in the area of ICT compared to the other UMCs. The longed-for implementation of a new ERP is coming closer, which we strongly encourage. Based on this research, we make several suggestions concerning the possibilities of the ERP. The ERP should indicate expiration of contracts to purchasers and internal customers, and support the development of contract management. In addition, with the ERP accurate data for expediting should be provided, the delivery time should be set with increased accuracy. The unreliability of the data for the vendor rating could be largely solved with the new ERP. With the implementation of the ERP momentum for change is created. Several the tasks performed by the administration staff will be automated or become redundant, such as faxing and transferring order from paper into a computer. This creates an opportunity for the administrative staff to take over (operational) responsibilities of the purchaser. The purchasers can be freed from operational tasks and the administration employees can be enforced.

GHX

We recommend optimizing the use of GHX, the current decentralized order system. The workload of the purchaser will decrease if GHX is used more frequently, especially in the area of purchasing laboratory supplies with many internal customers. The access to GHX has to be improved, by visits from the data manager providing login codes to the laboratories, all laboratories should get access to the system. Increased use of GHX could be stimulated through meetings with the analysts responsible for purchasing and by providing demos. We recommend having rules in place concerning the use of GHX. If an item is on GHX, the internal customer should order it themselves, through the system. It should be considered to return orders not placed through the proper channel. It has to be supervised that all employees adhere to these rules. The catalog of GHX should be kept up to date in the process of increasing the use of GHX, and clear categories of products need to be created.

Monetary threshold

Unless requested by the internal customer, we recommend that the purchaser is not involved in low-value purchases. Therefore, a monetary threshold could be considered, as is in place in the AMC, UMCU, and Radboud at 10,000 euros. This can help the purchaser to focus on high value, complex purchases. With the implementation of the ERP, this threshold can be set, providing more responsibility to the administration employees and internal customers.

Increasing the use of Bio-Connect

Increasing the amount of products routed through Bio-Connect, for all orders with uncontracted suppliers outside of Europe, could reduce the number of small laboratory suppliers and decrease the amount of newly generated suppliers. We recommend that the UMCG is more strict in the use of Bio-Connect towards internal customers to save time and effort at the Purchasing Department, like the UMCU, AMC, and Radboud.

Orders on paper versus through GHX

While administration employees are allowed to place orders through GHX for large amounts of money, for each euro on paper authorization of the purchaser is required. This slows down the purchasing process, is inconsistent and therefore, we recommend this is overcome. One rule should apply to both systems, providing equal authority.

Emergency deliveries

To reduce the number of emergency deliveries, we recommend to clearly document the procedure for these deliveries. The current variation in the way these emergencies are handled, by the administration staff, has to be reduced. The questions that should be asked and the text that should be added to the order should be recorded in a procedure, determining what an emergency delivery exactly is. This will increase the uniformity and prevent misunderstanding due to unclear instructions accompanying emergency deliveries.

Intranet

Because the Intranet is an important source of information for the internal customer, among others to keep track of orders, we recommend that the site is kept up to date. The internal customer requested keeping the site up to date and optimizing the information in the last customer satisfaction survey. With the quality manager retired, a suitable replacement for this task should be found as soon as possible. If time is not spent on keeping the Intranet up to date, additional emails and phone calls from customers are generated.

7.4 Recommendation on the purchasers' activities

Several recommendations can be made towards the activities performed by the purchasers. The most important recommendations, specifically for the purchasing involved in purchasing laboratory supplies are the following:

We recommend to use a purchasing portfolio and formalize the purchasing process, for low-value products, to increase differentiation for each product category. In addition, we recommend improving planning of large purchases, to prevent purchasers being taken aback by requests of customers and to issue public tenders for the laboratories to increase performance. We also recommend collaborating with other UMCs in resolving common difficulties and sharing information.

Use a purchasing portfolio

We recommend that purchasers use a purchasing portfolio to determine suitable purchasing strategies and supplier management per product category. Differentiation in, for example, the purchasing approach of routine and strategic items is necessary to increase the outcomes of the purchasing process. This knowledge on different product categories and supply markets should be put into use by purchasers when contracting and negotiating.

Formalize the purchasing process

If purchasers are aware of the different types of purchasing categories, formalization of the purchasing process can take place. Routine items should typically be purchased through GHX, via blanket contracts or public tenders minimizing transaction and switching costs. Little time has to be spent on purchasing these items. A more strict approach towards the internal customer in the use of GHX is needed to achieve this formalization. We recommend that the time-consuming, customized approach is reserved for complex, expensive products.

Planning large purchases and early involvement

Besides looking into the budgets of laboratories, we recommend increased communication about expected large purchases between the purchaser and laboratories, to prevent purchasers being taken aback by requests. During the regularly paid visits to the laboratories, the purchaser has to emphasize the importance of involving the Purchasing Department on time. Through increased visibility and reachability the internal customer is stimulated to come forward with their plans. This could be achieved by assuring good reachability by phone and using modern communications such as new letters promoting projects performed by the Purchasing Department. Still, this might be insufficient. Therefore, we recommend implementing an annual planning, as in the UMCU. Internal customers have to mention projects, possible public tenders, and purchases taking a lot of time, in an annual planning of the Purchasing Department. Otherwise, time to spend on these projects might not be available.

Issuing public tenders for the laboratories

We recommend the purchaser for the laboratories to issue public tenders for certain product categories for the laboratories, such as chemicals and PCR plastics, to reduce suppliers and generate savings. The laboratory purchaser at the UMCG should keep in touch with purchasers at the AMC and Radboud about the results of the public tenders issued at these hospitals concerning laboratory supplies. Based on the experiences at these hospitals, a suitable form of such public tenders could be determined for the UMCG. PCR plastics and oligos are successful examples at the AMC and might be possible at the UMCG as well. Like in the AMC laboratories could be consulted to determine appropriate areas for public tenders.

Collaboration among the laboratory purchasers of the UMCs

Because the purchasers at the UMCs seem to struggle with issues that are quite alike, we suggest that information exchange on these difficulties should take place. For example at the NFU meetings, to stimulate solving these matters. The purchasers could also share market knowledge and experiences with specialized products or services to increase purchasing performance.

7.5 Recommendations regarding performance management

Regarding performance measurement, relatively concrete points for improvement are formulated. The performance measures are mostly in place and functioning, their effectiveness and efficiency can be increased with relatively simple measures.

We recommend selecting laboratory suppliers to contact after the vendor rating more carefully and involve internal customers in this selection. We recommend to add questions to the customer satisfaction and formulate additional performance indicators focusing on activities of the purchaser. Lastly, we recommend to perform a regular spend analysis, reduce tail suppliers and pool demand, starting in the product category of Chemicals.

Vendor rating

The current vendor rating could be improved to be more useful for the area of purchasing for the laboratories. To reduce the number of suppliers that the purchaser for the laboratory has to meet with, we recommend that suppliers are selected for such visits based on spend or amount of orders. Especially the exotic suppliers, delivering few non-critical supplies, should not be looked into by the purchaser since these suppliers are merely added to the rating for certification of internal customers. We also recommend that internal customers are asked, during the rating, which suppliers should be looked into according to them. They can identify the suppliers with actual problems, avoiding acting upon the unreliable data of the objective criteria. The reason for the addition of a supplier to the rating should be determined. If it is solely for certification, the purchaser should not act upon the results.

Customer satisfaction

We recommend the addition of questions to, the customer satisfaction survey, on activities performed by the purchaser, representing additional levels of the purchasing process. These questions could focus on the satisfaction of customers concerning the contracts that were concluded, the satisfaction concerning the public tenders that are performed and whether GHX is functioning properly. It would be useful if the internal customer could indicate the purchaser they are in contact with during the survey. This way, the results of the satisfaction can be split out per purchaser. Individual results and points for improvement can be determined.

Performance indicators

Additional performance indicators, focusing on the strategic and tactical purchasing process, should be implemented to measure the performance these levels of purchasing as well. We recommend implementing indicators concerning the number of successful public tenders, the savings generated through negotiations and the number of large purchases that was properly planned. Also, the amount of items purchased through GHX, the number of expired contracts and contract under review, could be useful indicators. A staff member should be held responsible for implementing, monitoring, communication and acting upon the results.

Spend analysis, chemicals

Based on the limited spend analysis performed in this research, we recommend to increase the focus on large suppliers and reduce the number of small suppliers to generate savings. Especially the product category of 'Chemicals', with nearly 50% of total spend on laboratory supplies and many tail suppliers, needs to receive a close look. Since the AMC already investigated this area of spend and reduced suppliers, they could be contacted for tips. Other categories with large amounts of spend such as 'Test kits' and reagents' and 'Antisera' also indicate room for improvement. To generate savings by reducing suppliers, we recommend starting with three categories.

Regular spend analysis and product optimization

We recommend that a regular spend analysis is performed to reduce suppliers, eliminate duplicate suppliers, improve contracts to realize savings. However, also to meet legislation concerning public tenders. For all categories of spend it should be investigated whether threshold for issuing public tenders are not violated since this bears risks of complaints and lawsuits. Using the spend analysis, areas in which standardization is possible can also be identified. With the help of the staff advisors, who currently only standardize for the medical area of purchasing, standardization of selected supplies could be achieved for the laboratories as well.

Concluding remarks

Despite the different categories of recommendations, many of the formulated recommendations are closely linked together. For example, the recommendations concerning the high workload, increasing the flexibility of the staff and review of the responsibilities. To successfully improve the purchasing performance, these points should not be acted out individually, but all together.

We realize that a number of recommendations add extra work to the already busy Purchasing Department. Implementing activities that are currently not or minimally performed, inevitably take time. However, we believe that these additions are necessary to reach the improved performance.. By reviewing responsibilities and, or adding extra capacity, the important activities of contract management, stimulating increased use of GHX, performing a regular spend analysis, implementing additional performance indicators and reducing suppliers can be realized.

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Appendix I, Research context

The UMCG is divided into six sectors, each sector focusses on a certain health care demand such as oncology or short term care, see Figure 1. These sectors are divided into departments, that fit into the specific sector. The UMCG comprises many laboratories, approximately a total of 50 clinical and research laboratories. The clinical laboratories, divided into five different main groups such as medical micro biology and genetics, and the research laboratories, are spread over the different sectors and departments of the hospital. The Purchasing Department, at which this research is performed, is part of the Directorate Finance and Control, the UMC-staff.

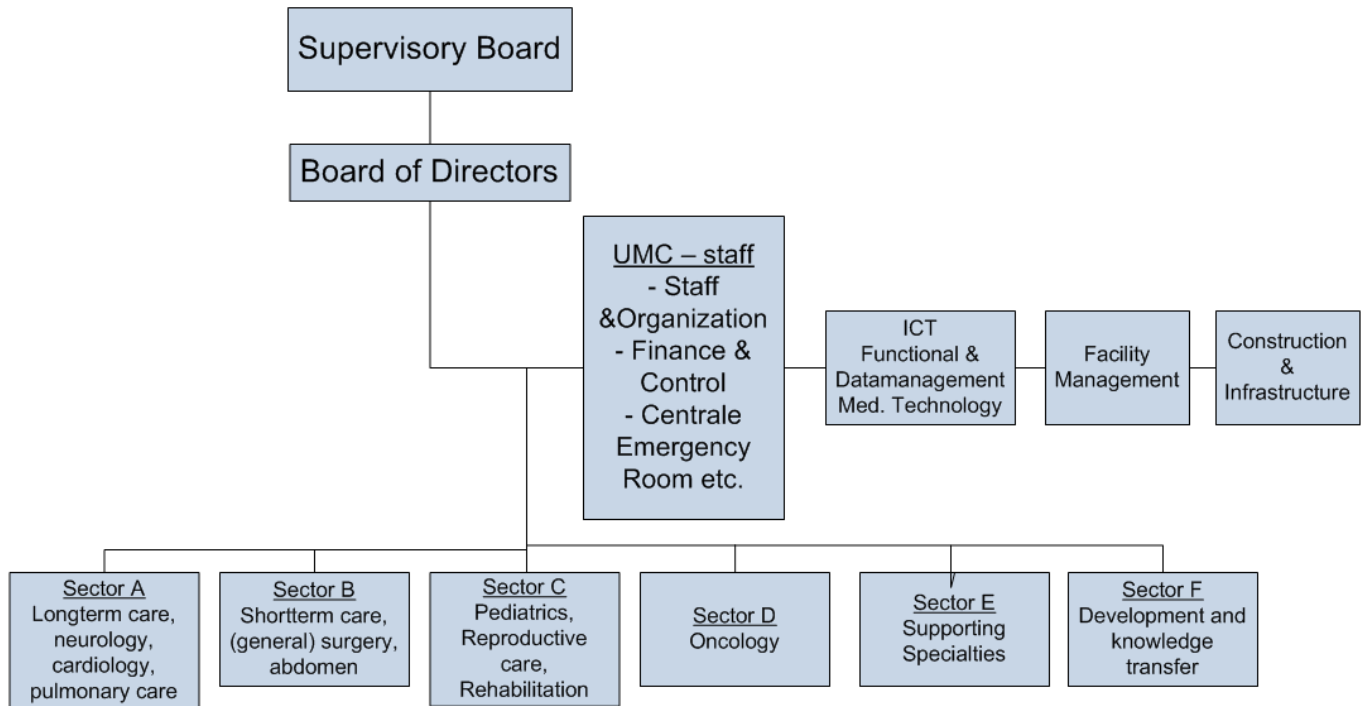


Figure 1 Organization chart of the UMCG

Appendix II, Methodology of the literature review

In this section, the methodology, with which the literature review is conducted, is described. A literature review is conducted regarding the purchasing process in health care. With this research, improvement opportunities to the purchasing process are identified. This is both relevant for practitioners, the new knowledge can be put into practice to enhance the purchasing situation, and researchers, collective insight on improvement opportunities into the field is listed. The identified points for improvement support the UMCG in increasing their purchasing performance for the laboratories. Such an integral list of points for improvement to the purchasing process in health care is currently non-existing.

1.1 Method

To assure a structured and thorough approach to the literature review, the guidelines from Tranfield, Denyer and Smart (2003), are followed. The paper states guidelines for a systematic review of literature specific for the management field. The guidelines of Tranfield et al. (2003) are followed to produce reliable knowledge and enhance practice (Raaij, Schotanus, & van der Valk, 2013). The different phases and activities of the review are listed in Table eleven below.

Stage	Phase	Activity
I	1 - Planning the review	Identification for the need of a review <i>Determine, with a scoping study, the relevance of the review</i>
	2	Preparation of a proposal for a review <i>The iterative process of formulating a research question</i>
	3	Development of a review protocol <i>The protocol serves to assure objectivity and includes search strategy and exclusion criteria</i>
II	4 – Conducting the review	Identification of research <i>The identification of keywords and search terms, based on the scoping study</i>
	5	Selection of studies <i>Selecting studies based on title and abstract before reading total papers</i>
	6	Study quality assessment <i>Using criteria to determine the quality of qualitative literature</i>
	7	Data extraction and monitoring progress <i>Gathering data from the selected articles</i>
	8	Data synthesis <i>Summarizing, integrating and cumulating findings of the selected studies</i>
III	9 – Reporting	Report and recommendations <i>Turning the conclusions into recommendations</i>
	10	Getting evidence into practice <i>Translating evidence into practice</i>

Table 11, based on Tranfield, Denyer and Smart (2003)

The first stage comprises the identification of the need for, the relevance and size for a review. In this case, the need for a review arises from the situation at the UMCG in which improvement to the purchasing process is sought. In the second phase, concerning the preparation of a proposal, a definitive research question is formulated, exclusion criteria and a timeframe are determined, and keywords and search terms are identified based on a scoping study. The title and abstract of the articles found in the databases are read for an initial selection if an article is selected the full text is read. A second selection will be made based on the full text, articles are summarized, integrated and cumulated to answer the research question. In the third phase, the findings are reported and recommendations formulated. For this research, this results in a list of opportunities for improvement to the purchasing process. The step concerning implementation into practice lies out of the scope of this research.

1.2 Databases

In the first place, academic refereed journal articles are used in constructing the framework. Web of Science is used as a search engine. Mostly because it gives access to cross-disciplinary research through multiple databases. This provides the opportunity for in-depth exploration of the specific areas of research through a large number of peer-reviewed journals. To make sure a complete set of articles is gathered, Scopus, the largest abstract and citation database, is also used as a search engine. The search results are sorted by relevance, the best match for search terms, by both search engines.

Because this research is performed specifically for UMCG in the Netherlands, Google will also be used to gather information in Dutch. Gray literature, such as performed benchmarks by consultants or the Dutch Federation of Purchasing Management (NEVI), is useful in this case. Even though this research might not be peer-reviewed, often lacks bibliographic control and misses basic information about the authors or date of publication, it is focused on how the Dutch system works and creates insight into the situation in Dutch health care. According to stage two of the guidelines proposed by Tranfield et al. (2003), searches should not exclusively be conducted in published journals. Conference proceedings, reports from the health care sector and the Internet can also be consulted.

1.3 Timeframe

The date of publishing is used to determine whether an article is relevant for this research. Articles published between 1980 till 2015 will be considered for inclusion, quite a large time frame. It is important to include articles written several decades ago, because the 1980s was a period in which new competitive approaches were introduced in health care. The rising interest in the organization aspects of purchasing can be seen in the number of articles published starting in the 1980s (van Raaij, Schotanus, & van der Valk, 2013; Schneider & Wallenburg, 2013). Articles that date far back might lack actuality, therefore, a critical look at whether an article is still relevant should be paid.

1.4 Search terms

To answer the following sub question, a search query is be constructed.

Which improvement opportunities to the purchasing process in health care can be identified based on a literature review?

The key elements of the question are underlined and used as search terms. For each search term, related terms and narrower terms are defined. Combining these search terms should lead to a complete search with relevant results.

Search term	Related Terms	Narrower
Health care	Public sector Health care system	Dutch Hospital Health care provider Cure
Purchasing	Procurement Buying Acquiring	
Process	Function Procedure Organization	Strategic + process, function, procedure Tactical + “
Improvement opportunities	Performance management Competitive potential Role of purchasing Optimize Benchmark Development Maturity	‘Points for’ + improvement, performance management, increased performance, optimizing purchasing Activities “ Changes “ Developments “

Table 12, search terms

To generate combinations of the search terms and try to prevent exclusion based on different spelling, operators like AND, OR and an asterisk are used. Based on these search term a set of articles will be found. The title and abstract will be read to determine whether an article is relevant to this research. If so, the whole article is read, otherwise it is discarded. For the selected articles both forward and backward citation will be looked into, to determine other relevant articles that were not found based on the search terms.

MSU+ model

In order to have an accurate idea of the completeness of the topics covered by the articles found, the subjects of the articles found are compared to the MSU+ model and a bachelor thesis of a student with a comparable research. No additional topics were found, based on the MSU+ model or bachelor thesis that had to be added to the research. Especially the MSU+ model did make the relations of the different points clear, contributing to the understanding of the researcher.

1.5 Exclusion criteria

Articles will be excluded from the literature review based on the following criteria:

- articles are not published within the timeframe;
- articles could not be acquired through the network of the university;
- articles are in other languages than English or Dutch;
- articles do not have a focus on, organizing, improving or optimizing the purchasing process to increase purchasing performance (for example articles with a focus on the supply chain, or on medical performance);
- articles are not applicable to Dutch health care.

The result of the literature review will be a list with points regarding how the purchasing function should be organized and how to improve the purchasing function in hospitals. As the paper of Tranfield et al. (2003) states, the results of a literature review should be complemented with personal experience and problem-solving skills before implementation in practice. Evidence from literature alone is incomplete and insufficient. Therefore, the points for improvement identified based on literature will be complemented by interviews.

1.6 Defining categories for the findings of the review

To structure the findings of this review, different categories are defined to which the improvement opportunities are assigned. Analysis of the set of articles leads to the definition of eleven different categories. These categories group the points for improvement based on corresponding subjects or goals. For example, all points concerning the staff and their responsibilities are placed in one category and all points focusing on contracting and managing suppliers in another category. With this classification of opportunities for improvement, oversight is created. In case a specific area of purchasing has to be improved, the relevant points for improvement can easily be found in the category.

1.7 Selecting articles for the review

To select articles from the initial search, a funneling method is used. From articles found using Scopus, Web of Knowledge and Google, taking into account the timeframe and the exclusion criteria, the title and abstract are read. A selection of articles is made, from which the full text is read to determine whether the articles are in fact relevant to the research. Articles had to contain information about possible improvements to, optimization of or developing the purchasing process. The selection process of the articles is presented in the flowchart below, a total of 65 sources is used to build the review.

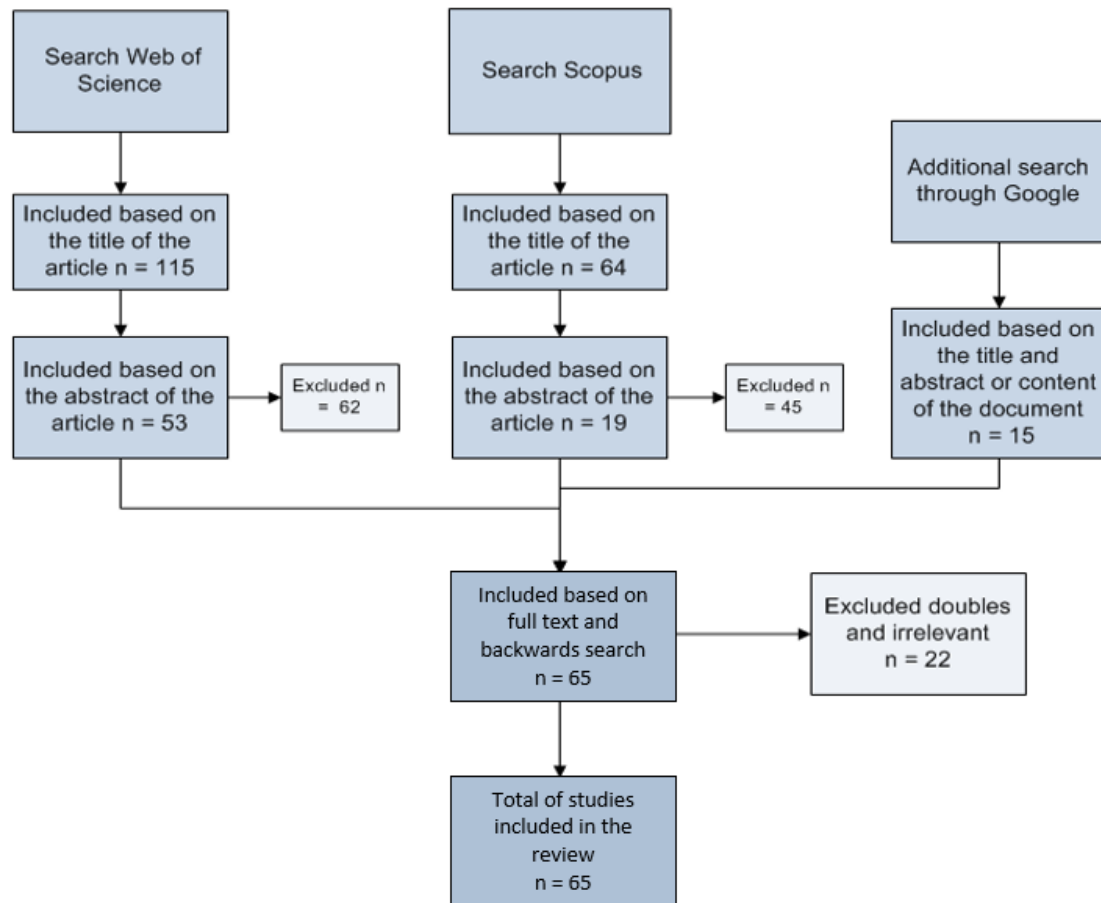


Figure 3, flowchart literature review

1.8 Overview of the articles

Table 12 present an overview of the different categories and the articles found in the literature review that address (issues in) these categories. For each article it is indicated, whether it focusses on private or public/health care purchasing. The basic objective of public and private purchasing are alike; both seek to support operations, buy competitively and develop reliable sources of supplies (Laios & Xideas, 1994). Husted and Reinecke (2009) consider the approaches and tools that improve purchasing performance in the private sector to be effective in public purchasing as well, despite a possible difference in motive. Approaches and tools effective in private purchasing, should not blindly be copied to public purchasing, but might serve to be useful in increasing public purchasing performance. Improvement opportunities from literature focusing on private purchasing, are therefore considered (partially) applicable to health care purchasing as well in this literature review.

Table 12, the articles and different categories

Categories / Articles	Role and importance of purchasing	Policy, direction of development, procedures	The staff, changing roles and ongoing education	Performance and management information	The use of ICT	Restructuring the purchasing process	Purchasing portfolio and sourcing	Market research	Managing suppliers and contracts	Communication is key	Internal marketing of purchasing	Control and Evaluation
Arnet et al (2014)		x							x			
Ates et al. (2015)									x			
Avery (2005)						x						
Barnet & Carrol (1995)						x						
Caniato (2014)		x										
Cousins et al. (2006)			x									
Dubois & Pedersen (2002)							x					
Ellram & Carr (1994)	x											
Gelderman & Van Weele (2005)			x				x					
Gelderman & Laeven (2005)									x			
Gonzales-Benito (2007)		x									x	
Holweg, Reichart & Hong (2011)							x					
Hu, Schwarz & Uhan (2011)	x											
Humpreys et al. (2003)			x						x		x	
Husted & Reinecke (2009)		x	x			x			x			
Janipha et al. (2015)											x	
Johnson & Leenders (2004)	x											
Kakwezi & Nyeko (2008)				x				x		x		x
Kamann (2007)	x	x										
Knoester (2005)									x			
Knoppen & Saens (2015)	x		x							x		
Kraljic (1983)							x					
Kumar & Ozdamar (2005)										x		
Kumru & Kumru (2013)										x		
Laios & Xideas (1994)	x	x			x	x						
Leenders & Schiele, (1999)												x
Li (2012)	x											
McCue & Gianakis (2001)			x								x	x
Moeller, Fassnack & Klose (2006)									x			
Monczka (2010)									x			
Moschuris & Kondylis (2006)							x					
Murray (2002)												x
Murray (2013)												
Nollet & Beauliea (2003)	x											
Palmer (2000)					x	x						
Parikh & Joshi (2005)					x	x						
Pemer et al. (2014)		x				x						
Pohl & Frost (2011)		x		x								
Roberts (2001)							x					
Ruiter et al. (2011)		x	x	x	x				x		x	
Schiele, Horn & Vos (2011)							x					
Schotanus & Telgen (2007)	x											
Swinder & Seshadri (2001)									x	x		
Telgen (1994)												x
Telgen & Sitar (2001)												x
Trent & Monczka (1998)			x	x					x			
Van Poucke et al. (2014)					x			x	x			x
Van der Valk & Rozemeijer (2009)						x						
Weele (2005)	x											
Wen-li (2003)										x		
Public/Health Care	17											
Private	33											

Appendix III, current strategic and tactical purchasing processes

This appendix contains a situation analysis of the Purchasing Department, serving as background information to the performed research. The organization of purchasing, structure of the purchasing process, different levels of purchasing, different functions and responsibilities are brought into view.

2.1 The purchasing department and its responsibilities

The Purchasing Department of the UMCG is in charge of acquiring supplies and services from external sources in an efficient and effective matter. The Purchasing Department purchases and orders consumables, supplies and capital goods. To fulfill the purchasing function, market research and collecting product information are needed. Purchasing is also involved in formulating product specifications, the invitation to tender and analysis and assessment of tenders, negotiating, arranging contracts and handling the operational ordering process. In addition, article data and purchasing contracts are managed, contact with the internal customer is preserved and public tenders are performed by the department (Bax H. , 2010).

Five primary responsibilities of the Purchasing Department can be identified:

- ensuring a reliable and integral purchasing policy, as the owner and coordinator of the purchasing process;
- realizing the availability of products, to ensure continuation of activities at the UMCG;
- focusing on controlling and reducing material and purchasing costs;
- minimizing the vulnerability on purchasing markets, taking into account laws and guidelines;
- representation towards suppliers and relevant external parties (Bax H. , 2010).

The integral purchasing process, as it is organized within the UMCG, has several phases. The structure is based on the purchasing process as proposed by Van Weele (2005). The purchasing process starts with the development of the need for a product or service at the internal customer. The first step in the purchasing process is therefore specification. The question what exactly has to be purchased to fulfill the need is answered by preparing functional, technical and commercial specifications. After setting up the requirements, market research is performed. The second step is to select suppliers, tenders have to be gathered from one or multiple suppliers based on the definitive specification. Based on the requirements, wishes and selection criteria, a reliable supplier is selected. The next step involves contracting, negotiations will take place and a contract will be concluded in which terms and conditions that have been agreed are recorded. Subsequently, an order can be placed. The ordering process is partially decentralized at the UMCG. Internal customers can use GHX, an automated system through which supplies are ordered directly at suppliers. Next, expedite involves monitoring the contract and individual orders and verification of the invoices. The last phase comprises evaluation of the supplies, contract and supplier. Every step of the process should be performed with care and systematically to provide the internal customer with a product fit for its use, on time, in the required quantity at reasonable costs (Weele. 2005).

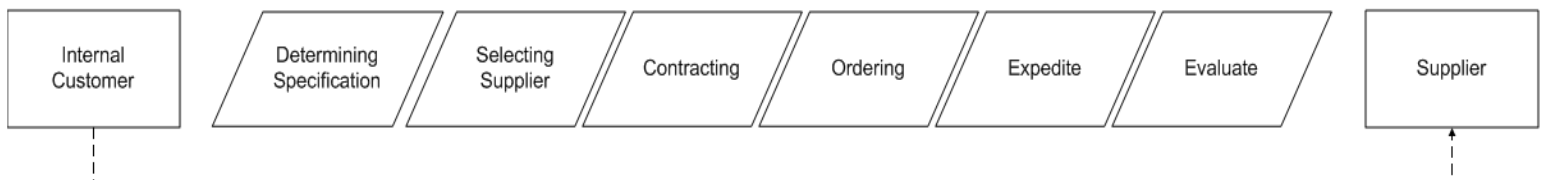


Figure 4 The purchasing process according to van Weele (2005)

2.2 Definitions of strategic and tactical purchasing

In this section, the different levels at which the purchasing process takes place will be discussed.

Besides the steps as illustrated in Figure 4, the purchasing process takes place at different levels, the levels of strategic, tactical and operational purchasing can be distinguished. Strategic purchasing is extensively discussed in literature and different definitions can be found. In this research the definition of NEVI (2009) is used, the strategic

purchasing process includes the activities influencing the direction of development of the position and actions of the purchasing function within the organization on the middle and long term. (NEVI, 2009). Strategic purchasing is an overarching level influencing the entire purchasing process, creating the environment in which the purchasing process takes place. Decisions made at the strategic level largely influence the effectiveness of the tactical and operational purchasing (Heijboer, 2003). The strategic purchasing process comprises, among others, formulating purchasing goals and policy, determining the type of supplier relationships desired, the contribution of the purchasing department to achieving the organizations strategy and defining the purchasing strategy (Ellram & Carr, 1994).

The tactical purchasing process comprises specifying the need of the internal user till negotiating with and contracting suppliers (Wittmaekers, 2015). These are the first three phases, specifying, selecting and contracting, in the purchasing process as indicated by van Weele (2005). The purchasers in health care should contribute to a successful purchasing process by focusing on the tactical level. A purchaser focusses on identifying suppliers that deliver high quality at a reasonable price and manages the selection process of the most suitable supplier. The purchaser is also responsible for negotiating and concluding purchasing contracts, assessing and monitoring supplier performance and gathering market knowledge (Humphreys, McIvor, & McAleer, 2003). From management perspective, purchasing provides a key role in generating tactical information that can be used to measure and control efficiency and effectivity of the purchasing process. Tactical activities, providing this information include; identifying spending patterns per product category, examine the amount of invoices per category, identify and evaluate the number of suppliers per category, the type of contracts per category and determining contract compliance (McCue & Gianakis, 2001).

The operational purchasing process are the activities performed daily that assure the availability of supplies and services. These activities are, among others, ordering goods and services, monitoring orders, solving operational problems and administration (McCue & Gianakis, 2001). The operational process comprise the last three phases, order, expedite and evaluate, of the purchasing process as indicated by van Weele (2005). These practical activities form the basic requirement for a purchasing process.

The different levels are indicated with the arrows in Figure 5 below. The strategic level forms an encompassing level over the tactical and operational purchasing.

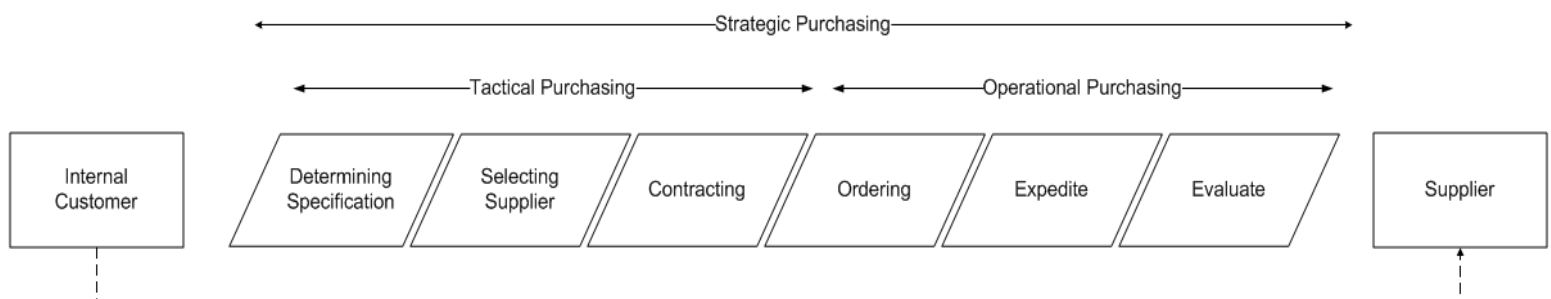


Figure 5 The purchasing process according to van Weele (2005)

2.3 The different roles and activities at the UMCG according to documentation

In this paragraph the division of tasks and responsibilities at the Purchasing Department will be discussed based on available documentation. Among others, the function descriptions will be used to identify the roles of the different staff members.

The strategical purchasing process at the UMCG is performed by the head of the Purchasing Department. Determining the purchasing strategy, the organization of purchasing, the purchasing policy and goals are responsibilities of the head of the Purchasing Department. In order to do so successfully, he is supported by the tactical and operational team leaders and the purchasers. According to the function descriptions of the team leaders,

they provide a contribution to strategic purchasing, the purchasing policies and procedures. The (senior) purchasers should advise the head of the purchasing department on formulating policy and strategy (UMCG, 2005; UMCG, 2013).

The tactical and operational purchasing processes at the UMCG are performed by the purchasers and the administrative staff. In case of the laboratories, one senior purchaser focusses on the tactical purchasing processes and is supported by two administration employees focusing on the daily operational purchasing. Among the purchaser and administrative staff members the activities have been divided.

According to the function descriptions, (senior) purchasers focus on specialized purchases and project based purchasing of a strategic kind, within their area of purchasing. The purchasers are responsible for performing market research, advising customers when programs of demand are drafted, analyzing and assessing tenders, selecting suppliers and products, performing negotiations, preparing agreements and contracts and issuing public tenders. The purchasers also advise the head of the Purchasing Department on policy and translate this policy into their daily work. In addition, the purchaser is the primary point of contact for the internal customer and advises the customer. The purchasers authorize purchasing orders, contribute to the purchasing documentation, take care of deviating order confirmations, coordinate product recalls and differences between invoices and bills and oversee a correct administrative handling of the purchasing process. The purchasers also gather purchasing data to analyze purchasing, proposes the standardization of products, reduction of supplies and evaluate policy effectuation. The purchaser is responsible for assessing and acting upon supplier performance, supplier management is performed. The purchaser is in contact with the rest of the purchasing staff, including the administration staff to provide functional and operational instructions, internal customers to advise and discuss wishes and the logistic department, the warehouse, financial administration and of course suppliers (UMCG, 2005).

The administration staff executes the operational purchasing tasks, according to the function descriptions. The most important activity is to handle the order requests. This includes administrative tasks and the communication with suppliers and internal customers about these orders. The administration staff gathers product information, asks for tenders, handles correspondence, verifies purchasing orders and sends these to the supplier after authorization of the purchaser. The administration staff also serves as primary contact for the internal customers and suppliers, to provide information on the purchasing and ordering procedures and to answer general questions. According to the function descriptions, a uniform way of working is present among the staff members of the different clusters. The administration staff handles the different types of requests and assesses these based on contract, verifies the budget and contacts the customer in case of ambiguities to explain the purchasing process or to discuss alternatives. In case new, non-standard products are order from new suppliers or high costs associated with the purchase, the purchaser is contacted (UMCG, 2003).

Until several years ago the administration staff and purchasers were directly managed by the head of the Purchasing Department. However, two team leaders have been introduced, first a team leader in charge of the purchasing administration, order and control management and data management employees. Three years ago a team leader was also hired to guide the purchasers in an inspiring way. According to the function description, the team leaders should coach employees in performing their work, provide professional support, discuss progress and the result of their work. The team leaders are responsible for providing optimal co-operation and a constructive dialog with other staff members, parts of the organization, suppliers and purchasing cooperation's. The team leaders should distribute the available capacities over the public tenders and projects and participates in these. Lastly, the team leaders identify difficulties, prevent and solve these and advises on new purchasing processes (UMCG, 2013).

2.4 An overview of the current strategic purchasing process at the UMCG

In this section an overview of the current state of the strategic purchasing process at the UMCG will be provided. This overview will be based on the documentation concerning strategic purchasing available, and a meeting with the head of the Purchasing Department, primary responsible for strategic purchasing.

The awareness of the importance of the strategic purchasing process at the UMCG has increased over the past years. In line with this increased awareness of the importance, the degree to which the strategy of the Purchasing Department is developed increases. A detailed purchasing strategy, with goals and the direction of development of the department, is currently not present. However, it is under development and should be finished at the start of 2016. Based on the currently limited information the purchasing strategy will be described.

It is acknowledged that the upcoming strategy of the Purchasing Department, has to fit with the organizational strategy, business alignment has to take place. The Purchasing Department has to contribute to achieving the mission, ambitions and goals of the UMCG. The mission, vision, ambition and goals of the organization for the coming years, are discussed in the Route 2020 documentation. The mission of the UMCG, the reason of existence, is providing excellent health care, performing excellent research and having excellent educational programs (Aartsen, Kuipers, Snapper, & van der Zee, 2014). The ambition of the UMCG is to set an example for others with the quality of care delivered and patient safety. Based on the Route 2020 documentation, goals for the strategic purchasing could be set in order to contribute to achieve the hospital wide ambitions and goals (Bax H. , 2015; Aartsen, Kuipers, Snapper, & van der Zee, 2014).

Based on the Route 2020 documentation, the focal points and goals for the coming years and the current position of the Purchasing Department will be determined in the upcoming strategy. According to Hans Bax (2015), stakeholders will be identified, key performance indicators monitored and a spend analysis will be performed which is expected to lead to long and short term goals for the department. The purchasing policy 2016-2020 should answer the questions of which activities are performed at the department, implying determining which activities are not performed at the department and why. The organization and processes should be mapped as well. It is acknowledged that strategic alignment is lacking at the moment. A centralized purchasing function is present, with bureaucratic procedures and protocols. While the performance of the department might be quite well, it is realized that the perspective is wrong. Cross functional procurement teams might be needed to improve purchasing and a focus on total cost of ownership is needed. The upcoming strategy will address these issues on a strategic level, rethinking the vision, mission and right of existence of the department. The purchasing policy will be based on the policy of the UMCG, the laws and regulations and the quality analyses of the department. Starting points are the following:

- A clear, comprehensible description of policies, role, tasks and products;
- A clear position and presence of the purchasing department at the hospital;
- A central purchasing organization for operational and tactical purchasing tasks;
- Minimal organizational and procedural burden but maximal service (Bax H. , 2010).

The expected strategy will focus on the years 2016-2020, in contrary to the annual plan that has been developed each year. Such an annual plan contains listed key points on various topics relevant at the Purchasing Department such as leadership, strategy and policy, managing the staff and managing processes. In quartile reports the quantitate points are commented on, however these quartile reports annual plans do not indicate how these key points will be achieved, implemented, scores improved or who is responsible. A more elaborated description of the purchasing strategy comprising multiple years, a bigger picture, is therefore eagerly awaited.

2.5 An overview of the current tactical purchasing process at the UMCG

In this section an overview of the tactical purchasing process, as currently performed at the UMCG, will be given. This is based on the available documentation and a meeting with the purchaser responsible for the laboratories, because of the focus on improving performance for the laboratories.

Usually the tactical purchasing process at the UMCG starts with a demand arising at an internal customer, at the research or clinical laboratories. This demand concerns internal goods that have to be replaced or new equipment or disposables that are needed. Often suppliers are known and internal customer have a supplier in mind when contacting the purchaser. Developing specifications is, in practice, in the first place a responsibility of the internal

customer, they are content expert and know what it is they need exactly. If necessary, the purchaser can assist. In case the internal customer already has a supplier in mind, the selection phase is less relevant. If not, based on several tenders a supplier has to be selected. The purchaser asks for the right amount of tenders from the suppliers, based on guidelines. Negotiations are mainly performed by the purchaser, sometimes in collaboration with the internal customer if product specific knowledge is needed. Concluding contracts is an issue in the current situation at the UMCG, often price arrangements are made, and actual contracts are often not concluded for the laboratories.

The purchasers are less involved in the next steps of the purchasing process, ordering, expediting and evaluation. Ordering is the task of the administration staff, expediting is mainly the responsibility of the order manager and evaluation is performed mostly by the quality manager. Managing supplier relations, performing market research and gathering data to analyze purchasing are not activities that the purchaser performs due to a lack of time available and the large amount of suppliers. Nor are proposing standardization of products, the reduction of suppliers and policy effectuations taken care of in practice. In the current situation 'contract control' is performed, instead of actual contract management. As the time approaches that a contract is about to end, the purchaser receives a notification.

In practice, the senior purchaser is involved in operational tasks, one of the experienced difficulties. As the function descriptions states, the purchaser authorizes purchasing orders, contributes to the purchasing documentation such as updating products and prices in GHX and takes care of deviating order confirmations. The purchaser coordinates product recalls, handles differences between invoices and bills and oversees a correct administrative handling of the purchasing process. In addition, phone calls are received concerning bills that have not yet been paid or about products that cannot be found in the catalogue. The purchaser indicates that these activities take a lot of time. The purchaser is aware that the laboratories use many different articles, many disposable articles. In comparison to other areas of purchasing, such as cardiology or psychiatry, the area of purchasing for the laboratories is therefore quite operational and a lot of work due to the many laboratories. In addition, the purchaser for the laboratories is also responsible for all printed matter at the UMCG, generating a large workload.

Last but not least, the purchaser is responsible for issuing public tenders. The UMCG is obliged to perform European public tenders when the estimated contract value for the contracted period of time exceeds the determined threshold, in 2016-2017 the threshold is 209.000 euros for supplies. The UMCG has procedures in place to issue public tenders. In addition, standard documents are available to structure the public tender such as the format for the program of demands and a project form with formalities. The goal is to select the supplier and product that, based on the predetermine criteria such as functionality, quality, terms and costs, is the best offers taking into account the laws and regulations. A program of requirements is composed, selection and awarding criteria are formulated and the tender documentation is published. Next, possible question from tenderers are answered and tenders received. (UMCG, Europese Aanbestedingsprocedure). The purchaser will assist with composing the program of requirements, this program has to be complete, correct and objective but knowledge of the actual product is less necessary. Issuing the public tenders consumes a lot of time of the purchaser.

Appendix IV, The interview protocol

Semi-structured interviews

Semi-structured interviews are conducted to determine the applicability of and supplement the findings from literature. A list with questions and topics focusing on the findings from the literature review is covered in a particular order. Open-ended questions are prepared ahead of time, but discussions diverging from the proposed questions might take place (Clifford & Valentine, 2010). This type of interviews is suitable for small samples and gathering qualitative information (Barriball & While, 1994), as is the case in this research. The points of improvement based on literature will be discussed individually with the respondents. This is followed by questions about additional opportunities for improvement to the purchasing process each respondent comes across in practice. Perceptions and opinions will be explored, which should give insight into difficulties present that did not rise from literature. Discussing the listed points for improvement with the respondents, allows to verify findings from literature and identify inconsistencies in respondent's views. References to statements of other respondents will be made anonymously, which is useful to validate the information gathered. The interviews will last 60-90 minutes, the amount of time that is expected to be necessary to cover all topics but not lose concentration (Laforest, 2009).

Validity, reliability and potential bias

Interviews are a flexible method of assessment, which makes the validity and reliability relatively complicated. Validity in qualitative research refers to the appropriateness of the tools, data and processes. The choice of methodology must enable detection of findings in the appropriate context, for it to be valid. The use of systematic sampling, comparison and documentation contribute to a high validity (Leungh, 2015). The validity is highest when the interviewer uses situational and job-related questions and in case the interview is structured and carried out by one person. Therefore, the questions are asked in a specific order, by one interviewer, and focus on the work of the interviewee. Systematic errors due to socially acceptable answers are prevented by conducting individual interviews and emphasizing that the results are used anonymously. To increase contrast validity, subjective terms such as 'contract management' are explained during the interviews, to assure respondents understood the question.

Reliability indicates the exact replicability of the process and results, in qualitative research reliability should focus on consistency (Leungh, 2015). A clear interview structure contributes to the reliability, which is complicated since each interview is unique. Reliability also depends on the interviewer's appearance, accents and the interviewer's experience, which are hard to control. Frequent eye contact and positive body language increase reliability (Leicester, 2009). To increase the validity and reliability of the interviews, for the overlapping parts of each interview an equal structure will be maintained. The questions will be focused on the specific situation and job-related while drawing anonymous comparisons between the interviewees. A positive attitude and eye contact should contribute to reliable results of the interviews. The interviews will, with permission from the interviewee, be recorded to be able to focus on the answers of the interviewee during the interview instead of having to take many notes. This should contribute to the reliability and validity of the interviews.

For research that includes qualitative elements such as the interviews, it is important to try and minimize potential bias. In this research the bias is minimized by choosing a representative sample of respondents. With the interviews at the UMCG staff members from all different functions are included. The purchasers and administration employees are selected on their differences in expertise and their perceived ability to reflect critically on the purchasing process. The three out of seven UMCs selected for interviews were chosen based on perceived differences in the purchasing process and organization by the purchaser for the laboratories at the UMCG. The UMCs were geographically scattered and should form a representative sample. In addition, inclusive bias is minimized since no volunteers were used. All respondents were asked personally to participate and agreed.

Different types of respondent bias can be present during interviews. Acquiescence bias, the friendliness bias, is a tendency of the respondent to agree with the interviewer. To prevent this bias, questions are focused on the true point of view of the respondent and before the start of the interview it is explained that there is no right answer.

Social desirability bias makes respondents answering questions in a way to be accepted and liked. To prevent this, the interviewer should focus on unconditional positive regard. Habituation, means respondents providing the same answers to questions similarly worded. The questions in the interview are varied, habituation is not likely.

Several types of researcher bias can be distinguished. In case of confirmation bias, the researcher uses respondents to confirm the hypothesis, instead of testing the hypothesis. To decrease this form of bias, the researcher reevaluated impressions and tried to take all positive and negative information in account. Culture bias is not expected to be present. Question-order bias is created by one question influencing the answers to other questions. This is expected to be partially present but tried to minimize by starting with general questions. Most difficult is researcher bias, the interviewer may subconsciously give subtle clues the influence the subject in the answer, towards the interviewer's opinion and values. This is closely linked to response bias, respondent saying what they think the interviewer wants to hear.

During the interviews, interaction with the interviewee is tried to standardize. However due to the nature of semi-structured interviews each interview remained unique. The questions asked were alike, but the order of the questions and an emphasis might be placed differently based on the situation. In an ideal situation the interviewed purchasers are all completely honest and interpreted each questions like wise. In addition, the interviewer should be blinded to the study hypothesis and should ask reliable and valid question likewise to each respondent.

Preparing the interviews; selecting staff members and a review of the list

Not all the points for improvement identified in the literature review are relevant to all members of the staff, some points focus on a specific part of the purchasing process in which not all staff members are involved. For example, the administration staff has little to do with the strategy development and the team leaders are not involved in expediting. Though the team leader might have an opinion about expediting, for this research questions are only asked to staff members involved in a process to save time. Therefore, a selection is made of the relevant categories that will be addressed per type of staff member interviewed. A list is made of the categories addressed, and questions asked, for different types of staff members. Conducting individual interviews with the staff of the purchasing department is important to explore personal perceptions and prevent socially delineable answers. In this case, a focus group would be less suitable and impractical because not all members of the staff are involved in all steps of the purchasing process (Clifford & Valentine, 2010).

Since the list of opportunities for improvement is quite extensive, the head of the purchasing department and the team leader tactical purchasing both reviewed the list before the start of the interviews. The review of the head of the department was received in writing and elaborated on by the team leader. In a meeting with the team leader his view on the different points was discussed. Based on the recommendations of points being less or more relevant, an emphasis will be placed on the more relevant points. Points that are not considered relevant will be addressed shortly. However, all points for improvement will be addressed during the interviews, staff members in other functions might have different views on the relevance of these points. The review by the head of the department and the team leaders serves as a first impression to which points could be more or less applicable to the UMCG. The points considered more important can be found in bold in Table 13.

The respondents interviewed at the UMCG

The first interview at the UMCG is conducted with the purchaser responsible for purchasing the laboratory supplies, this study aims at improving the purchasing process in which she is involved. She will be interviewed about the strategic and tactical points for improvement based on literature and the improvement opportunities she can add based on her daily work. In addition, both the team leaders for operational and tactical purchasing will be interviewed. The focus will be on the strategic aspects of the purchasing process, training of the staff and communication. Two purchasers focusing on different areas, the medical area and the technical area, of purchasing will be interviewed as well. A comparison of the purchasing process for the laboratories with the process for other internal customers will be made. In these interviews the emphasis will be on the tactical purchasing process in which

the purchasers are involved. One of these purchasers has recently been promoted from administration employee to purchaser, her perceptions on the gap between different functions, communication and collaboration is therefore very relevant. Three administration employees will be interviewed, both administration employees working for the laboratories and an administration employee working for the medical cluster. The administration employees working for the laboratories can identify difficulties in the daily practice of the purchasing process for the laboratories. Their opinions on the tactical improvement opportunities, procedures, formalization etcetera, will be asked. The administration employee involved in the medical cluster will be interviewed to determine possible differences in her way of working, and the way of working of the two administration employees working for the laboratories. Lastly, the quality manager at the Purchasing Department will be interviewed. His job comprises performing the vendor rating and monitoring internal customer satisfaction. This amounts to a total of 9 interviews with employees in different function at the purchasing department of the UMCG.

Interviews at the UMCU, AMC and RadboudUMC

In addition to the interviews at the UMCG, purchasers for the laboratories at the UMCU, AMC and RadboudUMC are interviewed as well. These UMCs have been selected based on the contacts of the laboratory purchaser. In her opinion the purchasing process at these hospitals differs from the process at the UMCG and could lead to useful insights. The purchasers interviewed at the UMCU, AMC and RadboudUMC are all involved in purchasing laboratory supplies. This is considered useful because a focus of the points for improvement is placed upon this specific area of purchasing. By interviewing purchasers involved in purchasing laboratory supplies, comparisons with the UMCG can be made and differences identified.

Structure of the interviews

Each interview starts with a short introduction about the research, the main question to be answered and the goal of the project. The topic and kind of questions asked are described, this should contribute to make the interviewee feel at ease (Leech, 2002). The respondent is asked permission to tape the interview, after which the interview is actually started.

1) Background information

The interview starts with open-ended questions about the background of the respondent. The questions focus on the current position of the respondent, on how long the respondent is fulfilling this position and the positions the respondent fulfilled before, in or outside of the hospital.

2) Addressing the categories from literature relevant to the respondent

The categories with improvement opportunities relevant to the respondent will be addressed. The interviews start with questions on possible points for improvement and end with an open question on additional points identified by the interviewee. This choice is made because orienting meetings with some interviewees showed that the staff of the Purchasing Department tended to come up with personal points for improvement, or issues outside of the scope of this research. Such as, the functioning of other staff member or details of the ICT system. By asking questions on the predetermined points for improvement first, the interviewees are guided in a certain line of thought. Starting with an open question could cause the interviewees to wander off topic which is undesirable with the limited time available and many points to discuss. The disadvantage of this approach, could be that the interviewee does not feel free to come up with additional points for improvement that might not directly seem to fit in the list.

At the start of the interview, a clear example of a point of improvement is given, to assure the respondent understands what is meant by a point for improvement. From each point for improvement a question is deduced, to identify the ideas of the respondents concerning this points for improvement and its applicability to the UMCG. For example the category of 'staff, changing roles and ongoing education', the question will be asked if and ongoing education is assured, whether this is important to the respondent and whether the respondent thinks more or less should be invested in the ongoing education of the staff. This way, the respondents can indicate whether they

consider the improvement opportunities relevant and whether these points solve current difficulties. Sometimes these are guided questions, the points for improvement based on which the questions are formulated are not neutral either. In order to determine whether a identified point for improvement is applicable, a guided questions is sometimes needed.

3) Additional points for improvement, based on the initiative of the respondent

At this stage of the interview, the respondent will be asked to reflect on daily matters of the Purchasing Department. The respondent will be asked which improvement opportunities he or she can come up with that were not in the list, but could contribute to a better purchasing performance. Lastly, the respondent will be asked whether he or she has anything to add and will be thanked for participating. It will be explained how the master project proceeds and that the results will be communicated towards the respondent at the end of the project.

The points for improvement addressed during interviews with a purchasers at the UMCG

Relevance of purchasing	Heb je het idee dat inkoop als een belangrijke functie wordt ervaren door het management?
	Is inkoop geïntegreerd met de doelen, de visie van het UMCG? Bij het bepalen van de strategie van het gehele UMCG, wordt inkoop dan ook meegenomen?
Policy, direction of development, goals	Wat weet je van het beleid en de inkoopstrategie van het UMCG? Wordt je hiervan op de hoogte gehouden?
	Ben je betrokken geweest bij het formuleren van de inkoopstrategie? Ben je betrokken bij het formuleren van lange termijn plannen voor de afdeling?
	Zijn interne klanten op de hoogte van het inkoopbeleid, de processen die ze moeten doorlopen?
	Zijn duidelijke richtlijnen, voorschriften, aanbevelingen aanwezig om het inkoopproces te structureren? (Is het herzien van bestaande procedures nodig?)
	Hoe zit het momenteel met centraal inkopen? Wat kunnen interne klanten zelf? Denk je dat dit een goede ontwikkeling is?
Formalization	Denk je dat huidige procedures (documentatie) aan vernieuwing toe is? (over selecteren, contracteren, bewaken etc.)
	Wat zou je er van vinden als het inkoopproces voor producten met lage kosten, lage complexiteit en een hoge bestelfrequentie geformaliseerd wordt? Dus duidelijke richtlijnen over hoe zulke producten gekocht worden, voornamelijk via GHX en raamcontracten en een focus lange termijn relaties met leveranciers om overstap kosten te minimaliseren.
	Zou je dit voor complexe producten ook willen, of dan liever een flexibele aanpak?
	Vind je inkoopprocessen duidelijk, bv. het aanbestedingsproces transparant, duidelijk, helder?
Staff & education	Hoe zit het met training van personeel? (budgetten, wie bepaalt wanneer?, welke personeel)
	Heb je het idee dat hier genoeg in geïnvesteerd wordt?
	Wat is jou idee bij de functie van Hans? Wat zou hij anders kunnen doen? Houdt hij zich bezig met coachen van de staff, updaten van processen.
	Zou je als inkoper je tijd anders willen verdelen, denk je dat dit zinvol is? Minder low-value producten, meer relaties met leveranciers? (financiële drempel) Zou je meer betrokken willen zijn bij strategische beslissingen?
	Welke taken doet een MIA precies (in vergelijking met ideaal van Weele, bestellen, bewaken, nazorg)? Wat vind je van deze taken? Wat zou je niet, of anders willen doen?
	Heb je idee dat er overlap is met een inkoper/MIA in de werkzaamheden? Of juist taken waar niemand zich verantwoordelijk voor voelt? Welke taken zou je kwijt willen aan een MIA?
Performance	Wat weet je van aanwezig performance indicators? Worden de resultaten hiervan gecommuniceerd naar de afdeling en naar het hoofdinkoop? Worden deze resultaten geëvalueerd?
	Welke management informatie zou je graag willen hebben?
ICT	In hoeverre is het operationele inkoopproces momenteel automatisch? In hoeverre functioneert het e-procurement system voor decentrale bestellingen? (GHX) Wat zou je automatisch willen?

Restructuring the process	Wat vind je van 'purchasing cards' in het UMCG voor kleine bestellingen, lage kosten, lage complexiteit van interne klanten?
	Is het inkoopproces voor diensten anders dan voor goederen? Worden er dan meer details opgevraagd voor specificatie? Zou dat nuttig zijn?
	Wordt er per product groep momenteel bewust anders in gekocht? (purchasing portfolio, Kraljic)
	In hoeverre wordt er nu marktonderzoek gedaan? Of alternatieve leveranciers gezocht?
	Kan je beschrijven hoe onderhandelingen met leveranciers verlopen? Welke rol speelt een inkoper hierin?
Managing suppliers and contracts	Heb je het idee dat er nu te veel, genoeg of juist te weinig leveranciers zijn gecontracteerd? Hoe wordt dit nu gereduceerd?
	Wordt er geïnvesteerd in lange termijn relaties met leveranciers? Denk je dat dit zou moeten voor het UMCG?
	In hoeverre vind contract management plaats? (monitoren spend, coverage, afloop datum, houdt de leverancier zich aan het contract)
	In hoeverre zijn er lange termijn contracten? Denk je dat meer lange termijn contracten nuttig kunnen zijn?
	Worden gesloten raamcontracten gecommuniceerd naar interne klanten?
Planning	In hoeverre wordt er momenteel gepland? (grote projecten) Zou het helpen om naar het budget van de afdeling te kijken en aan de hand daarvan te bepalen of er een groot project aankomt? Lastig voor het Lab?
Communicatie	Hoe is de communicatie met interne klant/ondersteunende diensten/leverancier en intern? (frequent, helder, open) Zou het de inkoopprestatie verbeteren als open en frequentie communicatie gestimuleerd wordt?
Internal customer	Is er afstemming met de interne klant over wensen, hoe verloopt die communicatie? In hoeverre is de interne klant betrokken bij het inkoopproces?
	Wordt bureau inkoop betrokken bij het inkoop proces door de interne klant? Wanneer?
	Wordt de klanttevredenheid gemeten? Ben je op de hoogte van de resultaten hiervan? Vind je interne klant tevredenheid belangrijk?
Expedite /bewaken	Worden levertijden bij gehouden? Door wie? Wordt er ook actie ondernomen?
Evaluation	In hoeverre heb je als inkoper met de vendor rating te maken? Wat vind je van de vendor rating? Hoe zou je deze willen verbeteren? Heb je als inkoper iets aan de resultaten? Gebeurt er iets met de resultaten?
	Bij het uitvoeren van een spend analyse, welke informatie zou je hier graag uit willen terug zien?

Table 13, questions for the purchasers

The points for improvement addressed during interviews at other NFU members

The interviews performed at the UMCU, Radboud and AMC are comparable to the interviews performed at the UMCG. However, after the introduction and questions about the function of the employee, there will be a focus on the organization of the purchasing department, to gain insight into the purchasing situation at the UMC member. It will be determined how the responsibilities are distributed and the purchasing processes structured. Next, questions concerning the categorized points for improvement will be asked. Since many points for improvement have been identified to discuss in one interview and time is limited, the most relevant points for the UMCG have been selected. These are the points that are considered most relevant, based on the interviews at the UMCG, and do not yet have a concrete form, such as contract management or reduction of suppliers. It would be interesting to determine how other hospitals handle contracting for the laboratories, who is responsible for contract management and which information is most useful to the purchasers. Or to determine whether reduction is considered necessary at the other UMCs, whether this is pursued and how, and what the advantages are. This can serve as inspiration for the UMCG when designing and implementing contract management. The selected points for improvement (bold) can be found in Table 14 in below. In case time was left during the interview, the other points were addressed as well. Several

practical issues concerning purchasing for the laboratories have been addressed as well, these can be found at the bottom of the table. Again, the interview is ended by asking purchasers for additional points for improvement.

Categorie	Vragen
Huidige situatie bij UMC	Hoe is de inkoopafdeling hier georganiseerd? Welke pakketten zijn er? Welke verschillende functies zijn er? Hoe zijn de verantwoordelijkheden verdeeld? Laboratoria; hoeveel zijn er, hoe is inkoop voor de laboratoria georganiseerd?
	Hoe besteed je als lab inkoper je tijd? (low-value of lange termijn relaties, contracteren, tactisch inkopen) Waar zou je liever minder tijd aan willen besteden en waaraan juist meer?
	Hoe besteden administratieve medewerkers hun tijd? Zijn ze 'in charge' over het dagelijkse inkoopproces? Wat vind je van deze taakverdeling?
	Heb je het idee dat er gedeelde verantwoordelijkheden zijn op de afdeling? (taken waarvoor meerdere mensen, of juist niemand zich verantwoordelijk voelt? Bv. low value invoices, phonecalls from the supplier)
Role & importance of purchasing	Hoe denk je dat inkoop wordt gezien door het management (RvB)? Is inkoop een belangrijke functie of ondergeschikt?
	Hoe is de verdeling tussen de centrale inkoopafdeling en decentraal bestellen door interne klanten?
	In hoeverre nemen jullie deel aan inkoop allianties? Vind je dit waardevol?
Strategie, beleid, structuur	In hoeverre is er een inkoopstrategie (visie, missie, doelen) en beleid voor de afdeling? Wie stelt dit op? Is dit in lijn met de organisatie strategie, beleid en processen?
	In hoeverre ben je als inkoper betrokken bij het formuleren van lange termijn plannen van de afdeling en de strategie? Hoe ervaar je dit?
	Zijn er (gedocumenteerde) richtlijnen, aanbevelingen aanwezig voor de verschillende stappen van het inkoopproces? Doet iedereen zijn werk op dezelfde manier?
Staf en training	In hoeverre wordt er geïnvesteerd in training van de staf?
Performance en management info	Wat weet je van aanwezig performance indicators en wat vind je van deze indicatoren? Worden de resultaten hiervan gecommuniceerd naar de afdeling en naar het hoofdinkoop? Worden deze resultaten geëvalueerd? Welke performance indicatoren worden er gemeten?
	Welke management informatie heb tot je beschikking? Wat wil je dat er gemeten wordt?
ICT	In hoeverre is het operationele inkoopproces momenteel automatisch? Is er een e-procurement system voor decentrale bestellingen? (GHX) Vind je dat dit goed werkt?
Structureren	Wordt er onderscheid gemaakt bij het inkopen van standaard producten tegen lage kosten, lage technische complexiteit en hoge frequentie versus technisch complexere producten met een lage frequentie? Ziet dat inkoopproces er anders uit? Denk je dat dit nuttig is? Dus duidelijke richtlijnen over hoe zulke producten gekocht worden en focus lange termijn relaties met leveranciers om overstap kosten te minimaliseren.
	Is het inkoop proces voor diensten anders dan voor goederen? Meer gedetailleerde specificaties, een match met in-house capabilities?
Portfolio and sourcing	Wordt er gebruikt gemaakt van een purchasing portfolio, zoals de matrix van Kraljic, om de juiste strategie en benadering van de leverancier te bepalen?
	Wordt er door de inkopers bewust een afweging gemaakt om juist lokaal of globaal in te kopen en hoe dan?
	Wordt er bewust een afweging gemaakt om te in- of outsourcen?
Managing leveranciers en contracten	In hoeverre wordt markt onderzoek uitgevoerd, door wie? Kom je daar aan toe bij het lab? Komen interne klanten vaak al met een leverancier, vind je dit zinvol?

	Heb je het idee dat er nu met te veel, genoeg of te weinig leveranciers zaken wordt gedaan? (algemeen en het lab?) Houden jullie bij hoeveel leveranciers er zijn? Vindt actieve reductie plaats, door wie en op basis waarvan?
	Hoe verloopt het sluiten van contracten? Zijn voor de top 20% leveranciers alle contracten gesloten, of zijn er ook prijsafspraken?
	Ben je bij onderhandelingen met leveranciers er van bewust wat voor type product je koopt en hoe je de onderhandelingen het best kan laten verlopen?
	In hoeverre bestaan er lange termijn relaties met geselecteerde leveranciers? Zijn er lange termijn contracten en raamcontracten? Wordt hiermee de vraag van interne klanten gebundeld?
	Wordt contract management uitgevoerd, door wie? Bijhouden van veranderingen in contracten, monitoren spend en performance contract, end date etc. (dus contracten worden vast gelegd, % op papier?)
	Worden dergelijke gesloten contracten ook gecommuniceerd naar de interne klant?
Communicatie	Hoe is de communicatie met interne klant/ondersteunende diensten/leverancier en intern? (frequent, helder, open)
Interne marketing	Hoe verloopt het contact met interne klanten? In hoeverre is er afstemming met de interne klant over wensen, hoe verloopt die communicatie?
	Is de interne klant goed op de hoogte van inkoop beleid en processen; weten ze jullie te vinden, hoe wordt de bereikbaarheid ervaren? Welke wegen zijn er (intranet)
	Worden jullie vroeg genoeg betrokken bij het inkoopproces door de klant? (als het om grote, complexe aankopen gaat?)
Control & Evaluatie	Hoe worden levertijden in de gaten gehouden? (Wie doet dit?)
	Lukt het om goed te plannen met de inkoopafdeling, zien jullie grote projecten en aanbestedingen aankomen en kan je hier op inspelen? Of overvalt het alsnog ook al is bekend dat een interne klant er mee gaat komen.
	Wordt er een vendor rating uitgevoerd, hoe gaat die ongeveer in zijn werk? Is dat zinvol voor inkopers (van het lab?)
	Wordt de interne klanttevredenheid gemeten, hoe? Is dit informatie die bruikbaar is voor de inkopers?
	Wordt er regelmatig een spend analyse uitgevoerd, hoe worden de resultaten gebruikt? Welke bruikbare informatie krijg je hieruit als inkoper?
Praktische punten lab	Zijn er dingen die je als inkoper wel moet doen maar die niet echt bij je functie horen en je liever niet doet? (telefoontjes, problemen met facturen etc.)
	Lukt het om aanbesteden te bij het lab? Bv. chemicaliën?
	Werken jullie met veel 'dozenschuivers' zoals BioConnect?
	Is er een grens (urgentie, monetair) waarboven de inkoper benaderd mag worden door interne klanten? Zou je dit willen?
	Zijn er duidelijke kaders waarbinnen je je functie uitvoert, wordt hier op toe gezien, is dit gedocumenteerd?