

Managing the surplus materials by enhancing the purchasing performance in an apparel manufacturing company

Vy Pham



Author Vy Pham	
Degree programme International Business	
Thesis title Managing the surplus materials by enhancing the purchasing performance in an apparel manufacturing company	Number of pages and appendix pages 74+1
<p>This is a research-based thesis which examines a practical purchasing issue of the commissioning company. The case company operates in the apparel industry being a garment manufacturer in accordance with its client's requirements. The company has been facing a problem with overpurchased materials, which leads to additional costs of purchasing, inventory and disposal. This situation involves purchasing and work study department. Work study function is responsible for calculation of material consumption which is employed by purchasing department as material to determine the purchase quantity. Overcalculation results in over-purchasing of the materials. This thesis is expected to improve the situation by helping to enhance purchasing's performance and suggest efficient ways to handle the surplus items.</p> <p>The theoretical section looks into the conceptual contents related to purchasing practices, collaboration between different internal functions and the surplus disposal methods. Sufficient purchasing and minimizing the amount of surplus materials can be achieved by enhancing the efficacy of purchasing process. Better collaboration improves on the outputs of purchasing activities. However, surplus material is inevitable. Therefore, the method to dispose surplus also needs investigating. These theories will be the foundation for empirical analysis and discussion to be built around.</p> <p>The thesis is analysed in a qualitative manner. Data is obtained through primary research including personal interviews and company report along with desktop searching for journals, articles, textbooks and other web-based resources.</p> <p>After analysing the current situation of surplus materials, the author suggests some feasible ideas to improve on the purchasing process, encourage the interdepartmental collaboration and three options to dispose the surplus material efficiently.</p>	
Keywords Purchasing Function, Purchasing Process, Surplus Disposal, Economic Order Quantity, Interdepartmental Collaboration, Apparel Industry	

Table of contents

1	Introduction	1
1.1	Background.....	1
1.2	Research Question	2
1.3	Benefits.....	3
1.4	Demarcation	3
1.5	Definition.....	4
1.6	Case Company	5
1.7	Thesis Structure.....	5
2	Literature review.....	7
2.1	The Theoretical Framework in details	7
2.2	Purchasing Function	8
2.2.1	The importance of purchasing.....	10
2.2.2	Purchasing Process	16
2.2.3	Economic Order Quantity (EOQ).....	22
2.3	Interdepartmental Collaboration	24
2.3.1	Purchasing's collaboration with other departments.....	25
2.3.2	Collaborative issues	28
2.3.3	Developing the interdepartmental collaboration.....	29
2.4	Surplus Management.....	31
2.4.1	Surplus Definition	31
2.4.2	Sources of material surplus.....	32
2.4.3	Surplus Disposal	33
3	Research Methodology	38
3.1	Qualitative Research.....	38
3.2	Research design	40
3.3	Interview	41
4	Empirical Findings.....	44
4.1	Purchasing Process of the company	44
4.1.1	The purchasing process in details	44
4.1.2	Calculation of order quantity.....	47
4.2	The situation of leftover in 2018	48
4.2.1	How company keeps track of leftover	49
4.2.2	Leftover situation.....	50
4.3	Reasons for excessive purchased materials	53
4.3.1	External liability	53
4.3.2	Internal liability	55
4.4	The consequences of over-purchased materials.....	58

4.4.1	To the company	58
4.4.2	To the environment	59
5	Discussion.....	61
5.1	Recommendations	61
5.1.1	Purchasing	61
5.1.2	Interdepartmental collaboration	62
5.1.3	Surplus Disposal	63
5.2	Research limitation	64
5.3	Suggestions for further reading	64
5.4	Personal learning	65
References	67
Appendix 1.	Interview questions for Purchasing Manager	75
Appendix 2.	Interview questions for Purchasing Staffs	75

1 Introduction

This chapter aims to generalize a coherent and detailed understandings of the thesis setting including the primary concepts and problem introduction. In this section, the author will cover the general research background, demonstrate the research question, specify its benefits, set the demarcation, explain some basic concepts as well as introduce the case company.

1.1 Background

Supply chain management (SCM) refers to the act of managing all operational undertakings to ultimately serve the end customers. On that account, it encompasses most of corporate functions such as marketing, production, purchasing, logistics. SCM is perceived as the holistic approach which requires to be carried out to initiate a world class culture and in fact maintain economic evolvement. (Quayle 2006.) The short-term purpose of SCM is to enhance productivity, optimize the inventory and diminish lead time. The enduring strategic objective of SCM is to add to the gratification of the consumer, secure market position, and increase financial gains for the stakeholders of the organization. In order to be aware of these goals, the purchasing function, which involves activities taken across functional boundaries, must be recognized as a key connection between the supply sources and the company. (Wisner & Keah 2000.)

Purchasing plays an important role in the supply chain since the supply chain begins with the raw material acquisition and the process to obtain these materials. The supply chain then extends from these items through various proceedings and being sold to the consumer as a part of the final commodity. Purchasing is expected to be responsible for the disposal of waste which occurs in the process of producing the traded goods. Businesses have come to realize the role of supply chain as a core and crucial entity and shift their focus towards the effectiveness of the supply chain. Some business organisations recognize that in order to survive, the supply chain needs to enhance the optimization of general costs since purchased commodities constitute towards 80% of net sales. (Quayle 2006.)

The thesis looks to discuss some aspects in purchasing field using different key performance indexes (KPI) given by the case company such as: on-time tracking (OTT), air freight, sales, cutting and making charge (CM/FOB), earnings per minute (EPM), leftover, and so forth. In the first half of 2018, the garment firm had faced an issue of excessive amount of purchased material. This leads to over-expense to keep it in warehouse or destroy it. This thesis will help them to solve the problem and improve the current situation.

1.2 Research Question

This thesis aims to reduce the amount of over-bought material by giving suggestions to enhance the purchasing function based on theoretical assertions.

The company has been facing the issue of excessive quantity of materials being purchased by purchasing department. High ratio of leftover leads to lower earning per minute (EPM) in the selected accounts. In addition, the material is either being kept in the warehouse for next-season usage or destroyed. This may cost the company a lot to maintain the quality of material or to dispose them. In short, the problem here is buying more of what is needed.

Addressing the problem as stated above, the thesis research question is **How to manage the amount of surplus materials by the purchasing performance of the commissioning company**. Research question is divided into four investigative questions (IQ) as follow:

IQ 1. What is the purchasing process of the case company & how is the purchase volume decided?

IQ 2. What are the reasons accounting for the exceeded amount of purchased materials?

IQ 3. What are the shortcomings of having excessive material surplus?

IQ 4. How to improve the current situation of material surplus purchased by the case company?

Table 1 below presents the theoretical framework, research methods and results chapter for respective investigative questions.

Table 1. Overlay matrix

Investigative questions	Theoretical Framework	Research Methods	Results (chapter)
IQ1 What is the purchasing process of the case company & how is the purchase volume decided	Purchasing process Economic Order Quantity (EOQ)	Company's interview	Chapter 4.1
IQ2. What are the reasons accounting for the exceeded amount of material wastes?	Purchasing process Interdepartmental Collaboration Sources of surplus	Company's report and interview	Chapter 4.2 Chapter 4.3
IQ3. What are the shortcomings of having excessive material surplus?	The importance of purchasing Surplus Definition	Company's report and interview	Chapter 4.4
IQ4. How to improve the current situation of material surplus purchased by the case company?	Economic Order Quantity (EOQ) Surplus Disposal Interdepartmental Collaboration	Author's observation and suggestion	Chapter 5.1

1.3 Benefits

The commissioning company is one of the pioneering apparel exporters in the operating country. In two quarters of 2018, the company has been facing a problem of a big amount of leftover including raw material and final goods, which costs the company lots of money to preserve or to destroy. The result of the thesis is to resolve the problems with the surplus by applying some theoretical concepts to enhance the purchasing process and suggest the better way to deal with the surplus materials. Cost-saving is always one of the priorities in the managerial level. In this company's case, higher level of surplus materials leads to lower earning per minutes (EPM). Therefore, minimizing the quantity of material surplus helps them to achieve better EPM and then better profit.

The author believes that conducting this thesis helps her to gain better understanding and more profound knowledge about purchasing function and other aspects associated with supply chain management in general. In addition, this research also enlightens the author with new insights into purchasing collaboration with other departments and disposing surplus. It may be useful for the author in the near future of working in any companies as a purchaser. Moreover, the author manages to enhance her skills of researching, summarizing and analysing through the study of books, journal, intellectual articles and garnered data of the commissioning company. The thesis facilitates the writing and problem-solving skills which are beneficial for the author in any other academic projects in the time to come.

1.4 Demarcation

There are a lot of factors which explain the excessive materials of the commissioning company. These factors are divided into two major categories: objective and subjective.

Firstly, some of the reasons are the objective ones, which means most of it comes from the outside organizations (suppliers), such as: quality, quantity, late delivery, minimum order quantity (MOQ) and so forth. My thesis is going to focus on the subjective reasons which are from the company itself or to be specific, its purchasing process. Therefore, the thesis will not mention the theory of supplier relationship management as well as supplier selection.

In the company, the purchasing staffs receive data of a quantity of material to be procured from the other department called Work Study Department (WS), which is referred by other

companies as Research and Development department. Since it is an enterprise manufacturing the garments for their clients, the material includes different things such as: fabric, thread, zipper, hanger, carton box, plastic bag and tag. The WS department will first calculate an amount of fabric or thread are used to sew clothes then send the figures to the purchasing staffs. Therefore, WS department is also responsible for the extra amount of materials purchased. However, this thesis will focus on the role of procurement department only and try to find the solutions which helps to improve their operating process.

In the aspect of the theoretical approach, minimizing the wastes through the **lean** method is somehow considered and used a lot in many theses of related topics. However, it is mostly applied the manufacturing process therefore it is somehow irrelevant for this thesis, which only concentrates on the purchasing entities.

1.5 Definition

Procurement involves all essential undertakings which focus on the product transition from the outside organizations to the determined place inside firms. It covers the purchasing function, inventory, logistics, inspection, and quality management, facilitating firm's decision to select the right suppliers in regard to the total cost of ownership. (Weele 2010.)

Purchasing function refers to an internal business process of acquiring needed commodities from the outside organizations. Purchasing function involves sourcing and supply activities in which purchasing function is responsible for supplier's interaction, ordering and ensuring the continuity of the items' supply. (Weele 2010, 8.)

Surplus materials are materials that are regarded as the excess to the operational purposes. Those materials are considered to be unnecessary in the business process. (Chunawalla 2008, 236.)

Purchasing performance indicates how effective the purchasing function has performed based on the predetermined targets using least possible resources (Weele 2010, 60.).

Total cost of ownership (TCO) consists of the original cost of the item, the production costs, accounting, tutoring, repairing and insurance costs, together with taxes depending on the item's value. (Burt & Pinkerton 1996, 66.)

Enterprise Resource Planning (ERP) is a system which integrates all the core activities required for company to operate including: accounting and finance, human resources,

production, logistics, inventory, procurement, and so forth. Typically, an ERP system offers intelligent, visible, analytic, and efficient solution to every facet of an operation. (SAP 2018.)

Earning per minute (EPM) refers to the profit company gains in every minute in the process of manufacturing the finished products. It is calculated by dividing the total contribution margin to the standard minutes to produce one garment. (Company X 2018.)

1.6 Case Company

The commissioning company (referred as “X”) is one of the pioneering apparel exporters in Y country. It was established in Y country in 1994 with 100% foreign investment. In 2017, the turnover of the company was 175 million USD with more than 8400 staffs across 7 locations and 130 production lines. In 2017, the company produced over 60 million pieces of garments. Procurement of raw material accounts for one of their biggest costs in the financial year. (Company X 2018.)

The company offers three product ranges as: adult knitwear (active and casual), intimates and woven shirt along with children knitwear (active and casual). The company is doing business with more than 12 giants in the fashion retail industry. It is an independent contractor which manufactures clothes for its clients based on the received orders.

In the first two quarters of 2018, the company has been facing a problem of excessive left-over quantity. There are two major kinds of purchased material including fabric and thread. The company has set the limit number for the leftover, which is 0.5% of their revenues. However, in most selected accounts, the leftover ratio has risen up to 2-4 percent of the respective net sales. The leftover costs the company lots of money to keep it in warehouse or to destroy.

1.7 Thesis Structure

The thesis is composed of 5 chapters in total including: thesis’s introduction, literature review, research methodology, empirical results, and discussion. At the end of the thesis, the author also includes sources for reference and discloses relevant appendixes.

Chapter 1 represents the general background for the thesis, introduction of case company, research problems and question, boundary of the thesis and key concepts explanation. In the chapter 2, the primary theoretical concepts are explained and analysed. In the literature review chapter, the author looks for prior intellectual conceptualization, perception, analysis

and assertions from various researchers and practitioners. Chapter 3 demonstrates the thesis methodology and discusses systematic approach to gather essential data. Chapter 4 is the crucial chapter in which the empirical results are presented and analysed. The outputs of chapter 4 are used as the materials for the following chapter (chapter 5). In the last chapter, the summary of the key findings, recommendations looking for improving the given issues of the commissioning company are highlighted. Furthermore, the author will talk about the limitation of the thesis as well as her suggestions for further research and reading on the related topics. In addition, personal reflections of learning after conducting the thesis is also expressed. The overall structure including major content of the thesis is visualized by the following figure.

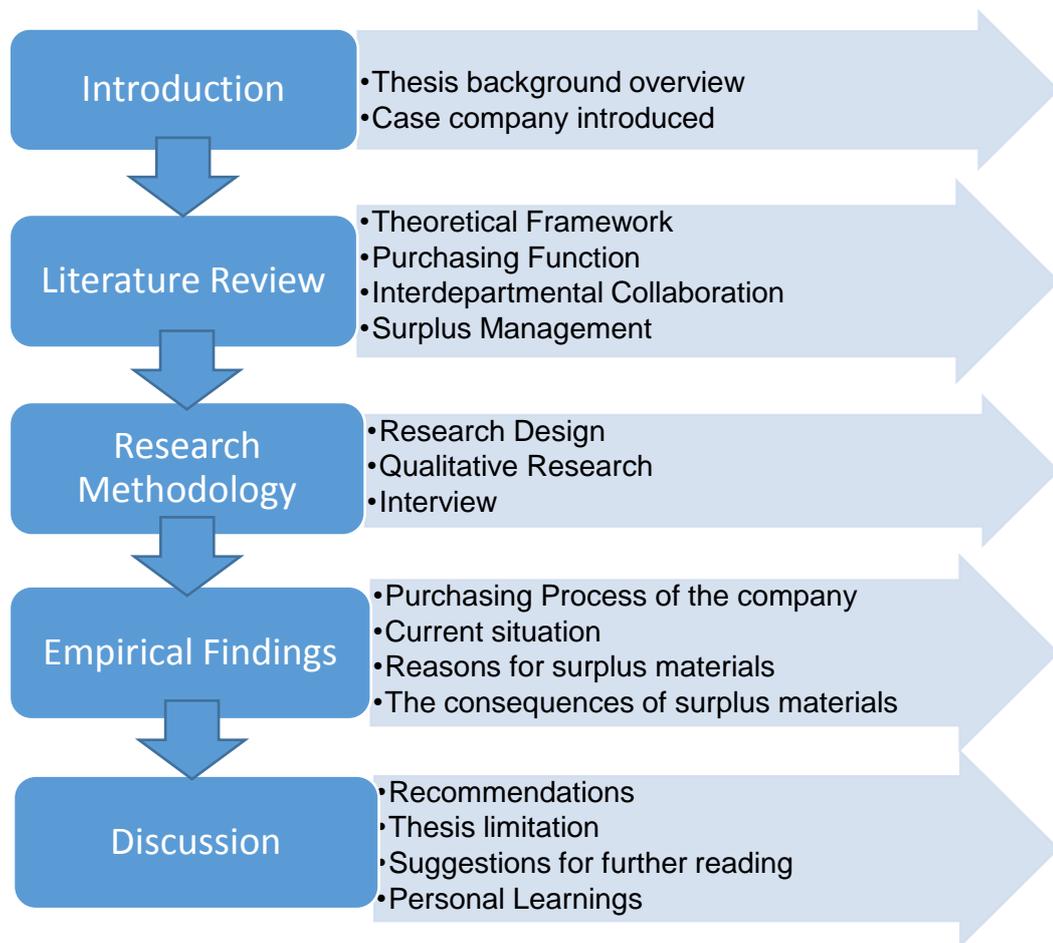


Figure 1. Structure of the thesis

2 Literature review

The literature review builds a platform for an overall comprehension of a specific academic entity which covers or determines the research of the concern (Wotela 2016.). This chapter gives an explanation of the theoretical approach to the research problems based on three major theories: purchasing management, interdepartmental collaboration and surplus management. With a purpose of enhancing the situation of overbuying the required items, the needs of optimizing the purchase quantity and handling the excessive surplus on ad hoc basis are concerned. The author will tap into different professional sources to explain in details the theoretical framework. Published papers such as books, research and journals are primarily used to avoid the information invalidity and any suspicions of false knowledge. The textbooks offer the literature reviews and interpretation of the specific topic whereas specialized journals deliver the practical illustration and implementation of such concern in real-life scenarios (Wotela 2016.).

2.1 The Theoretical Framework in details

Theoretical framework which facilitates the explanation, analysis and interpretation of research outcomes is the key contributor to any kinds of intellectual research (Wotela 2016.). The theoretical framework is visualized as the following figure.

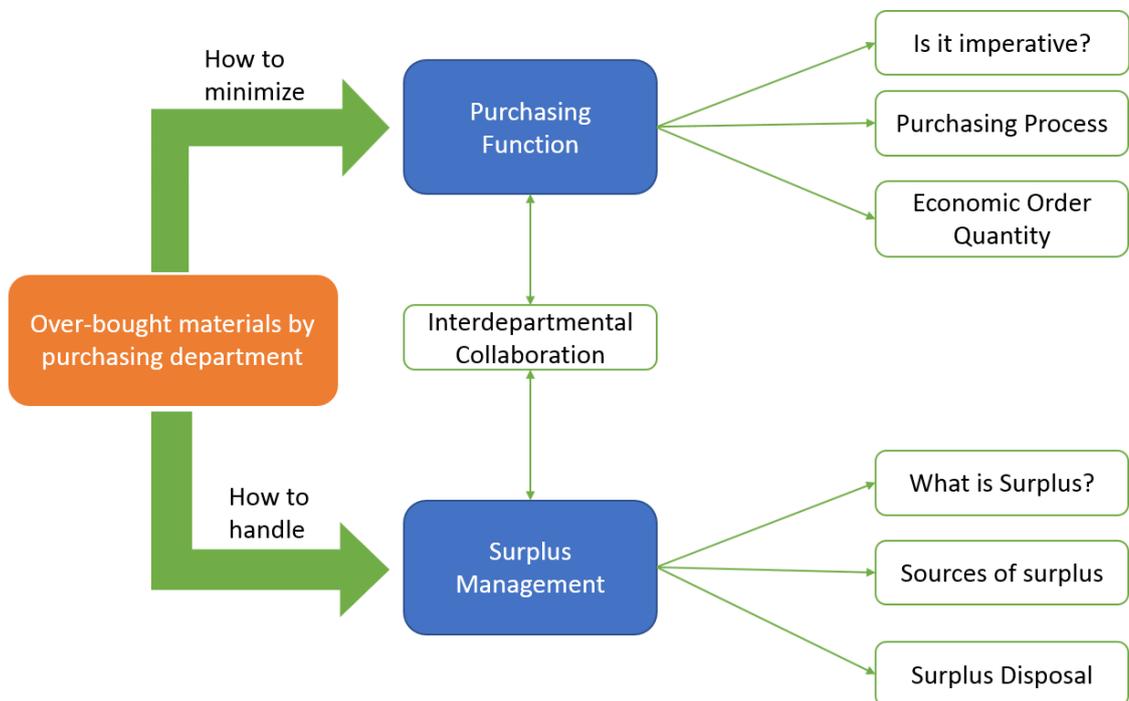


Figure 2: Theoretical Framework

Figure 2 demonstrates the overall theories used to improve the circumstance of excessive material being purchased by the case company. Purchasing department is responsible for buying materials and components for production. When the purchasing staffs purchase what is more than required, they have to take care of the excessive items. Accordingly, the thesis framework is composed by two distinguished dimensions: prevention of the situation and handling it.

Firstly, the efficient purchasing (chapter 2.2) will help to minimize the amount of material surplus. As far as the theme of this thesis is concerned, the purchasing concepts will be thoroughly explained in this chapter. The author will discuss three crucial aspects (3-hows) related to purchasing as:

- how important purchasing activities are to a firm (chapter 2.2.1)
- how to do it by addressing the purchasing steps (chapter 2.2.2)
- how to calculate the order quantity (chapter 2.2.3)

Normally, purchasing department has to work with other internal functions in some related fields on daily basis. Unsuccessful collaboration leads to lower performance of purchasing employees. Therefore, the author will discuss the interdepartmental collaboration in chapter 2.3, including: purchasing involvement with internal functions (chapter 2.3.1), collaborative issues (chapter 2.3.2) and suggestions to enhance the collaborating performance of the purchasing department by with other functions in an organization (chapter 2.3.3).

Finally, surplus management (chapter 2.4) gives a comprehensive approach to handle the lavish amount of material. The author will explain the term “surplus” in an academic context (chapter 2.4.1), where material surplus emanates from (chapter 2.4.2) and present some suggestions for disposing surplus from theoretical findings (chapter 2.4.3).

It is important to keep in mind that this thesis refers to the involvement of purchasing department in those areas. Overbought materials may become a source of waste and cause some inventory-related issues. Hence, various departments may get involved in this situation, especially those who take part in material and resources management activities such as: logistics, inventory, manufacturing and waste management function.

2.2 Purchasing Function

According to Monczka et al. (2011), the early stage of purchasing history was before 1850 as Charles Babbage (1832) dedicated to the importance of purchasing in his book. It was low-key developed from 1900 to mid-1960s. From mid-1960s to late-1970s, purchasing

gained more attention from the academics and practitioners in the era of material management's development. In the article "Strategic purchasing: A history and review of the literature", two authors - Ellram and Carr (1994) demonstrate the advancement of purchasing concepts in the academic setting. In early years of 1970s, purchasing's role was recognizably embedded in the marketing sector and was a clerical function affirmed by Ansoff (1974). The 1980s witnessed the change in the insights into purchasing's contribution to the organizational strategy as many authors and companies began to realize the greater benefits of purchasing function to business operation. A finding from Trent and Monczka (1998) points out the significantly increasing involvement of purchasing activities in a span of 7 years in the 1990s. Ever since, there have been lots of research, discussions and books regarding the purchasing topics. So what purchasing is about?

Purchasing is a functional cooperation (Monczka et al. 2011, 30.), a managerial (Aswathappa & Bhat 2009) and a core activity in business operation which refers to the process of acquiring essential materials, machine, services (Wisner et.al 2012, 39.) "of right quality, in the right quantities, from the right source, at right time and at right price" (Chunawalla 2008, 13.). Purchasing is divided into 2 groups: mercantile buying and industrial buying (Chunawalla 2008, 10.). Referring to the first category, merchants (wholesalers and retailers) purchase materials in bulk from the third parties and sale it to their customers. While industrial buyers procure raw material and/or components for transfiguration intention (Wisner et.al 2012, 39.). In this thesis, the author will focus on industrial purchasing since the case company plays a role of an industrial buyer.

Despite having similar meaning, purchasing is distinguished from procurement in business operation as Michael Porter (1998) claims that the idea of "purchasing" tends to be more narrowly expressed (Barnes 2001, 54.). This is also supported by Weele (2010) (see figure 3). Whereas, some authors (Novack & Simco 1991, Rajagopal & Bernard 1993; Monczka et al. 2011, 30; Allal-Chérif & Maira 2011) have the tendency to use the terms "procurement" and "purchasing" interchangeably in their papers. Wisner et.al (2012, 40) state that many corporations are now still using these terms identically since it is hard to tell exactly where purchasing activities eventually end. Notwithstanding, procurement involves more activities from the downstream value chain of supply chain management such as supplier's follow-up and logistics undertakings. The common usage of "procurement" is within government agencies as usually expressed as "public procurement".

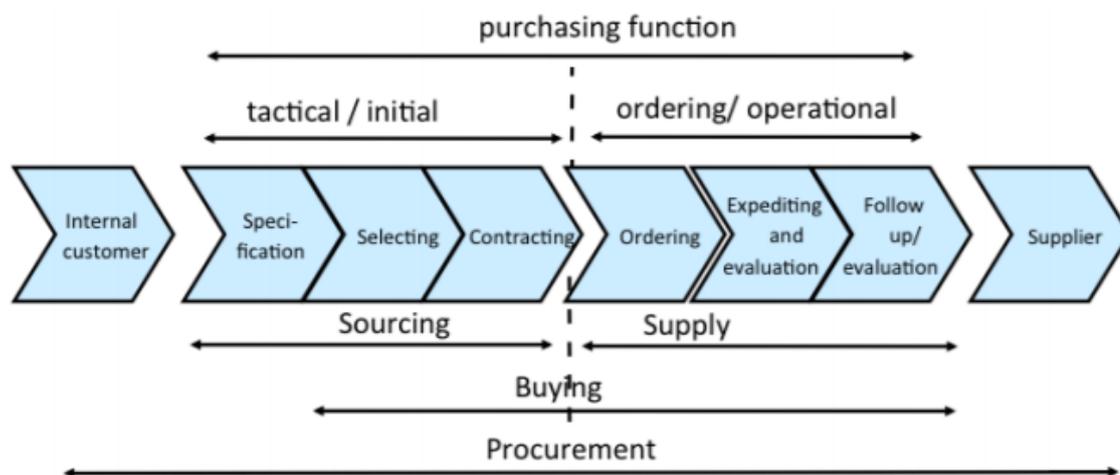


Figure 3. Procurement and purchasing concepts (van Weele 2010, 9.)

Figure 3 shows the distinguished features between purchasing and procurement provided by Weele (2010). The purchasing activities are included in the procurement process. The connotation of “Procurement” encompasses additional material and resources management activities such as inventory control, quality inspection, material collecting and storing (Aswathappa & Bhat 2009.). Procurement process travels across both functional frontiers (intrafirm) and organizational frontiers (interfirm) and fails to be successfully executed without sufficient involvement from both ends (Novack & Simco 1991). On the other hands, purchasing performs as an intrafirm function.

2.2.1 The importance of purchasing

Throughout the history, purchasing has been developed from being an administrative work (early 1900s) to a tactical function and now is proved to be strategic. One of the main reasons for the enhancing role that purchasing plays is globalization of business from late-1970s in which the competition between firms intensified rapidly. Firms no longer exchanged views on “as lowest as possible” price but discussed total costs, cost-cutting and life-circle costs with their suppliers. (Tate 2013, 2-4.)

Concerning the focus of this thesis, the author will demonstrate the importance purchasing is to an organization including three essential points: (1) its strategic role, (2) its influence on cost-saving and (3) its involvement in waste management. The first two points refer to the operative benefits whilst the last one highlights the purchasing’s role in environmental perspectives.

1. The strategic role of purchasing

Back in late-1990s, there were lots of debate on whether purchasing is indeed a strategic function - one that can create value - to an enterprise while purchasing was long perceived as an organizational backwater: needed but not-so-pivotal (Sherkin 1999.).

Ellram and Carr (1994) studied the strategic role of purchasing based on other authors literature findings (conceptual and empirical study). The article refers to 3 different aspects related to purchasing strategy including: major issues of purchasing strategy, how it supports the company's strategy and how firms use it as a strategic function. The authors concluded on their research that purchasing held a key to the strategic success of an organization. Many firms claim that purchasing is an added-value function as it is involved in product development and improves buyer-supplier relationships to a greater degree. Historically, the strategic role of purchasing was disregarded. However, the situation had been shifted dramatically as the internationalization and competition between firms got more intense as well as the development of information technology in business world.

Later, Carter and Narasimhan (1996) conducted a empirical study in attempt to answer the ultimate question: "is purchasing really strategic?". The outcome of this research was based on interviews with senior purchasing executives and 302 completed answers from 3000 questionnaires which were emailed to purchasing practitioners selected from the National Association of Purchasing Management (NAPM) database. The research has confirmed the critical role of purchasing function in creating competitive advantage and to the overall success of a firm together with pricing, positioning, and product design factors. "Indeed, purchasing has a strategic impact on the firm!". Interestingly, an empirical research conducted by Pearson, Ellram and Carter in the same year claimed that top management, other intrafirm functions, and more surprisingly purchasers themselves still did not think highly of purchasing's strategic role. However, purchasing function was in the way to attain its recognition and status among other functional areas and a strategic function to the firm (Pearson et al. 1996.).

In summary, purchasing was long viewed as a no-better-than back-room function supporting other ones. The traditional duty of purchasing department was to shop for commodity required by other functions at the possible lowest price. It served as a supplement in firm business operation. However, as business environment changed, the level of contribution of purchasing to organizations was redefined. Firms now more concentrate on product development, lead-time improvement, and cost-cutting to serve higher demand of the market. As a result, purchasing has developed from being a clerical and operative function to playing

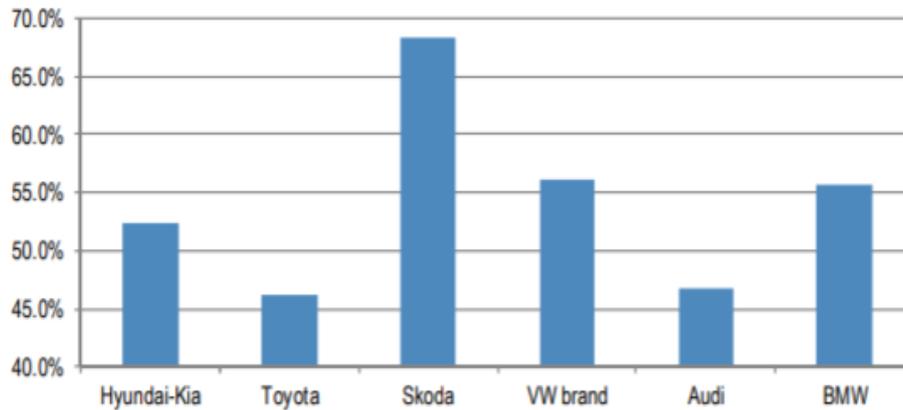
a strategic role that adds value and generates competitive advantages for businesses. (Úbeda, Alsua & Carrasco 2015.)

2. Purchasing and cost-saving

An empirical research conducted by Baier, Hartmann and Moser (2008) concludes that Chief Procurement Officers from high-performance companies view cost reduction as a number-one purchasing competitive priorities. They were asked to evaluate the eight different proposed elements of purchasing competitive priorities. Finally, three indicators accounting for highest percentage are selected including cost reduction, quality enhancement and product development.

Ellram (1992) discussed the involvement of purchasing in cost savings projects in her article, which analyzes the data from 515 firms surveyed. 77% of top managers which equals to 99% of respondents agree that purchasing function should be involved in such projects. Greater attention on harnessing cost, together with higher acknowledgement of purchasing-related expenditure, potentially encourage the purchasing function to take the center stage. The research's findings demonstrate that most purchasing departments are engaged in cost reduction projects as well as expected to be. The author also believes that the purchasing function will have a greater impact in those cost-saving plans of all kinds in the time to come. Van Poucke, Matthysens and Weeren (2016) through their empirical research prove that early purchasing involvement exerts influence on sourcing projects by its contribution on the improvement of cost-saving result.

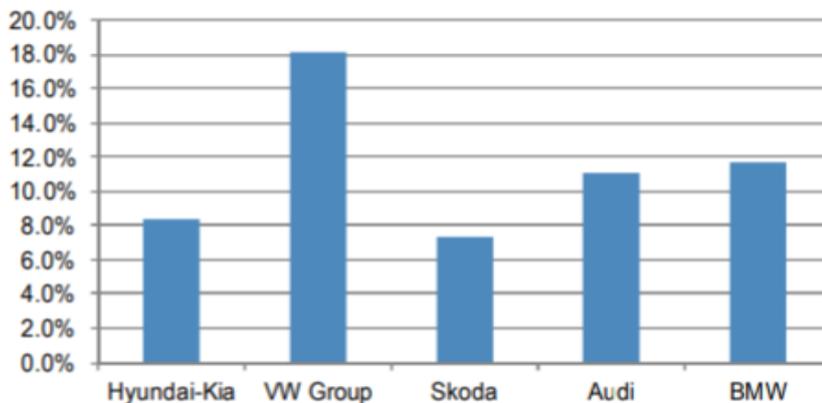
Nowadays, the footprint of purchasing on the firm's bottom line is very strong. It directly affects two forces driving the bottom line of an organization: costs and revenues. (Tate 2013, 4.) Purchasing department substantially spends more than 50 percent of all net sales of the firm. This signifies that for one dollar of sales income from selling products and services, over half is sent back to vendors (Monczka et.al 2011.). Firms have tendency to spend more money on materials and services buying than any overheads from other departments (Tate 2013, 5.). Below is the example of raw material expense from high-profile car companies as compared to labour cost.



Source: Company reports and J.P. Morgan estimates.

Figure 4. Raw materials as percentage of sales in financial year 2013 (Asumendi & Bhat 2014)

On J.P. Morgan Equities Research Reports (2014) about Volkswagen (VW) cost structure, there is a comparison on raw material costs as a percentage of revenues of various brands in 2013 between VW and its considered-to-be-biggest rivals, including Hyundai-Kia, Toyota, Skoda, Audi and BMW. It is noticeable that the biggest expense of these companies comes from the activities of acquiring raw material.



Source: Company reports and J.P. Morgan estimates. Note: VW figures are ex-Trucks.

Figure 5. Labor cost of sales in financial year 2013 (Asumendi & Bhat 2014)

Hyundai-Kia spends more than 50% of their sales on purchasing raw material while their average labor costs account for nearly 8.5%. Toyota has the lowest labor-cost ratio out of those six enterprises as reported at only 4.1%. However, the percentage of their material cost (46%) is over 10-times bigger than labor cost. The significant difference in the expense between raw material and labor comes from Skoda with 68% versus 7.3% respectively. None of these companies spend more than 19% of their net sales on paying their personnel.

It is apparent to understand why purchasing is without doubt a high-priority contributor in saving cost. Almost all organizations recognize that reducing expense from purchasing activities help to increase profits and return-on-investment better than any other attempts (Burt and Pinkerton 1996). Therefore, putting more emphasis on cost enhancement is a must and “core competency” to purchasing practitioners (Tate 2013, 5.) who on top of that should develop other essential expertise such as trading partnership, market supply and commerce insights, research and analytical know-how (Van Poucke, Matthyssens & Weeren 2016.).

3. Purchasing and its involvement in waste management

Green or environmental purchasing refers to the involvement of the purchasing function in supply chain management ventures to accelerate the 3Rs process which talks about materials reduction, recycling and reuse. (Carter, Ellram & Ready 1998.) Min & Galle (2001) defines green purchasing consists of environmentally-alerted procedures which support waste reduction, foster the recycling program and surplus reclamation, furthermore not to disadvantageously affect the functioning of acquiring the respective materials.

Min & Galle (1997) discussed the contribution of green purchasing in two categories including waste reduction and elimination in their empirical research. These two authors suggest that proper implementation of reducing material strategies which includes recycling, reusing, changing and harnessing source will possibly lesser the quantity or alternative waste created in the early stage of supply chain process. Purchasing helps to improve the efficacy of those strategies through various approaches such as:

- reducing the quantity of procured items which are uneasily disposed or environmentally harmful.
- minimizing the utilization of hazardous virgin resources by buying alternative materials that are more easily recycled or reused.
- calling for suppliers to reduce inessential packaging and use more environmentally friendly content

Purchasing spans over functional boundaries throughout the supply chain activities and involves in enhancing the effectiveness of firm's assessment of the environmental periphery for goods and process adjustment. It is noteworthy that reducing waste at the start of the supply chain cost less than disposing it at the end of the supply chain. Thanks to being involved at the earliest stage in an operation's material flow, purchasing is given the advantages of putting into practice the material reduction strategy. (Carter, Ellram & Ready 1998.)

Green, Morton and New (1996) exemplify the role of purchasing function in environmental management in the approach of suppliers management.

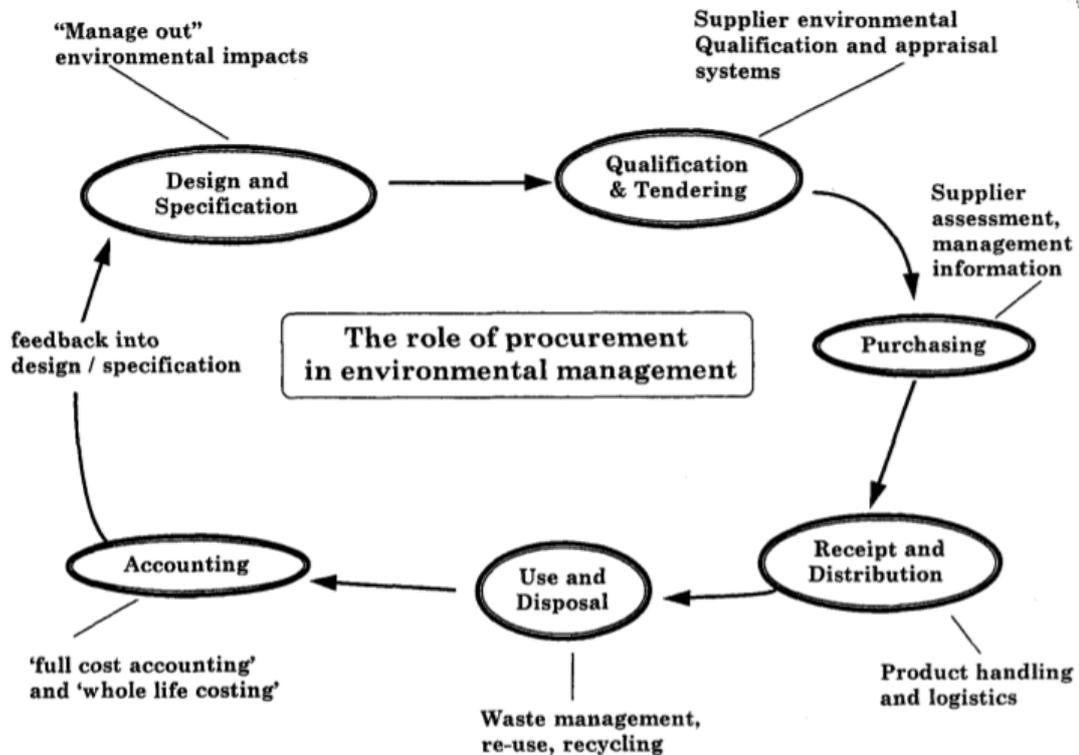


Figure 6. The role of procurement in environmental management (Green, Morton & New 1996).

Procurement has general influences on the overall activities of environmental program throughout a firm’s supply chain in various stages encompassing design/ specification, tendering, purchasing and distribution. Though it has been thought of that environmental management is carried out during the production stage in which material is used or later being disposed. In the purchasing stage, specific environmental standards are being assimilated into regulations and practices of purchasing function involving assessing supplier and managing information systems. These endeavours are carried out to keep in track the environmental performance of their vendors as well as its variation over time. (Green, Morton & New 1996.). Purchasing executives are now gaining more power in procurement specification modification with great knowledge and using alternative contents that are friendlier to the ecosystem (Carter, Ellram & Ready 1998.).

2.2.2 Purchasing Process

Van Weele (2010) views the purchasing process as an organizational system which directly involves tangible assets (personnel and apparatus) and intangible assets (methods, management) of a particular firm. It is functioned to handle the administrative tasks of the purchasing department and other associated departments, facilitates decision-making of the management, contributes in report-making of purchasing department and other ones.

There have been many research and conceptualizations of the buying process conducted by several academics. Historically, purchasing process has been documented and broken down in a variable number of phases spanning from two to 12 in multiple studies between 1967 and 1992 (Xideas & Moschuris 1998). In 1998, Xideas & Moschuris published an empirical research on purchasing structure in which purchasing activities are divided into four linear phases in combination with previous literature reviews. Each phase embodies a part of distinctive and noticeable endeavours explicated in the field research on six Greek enterprises. The purchasing cycle is concluded in four stages including:

- Initiation: issue the purchase requisitions, determine products' specifications, calculate price and estimate time to market, plot on buying.
- Finding: screen potential suppliers, revise of approved supplier catalogue, research on supplier.
- Selection: pricing strategies are concerned, decide on specification to opt on sources, apply the competitive bidding, assess suppliers' performance, place the purchase orders.
- Completion: order speed-up, manage contract, receive products and carry out inspection, audit and warehouse, issue to users.

Later, Van Weele (2010) has come up with a six-stage model of purchasing function involved in the whole procurement process (see figure 3). The details of completed purchasing process is described further by van Weele in the below figure.

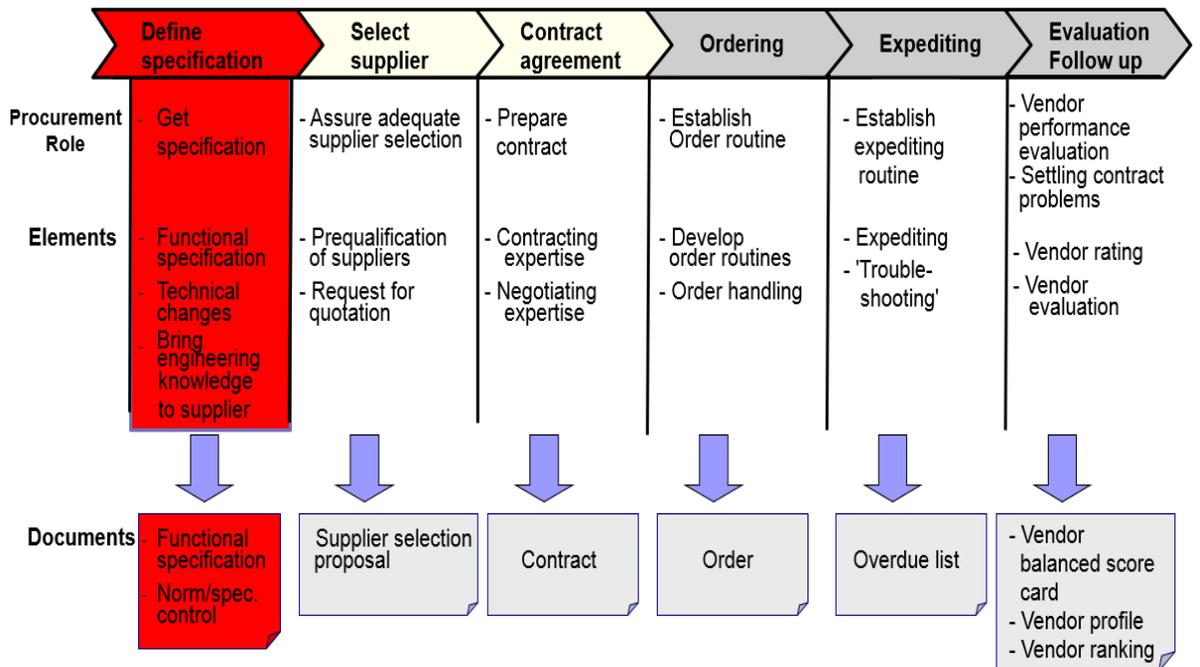


Figure 7. The purchasing process (van Weele 2010, 29)

According to van Weele (2010), purchasing process consists of six steps as: specification defining, supplier selection, contract agreement, ordering, expediting and further follow-up or evaluation. This linear process starts with data-collecting step to decide on the specific quantity and quality of the items need to be bought. Based on the information, purchasers then work on finding the best vendors. The third step includes the contract preparation and negotiation. After that, purchasing staffs then send the purchased orders to the selected vendors. The purchasers in addition are required to keep track of their supplier's performance to speed up the process if needed and later to conduct the evaluation on that.

The author will use the van Weele purchasing process model as a cornerstone for the analysis. Referring to thesis demarcation (see chapter 1.3), the first step (marked as red), which talks about specification definition, will be precisely and thoroughly demonstrated. The author will address the concept through two points: (1) explanation of term and characteristics; (2) the role of purchasing department plays in specification determination step.

1. Product specification

In the first step which is specification definition, purchasers determine what to buy to meet with all the requirements. Deciding on what commodities to be bought is the initial and one of the most pivotal endeavour in the purchasing process (Burt & Pinkerton 1996.). Specification is a detailed requirement of to-be-purchased products such as: the concrete features,

qualitative attributes, or expected outcomes, which is compulsory for a supplier to meet with in return for an award or contract (CIPS & NIGP 2016). Product specification is a core component which assists and creates guidelines for product enhancement in any manufacturers. In short, it refers to a documental set of requirements managing the design process. (Karlsson, Nellore & Söderquist 1998.). On the other hand, Nellore & Söderquist (2000) address that product specification has two connotations : narrow and broad. A narrow one is descibed as a set of document while a broader definition refers to the specification process. In the other way of saying, the more extensive connotation of specifications alludes to the written document together with the process from creating to sending such document. Rather than being considered as a “fixed document” which give orders to the supplier, the specification develops into a forum of “transferring knowledge between minds” (Burt & Pinkerton 1996.) in which firm conveys required characteristics of a product as well as essential design changes to their suppliers and vice versa (Karlsson et al. 1998).

Having regard to the content of specification, Nellore and Söderquist (2000) divide it into three respective categories:

- The first category is qualitative specification which includes the essential qualitative information. These are result of intrafirm development and are done internally as referred as insourcing.
- The second category is about quantitative specification. Firm obtains its full responsibility and access to develop these specifications accepting no changes or additional recommendation from the supplier (outsourcing).
- The third category refers to specification which consists of the equal amount of both quantitative and qualitative input. One party, either firm or its vendors, will initial the activity to develop the specification. The other party is later in charge of any adjustment or revision on that specification if needed (co-sourcing).

In accordance with van Weele suggested process (figure 6), product specifications are put into two categories: functional specification and technical specification or performance specification and design specification respectively (Burt & Pinkerton 1996, CIPS & NIGP 2016).

Functional specification gives a description of required product’s functionality as the purpose for using (van Weele, 2010.). It possibly consists of a declaration of the demanded attribute output of the commodity or may make rules of those least necessary features and patterns to be complied with on ad hoc basis. In the functional specification, the item is expressed and described in words its intended utilization rather than its tangible dimension. (Burt & Pinkerton 1996.) According to van Weele (2010), functional specification brings at least three benefits upon its usage. First, it leaves space for suppliers’ innovation. Thanks to this, suppliers develop their full potential to offer their expert skills and knowledge to their

customers. The second advantage is that functional specification encourages the utilization of innovated products and technologies. Finally, it generates a homogeneous merit which facilitates evaluation of all suppliers' offer.

Technical specification is a subset of documents which include guidelines for technical parameter and specific features of the product (i.e. technical drawings) coupled with proposed undertakings carried out by the vendor (i.e. schedule) (CIPS & NIGP 2016.). Firm should review and keep on updating the technical specifications' content at regular intervals (Burt & Pinkerton 1996.). The use of technical specification also brings three advantages as: the end user is ensured of the commodity's outcome; supplier's proposals are assessed objectively; easily select the suppliers in accordance with the required details of the specification (CIPS & NIGP 2016.). However, using technical specifications will complexify the management of purchase order (expediting and evaluation), which may result in cost increasing, delivery postponement, as well as dramatical escalation of costs to carry the inventory (Burt & Pinkerton 1996.).

According to van Weele (2010), functional specification and technical specification formulate the purchase order specification which usually consists of the following sectors:

- quality specifications: describe the product's conditions (quality and design satisfied) upon its arrival at the warehouse
- logistics specifications: specify the demanded amount expected date for delivery
- maintenance specifications: mention how suppliers keep the products in good condition
- legal and environmental specifications: remind the suppliers of health, safety and environmental rules which are obligatory to follow.
- aim budget: is the financial threshold offered for suppliers to provide the solutions. (van Weele 2010, 33.)

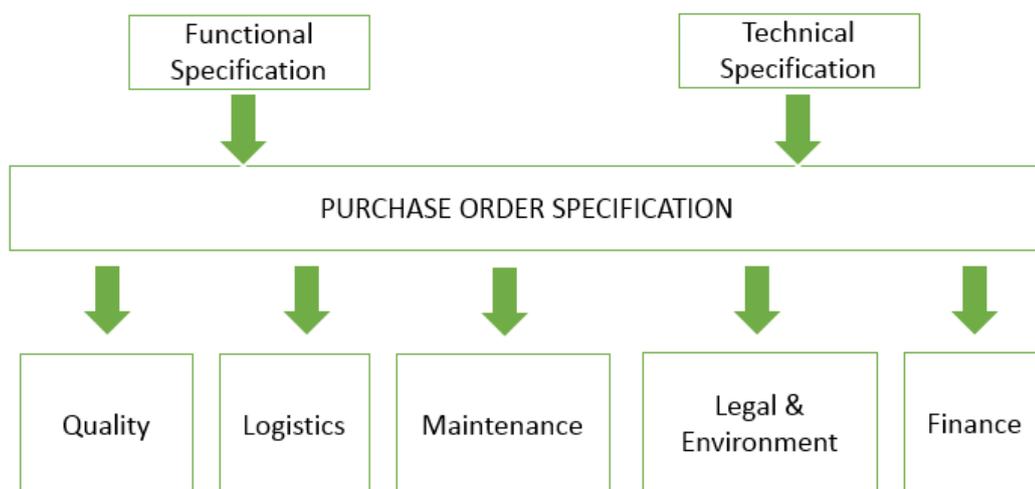


Figure 8. Purchase order specification

Figure 8 includes the respective types of specifications which together make up the complete concept of purchase order specification as explained on the previous paragraph. It is adapted from van Weele (2010) and illustrated by the author.

Karlsson et al. (1998) conducted an empirical research to explore the problems occurred in the specification phase. Concerning the technical content, suppliers claim that they encounter two contrary problems: the specification is either too little or too much. Sometimes specifications do not contain adequate information of desired characteristics of the product's outcome. This causes the delay in the operational execution of the design, which leads to cost increasing due to the extra time-consuming interpretation of incomplete specifications. In addition, vague specification leads to misunderstanding and possible conflicts between other departments within a firm. In contrast, the technical specification is sometimes over-specified, which contains too extreme or difficult requirements for suppliers to comply with. Too much or too little information on the specifications cause the supplier the risk of being tangled and wasting valuable resources. The main reason accounting for this is believed to be the lack of insights into what the different suppliers are capable of from the buyer's perspective. The research also addressed the issues regarding the product specification from supplier's point. The two biggest problems are associated with the changes in specification description and the interpretation of specification. This is a result of little to no communication between firm and its suppliers. (Karlsson et al. 1998)

2. The involvement of purchasing department in the specification process

Departments which are responsible for determining the product specifications varies for different cases. For instance, plant engineering is in charge of developing demanded apparatus. Administrative function provides essential office supplies, facilities, and other assistance. The decision of material or component selection for product development is such a tricky thing to do because it may trigger frequent conflicts due to contrasting concerns, preferences, and favouritism among many functions that are affected by the commodity's outcomes. As an instance, engineers possibly strive for design excellence while marketing department perhaps requires unusual and distinctive attributes. Moreover, operative function prefers already-in-use equipment which requires a small number of mechanics, as well as materials of high quality and easy usage. Purchasing department has favouritism towards buying ready-for-purchased contents from some reliable origins at decent prices. (Burt & Pinkerton 1996.).

In the past, purchasing was believed to contribute to the firm's success by two basic duties: to purchase the demanded commodities at as-lowest-as-possible price and ensure its on-time arrival on the company's warehouse. The purchasing's contribution is expanded to a greater extent by getting involved in the early stage of the design process (Burt & Pinkerton 1996.). One thing should be bared in mind that purchasing doesn't merge with the designing team but provides an ad hoc assistance to the engineers (Lakemond, Ferrie & Wynstra 2001). Burt & Pinkerton (1996) indicate two phases in design (specification) process to result in the final detailed specification along with the recognizable intervention of different departments in such entire process.

- The specification process starts with the investigative phase. In this phase, the team determines the desired outcome of the new product as well as project's objectives. These ideas need the Marketing's insights into the customer preference aligning with the organizational aims and capability. Purchasing and suppliers may provide data of innovation product developed by suppliers. Those may encourage the marketing and engineering staffs to assess new product potentiality. In addition, purchasing and suppliers can give the advices and recommendation about the price, applicability, market accessibility, quality of the interfirm supply which may build the new product.
- The second phase is laboratory phase in which builds the specific design of the desired attributes into the end product. There is a need to make sure that the wanted quality set by marketing in the previous phase will be achieved by the compliance of purchasing and manufacturing with the design guidelines. Purchasing should analyse the value suggested from suppliers, which helps to improve the performance and cut cost. Purchasing involves in revising the design as well as denotes the specifications' impact and items' availability on the inventory or to be purchased from suppliers.

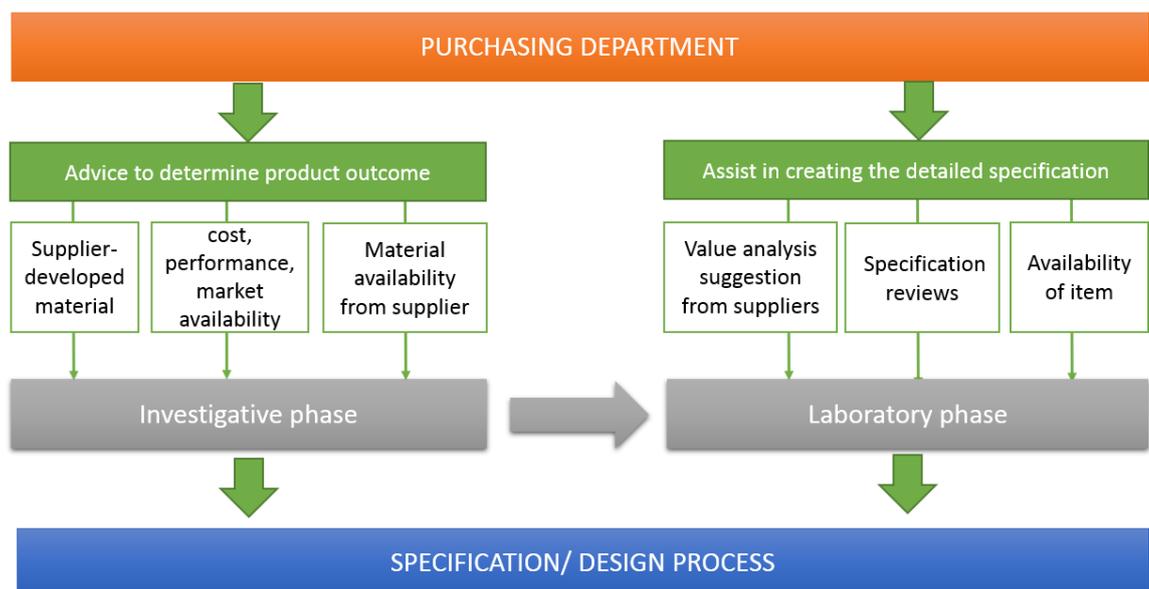


Figure 9. Purchasing's role in the specification process

The involvement of purchasing department is illustrated by the author in the figure 9. It is adapted from the book of Burt & Pinkerton (1996). It should be noted that this specification process from Burt & Pinkerton (1996) is used for new product development. In case of “old” or already developed product, firm tends to use the existing specification. In that situation, there is little or insignificant involvement of purchasing function to such process.

It is a must for purchasing function to assess and approve the proposed specification prior to sending to the outside firms. This helps to avoid possible miscomprehensions which might later happen in the process. In addition, it reduces cost for changing specification as well as the lead time of the engineering. (Karlsson et al, 1998.) Purchasing should make sure the prepared material requirements (a specification) are included for only necessary needs. It should not consist of any particular features which overly restrict the competition among selected vendors. (Burt & Pinkerton 1996.).

In a nutshell, the specification process requires the essential involvement of other departments such as Engineering, Marketing, Purchasing and Production. The involvement of purchasing in the specification process always reinforces firm’s productivity and potentially reduces the total cost of purchasing material (Ellram & Carr 1994.). In today business, purchasing is required to focus on end item more than merely the material in order to facilitate the product innovation, which calls for purchasing to merge with other functions within a firm (Trent & Monczka 1998.). In that sense, the effective communication, interaction and collaboration between different functions provides the platform to achieve the utmost outcome and best decision in creating product specification. Recognizing the importance of intrafirm cooperation, the author will hence elaborate on such interdepartmental partnership in detail on chapter 2.3.

2.2.3 Economic Order Quantity (EOQ)

Economic order quantity (EOQ) is a mathematical formula developed by Ford Harris in 1913 (Choi 2014.). The EOQ model introduced by Harris simply illustrates an inventory forecast and planning pattern which achieves a trade-off of the costs arising from ordering activities and inventory carrying endeavours (Tungalag, Erdenebat & Enkhbat 2017.). It determines the ideal amount for firm to order commodities, which helps minimizing the sum of inventory cost assuming some particular conditions (Choi 2014.). The EOQ is one of the most useful tools that a purchaser or an expert in controlling inventory may possess (Kimes 1984.).

The EOQ is functioned to continuously review and monitor the inventory level all the time and to calculate an exact order amount whenever the determined reorder point is reached.

In addition, the EOQ helps to specify the proper reorder point and the cost-effective reorder quantity to ensure the continuity of inventory level without any shortages occurring. The EOQ formula is a helpful tool for small-scale businesses, which facilitates the decision-making activities related to inventory level (how much to keep), purchasing quantity (how many to buy), and the ideal interval to order (how often to repurchase items) to serve the ultimate purpose of obtaining the lowest costs as possible. (Tungalag et al. 2017.)

Whereas the EOQ is unlikely to fit in all inventory circumstances, the majority of companies consider it as a useful tool in some operational areas. The EOQ should be put into consideration whenever the recurring procurement of a product or material happens. The EOQ is applied in purchase-to-stock philosophy and make-to-stock business model. (Piasecki 2001.) Kimes (1984) states that despite the allowability and inclination of purchasing department towards using the EOQ model, they are advised to use it solely for guiding purposes.

The EOQ is calculated based on assumption of a constant demand and the fixed-rate depletion of the inventory level. To this point, firm needs to receive an exact quantity of items to make the current inventory level go back to its original state. Due to the assumption of immediate restock, the problem concerning the shortages of inventory or related costs is excluded. (Tungalag et al. 2017.) Above assumptions are often credible for the end products of which the demand is independent and repeated in the same pattern (Arnold, Chapman & Clive 2008.). The EOQ is calculated based on the following formula:

$$EOQ = \sqrt{\frac{2Dc}{c_h}}$$

“D” is the demand rate or annual sold quantity of particular item. “C” stands for the cost associated with ordering activities. (Tungalag et al 2017.) These costs do not include the total price of the item but mostly associate with concrete activities carried out in order to acquire the item including the cost for creating purchasing order, approval phases, handling the receipt, quality inspection, invoice receiving, and supplier remittance. In many situations, a part of the inbound shipment cost is likely to be added. (Piasecki 2001.) “ c_h ” is the holding cost which accounts for the money firm spends to maintain the particular item in their warehouse. (Tungalag et al 2017.) The holding cost mainly consists of four different costs such as: on-loan interests, insurance based on total inventory value, any required taxes, and cost of storing item in a warehouse. Though the formula does not look complicated at all, to correctly generate the inputs of inventory and production data seems to be

more of a challenging task. Overcalculation of order costs and holding costs are typical errors, which results in the inaccuracy of the EOQ outputs. (Piasecki 2001.)

Plenty of Enterprise Resources Planning (ERP) software offers a built-in service to calculate the EOQ automatically. In that sense, the users have no idea of the calculation method, which leads to the inability of understanding the generated results and setting up the programme to harness the output. When the system is not functioning, the users merely pay no attention to. This possibly leads to an assumption from the ones poorly purchasing the ERP software that material planners and purchasers order items according to the system's output. Moreover, lots of enterprises find this inbuilt set-up inaccurate and required of customization due to the product diversification and process variation. (Piasecki 2001.)

2.3 Interdepartmental Collaboration

In today business, customers prefer more complex and innovated products and services. In order to catch up with the trend, firms are required to develop and introduce new products regularly to sustain their business. As a result, companies call for enhancing the rapport with their external forces. In addition, there is a need to attain close interdepartmental collaboration through which emphasizes collective aims and promotes the value of mutual communication.

Collaborating is defined as a commitment for co-working (Stank, Keller & Daugherty 2001) to achieve mutual benefits, which ultimately facilitate value-creating and innovation (Mattos & Laurindo 2015.). Interdepartmental collaboration touches on the rapport between departments within a firm, which brings attention to co-operation, mutual comprehension, joint vision, co-usage of resources, and common target (Kahn & Mentzer 1996). In the international economy, firms which manage to generate and maintain productive collaborations are placed in an advantageous position to improve their market standing in business's competition. Development of organizational process, system, hierarchy as well as competencies brings close the organizational and individual gap and facilitates beneficial partnership achievement, which generally promotes the active collaboration (Kanter 1994.). Collaboration is an intangible entity which is hard to manage by regulation or prolong without mutual endeavours and is interdependent to a high extent (Kahn & Mentzer 1996.).

As a purpose of generating firm's utmost value, it is essential to enhance the interfunctional collaboration due to its assistance in evolving sourcing decision, specifying what to purchase, vendors selection, deciding contract specifications, and managing suppliers rapport (Hartley et al. 2014.). A fruitful interdepartmental collaboration enhances productive

endeavours, stimulates expertise development, encourages confidence in cooperative partnership. Unsuccessful collaboration is expensive to the firms and their employees. It becomes a time-consuming and resource-wasting activity as well as decreases production capability. As a result, the future situation of inter-functional collaboration becomes unsure. (Tjosvold 1988.)

Regarding the scope of this thesis, the author will illustrate (2.3.1) the purchasing's collaboration with other internal functions, (2.3.2) some issues related to the cooperative relationship between purchasing and those departments and (2.3.3) ways to improve the collaboration.

2.3.1 Purchasing's collaboration with other departments

Majority of employees not only work directly with interfirm forces but also deal with intrafirm functions to bring forth commodities and provide required data. Purchasing is an internal function which purchases products, materials and services in fulfilment of its internal stakeholders' needs and requirements. Therefore, purchasing plays as an internal supplier which serves the needs of its internal customer; at a same time, being an internal customer, which is served by other departments. In addition, purchasing also interacts with external suppliers of an organization. Acting as an intermediary between suppliers and its internal customers, purchasing team plays the critical role in expediting the fruitful interfirm collaboration and interdepartmental liaison (Bedey et al. 2008.). Commonly, purchasing initiates the interaction with external organizations, which has a great impact on how purchasing performs duties for its internal customers (Wisner & Stanley 1999.).

The main internal customers of purchasing include accounting, finance, marketing, engineering and manufacturing department. Purchasing function contributes in delivering needed information such as: the status of purchase order, commodity details, supplier assessment and estimated cost analysis to its internal customers. Besides, purchasing procures raw materials or components for production activities. On the other hand, purchasing plays as an internal supplier to some departments such as waste management (surplus and scrap), logistics, warehouse and inventory. The finding points out that purchasing staffs have a tendency to communicate better and effectively with their internal customers than the internal suppliers. This issue takes place because the high levels of purchasing department have a perception of them playing an upper hand in the relationship with their internal suppliers. In some businesses, purchasing is given a power to harnesses some internal suppliers. (Stanley & Wisner 1998.)

It is imperative to determine the functional roles and duties of departments within a firm such as purchasing, production, research and development (R&D), logistics, marketing, inventory and finance. The employees should understand that the intra-organizational climate is collaborative, not competitive (Kahn & Mentzer 1996.). Departments are not independent but interdependent, which requires the joint effort to work together. Accordingly, purchasing activities do involve and relate to other departments.

Table 2. The interrelation of purchasing and other departments

Departments		Author (s)	Related findings
Internal Customers	Finance	Burt & Pinkerton (1996)	Finance department reviews on the purchased material value based on firm's pricing strategies, then decides whether it is economically feasible for purchasing to proceed it.
	R&D	Lakemond, Ferrie & Wynstra (2001)	Purchasing involves in the first stage of R&D process: specification in which purchasing provides cost estimation, equipment (See chapter 2.2.2) and engages supplier in the process. The more complex development project is, the more constant and deeper involvement of purchasing department is required.
		Bedey et al. (2008)	A fruitful collaboration between purchasing and R&D fosters better handling of materials in the later phase of the physical flow within a firm.
	Manufacturing	Fawcett, S.E. & Fawcett, S.A. (1995)	Purchasing department is responsible for buying materials for production activities, which is also purchasing's main value-added task.
		Vonderembse & Tracey (1999)	Well-selected suppliers by purchasing department and good relationships with them play a significant role in enhancing the firm's manufacturing performance.

	Marketing	Goebel, Marshall & Locander (2003)	Marketing provides purchasing department with important information such as: revenue forecasts, promotion campaigns, plan to develop new product and other joint endeavours. Purchasing updates suppliers' plans and purchase order following the marketing strategies.
		Williams, Giunipero & Henthorne (1994)	Improving the rapport with marketing function helps purchasing to enhance: forecast's accuracy, negotiation skills, internal and external customer service.
Internal Suppliers	Logistics	Fawcett, S.E. & Fawcett, S.A. (1995)	Logistics cooperates with purchasing staffs to ensure that the arriving time of procured commodity is in compliance with the schedule.
		Bedey et al. (2008)	Logistics provides the information of delivery schedule, inventory and capacity forecasts, together with shipping inter-space for purchasing to establish new supplier plans.
	Inventory	Monczka et al. (2011)	Warehouse department provides information about inventory level for purchasing to determine the reorder point and purchase quantity.
	Surplus Management	Smith (1956) Chapter 2.4.3 (Surplus Disposal)	Purchasing department is in charge of disposing surplus and obsolete resources to other organizational units, sending back new material to suppliers and eventually, for the trade of resources no longer in used.

Table 2 indicates how purchasing relates and affects other departmental operational undertakings within a firm. It stresses on the importance of the collaborative activities between purchasing and other internal functions. Generally, the purchasing function operates as an internal middleman which assists intrafirm activities in the overall value-added process in order to enhance forecast's accuracy as well as establish errorless and feasible schedules (Bedey et al. 2008). On daily basis, purchasers communicate with their colleagues across

the functional boundary verbally, through documents or virtual platforms. An empirical research by Wisner and Stanley (1999) points out that the communication between purchasing and its internal customers (finance, accounting, marketing, engineer and operations) is mostly one-way and not paying regard to other's demands and perception. In the meantime, purchasing and its internal suppliers manage to communicate bidirectionally, which means that every single involved function continuously comments and exchanges ideas to the other during the communication process (Goebel et al. 2003.).

2.3.2 Collaborative issues

Many organizations are incapable of foreseeing the potential of their partnership. This is consequence of intrafirm obstacles of which their employees fail to mutually communicate and interact and are restricted from learning from each other (Kanter 1994.). There are three major issues related to the collaboration efforts between purchasing and other internal departments.

Firstly, firm has a tendency to focus too much on meetings, documentation endeavours and information exchanges, which is quite taxing to its people. It is noteworthy that interdepartmental interaction reflects the means of managing the interrelation by communicating. The focal point of inter-functional collaboration is not setting up a system of data links, but initiating "esprit de corps" across functional frontiers. Though, it is necessary to bear in mind that in some respective circumstances, fruitful cross-functional liaisons do not solely rely on communicational status. (Kahn & Mentzer 1996.)

Secondly, other departments' perception of purchasing as a clerical function leads to the neglect of keen communication (Williams et al. 1994.; Rossler & Hirsz 1996; Stank et al. 2001; Goebel et al. 2003.). If members of important departments within an organization do not consider purchasing as playing a crucial role in reaching firm's targets, there will be less willingness to communicate more frequently between purchasing employees and their cross-functional colleagues (Goebel et al. 2003.). Internal customers such as engineer and maintenance who view purchasing as an administrative function or are sceptical of purchasing's mechanical knowledge keep on bypassing purchasing and personally work with suppliers without considering firm's policies and established process (Rossler & Hirsz 1996.). In addition, members of marketing perceive purchasing as clerical activities because purchasing department depends on them for revenues forecasts, advertising campaigns, product development strategy, and other information to perform accordingly (Goebel et al. 2003.). Stanley and Wisner (1998) through their empirical study found out that the attempt to communicate between marketing and purchasing department was the most ineffective

among respective functions. As a result, it can be derived that the attempts to communicate interdepartmentally is likely to be made on more regular basis by members of the functions which are regarded as value-adding activities for the firm and a contributor to firm's success. In other words, departments which view purchasing as a non-value-adding function are unwilling to communicate with purchasing, which messes up the inter-functional collaboration.

Finally, the collaboration process is difficult for firm to structure, which sometimes confuses or frustrates the employees. Due to the unregulated characteristic, staffs are possibly bewildered of their responsibilities in the collaboration process, which ultimately results in personal frustration. (Kahn & Mentzer 1996.) Michaels, Kumar and Samu (1995) conducted an empirical research on the role stress in purchasing activities. Role stress is associated with role ambiguity and role conflict. Role ambiguity happens when employees are unable to understand their job responsibilities whereas role conflict refers to the clashing of expectations to a role of members in other groups. Role ambiguity and role conflict occur more frequently in the activities involving purchasing department and other internal functions. The role ambiguity in the inter-organizational activities such as supplier cooperation is reported to be lower than that in the internal interactions because most firms create more comprehensible merits for working with outside organizations than for internal collaboration. Activities such as reviewing specification and setting quality standards disclose a great degree of role conflict. In those activities, the purchasing staffs depend on the competencies of other functions' personnel. The study also shows that the role ambiguity and role conflict less happen when members of purchasing function work within their department or interact with outside organizations.

2.3.3 Developing the interdepartmental collaboration

Fostering the interdepartmental collaboration is doable by combining the various facets which together give a meaning of collaboration (Kahn & Mentzer 1996.). Collaboration refers to informal etiquettes among firm's functional units in which resource and information sharing are the main activities (Ellinger, Daugherty & Keller 2000.). Therefore, to stimulate the inter-functional collaboration, firm needs to develop the well-structured platform to exchange necessary information as well as collaborative spirit between directly involved departments within an organization.

Information exchange is crucial for firm to facilitate its internal collaboration process. Information flow includes documented information (mail, tax and other related documents) and verbal information (face-to-face team-meet, personal phoning, and virtual seminar). (Kahn

& Mentzer 1996.) A clear, specific and on-time information is essential for a fruitful collaboration. There are two types of key information: control and educational. Control information is used for resource management activities. For instance, data including supplier quantities, kinds and performance is crucial for purchasing department to harness the buying process. Secondly, educational information is used to enhance the employees' behaviour and expertise which are a foundation of firm's competences for certain strategic priorities. Having regard to the overload of information, the management should pay attention to what information is requisite for business operations on daily basis to attain determined targets. Therefore, firm must develop an effective information system to facilitate the exchange of essential information regarding strategic goals and the respective departmental responsibilities to accomplish them. (Fawcett, S.E. & Fawcett, S.A. 1995) Information interchange should be formal, well-constructed, document transactions and not require interpersonal communication (Ellinger et al. 2000.).

The management may contemplate some special programmes or trainings which promote teamwork, attainment of mutual goals, inter-comprehension, formal coordination, attribution of the similar vision and resource-sharing between departments. Due to the considered-to-be strategic characteristic of these undertakings, a collaboration plan needs to be adaptive to the planning and executing strategies of an organization and to involve various internal functions. However, there may be some particular situations in which interdepartmental training programmes and other joint activities generating the personnel's unproductiveness because these endeavours entail time and resources to be performed. (Kahn & Mentzer 1996.)

The efficacy of interrelation between different organizational groups depends on the inter-perception of respective units that the rapport is worthy, fair, constructive, and enjoyable (Ellinger et al. 2000.). In other words, collaboration effectiveness relies on how one department perceives the others. If purchasing's role is considered to be relevant and a key contributor to firm's performance, other departments will make extra efforts to collaborate with purchasing in order to achieve the best outcome. Therefore, employees should be educated and well aware of the responsibilities and supportive roles of each function to the related ones. Firm can establish manual or guidelines which support the process of collaboration between its internal forces. (Aswathappa & Bhat 2009, 460.)

In short, to reinforce the internal collaboration effectiveness, firm needs to develop a coherent platform for information sharing between its people as well as create some collaboration guidelines and special workshops to bring close the interpersonal relationship. However,

collaborating activities are voluntary in nature (Ellinger et al. 2000), which is challenging for firm to regulate, control and force. The core of collaboration happens at the individual tier. Here, the collaboration is affected by personal networking behaviour. (Stank et al. 2001.)

2.4 Surplus Management

This chapter describes how purchasing department handles the excessive material which are considered to be irrelevant for manufacturing endeavours. Concerning the thesis problem, the author will discuss three major aspects of surplus management in this chapter including: the definition of surplus (chapter 2.4.1), sources of surplus (chapter 2.4.2) and surplus disposal methods (chapter 2.4.3).

2.4.1 Surplus Definition

Chandrashekar and Dougless (1997) define surplus as organizational assets which have been utilized in already-established or no-longer-available operations or are the outputs of the production session but later unlikely to be used again in the unit that accounts for these assets. On the other hand, Carter (1982) describes surplus as the purchased materials which are not used up in the operation whereas refers the extra of materials left after being processed as scrap (Ogbadu 2009.). Moreover, surplus also refers to the item's status when stock is expected to remain for a longer period than usual or when it is considered to be useless. (Chunawalla 2008.)

Surplus are different from idle assets signifying those which have not been consumed for the time being but are foreseen to be used in the upcoming time (often in a span of one year). Materials may be surplus to a specific department yet uncertainly surplus to other internal and/or external units. Hence it may be put to use somewhere else in the inter-organizational groups such as vendors, subordinate firms and global partners. (Chandrashekar & Dougless 1997.)

Most of the time, surplus does not have "appealing" connotation. All manufacturing firms reluctantly but inevitably create surplus. More importantly, surplus is believed to be related to "Junk" and "Scrap" loads. As a result, surplus is rarely regarded as a delightful operational attempt. On that account, the management does not pay enough attention to it, which is totally awful since the total cost of production is the sum of labour and overheads costs, materials expenses less possible return of surplus materials revenues. Remarkably, scrap sales are becoming a subordinate source for business gains. Therefore, firm can maximize

their financial returns by taking the full control of all factors which have impacts on the overall costs. (Chunawalla 2008.)

2.4.2 Sources of material surplus

According to Chunawalla (2008), there are two main sources which account for creating material surplus: (1) scrap and waste from production activities and (2) obsolete or damaged inventory.

1. Scrap and waste

Spoilage and wastage refer to things which are unable to be returned to vendors, such as non-functioning equipment which cannot be repaired. These are usually referred as “scrap”. (Chunawalla 2008.) Scrap are either work-in-process wastages or defects which are considered to be useless in the present situation. However, defects are likely to be remanufacturing, but the cost to carry out such activities is unremunerative. (Datta 2006.)

Wastage includes remnants or pieces of materials which are being processed in the production run. Surplus coming out of manufacturing activities are unavoidable and a cause of popular issues because not all the production inputs are transformed and included in the end products. It is really unfeasible for any manufacturers to completely avoid this kind of surplus. Nevertheless, productive and clever operational planning, effective inventory management to handle this problem can partially help to cut down the amount of wastage. (Chunawalla 2008.) Sometimes, it is hard for firm to handle the bulky items referred as heavy inventory. After being inspected, the material will be converted into the finished goods. The additional handling of material results in the increase of material wastage with longer lead time. (Singh & Garg 2011.)

Spoilage is a result of unproductive utilization of machine and equipment in the production process. In addition, spoilage is the piece of merchandise with poor quality which stems from the inefficient or mediocre purchasing. Commodities are damaged during the producing attempts or in the stored spaces are all acknowledged as spoilage. These types of spoilage are avoidable if firm pays more extra attention and care to such perishable items during the storage period. (Chunawalla 2008.)

2. Obsolete or damaged stock items

Commodities which are considered to be out-of-date or being replaced by the innovated ones - are recognized as obsolete stock (Chunawalla 2008) or as dead inventory by Muller

(2002). Obsolete materials are no longer beneficial for operational purposes due to product's remodelling, the adjustment of manufacturing process, product-line variation or usage of other materials (Datta 2006.). Furthermore, lavish buying ahead and intended over-purchasing are additionally a typical but complex creator of surplus items. These bring about the threat of generating obsolete surplus, failure and mistakes in inventory checking and record-keeping. (Chunawalla 2008.)

Obsolete materials are no longer valuable as the utilization of those materials for production is not essential any more. These materials are unusable anywhere in the company, but firm continues to keep it on precious storage area, which add more costs. Sometimes, the management is resistant to dispose it because of its high value. (Datta 2006.) Muller (2002) indicates three major reasons which explain why these items can't be disposed from the perspectives of high-levels: firm already paid for it, it is likely to be used someday, it is likely to be sold someday. These excuses somehow sound rational and the thought of getting rid of dead inventory is possibly counterintuitive (Muller 2002.). However, their disposal is indispensable regarding the issue that its holding costs are concerned. There is a known principle that if the holding costs in two years of respective materials are equal to or bigger than the scrap value, the disposing activities need to be carried out. (Datta 2006.)

Over-expectation, eager and positive revenues forecasting leads to the excess of material. Moreover, today business brings about the needs for regular, non-stop and speedy changes in the designs and specifications of the commodities. Therefore, the immobile bits are surplus in this driving and active marketplace. As a result, obsolete goods and their components continuously add up to the quantity of surplus materials. In addition, the deviation between the planned production schedule and the actual production run causes more possibility of specification changes. The fact that more than 50% of the commodities sold are non-existent 10 years ago emphasize the theory of surplus materials which occur due to the need for innovation. (Chunawalla 2008.)

2.4.3 Surplus Disposal

Surplus disposal function had been long seen as a backwater and insignificant section which is required of minimal care. It has been often considered as being the procurement's stepchild or orphan. (Chandrashekar & Dougless 1997.) When the item is acknowledged as surplus, it is the responsibility of Purchasing Department to handle it. Concerning the difference from the other items trading activities, material disposition is assigned under the purview of Purchasing function. The Purchasing Department which is responsible for buying

a variety of materials, components, equipment and machines attains better insights into who would consume the similar materials and what can be used interchangeably. (Chunawalla 2008.) Moreover, purchasing officers are no stranger to the market and market conditions (Datta 2006.). Based on this essential information, purchasing department manage to handle the disposal activities in the most efficient and productive way. Without a doubt, the purchase function is able to perform well in this interest. (Chunawalla 2008.) The activities of disposing scrap and surplus happen after the core buying endeavours (Michaels et al. 1995.).

Disposal may bring benefits to firms regarding two facets including: the salvage sales of disposing surplus items, and the savings on inventory holding costs as a result of stock-reducing. Though, the organization may later need to rebuy (or reproduce) items due to the continuous operational consumption of it. Therefore, over-elimination of these stocks may coerce the firm to arrange rash repurchasing schedule. Consequently, it creates the trade-off cost between salvage revenue and declined cost of carrying inventory versus costs of potential rebuying. (Willoughby 1999.) Firm may long for the speedy disposal. However, it is necessary to take into account of the potential needs for the surplus material in the future when carry out any disposing attempts. In addition, the departments should be aware of the impossibility of saving every single out-of-use item. (Morgan 1947.)

It is quite a debate of whether to dispose the surplus. It is challenging for firm to determine to dispose the unused inventory since it may disadvantageously affect the balance sheet and diminish resources which may be utilized for lending intentions. On the other hand, to support the idea of surplus disposal, decision makers argue that it facilitates the recapture of space, more efficient usage of machinery and workforce, with the addition of a reduction in the inventory holding costs. (Muller 2002.) The inventory holding costs consist of cost of capital, storage capacity and insurance. It is important to expedite the disposing activities if firm spend lots of money for those costs. (Chandrashekar & Dougless 1997.)

According to Chunawalla (2008), there are five ways to get rid of the surplus material through different channels: (1) circulating it to other organizational units, (2) send back to vendor, (3) sale by purchasing department (4) sell to employees and (5) donate. Firm's philosophy determines the surplus disposing strategy. If the company prefers to throw away the surplus as swiftly as possible, the choice for the suitable surplus disposal methods is restricted in amount. (Chandrashekar & Dougless 1997.)

1. Circulating within a firm

With the intention of retaining the value of any kind, the information regarding the surplus material is distributed to the different intra-organizational functions which may manage to make use of the surplus (Morgan 1947.). The purchasing department here will send to various functional groups the record of surplus items which contains the necessary item's data such as quantity and value (Smith 1956.).

The best way to dispose the surplus item is to circular it among several units since it brings additional benefits to a firm. Internal usage of surplus invalidates the likelihood of "Bargain Loss" or "Deal Reduction" which usually occurs in other disposal methods. Moreover, firm is able to save more on the expense for disposal administration when the surplus is also used elsewhere within the concern. (Chunawalla 2008.)

Usually, surplus material which is a result of the changes in the latest product design is still valuable to the firm. It can be used as replacement components for the old-design products still in sale or as re-manufacturable material for particular parts. Plenty of times a product is composed of variety of components which are made from similar material but different in size. (Morgan 1947.)

2. Return to vendor

If the surplus items are no longer usable within a firm, the second best disposal way is to send back to the vendors. Suppliers usually show their courteousness by allowing the return of such items especially those which are not easily perishable and become obsolete so quickly. This method is in favour of expensive materials when its remnants are qualified to be utilized elsewhere. Such act yields the sum which mainly makes up for costs for buying as well as producing surplus items and equals a proper reimbursement for scrap units. (Chunawalla 2008.)

The purchasing employees have to contact the suppliers where the procured material comes from in order to find out if it is returnable for credit or not. There are various factors which have impact on the success of returning this surplus material to suppliers. Some of these may be determined in the supplier's contract such as the time span for returning the material, state of the returned material, price variation, and the inventory level of the suppliers. The biggest issue is that firm has tendency to keep surplus too long, which results in the value reduction of such surplus items due to its deficient quality or obsolescence. (Smith 1956.)

3. Inter-organizational trading

As the purchasing function has failed to transfer the surplus items to other intrafirm departments or to return to its suppliers, outside sale is initiated (Smith 1956.). However, the outside sale may lead to some product liability issues when firm tries to get rid of surplus which occurs from scrap, manufactured defects, overstocked items or discontinued goods. Product liability refers to the responsibility of organizations (manufacturers or sellers) for selling defects which may be harmful to the customers (Vargo 1995).

Some surplus items can be sold to the other firms such as dealers, scrap consultant or those who potentially use such the similar ones. The dealer here plays a role of a middleman which helps firm to sell the surplus items and receives commission accordingly in return. The scrap consultant provides the surplus preliminary survey then gives suggestions for sorting, assessing, managing, measuring and accounting the surplus stock of the company in need. On the other hand, the firm may look to open market and discover other organizations which could use the similar items or materials. Usually the other firms using the same material are competitors, though some companies operating in other business fields should be put into consideration. In case of scrap units, it is perfect if the manufacturing surplus scrap is the necessary materials or components for the other operational groups. (Chunawalla 2008.)

One of the methods to dispose the surplus is to barter materials. Barter refers to a trading entity which concerns the sale of commodities and the receipt of the equivalent items or services in return (Plank, Reid & Bates 1994) without cash involvement (Vaccaro & Isiltan 1998). Barter organizations normally use profound electronic data platform (Plank, Reid & Bates 1994) to find the suitable firm in order to get rid of overstocked products with a ready market (Chandrashekar & Dougless 1997.). Barter agents mostly help the concerning firm with the issue of excessive inventory, creating substitute markets, and tapping into the idle operational resources. Purchasing department initially contacts the barter agent to locate the demand for the surplus. Then, purchasing clerks provide them with required information for Request for Quotation and bidding outcomes. Eventually, the purchasing function keeps the accounting documentation of business credits spent. (Plank, Reid & Bates 1994.)

4. Sale to internal staffs

Many scrap items are available to be purchased by the firm's people. However, there are some factors should be considered to determine whether it is allowable to be put up for sales. For instance, when the items are overstocked, technically obsolete or are pieces of

scrap, this is highly considered to be sold to the internal staffs. In contrast, if the quality of surplus items is not guaranteed, such disposal method may result in the employees' dissatisfaction towards the company. (Chunawalla 2008.)

5. Donation

Nowadays, academic institutions are actually in needs of equipments and industrial resources for tutorial and practice purposes. This method to dispose operational surplus is viewed as a uncommon happening in the business realm. In spite of not gaining any financial perks, this method helps the company to foster their public image and social reputation. This demonstrates the firm's awareness of its responsibility to the society. The amount of money which firm is unable to receive due to this give-away strategy can be highly regarded as the incentive to take advantage of greater community confidence. (Chunawalla 2008.)

Surplus donation to charity can help firm to attain tax advantages. Donation to non-profit-making organization facilitates tax deductions and may affect the disposal options. Charitable donation is highly considerable solution to get rid of overstocked items without resulting in sharp price reduction. Today, there are some organizations which can match the donator with a certified institution, which facilitates time-saving and effort-making to find the in-need ones. (Chandrashekar & Dougless 1997.)

3 Research Methodology

There are two well-known research methods commonly used in theses and various academic papers: quantitative and qualitative research. The application of particular methods leads to certain types and quality of information obtained in order to support and illustrate the ultimate finding. In this chapter, the author will explain the chosen approach and demonstrate the application of this method as an analysis tool for the thesis's results. In this thesis, the author applies three collecting methods which are considered to be beneficial to the outcome such as emailing, interview through virtual platforms and physical meeting. Since the obtained data is qualitative in nature, qualitative research is regarded as the most suitable approach. The author will in order illustrate the reason for selecting the research method (chapter 3.1), specific implementation of this qualitative method (chapter 3.2) and the channel for data acquisition: interview (chapter 3.3).

3.1 Qualitative Research

Saldana (2011, 3-4) decodes qualitative research as “an umbrella term” which covers various approaches and methods to investigate a concerned entity. The obtained inputs of qualitative research which are used for analysis are expressed mainly (but not solely) in a qualitative way, including textual contents (books, transcripts of interview, etc.) and visual contents (pictures, artifacts, videos, etc.). These materials record human observations and conceptualization of themselves or other individuals with own reflection. There is possibility of using the exact information and data for diverse purposes in different approaches (Travers 2011, 12).

Being equivalent to two different approaches in conducting research, there are two types of data gathered for investigative purposes: qualitative and quantitative data. Those two possess distinguished traits in the derivation form, collection results and usage for analysis. Saunders, Lewis & Thornhill (2015, 569) illustrate the differences between quantitative data and qualitative data in three aspects (see table 3).

Table 3. Distinctions between quantitative and qualitative data (Saunders, Lewis & Thornhill 2015, 569.)

Quantitative data	Qualitative data
Based on meanings derived from numbers.	Based on meanings expressed through words (spoken and textual) and images.
Collection results in numerical and standardised data.	Collection results in non-standardised data requiring classification into categories.
Analysis conducted through the use of diagrams and statistics.	Analysis conducted through the use of conceptualisation.

In the field of marketing study, quantitative data is related to positivism while qualitative data is associated with interpretivism philosophy with the unlikelihood of interface (Petrescu & Lauer 2017.). The most noticeable distinction between qualitative data and quantitative data is their collected form. Qualitative data is delivered by wording and narrating and non-numerical in nature. On the other hand, quantitative data includes figures, statistics and other numeral entities. (University of Minnesota 2018.) In qualitative research, the researcher derives essential information from texts and pictures, not mathematical figures. Since texts and pictures may embody several connotations plus ambiguous denotations, it is crucial to pay more attention to the exploration and explanation of these data sources (Saunders et al. 2015, 568.).

Qualitative data are regarded to be abundant and full in nature since it can be explored and interpreted in as many ways as possible depending on the researchers (Saunders et al. 2015, 568.). Therefore, qualitative research is useful in depicting an occurrence and evaluating its signification that a quantitative research is unable to offer. Qualitative study facilitates the comprehension and interpretation of profound phenomena and circumstance to develop theories and obtain daily knowledge. (Petrescu & Lauer 2017.) Quantitative researchers look for determinants of the issue's causes, forecast, and overall speculation whereas qualitative investigators are in pursuit of enlightenment, comprehension as well as extrapolation to same circumstance (Hoepfl 1997.).

In this thesis, the author uses qualitative data for the analysis. The majority of obtained data is non-numerical in nature, such as purchasing process of the case company, the situation of interdepartmental collaboration, the surplus disposal methods. In addition, there are several numerical information of number of overpurchased materials, financial report on those materials' values. However, these numerical data will be interpreted and explored in a qual-

itative manner. The author plans to use those statistical data as a concrete evident for illustration and credible platform to develop more in-depth understanding of the phenomenon. Therefore, such data is considered to connote the qualitative meanings.

Travers (2011, 2) presents five primary methods for qualitative researchers to collect necessary data: observation, interviewing, ethnographic fieldwork, discourse analysis and textual analysis. In the empirical part, interviewing purchasing managers and other purchasing clerks as well as researcher's observation will be used as the main sources to obtain secondary data. Observation enables in-depth insights rather than interviewing in the situation of which the interviewees may not be knowledgeable or try to avoid the discussion, but the researcher can somehow derive the knowledge from personal observation (Hoepfl 1997.).

3.2 Research design

The research design specifies the main research question to be studied (Hoepfl 1997) and sketches out the agenda for providing the required answers to the investigative questions. It includes the precise channels from which the data is collected, suggested mediums for data analysis, and discusses other potential issues encountered during the research period. (Saunders et al. 2015, 162-163.) The certain proposal of qualitative research is determined by the objective of the investigation, what data is considered to be most helpful and most credible (Hoepfl 1997). Below is the illustration of the research design in order to collect needed data.

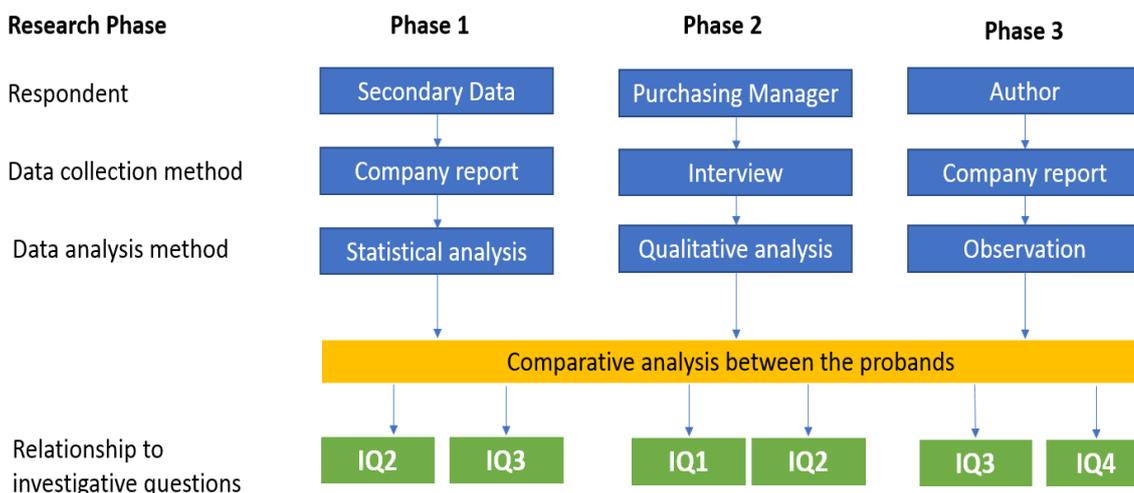


Figure 10. Research methods

There are three stages in the research process involving different respondents, ways to obtain the necessary information and methods to analyse such data. The three biggest information sources which account for the whole thesis content are field research, company report and inputs from interviewing relevant individuals. In the first and second phase, data is gathered through “outside” channels. Thanks to these inputs, the author manages to have a better and clearer understanding of the research problems. This generally assists the author in further suggestions and recommendations to solve those issues.

It is important to approach the research design flexibly since those phases may not be followed by the exact order and are likely to be conducted simultaneously especially phase 1 and 2. Shortage of necessary information forces the author to go back to the phase which already has passed. Therefore, it is imperative to employ the research design in an innovative manner via personal deliberation and learning, which helps to avoid unproductive result of the poorly developed study.

3.3 Interview

Both qualitative and quantitative researchers have a tendency to depend on interview as the fundamental method of collecting data regardless of the researchers’ objectives which either target at rich, in-depth information or gather simple quantitative data such as respondents’ rating in a scale of 1 to 10 (Denzin & Lincoln 2005, 698.). Saunders et al. (2015, 388) describe the research interview as a driven interactive discussion involving plural parties. This method facilitates documenting and asking for personal and organizational viewpoints, thinking, conviction and impression about their own encounters and surroundings to compare with the fact-based information (Saldana 2011, 33.). Using interview method enables researcher to collect creditable and authentic information which are needed for building the research’s content. In addition, it may encourage the idea refinement especially when the researcher has not come up with the fully-developed research question. (Saunders et al. 2015, 388.) Researcher may employ qualitative interview as the core method to obtain the required information or mix it with other data-gathering approaches such as observation, content analysis and other modes (Bogdan & Biklen 1982.).

Interview requires the researcher to ask questions for a planned purpose and pay attention to the participant’s replies in order dig deep in these answers for investigation (Saunders et al. 2015, 388.). In order to do this, researcher should develop a precise interview guide. Hoepfl (1997) refers to an interview guide or “schedule” as a catalogue of enquiries or well-established subjects which need exploring during each section of interaction. It is expected

to have unplanned responses from the participants regardless of the interviewer's endeavours to assure the similarity in the respondent's inputs by preparing the interview guide beforehand. Interview guides regulate the interview time, keep different topics at the structured and comprehensive level, and maintain the conversation focus. (Hoepfl 1997).

There are three major types of interviews including structured, semi-structured or unstructured interview (Denzin & Lincoln 2005, 698) or referred by Patton (1990, in Hoepfl 1997) as open-ended interviews, semi-structured interviews and conversational interviews respectively. Structured interviews rely on the interview guides which contain proposed questions to be asked by the researcher (Saunders et al. 2015, 391.). In semi-structured interviews, the interviewer is given the unlimited access to his or her own examination and exploration within the predetermined boundaries of the on-research topic (Hoepfl 1997.). Unstructured interviews do not follow the interview guide. It is the most-used channel to gather the richest information. The interviewees are given a chance to freely discuss the subjects which they may view as a relevant concern. The interviewer is expected to assign the primary theme during the interacting period. (Corbin & Strauss 2008, 38.)

In this thesis, the author will use the structured or standard interview as the only mode to garner the required data from Purchasing Manager and Purchasing Staffs. The author will prepare a list of enquiries beforehand to ask the particular participants. As can be seen in Phase 2 of the research design (see figure 9), the author will proceed on interviewing some relevant individuals to obtain in-depth data about the purchasing activities and company's current situation. The author seeks factual data as well as personal understandings, perceptions, feeling and evaluation on the nominated topic. These responses will be used to address and explore the issues expressed by the investigated questions. The interview questions will be customized based on the participants' work position: the management versus the office employees. To be precise, the author will interview the Purchasing Manager, one senior purchaser with seven years of experience and one junior purchasing clerk working in the company for almost two years. The schedules for those face-to-face interviews were arranged by the author, followed by the approvals from the company's representatives. Lists of specific interview questions are included in Appendix 1 and 2.

In addition, during the process of writing this thesis, the author also receives additional explanation on sudden-occurred topics, specialized knowledge and other assistance from the employees of purchasing department via virtual platforms (email, skype). This is one chan-

nel for data gathering which is helpful, convenient and time-saving for author and the involved parties. This information-exchange session will not be scheduled beforehand and can be set up ad hoc.

4 Empirical Findings

The objective of this segment is to examine the first three investigative questions of the research. In order to answer these questions, the author embarks on the qualitative approach to analyse the garnered data through interviews and company's report. Three investigative questions are scrutinized by respective order in the equivalent chapter, which fosters logical and coherent understanding from readers. This chapter demonstrates the results attained by the data-gathering method explained in the previous chapter.

4.1 Purchasing Process of the company

In this section, the author will introduce the purchasing process of the company as well as how purchasing officers calculate the order quantity. The data is collected through personal face-to-face interviews and via virtual contacts such as phone, emails and skype.

4.1.1 The purchasing process in details

Productive purchase of commodities plays a tremendous part in creating the competitive advantage for a business. The purchasing process connects different associates in the supply chain as well as become involved in keeping an eye on the performance of suppliers in that chain. Purchasing is a profound process which is sometimes hard to put into words, comprehend and control by the management. Purchasing process refers to the achievable conduction of a chain of boundaries-spanning activities. (Novack & Simco 1991.)

Purchasing process varies depending on particular business's conduct. Though, there are some compulsory steps to be carried out in order to assure the coherence and productivity of the whole process. The common steps included in a purchasing process have been discussed in the chapter 2.2.2, using Van Weele suggested model. By interviewing Ms. Xx as known as Purchasing Manager of the commissioning company (see appendix 1), the author manages to collect mandatory and relevant information about their purchasing process.

The general purchasing process of the company consists of different activities spanning across various internal functions and organizational groups. The process starts with purchaser receiving the order from operation units. Purchasing employees are required to input the information about purchase quantity and product style to an excel file to follow and record. Later, the operation will send the estimation data on style, colour, consumption, quantity, stock and price of the items which need to be purchased. This is referred as a product specification. In the company, technical specification is used in order to determine exactly

the expected outcomes of the purchased material. The purchaser will forward these specification files to the suppliers. Vendor will later send the samples to the purchasing staff to evaluate and assess the materials' quality. After approving the sample, purchaser proceeds to calculate the order quantity based on the consumption data from WS department. Then, purchasing clerk should create the purchase requisition, issue the purchase order (PO) and send to the suppliers to confirm the delivery date. Purchasing staffs still have to follow-up the suppliers to assure on-time delivery and qualification of acquired materials. The process ends with receiving invoice from suppliers and transmitting to finance department to proceed the payment. The whole process is illustrated in the following figure.

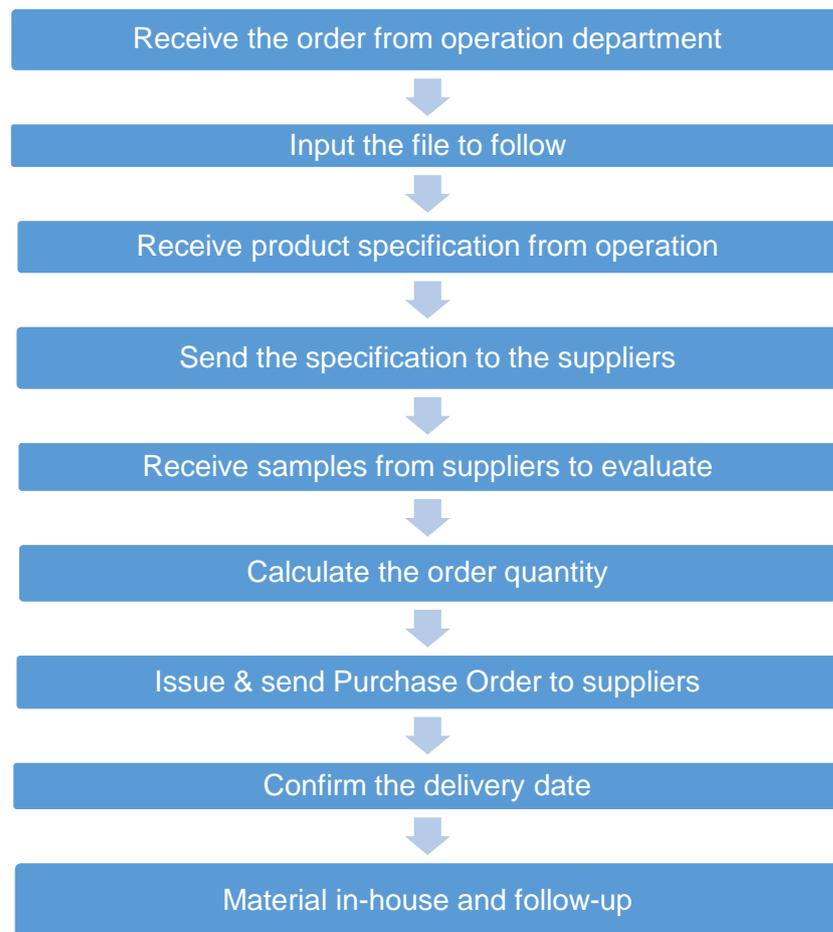


Figure 11. The purchasing process of the case company

Since the supplier is appointed by the ultimate client, purchasing personnel may skip the step of finding suitable suppliers. In some cases, such as new client or new product development, the purchaser has to look for the capable vendors themselves. Most of the cases, the purchasing officer will check their existing supplier base for the right ones to send the requirements and quotation. If no suppliers are fitting the measurement, purchaser in the company will search for new ones, typically through networking or word-of-mouth method.

The two merits that are considered to be the most imperative for the selection of the right supplier are quality and price in which quality weights more than price according to the company.

The process to order materials priorly described is a general procedure for every item. It may be modified depending on the types of items, particular lead time and urgent cases. For example, when the lead time is long, the purchaser may need to speed up the determination of product specification from the operation function for quick progressing to the suppliers. In some special cases, the purchasing staffs are not allowed to approve the samples from suppliers. Those samples are asked to send to the ultimate client for approval, comments and any further instructions. In the urgent situation, the purchaser can expedite the process to meet the deadline.

Usually, it takes approximately 1 to 3 days for purchasing staffs to check the purchase requisition and create the PO. After issuing the PO, it is regulated to be sent to the suppliers in the span of 3 to 5 days. The lead time of suppliers in China and Taiwan is 2 days and 7 days respectively. The delivery date should be 14 days prior the production run. In other words, the purchased materials must be in the warehouse for the maximum of 2 weeks before being used by the operation department. Typically, the order process should take around 7 to 10 days to proceed after receiving the order to purchase from operation department.

Conventionally, the purchasing process is a system which is non-automatic and works based on paper. Nevertheless, thanks to the innovation of information technology, electronic devices and the Internet, lots of businesses are shifting toward a more computerized, preprogramed system. A suitable purchasing system assures the efficient information flow between the users and the purchaser. Additionally, the system is required to operate adequately and be controlled by the person in charge as a purpose of prohibiting the exploitation of purchasing budgets. (Wisner et al. 2012, 43.)

The company has employed an ERP system in order to assist the purchasing process. The ERP system is functioned to create the purchase requisition and the PO in favour of purchasing employees. Staffs use this system to calculate the exact quantity of purchased items based on the estimation data from WS department. The PO normally contains basic information of suppliers, item's description, quantity, the PO value, delivery date and the destination of shipment.

4.1.2 Calculation of order quantity

Purchasing personnel is required to follow the financial budget estimated by the management for the particular procured items. The total value of PO for that product should not surpass the limit costs for buying materials and components. When the PO value exceeds the qualified sum which is priorly set in order to achieve the planned budget, the purchaser will fail to proceed and issue the PO. This leads to lots of issues mainly because of the variation of trading prices for the material. The decided budget is usually calculated based on the previous price for acquiring the material. Therefore, problem with the system will occur if the material price changes, which takes more time to correct and modify the inputs as an attempt to issue the needed PO.

The company uses Bill of Material to manage the important information of one product. Bill of Material is a list of materials and component required in order to produce a complete garment. In the company, BOM is developed by the operation department and forwarded to the purchasing function in order to start the buying process of these materials. A BOM commonly consists of product's description, material's consumption, estimated cost for each unit and total amount for all purchased items. (Sarkar 2012.)

In this thesis, the problem with purchased surplus materials occurs in the step of calculating the purchase order. The WS department is in charge of estimating how much material will be used in order to produce one item of clothing. Then the purchasing staffs depend on that data to calculate the required amount of those materials to purchase in traded unit. To be specific, fabric is purchased by yards while thread is bought in cone. In addition, the purchasing employees usually order extra 3 to 5 percent of the calculated quantity.

Buyer	Reebok					Prepared by	Sushmita			
Style	#2345JK					Date	12/12/2012			
PO#	JK-240									
Order Qty	5000									
Seq. No.	Item Description	Consumption	Extra Purchase	Qty.	Unit of measure (UOM)	Rate (Rs.)	Unit of price	Amount (Rs.)	Remarks	
1	Shell fabric Single Jersey 160 GSM	0.260	5%	1365.00	Kgs	260.00	Kgs	354,900.00		
2	Rib (2/2) 260 GSM	0.002	2%	10.20	Kgs	350.00	Kgs	3,570.00		
3	Sewing Thread	200	7%	2675.00	Tube	6.00	tube	16,050.00		
4	Size Labels	1	3%	5150.00	unit	3.00	unit	15450.00	nominated vendor	
5	Hang tags	0	3%	10300.00	unit	5.00	unit	51500.00		
6	Cartons			50.00	unit	50.00	unit	2500.00		
7	Polybag	1	1%	5050.00	unit		Kgs	0.00		
								0.00		
								Total Amount	443,970.00	
					Approved By _____ Sourcing Department _____					

Figure 12. A sample of Bill of Material with estimated consumption and purchase quantity (Sarkar 2012.)

For example, the WS sends their estimation of how much thread is used to sew one complete garment as 5500 yards per garment. The purchasing personnel then needs to calculate how many cones to be ordered. The company uses big cone which is made of 2750 yards (2500 meters) of thread. We have: 5500 yards = 2 cones. Therefore, in order to sew 10 garments, the operation department needs 20 thread cones. Then, adding to the extra of 5%, purchaser has to order the number of cones based on the following calculation:

- The needed quantity for manufacturing = 20 cones
- The extra quantity to be ordered = $20 \times 0,05 = 1$ cone
- The total amount of cones to be purchased = $20 + 1 = 21$ cones in total

4.2 The situation of leftover in 2018

The company uses the term “leftover” to define the excessive amount of materials purchased and the over-manufactured items. Therefore, in this empirical section, the author will refer to the terminology “leftover” used by the company when discussing the surplus materials. The term “leftover” and “surplus” will be used interchangeably without explicit distinction. The formal mechanism of which leftover data is recorded and managed will be introduced, followed by the discussion of leftover situation in general and in selected accounts.

4.2.1 How company keeps track of leftover

Company X has divided the manufacturing materials into three major categories: raw material, sewing material and packing material. Raw material is the most important and valuable material creating a complete garment, which is fabric. Sewing materials include different accessories or small details in one particular cloth such as labels (heat label, time label, care label, etc.), sewing thread, stickers, security tags, tapes and zipper. Packing materials consist of several items used for packaging purposes. These include poly bag, relevant tapes, carton box, tag pins, hangers, labels, hangtag and packing stickers.

In company X, leftover is recorded in an excel file and updated by purchasing staffs by the end of each month. It helps managers to keep an eye on the purchasing performance and up-to-date situation of leftover in one particular month. The following figure is a sample of how leftover is documented and broken down in details.

Buyer	FOB	Left-over value APR	% Left over	Left Over Breakedown				Fabric Left detail breakedown					
				Fabric	Garments	Actual Garments	Trims	YY savings	round up qty to hit MOQ	Customer liability	Booking mistakes	Supplier over shipped under FOC	Other reason
ABC	200.000	2.000	1,00%	1.500	1.000	-	2.000	1.500	100	1.000	76		
TOTAL	200.000	2.000	1,00%	1.500	1.000	-	2.000	1.500	100	1.000	76	-	-

Figure 13. A monthly summary of leftover in one account

Leftover data includes the total value, each types of leftover value, value coming from different reasons such as yard yield savings (YY savings- how much fabric is saved after production stage), booking mistakes from purchasing staffs, customer liability, supplier over-shipping, minimum order quantity and other reasons. In addition, the monthly net sales and leftover ratio as percentage to that revenue are included. Despite particular modification of the reporting format for specific needs in different accounts, these types of information will be basically covered in the purchasing reports from most of the accounts.

In addition, each leftover item is recorded and put down in separated excel sheet including detail information. This helps purchasing staffs to keep track of and search for specific material for future needs. This record is updated by warehouse or operation staffs and to be monitored by purchasing personnel.

2	Item Category	Item number	Item name	Kind	Unit	Warehouse	Leftover qty	Unit price	Leftover amount	MER COMMENT
3	Raw Material	FCK1x1PYEW64JW	Fabric Knit 1x1Fabric		YDS	XXX			59	
4	Raw Material	FCKSJYPYBZ72235\	Fabric Knit Sin Fabric		YDS	XXX			119	
5	Raw Material	FCKSJYPYBZ72235\	Fabric Knit Sin Fabric		YDS	AAA			87	
6	Sewing Material	LBWMLNAPWLB00	LABEL MAIN FACC		PCS	XXX			9	
7	Packing Material	SSBCKPINK1	BarCode Stick ACC		PCS	BBB			83	
8	Packing Material	TZRBPRTPILB203	Price ticket-PIL ACC		PCS	CCC			398	
9	Packing Material	SSBCKPINK1	BarCode Stick ACC		PCS	XXX			61	
10	Raw Material	FCK1x1PYEW64JW	Fabric Knit 1x1Fabric		YDS	AAA			1175	
11	Raw Material	ILNF090VL	Interlining-CE1ACC		MTR	XXX			57	
12	Raw Material	FCKSJYPYEC64CTJ	Fabric Knit Sin Fabric		YDS	AAA			75	
13	Sewing Material	ESKNONSES34	ELASTIC: LT \ ACC		YDS	XXX			1920	
14	Raw Material	FCKSJYPYBA72YYS	Fabric Knit Sin Fabric		YDS	CCC			83	
15	Raw Material	ILNF090VL	Interlining-CE1ACC		MTR	AAA			220	
16	Sewing Material	LBALGNAPLB00332	Generic: PLB- ACC		PCS	BBB			72	
17	Sewing Material	LBALGNAPLB00332	Generic: PLB- ACC		PCS	DDD			93	
18	Raw Material	ILNF090VL	Interlining-CE1ACC		MTR	EEE			56,69	
19	Raw Material	FCKSLTPYEM68CT	Fabric Knit Sin Fabric		YDS	XXX			15	
20	Sewing Material	DCCTTnaLSP341	Draw Cord LE ACC		YDS	AAA			600	
21	Packing Material	SSBCKPINK1	BarCode Stick ACC		PCS	BBB			74	
22	Raw Material	FCKSJYPYBZ72235\	Fabric Knit Sin Fabric		YDS	CCC			793	
23	Raw Material	FCK1x1PYEW64JW	Fabric Knit 1x1Fabric		YDS	DDD			1788	

Figure 14. Basic details of leftover in one account

The leftover is put down in categories, number, name, kind (Fabric or accessories), measured unit, storage warehouse, quantity, unit price, the gross value for each item (leftover amount) and any further comments from merchandise personnel. Purchasing staffs usually check this file before ordering new items or search for material substitutes if there is shortage in production.

4.2.2 Leftover situation

The leftover level is managed and monitored by purchasing department. It is counted as one of the KPIs for purchasing personnel to keep track of their doings. The company, in addition, uses the leftover KPI to control the waste and maximise the EPM. Usually, the KPI will be updated and reviewed by the management at the end of each month. The leftover is reported in value and percentage compared to the net sales. Every 10% of the net sales will be counted as less 1% on the turnover.

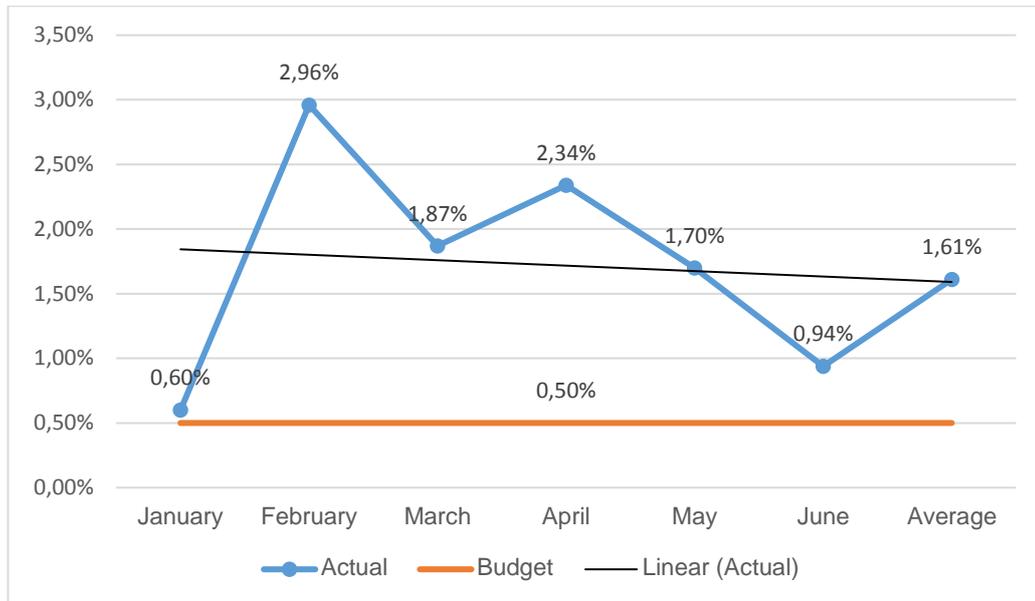


Figure 15. Surplus material as percentage of sales in 2018

Figure 15 is the situation of leftover in all accounts in the first half of 2018. The desired level for leftover is 0,5% of the overall revenues. Throughout six months of 2018, the leftover ratio always exceeds the preferred level. The lowest leftover ratio is recorded as 0,6%. On the other hand, the highest number is 2,96% in February which is nearly 6 times higher than the regulated one. Generally, the leftover ratio fluctuates in the course of six months. However, the overall ratio (1,61%) is still higher than the budgeted one by more than 300%.

According to the purchasing manager, the overall leftover ratio which is calculated from the average of leftover ratio from all accounts each month is considered to be an acceptable number though it bypasses the desired percentage. This data depicts the leftover trend in the overall performance of the company. The leftover ratio has tendency to decrease slowly in the first half of 2018 in comparison with the concluding average one of 2017 which is 1,7%.

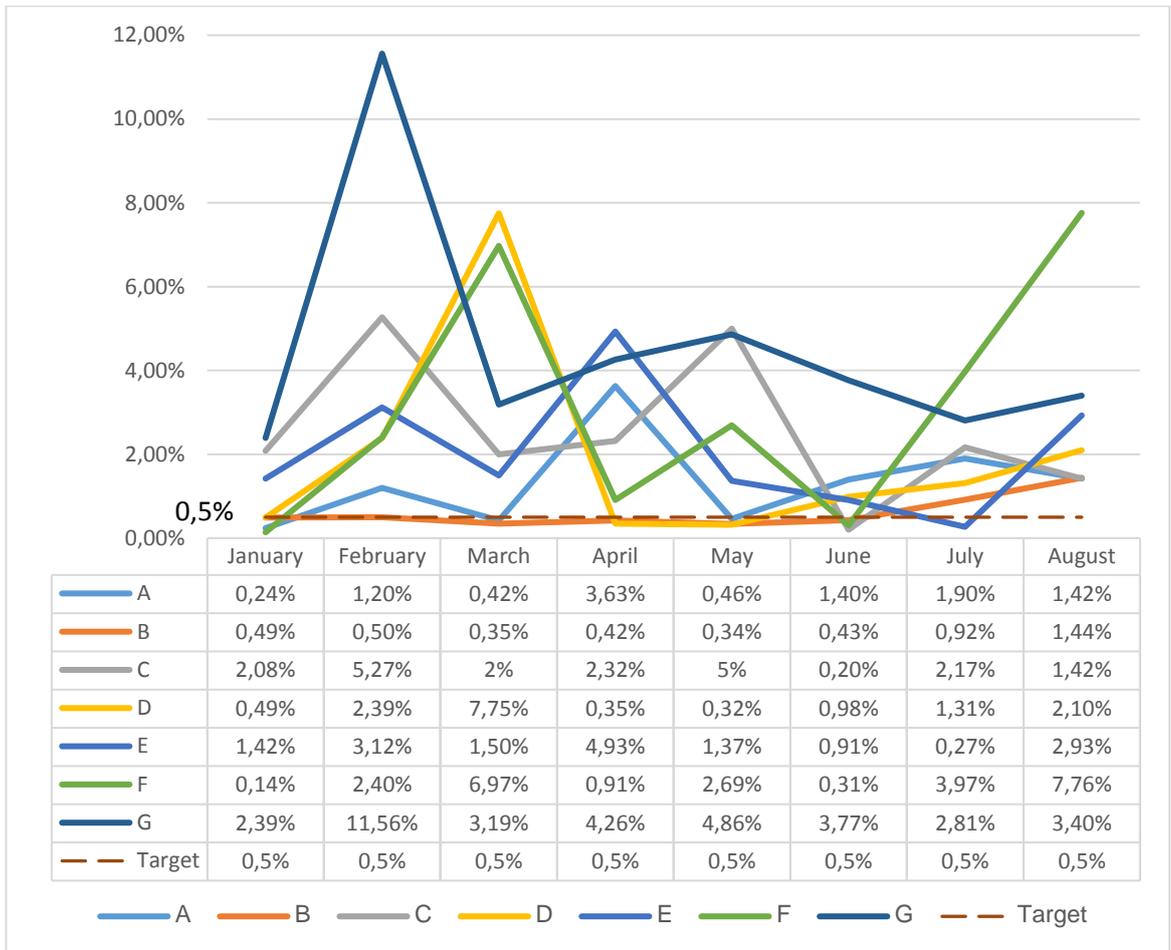


Figure 16. Surplus material as percentage of sales in 2018 in 7 accounts

The above figure is the break-down of leftover ratio in seven biggest clients or accounts. These clients accounted for 91% of the total net sales in the first half of 2018. In general, the desired level 0,5% is hard to achieve by most of the accounts. However, account B has been maintaining the perfect level throughout six months with the exception of April with 5% of leftover compared to its monthly net sales. The highest number is 11,56% from account G in February, which is significantly 23 times higher than the set level. The lowest ratio is 0,14% in January from account F. It can be said that in the first month of 2018, F managed to purchase the perfect quantity of materials which helps to avoid any surplus. Generally speaking, the overall level of leftover from the majority of accounts is around 5% and below. There are only four significant cases among 56 reported ones exceeding 5%, which are caused by account G with 11,56% (February), account D with 7,75% (March), account F with 6,97% (March) and 7,76% (June).

Nevertheless, it is noteworthy that high leftover ratio does not equal to high value of leftover and vice versa. For example, in August, the account E and F are reported to have dramatically difference in leftover ratio as 2,93% versus 7,76% respectively. However, in fact, the

value of surplus materials from account E is over \$80 000 while account F has wasted more than \$20 000 on overbuying the materials. The value of leftover from account E is almost 4 times bigger than that from account F in contrast of the particular leftover ratio from the two accounts.

Material's prices and differences in the revenues are primary determinants of the reported values of the leftover. The higher sales revenue is, the more goods will be produced, hence the more materials will be purchased for production. The value of leftover depends on the volume of the leftover. That explains the situation in which an account having lower level of leftover wastes more money on surplus materials than other ones. Therefore, using the leftover ratio to assess the firm's performance promotes fairness in evaluation and helps to avoid any misled perception and judgement.

4.3 Reasons for excessive purchased materials

There are lots of reasons which explain for the over-buying of materials. Those causes are divided into two categories including external and internal factors. The external factors come from outside of the firm while the internal ones are caused by the firm's workforce. As stated before in the chapter 1.4 (Demarcation), internal factors will be the main focus of the thesis.

4.3.1 External liability

Since purchasing is a boundary-spanning function, activities carried out by purchasing department involve different internal and external groups of people. The external units which work most closely with purchasing function are suppliers. Vendors play a significant role in determining the performance and delivered outcomes of purchasing department. As for the case company, there are three external factors which are the primary sources for the excessive purchased materials: suppliers, the minimum order quantity and customers liability.

First, the most occurred reason for leftover relates to the quality of the procured materials. Materials which are not matched with the requirements or expected condition cannot be used in the production since it may affect the quality of the end product. It applies in some important materials such as fabric and thread. Since fabric is mostly bought from foreign suppliers (China and Taiwan) and shipped by sea, there are lots of factors affecting the quality of fabric. Most of them come from external forces (force majeure, weather, humidity, temperature, handling activities) which are hard to avoid or harness. These incidents cause the physical changes of fabric such as the faded colour, scratch, mould and the stretch-out. As a consequence, those unqualified materials are unable to be consumed by the company,

hence become leftover or waste. For those unusable items, company usually resorts to destruction method though in some cases, it was sent back to the suppliers for better handling. Supplier over-shipping is reported to be a common reason for surplus materials in the case of the company. Suppliers have tendency to ship more than required, which causes extra receipt of the ordered items.

Second reason explaining for the excessive purchased materials in the case of company X is the Minimum Order Quantity (MOQ). The MOQ refers to the least possible quantity of commodity to be sold to the outside organizations in order to generate financial profits or at least achieve the break-even point. In other words, MOQ sets the required smallest amount for a sale order. For example, company X needs total of 300 thread cones and plans to order from supplier Y. However, supplier Y only sells those items with the volume of 400 to be at least. If company Y has any sale orders under 400 quantity, they will suffer financial loss because the manufacturing costs are higher than the sales revenue of those. As a result, the case company has to buy the extra of 100 items to hit the MOQ required by their supplier. MOQ is regarded as one of the external factors accounting for the overbuying concern of purchasing department.

Thirdly, the customers are sometimes held liable to the surplus materials. This takes place when the customer decides to terminate the contract without prior announcement. In that sense, the purchasing staffs carry out the buying activities according to the production plan. The purchasing department has already bought the required materials without being informed of the contract termination from the customers. In addition, sometimes the customers change or update on their product's design but fail to notify the company before their purchasing schedule. As a result, the purchased materials are no longer needed and counted as leftover.

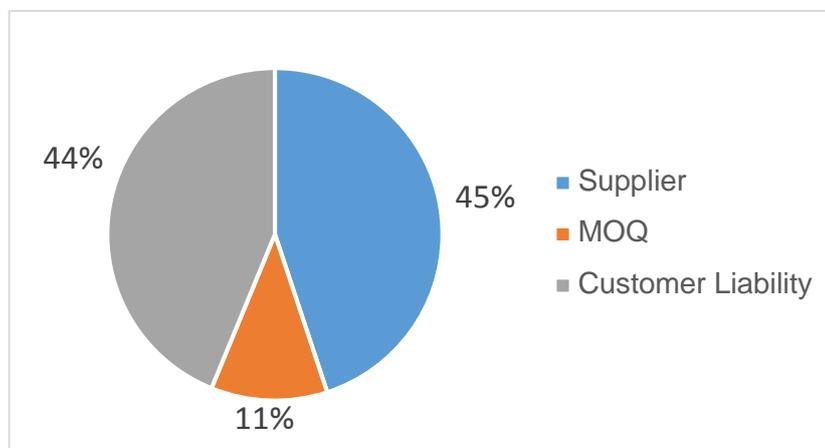


Figure 17. The external reasons for surplus material

Figure 17 illustrates how often each factor would occur as the cause for the over-purchasing of materials. This figure is the aggregate of statistics recorded in the span of January to August from the data regarding seven biggest clients of company X. In general, MOQ does not happen frequently while supplier and customer factors account for most of the cases of extra materials. Concerning the apparel industry which is fast-moving and sensitive to end consumers' preferences, the clients of company X are inclined to design's changes and add-ons. Extra modification at the last minute from the clients results in the unsuitability of priorly-planned materials. In addition, supplier sending glut of goods to make up for the items of bad quality is also the main reason for excessive materials found in the warehouse.

4.3.2 Internal liability

The internal liability relates to the operational outcome of intrafirm functional units. It is affected by the activities carried out by the company's workforce. Whereas external liability refers to the outside business units, the internal liability involves the entities inside the company. Regarding the thesis's topic, there are two major elements which account for the surplus materials procured by the purchasing department: interdepartmental involvement and intradepartmental mistakes.

1. Involvement of other internal departments

Purchasing activities correlate with other operational endeavours carried out by different internal functions. Purchasing clerks collaborate with members from other departments on a regular basis to facilitate the organizational productivity. Therefore, activities operated by other departments have impact on the performance of purchasing personnel. The purchasing function in the case company is no exception to those practices.

In company X, purchasing staffs receive data from WS department in order to place purchase order accordingly. WS is responsible for calculating how much of material needed for the production run. Problem occurs when the calculation is exaggerated, which results in the absolute error to exceed the tolerance. Hence, the order quantity is over-predicted leading to needless materials. In other words, based on the estimation from WS department, the purchasing staffs will calculate the aggregate amount of materials to be procured. Inaccurate estimation causes material surplus. The estimation error takes place during the activity of forecasting the total amount of fabric consumed to produce garments.

In the interviews with purchasing manager and purchasing staffs, it is stated that the estimation inaccuracy is the main reason accounting for the overbuying materials. In this case, fabric is specifically addressed since the company spends the most on buying that material. In monthly purchasing report of all accounts in company X, the company uses the term “Yard Yield (YY) Savings” to refer to the difference between the forecast number and the actual amount being consumed by production. In brief, it indicates how much fabric is saved or unable to be used up after the manufacturing process. By the end of every month, YY savings figure is written down in purchasing report and included in the breakdown sheet of fabric leftover details (see figure 13). There is amount of YY savings reported in all of the accounts, which means every account buys more than needed because of the inaccurate estimation of how much materials will be used for production. Significant variation of booking YY to actual YY results in the high quantity of leftover.

There are lots of determinants which reinforce the inaccuracy of material consumption estimated by from WS department. It can be summed up as two major factors: objective and subjective factors. Objective factor is associated with the operational activities whereas the subjective one relates to the employee’s performance.

Regarding the objective determinant, method of manufacturing garments explains this phenomenon clearly. Before mass production, the company first has to make garment samples or run the pilot to be assessed by the customer. The WS staffs calculate how much materials will be used based on actual material consumption from the samples. In other words, WS department will produce the samples first and later report how much fabric or thread is needed to complete one sample garment. Then, WS will use some special mathematics formula based on that actual figure to come up with the final consumption. This data is later forwarded to the purchasing department to calculate the order quantity. The deviation in calculation is inevitable since this is done manually. In addition, material consumption varies depending on the garment’s specifications such as: style (long or short sleeves, collar, pocket, hood, etc.), size (S, M, L, adult, children, etc.), utilisation (sports, lingerie, dress, etc.) and so forth. The deviation may be trivial for one garment. However, in the production of 1000 garments, the gap between the actual and forecasted figure may be significantly high, which results in the excessive purchased materials.

On the other hand, subjective reason comes from the company’s personnel. To be precise, it involves the WS staffs and their counterparts in purchasing function. In accordance with the interview’s results and author’s own observation, there is lack of efficient communication between purchasing staffs and their colleague in WS department, which is believed to cause

the continuity of overbuying materials concern. WS gives their calculation of material consumption without caring much about the amount of leftover because “dealing with leftover” is the responsibility of purchasing function. When purchaser notices the excessive amount of materials bought through monthly report, he or she does not communicate or work with WS employees as to review or enhance their estimation for the upcoming purchase order. If there is communication on daily basis between purchasers and their WS peers, purchaser is able to discuss the previous and calculation, on top of that, give suggestions or modifications on the material consumption. Purchaser may help to improve the calculation based on their knowledge learnt from generating well-done purchase orders for the similar materials and alike garment’s style. However, in the reality, purchaser does not even know the in-charge person in WS who actually provides the data of material consumption. WS staffs update the data in the integrated virtual platform which can be accessed by purchasing department. It is the commonly-used way to exchange the required information.

In the interviews with purchasing officers, when being asked the reason why there is little interpersonal communication between two departments, the purchasing staffs stated that there was no clear guidelines or requirements by the company to do so. In addition, it is unclear of how they are able help with WS’s calculation since they have no idea of the calculation’s method and formula. Interfering with WS’s business may create additional issues, which ultimately messes up or delays the calculation process. Furthermore, the inter-communication activities are believed to be time-consuming and non-value-adding endeavours. The benefits of interdepartmental collaboration appear to be debatable and unforeseeable to the purchasing staffs as well as the management. As a result, there is no willingness to communicate interpersonally between WS and purchasing department to discuss the estimation of material consumption.

2. Purchaser’s mistakes

In some cases, the purchasing staffs are responsible for buying too much of the materials then required. This occurs because purchaser does not check the leftover from previous purchase order or books with higher extra percentage. Usually company sets the order extra of 3% or 5% depending on the products. Therefore, the purchaser may use 5% instead of 3% decided for those materials. There are some common mistakes caused by the purchaser such as: order from wrong suppliers, purchase inaccurate materials listed in the specifications, incorrect purchase quantity. The wrongly-purchased items cannot be used for production, which eventually become the leftover at some point in the future. These mistakes come from the carelessness and negligence of purchasing staffs when proceeding the purchase order without thorough checking and review. Fortunately, this happens once

in a while as in the course of eight months, there are five cases of booking mistakes reported in account A, C, G in total.

4.4 The consequences of over-purchased materials

There is a saying that goes, “Too much of anything is bad”. This philosophy applies to the situation of excessive materials purchased by the case company as well. The act of over-buying materials brings more harm than good to the company as well as the ecosystem.

4.4.1 To the company

The most noticeable consequence of having surplus materials is the increased costs of purchasing, additional inventory holding costs along with costs of item destruction. In the end of the first half of 2018, the sum of leftover value is reported to be over \$1,5 million dollars whereas surplus fabric accounts for over 61% of the total leftover value. In 2017, the company wasted more than \$3,6 million dollar on those unoptimizable items, which equals to 1,7% compared to the respective net sales. Improving purchasing performance will help to reduce those inefficient costs for overpurchased items.

When surplus materials are recognized, purchaser will measure the usability of those items in order to proceed with the follow-up management of leftover. Many of which can be reused in the next production run or else to be written off. Those which are reusable are stored in a warehouse and will be inspected by Quality Assurance (QA) personnel prior its consumption for the next production session. The purchaser will check the availability of those materials for the quantitative deduction of the next purchase order. All material activities are managed through ERP system.

It costs the company to maintain the overpurchased materials in the warehouse. In order to preserve the quality of materials, it takes efforts and resources to provide the appropriate storage environment such as temperature, humidity, heating and other holding conditions. Atmospheric state is the most influential factor which affects the overall qualitative characteristics of fabric. Two most common damages to the fabric are the changes in colour and the loosening of thread linear density. Careless handling from staffs causes deterioration in the physical dimensions of fabric including scratches and stretch-out. The storage plan is divided into three periods: 1 to 30 days, 30 to 60 days and over 60 days. Usually, the leftover needs to be used in the span of one to two months after being placed in the warehouse. Regarding the materials' quality and inventory holding cost, the second choice (30-60 days) is highly preferred by the production function.

When the leftover is identified as an unproductive entity to the company's operation, it is planned to be destroyed. Purchasing department is responsible for making decision to discard the unusable materials while the warehouse function carries out the activities associated with the demolition of those ones. The destruction activities are outsourced to the local organizations. It is considered as a "double" expenditure to the company as it involves the costs to purchase and to get rid of those materials. On average, the discarded items account for 30% of total value of leftover.

Beside the financial aspect, over-purchasing materials exploit other intangible resources of the company. The company's workforce is required to make additional efforts to handle those materials especially the warehouse personnel. QA staffs may need to conduct the inspection process twice. The first one is when the materials are delivered to the warehouse and the second one is after its storage period. Moreover, it occupies more resources on ERP platform as well as processing time for staffs to input the data on such system. These resources such as efforts and time can be saved up for other value-adding activities.

4.4.2 To the environment

Higher demand leads to higher supply. When the company overbuys materials from its suppliers, more products will be generated leading to greater stress to the environment. The production activities are either modestly or greatly harmful to the ecosystem. In this case, the author refers to the manufacturing process from the company's suppliers including production of fabric, thread and other materials. Among different business industries, the textile dyeing activities are identified as one of the operational endeavours which is the most unfriendly to the environment (Chequer et al. 2013, 153.). The higher amount of fabric purchased by the case company, the more activities of dyeing will be carried out by its suppliers. The issue here is that the case company does not use up all the purchased fabric. As a result, higher amount leftover implies more negative impact on the environment in a completely irrelevant way.

The textile industry uses a solid amount of water for the production endeavours primarily in the process of dyeing and product's finalization. That wastewater generated by the operational process of the textile business is identified as the biggest pollutant among all manufacturing businesses, regarding its discharged volume and its composed elements. The textile industry discharges around 200,000 tons of dyeing wastes annually because of the inefficient dyeing activities. Most of the colouring agents get away from the common treat-

ment for wastewater and remain in the natural habitat, which may constitute threats to human's health to some extent. Up to now, there has been no better method developed to remove the pigment and the poisonous constituents of the dyes disposed to the nature. (Chequer et al. 2013, 152-167.)

Moreover, inventory proceedings are harmful to the environment in various aspects. In order to maintain the environmental conditions of the storage space, the company must use some technical equipment which operates by consuming electronics or other energies. The equipment running produces emission or harmful gases to the ecosystem. In addition, extra transportation of the leftover emits more carbon dioxide or greenhouse gases through the process of burning fuels of the engine.

In summary, excessive materials purchased have negative effects to the environment. It comes from the interfirm operation and intrafirm activities. Unneeded demand reinforces the unnecessary production quantities, putting more stress to the environment. Among all manufacturing activities, the most polluting process is dyeing fabric. Intrafirm operational attempts such as additional activities of the material handling of leftover release emissions to the ecosystem as well.

5 Discussion

This chapter delves into the results of the research. Based on some key takeaways from the empirical data analysis and the theoretical findings, recommendations to improve the situation are presented. Research limitation is also discussed. In addition, author will suggest other readings or research which are believed to be relevant, useful and supplementary to the thesis's concern. Personal reflections through the process of conducting this research are expressed and evaluated.

5.1 Recommendations

This section looks to deliver the answer to the fourth investigative question: How to improve the current situation of material surplus purchased by the case company?. Suitable solutions based on the actual data analysis and theoretical practices will be demonstrated. The author will propose the action plan which is expected to improve the current situation in the areas of purchasing practices, interdepartmental collaboration and surplus disposal attempts.

5.1.1 Purchasing

It has been proved that purchasing has great impact on the specification process (chapter 2.2.2). In this case, the purchasing department should be involved in the activity of calculating material consumption. This does not mean purchasing department needs to merge with WS and carry out the calculation by themselves. Instead, purchasing personnel should contribute their attained knowledge and experiential takeaways of the particular material. As a rule of thumb, purchaser usually obtains in-depth knowledge of the utilization and management of the material, especially those from repeated buying. Since purchasing department has to keep track of leftover amount, they can share their experiences with the encountered items as well as give great observation and evaluation on its consumption history.

In addition, company should carry out training sessions for their employees to understand the operational activities of other departments and how it affects the performance of purchasing function. Employees from other departments should be better aware of the importance of purchasing function as well as its strategic role and contribution to overall firm's success. On top of that, purchasing personnel is required to fully understand their responsibilities and the constraint of their accountability.

Nowadays, many firms have established cross-functional sourcing teams for the enhancement of coordinating and collaborating activities. Cross-functional sourcing teams are made of different functional members who come together in order to facilitate the procurement endeavours or any activities of material management. A research proves that a cross-functional team results in more accurate intrateam communication, more efforts generated, more satisfactory information exchange, team conferences found more helpful. (Trent & Monczka 1994.) In case of the commissioning company, it is possible to put together staffs from Purchasing and WS or warehouse to improve the procurement process and the material's follow-up. However, this may go against the current organizational culture and structure, thus creating chaos, confusion and discontentment in the working environment.

5.1.2 Interdepartmental collaboration

There is an important need to put more emphasis on the joint activities. Instead of intradepartmental meetings, more inter-functional gatherings to update, discuss and tackle the latest issues should be scheduled. On top of that, those meetings will reinforce the participating parties to put more efforts into generating collective decisions and solutions to improve the situation. It is necessary to maintain the frequency of those meetings at the moderate and reasonable level.

In addition, firm should develop guidelines or a manual for interdepartmental collaboration which includes instructions on how to coordinate and exchange information with other departments. The collaboration manual is suggested to point out clearly the specific responsibility of each party throughout the whole business process. This prevents members of one particular function getting confused of their roles or bypassing the other departments' territory. The company should develop KPIs to benchmark and monitor the performance of the internal collaboration.

Since it is difficult to force the collaboration between employees, firm should focus on having some plans to encourage and promote the collaborative efforts and environment within the company. It is important to be reminded of the fact that the core of collaboration happens at the individual level (Stank et al. 2001.). Therefore, firm is recommended to bring forth more informal gatherings such as joint teambuilding or small meetings for the staffs to get to know each other as a purpose of facilitating networking and mutual communication at the personal tier. An appropriate reward system is also useful to encourage more efforts into co-working between the employees.

In order to facilitate the collaboration process, company is advised to locate related departments close to each other. For instance, purchasing and WS are placed in different locations which is almost three kilometres away from each other. Purchasing is located at the head office while WS is situated at the production plant. It is a great hurdle for face-to-face meeting or instant discussion. It is a great rule of thumb that communication through virtual platform is not as effective as physical contact. Therefore, departments with frequent interactions should be located in the same building.

5.1.3 Surplus Disposal

Many methods to dispose surplus materials which are addressed in the theoretical section can be implemented by the company in a practical realm. Chunawalla (2008) suggested five ways to deal with the surplus material (see chapter 2.4.3). However, concerning the company's way of conducting business and the characteristics of the surplus items, there are three options for surplus disposal which are most feasible and beneficial to the firm.

The most efficient option after identifying the surplus item is to circulate it within a firm for different purposes of utilization. The surplus materials of one particular account can be applicable for other ones. In this case, materials with less detailed composition and typical features are most likely to be reused by other internal groups. For instance, packing materials, fabric with neutral or core colours, matching thread colours are commonly circulated within different operational groups for production purposes. In addition, the fabric can be utilized by the human resource department for the purposes of making uniforms for workers or participants of any established internal committees.

The second method is to return those materials to the suppliers. Suppliers have better expertise, knowledge and equipment to handle those items in the most productive way. In order to do this, firm should work on the Service Level Agreement with their suppliers. However, this method brings forth a lot of extra costs to the firm such as transportation costs and other administrative costs especially in the case of foreign organizations. Therefore, firm should conduct a thorough calculation and examination of all related aspects before resorting to this option. It is recommended to develop the budget constraint used as a criterion for better evaluation on the applicability of this method.

The other possible way is to sell it to outside organizations. The surplus materials are usually purchased by small to medium organizations such as local fashion designers, tailor shops or spontaneous retailers. Lots of companies which acquire textile remnants can be

found through the different channels such as Internet platform, established websites, business fairs, telephone switchboards or personal networks.

5.2 Research limitation

As mentioned before, there are lots of factors which contribute to the leftover circumstance. This thesis expresses the factors which are generated by the internal workforce, together with the operational entities including particular procedures, process and activities. The author only looks to improve the surplus materials situation by enhancing the internal performance. However, in order to solve the problem in the most effective way, external factors should be deeply investigated as well.

In addition, the leftover concern relates to different departments. However, the author is granted limited access to other department's resources such as specialized information, daily practices, internal environment or the operational status quo. This restricts the deep-rooted analysis of the phenomenon. The thesis is conducted and viewed through the obtained knowledge, personal perceptions and perspectives of purchasing department, which somehow may be biased and easily manipulated. Actual statistics from company report are used to back up these personal opinions. Nevertheless, in some particular aspects relating to other functions such as interdepartmental communication and collaboration, personal viewpoint is largely used for the study of the concern.

5.3 Suggestions for further reading

In this thesis, interdepartmental collaboration is only developed and investigated through the eyes of purchasing practitioners. It would be interesting to know how it is perceived by other departments as well. As a saying goes, "It takes two to tango", so does collaboration. Therefore, the perspectives of other functional groups should be additionally and equally studied. Further exploration of how other departments think of purchasing function and their relationships with purchasing unit will lead to more in-depth analysis and understanding of the inter-functionally collaborative phenomenon.

Moreover, the methods for surplus disposal which were previously addressed are developed in the way of bringing as much benefits to the company as possible. However, those methods should be additionally examined in the approach of sustainability development, social responsibility and the environmental determinants. Sustainability is crucial to every company in today business. In this case, environmental focus of the methods to dispose surplus materials should be highly emphasized since disposing activities have been proved

to bring forth several damages to the natural habitat one way or another. This also aligns with the company's vision as to become "the most innovative, sustainable and socially responsible apparel manufacturer" (Company X 2018.) in the operating country. Therefore, the author encourages any further study and investigation of sustainable approach to the surplus disposal.

5.4 Personal learning

Up to the present, this thesis has been the biggest project conducted by the author. 76 academic papers including journals, articles, reports as well as textbooks have been used as references for the theoretical assertions of the thesis. The author put a solid amount of time and efforts into researching and examining over 100 intellectual journals in order to determine the diverse theoretical findings which are most suitable to the thesis's topic. Due to that, the author spent months in writing and finishing the thesis. It is a great opportunity to dig deep on the Supply Chain Management insights, or specifically Purchasing practices. The thesis touches on the theories of collaboration and surplus disposal, which is a totally new and challenging subject for the author. It is a supportive platform for the author to develop personal knowledge and better understandings in her specialization study of Supply Chain Management area. In addition, this research assists the author in learning to put into practice all acquired intellectual concepts and comprehension in a particular business case.

Through the process of writing this thesis, the author managed to obtain and enhance various skills in academic and real-life aspects. The major academic competence which had been improved and built up is researching expertise. The author has learnt to look up for information in the most efficient and fastest way giving the most accurate and satisfying results. Together with research skills, other ones such as writing, summarizing, evaluating, data analysing and reading for keywords are elevated to a more advanced level. Besides, the author is able to develop her skills in a professional working environment such as soft skills and computer skills. Some learned soft skills include interviewing, negotiating, interpersonal communication and networking. Using excel and word programme for the storing, processing and representation of information facilitates the enhancement of computing know-hows. All of the expertise that is priorly mentioned is believed to be beneficial and applicable to the future employment of the author.

However, in the process of composing the thesis, there had been a lot of trials and difficulties happening. The most serious obstacle was the obtainment of realistic figures related to company's business. At first, the company refused to provide the data involving financial

performance and operational procedures which are considered as “trading secret” and confidential information. Fortunately, the author has managed to convince the company that all of those data will be kept in strict confidentiality. The data will be used only for the study and analysis of the phenomenon. Eventually, the company gave their consent in sharing the information with the writer to an agreeable degree. Furthermore, the author had a hard time in finding the suitable intellectual papers about the collaboration and surplus disposal theories since it is quietly new and seldom touched upon by the purchasing academics and practitioners. Therefore, it took lots of time and efforts to come up with sufficient theoretical findings of those subjects.

Despite all the trials and tribulations, writing this thesis is a highly positive experience to the author after all. Given this precious opportunity, the author embarked on intensive working on researching along with developing personal competences and knowledge of the chosen topic. This thesis is believed to add values to the author’s career path as a high-performing purchaser and the pursuit of higher education in the future.

References

- Allal-Chérif, O., & Maira, S. 2011. Collaboration as an anti-crisis solution: The role of the procurement function. *International Journal of Physical Distribution & Logistics Management*, 41, 9, pp. 860-877.
- Arnold, J. R. T., Chapman, S. N. & Clive, L. M. 2008. *Introduction to materials management*. 6th edition. Upper Saddle River (NJ): Pearson Education.
- Asumendi, J.M. & Bhat, N. 2014. Volkswagen Prefs: Deep dive in VW cost structure: Future Tracks Cost savings plan. JPMorgan Chase & Company. New York.
- Aswathappa, K. & Bhat, KS. 2009. *Production and Operations Management*. Global Media. Mumbai.
- Baier, C., Hartmann, E. & Moser, R. 2008. Strategic alignment and purchasing efficacy: an exploratory analysis of their impact on financial performance. *Journal of Supply Chain Management*, 44, 4, pp. 36-52.
- Barnes, D. 2001. *Understanding business process*. Routledge.
- Bedey, L., Eklund, S., Najafi, N., Wahrén, W. & Westerlund, K. 2008. *Purchasing Management*. Chalmers. Department of Technology Management and Economics.
- Bogdan, R. C. & Biklen, S. K. 1982. *Qualitative research for education: An introduction to theory and methods*. Boston: Allyn and Bacon.
- Bonciu, F. 2014. The European Economy: From a Linear to a Circular Economy. *Romanian Journal of European Affairs*, 14, 4, pp. 78-91.
- Burt, H.D. & Pinkerton, L.R. 1996. *A Purchasing Manager's Guide to Strategic Proactive Procurement*. AMACOM Division. American Management Association.
- Carter, C. R., Ellram, L. M., & Ready, K. J. 1998. Environmental purchasing: Benchmarking our german counterparts. *International Journal of Purchasing and Materials Management*, 34, 4, pp. 28-38.

Carter, C.R. & Carter, J.R. 1998. Interorganizational determinants of environmental purchasing: Initial evidence from the consumer products industries. *Decision Sciences*, 29, 3, pp. 659-684.

Carter, J.R. & Narasimhan, R. 1996. Is purchasing really strategic?. *International Journal of Purchasing and Materials Management*, 32, 1, pp. 20-28.

Chandrashekar, A. & Dougless, T.C. 1997. Asset recovery: New dynamics for purchasing organizations. *International Journal of Purchasing and Materials Management*, 33, 4, pp. 18-25.

Chandrashekar, A. & Dougless, T.C. 1997. Asset recovery: New dynamics for purchasing organizations. *International Journal of Purchasing and Materials Management*, 33, 4, pp. 18-25.

Chequer, F., Oliveira, G., Ferraz, E., Cardoso, J., Zanoni, M. & Oliveira, D 2013. *Textile Dyes: Dyeing Process and Environmental Impact*. URL: <https://www.intechopen.com/books/eco-friendly-textile-dyeing-and-finishing/textile-dyes-dyeing-process-and-environmental-impact>. Accessed: 15 October 2018.

Choi, M, 2014. *Handbook of Economic Order Quantity Inventory Problems*. Springer.

Chunawalla, S.A, 2008. *Materials and Purchasing Management*. Himalaya Publishing House.

CIPS & NIGP 2016. *Public Procurement Practice Specifications. Principle and Practice of Public Procurement*. URL: <https://www.sbcounty.gov/purchasing/home/pdfs/Specifications.pdf>. Accessed: 1 September, 2018.

Corbin, J.& Strauss, A. 2008. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. Third edition. CA: Sage Publications. Los Angeles.

Datta, A. K. 2006. *Materials Management: Procedures, Text and Cases*. 2nd edition. Prentice Hall of Indian Learning Private Limited. New Delhi.

Denzin, K.N. & Lincoln, S.Y. 2005. *The SAGE Handbook of Qualitative Research*. Third edition. SAGE Publications. United States of America.

Ellinger, A.E., Daugherty, P.J. & Keller, S.B. 2000. The relationship between marketing/logistics interdepartmental integration and performance in U.S. manufacturing firms: An empirical study. *Journal of Business Logistics*, 21, 1, pp. 1-22.

Ellram, L.M. & Carr, A. 1994. Strategic purchasing: A history and review of the literature. *International Journal of Purchasing and Materials Management*, 30, 2, pp. 10-18.

Ellram, L.M. 1992. The Role of Purchasing in Cost Savings Analysis. *International Journal of Purchasing and Materials Management*, 28, 1, pp. 26-33.

Fawcett, S.E. & Fawcett, S.A. 1995. The firm as a value-added system. *International Journal of Physical Distribution & Logistics Management*, 25, 5, pp. 24-43.

Goebel, D.J., Marshall, G.W. & Locander, W.B. 2003. Enhancing purchasing's strategic reputation: Evidence and recommendations for future research. *Journal of Supply Chain Management*, 39, 2, pp. 4-14.

Green, K., Morton, B., & New, S. 1996. Purchasing and Environmental Management: Interactions, Policies and Opportunities. *Business Strategy and the Environment*, 5, pp. 188-197.

Hartley, J.L., Brodke, M., Wheeler, J.V., Wu, Z. & Steward, M.D. 2014. Exploring supply management status, internal collaboration and operating performance. *Operations Management Research*, 7, 1-2, pp. 24-35.

Hoepfl, M. C. 1997. Choosing qualitative research: A primer for technology education. *Journal of Technology Education*, 9, 1, p47-63.

Kahn, K.B. & Mentzer, J.T. 1996. Logistics and interdepartmental integration. *International Journal of Physical Distribution & Logistics Management*, 26, 8, pp. 6-14.

Kanter, R. (1994). Collaborative advantage. *Harvard Business Review*, 72, 4, pp. 96-108.

- Karlsson, C., Nellore, R. & Söderquist, K. 1998. Black Box Engineering: Redefining the Role of Product Specifications. *Journal of Product Innovation Management*, 15, pp. 534-549.
- Kimes, J.D. 1984. Are You Really Managing Your Inventory?. *Management Accounting*, 65, 8, pp. 70-77.
- Lakemond, N., Ferrie, v.E. & Wynstra, F. 2001. A configuration typology for involving purchasing specialists in product development. *Journal of Supply Chain Management*, 37, 4, pp. 11-20.
- Mattos, C. & Laurindo, F. 2015. Collaborative Platforms for Supply Chain Integration: Trajectory, Assimilation of Platforms and Results. *Journal of Technology and Innovation*, 10, 2, pp. 79-92.
- Michaels, R.E., Kumar, A. & Samu, S. 1995. Activity-specific role stress in purchasing. *International Journal of Purchasing and Materials Management*, 31, 1, pp. 11-19.
- Min, H. & Galle, W.P. 2001. Green purchasing practices of US firms. *International Journal of Operations & Production Management*, 21, 9, pp. 1222-1238.
- Min, H., & Galle, W. P. 1997. Green purchasing strategies: Trends and implications. *International Journal of Purchasing and Materials Management*, 33, 3, pp. 10-17.
- Monczka, R., Handfield, R., Guinipero, L. & Patterson, J. 2011. *Purchasing and Supply Chain Management*. Fifth edition. South-Western Cengage Learning.
- Morgan, R.A. 1947. Disposal of Peacetime Surpluses. *National Association of Cost Accountants. NACA Bulletin (pre-1986)*, 28, 19, pp. 1230-1239.
- Muller, M. 2002. *Essentials of Inventory Management*. AMACOM. Saranac Lake.
- Nellore, R. & Söderquist, K 2000. Strategic Outsourcing through Specifications. Working paper serie RMT (WPS 00-07). URL: <http://hal.grenoble-em.com/hal-00455163/document>. Accessed: 1 September, 2018.
- Novack, R.A. & Simco, S.W. 1991. The Industrial Procurement Process: A Supply Chain Perspective. *Journal of Business Logistics*, 12, 1, pp. 145.

Ogbadu, E. 2009. Profitability through effective management of materials. *Journal of Economics and International Finance*, 1, 4, pp. 99-105.

Pearson, J.N., Ellram, L.M. & Carter, C.R. 1996. Status and recognition of the purchasing function in the electronic industry. *International Journal of Purchasing and Materials Management*, 32, 2, pp. 30-36.

Petrescu, M. & Lauer, B. 2017. Qualitative Marketing Research: The State of Journal Publications. *The Qualitative Report*, 22, 9, pp. 2248-2287.

Piasecki, D. 2001. Optimizing economic order quantity. *IIE Solutions*, 33, 1, pp. 30-39.

Plank, R.E., Reid, D.A. & Bates, F. 1994. Barter: An alternative to traditional methods of purchasing. *International Journal of Purchasing and Materials Management*, 30, 2, pp. 52-57.

Quayle, M. 2006. Purchasing and Supply Chain Management. *Information Management*, 19, 1 /2, pp. 1-3.

Rajagopal, S., & Bernard, K. N. 1993. Strategic procurement and competitive advantage. *International Journal of Purchasing and Materials Management*, 29, 4, pp.13-20.

Rossler, P.E. & Hirsz, A.B. 1996. Purchasing's interaction with customers: The effects on customer satisfaction--a case study. *International Journal of Purchasing and Materials Management*, 32, 1, pp. 37-43.

Saldana, J 2011. *Fundamentals of Qualitative Research*. Oxford University Press USA – OSO. Cary.

SAP 2018. What is ERP?. URL: <https://www.sap.com/products/what-is-erp.html>. Accessed: 27 September 2018.

Sarkar, P. 2012. What is Bill of Material (BOM)?. URL: <https://www.onlineclothingstudy.com/2012/12/bill-of-material-bom-format.html>. Accessed: 27 September 2018.

- Saunders, M. N. K. & Lewis, P. & Thornhill, A. 2015. *Research Methods for Business Students*. Seventh edition. Pearson Education Limited. Harlow.
- Sherkin, R. 1999. Purchasing: A new and critical role. *Ivey Business Journal*, 63, 5, pp. 12-15.
- Singh, S. & Garg, D. 2011. Effect of JIT Purchasing Attributes in Automobile Industry (A Case Study). *Productivity*, 51, 4, pp. 360-368.
- Smith, H.O. 1956. Organizing for Disposition of Surplus Materials. *National Association of Cost Accountants. NACA Bulletin (pre-1986)*, 38, 1, pp. 29.
- Stank, T.P., Keller, S.B. & Daugherty, P.J. 2001. Supply chain collaboration and logistical service performance. *Journal of Business Logistics*, 22, 1, pp. 29-48.
- Stanley, L.L. & Wisner, J.D. 1998. Internal service quality in purchasing: An empirical study. *International Journal of Purchasing and Materials Management*, 34, 3, pp. 50-60.
- Tate, W. 2013. *The definitive guide to supply management and procurement*. Pearson Education.
- Tjosvold, D. 1988. Cooperative and Competitive Interdependence Collaboration Between Departments to Serve Customers. *Group & Organization Studies*, 13, 3, pp. 274.
- Trent, R.J. & Monczka, R.M. 1994. Effective cross-functional sourcing teams: Critical success factors. *International Journal of Purchasing and Materials Management*, 30, 4, pp. 3-11.
- Trent, R. J., & Monczka, R. M. 1998. Purchasing and supply management: Trends and changes throughout the 1990s. *International Journal of Purchasing and Materials Management*, 34, 4, pp. 2-11.
- Tungalag, N., Erdenebat, M. & Enkhbat, R. 2017. A Note on Economic Order Quantity Model. *iBusiness*, 9, 4, pp. 74-79.
- Úbeda, R., Alsua, C., & Carrasco, N. 2015. Purchasing models and organizational performance: a study of key strategic tools. *Journal of Business Research*, 68, 2, pp 177–188.

University of Minnesota 2018. Qualitative or Quantitative Data?. URL: <https://cyfar.org/qualitative-or-quantitative-data>. Accessed: 27 September 2018.

Vaccaro, J.P. & Isiltan, T. 1998. The prevalence of barter in magazines: An empirical study. *Journal of professional services marketing*, 17, 2, pp. 31-40.

Van Poucke, E., Matthyssens, P. & Weeren, A. 2016. Enhancing cost savings through early involvement of purchasing professionals in sourcing projects: Bayesian estimation of a structural equation model. *Journal of Purchasing & Supply Management*, 22, 4, pp. 299–310.

Vargo, J.F. 1995. *Understanding product liability*. American Society of Mechanical Engineers. New York.

Vonderembse, M.A. & Tracey, M. 1999. The impact of supplier selection criteria and supplier involvement on manufacturing performance. *Journal of Supply Chain Management*, 35, 3, pp. 33-39.

Weele, J.V. A., 2010. *Purchasing and supply chain management*. Fifth edition. Cengage Learning EMEA.

Williams, A.J., Giunipero, L.C. & Henthorne, T.L. 1994. The cross-functional imperative: The case of marketing and purchasing. *International Journal of Purchasing and Materials Management*, 30, 3, pp. 29.

Willoughby, K.A. 1999. *Modelling assistance for project procurement and disposal decisions*. University of Calgary. Canada.

Winkler, H & Kaluza, B. 2006. Sustainable supply chain networks a new approach for effective waste management. *Waste Management and the Environment III*, 92, pp. 501-510.

Wisner, J. D., Tan, K. & Leong, G. K. 2012. *Principles of supply chain management: A balanced approach*. Third ed. Mason (OH): South-Western Cengage Learning.

Wisner, J.D. & Keah, C.T. 2000. Supply Chain Management and its impact on purchasing. *Journal of Supply Chain Management*, 36, 4, pp. 33-42.

Wisner, J.D. & Stanley, L.L. 1999. Internal relationships and activities associated with high levels of purchasing service quality. *Journal of Supply Chain Management*, 35, 3, pp. 24-32.

Wotela, K. 2016. Towards a Systematic Approach to Reviewing Literature for Interpreting Business and Management Research Results. *Academic Conferences International Limited*. Kidmore End, 6, pp. 338.

Xideas, E. & Moschuris, S. 1998. The influence of product type on the purchasing structure. *European Journal of Marketing*, 32, 11, pp. 974-992.

Appendices

Appendix 1. Interview questions for Purchasing Manager

1. What is the procurement process of your company?
2. What activities are purchasing employees responsible for?
3. What are KPIs for purchasing staffs to be assessed?
4. When do purchasing staffs have to place the order?
5. How do purchasing staffs calculate the purchase quantity?
6. What is the role of Work Study Department?
7. How do purchasing staffs exchange information with other departments?
8. Does purchasing department meet with members from other functions? If yes, please give details on how often the meeting is held.
9. How do you keep track of the amount of surplus materials?
10. What is the limit for the level of surplus materials set by the company?
11. In your opinion, what are the major reasons account for excessive surplus materials?
12. What is the strategy of your company to handle the surplus materials?

Appendix 2. Interview questions for Purchasing Staffs

1. Do you communicate or exchange information with WS staffs?
2. How often do you communicate with WS staffs?
3. Have you ever met the WS staffs for task-related purposes?
4. Do you personally know any of WS staffs?
5. In your opinion, what are the major reasons account for excessive surplus materials?
6. Do you know how WS staffs come up with the quantity of fabric needed to be used?
7. Does your company have any guidelines to instruct the communication between employees from particular departments?
8. How do you handle the surplus materials?