

Table of Contents

1	INTRODUCTION	7
1.1	BACKGROUND	7
1.2	PROBLEM STATEMENT	9
1.3	RESEARCH PURPOSE AND QUESTIONS	10
1.4	DELIMITATIONS	10
1.5	DISPOSITION OF THE THESIS	11
2	FRAMEWORK OF REFERENCE	12
2.1	DEFINITION OF E-PROCUREMENT	12
2.2	PROCUREMENT PROCESS	13
2.3	MRO SUPPLIES	14
2.3.1	TRADITIONAL PROCUREMENT OF MRO SUPPLIES	15
2.3.2	E-PROCUREMENT OF MRO SUPPLIES	17
2.4	EFFICIENCY IN THE E-PROCUREMENT	21
3	METHODS	23
3.1	QUALITATIVE RESEARCH	23
3.2	ABDUCTIVE APPROACH	23
3.3	MULTIPLE CASE STUDIES	23
3.4	LITERATURE STUDIES	24
3.5	SAMPLING AND COLLECTION OF EMPIRICAL DATA	24
3.6	INTERVIEWS	25
3.7	STRUCTURE OF THE ANALYSIS	27
3.7.1	ANALYSIS OF EMPIRICAL DATA	27
3.8	RESEARCH CREDIBILITY	28
4	RESULTS OF EMPIRICAL STUDY	29
4.1	JOB AGENCY	29
4.1.1	CURRENT MRO PROCUREMENT PROCESS	28
4.1.2	BENEFITS OF CURRENT PROCUREMENT PROCESS	30
4.1.3	CHALLENGES OF CURRENT PROCUREMENT PROCESS	30
4.2	MARKETING COMPANY	30
4.2.1	CURRENT MRO PROCUREMENT PROCESS	31
4.2.2	BENEFITS OF CURRENT PROCUREMENT PROCESS	31
4.2.3	CHALLENGES OF CURRENT PROCUREMENT PROCESS	32
4.3	EDUCATIONAL SECTOR	32
4.3.1	CURRENT MRO PROCUREMENT PROCESS	32
4.3.2	BENEFITS OF CURRENT PROCUREMENT PROCESS	33
4.3.3	CHALLENGES OF CURRENT PROCUREMENT PROCESS	34
4.4	CONSULTING SERVICE SECTOR	34
4.4.1	CURRENT MRO PROCUREMENT PROCESS	34
4.4.2	BENEFITS OF CURRENT PROCUREMENT PROCESS	35
4.4.3	CHALLENGES OF CURRENT PROCUREMENT PROCESS	35
4.5	INTERVIEW WITH THE EXPERT	36
4.6	SUMMARY OF THE EMPIRICAL STUDY	36
5	ANALYSIS	39
5.1	HOW DOES E-PROCUREMENT ENHANCE TRADITIONAL PROCUREMENT OF MRO	39

5.1.1	E-PROCUREMENT MODEL	43
5.2	BENEFITS OF MRO E-PROCUREMENT	45
5.3	CHALLENGES OF MRO E-PROCUREMENT	46
6	CONCLUSIONS	48
7	MANAGERIAL IMPLICATIONS	51
8	REFERENCES	52
9	APPENDICES	57

LIST OF FIGURES

Page

Figure 1	The Benefits of an Efficient MRO Supplies Management	8
Figure 2	Disposition of the Thesis	11
Figure 3	Procurement Process	13
Figure 4	MRO Procurement Process	15
Figure 5	Problems in MRO Traditional Procurement	17
Figure 6	MRO E-Procurement Process	18
Figure 7	Benefits of MRO E-Procurement	19
Figure 8	Overview of the Interviews	26
Figure 9	Structure of the Analysis	27
Figure 10	Summary of Empirical Data	38
Figure 11	E-Procurement Model	43

I INTRODUCTION

This introduction part or section starts with presenting the research background, followed by the research problem, the purpose and research questions. Lastly, the delimitation and disposition will be given.

I.1 Background

How to maintain the daily operation if there are no more available supplies and materials within the company? What is the impact of this situation to the business activities, employees and clients? To what extent is an appropriate procurement of Maintenance, Repair and Operations or MRO important for the industry? These are questions which demonstrate the significance of Maintenance, Repair and Operations' supplies in any type of organization. MRO supplies are a small segment of the company operation and may not be needed for the final product but play an important part in order to have a continuous process of activities. According to Gebauer and Segev (2000), MRO can be described as indirect and low value items but, it is essential to keep administrative task, machines and factory running. These include a vast array of items that support internal operations ranging from office supplies to spare parts (DHL MRO Indirect Supply Report, 2009). Proper handling of MRO procurement is important in order to avoid problems that may negatively impact the business operation and result to scarcity or excess of the supplies. According to Jin (2011) MRO procurement plays significant role in the company's cost and profit because it is accounted for 26% of an average ratio of total procurement cost.

Nowadays, companies are starting to realize that MRO procurement can contribute to a sustainable competitive advantage with proper strategies (Bailey, Farmer, Crocker & Jones, 2008). Furthermore, MRO supplies attract more organizations' attention because of the enormous variety, quantity and cost (Islam & Tzu, 2012). The two strategies which are being used by companies when buying MRO supplies are the traditional procurement and the electronic procurement. These strategies have their own characteristics, benefits and challenges for the operation of the organization.

Traditional procurement is mainly face-to-face interaction with the buyers and suppliers. It involves paper-based work and manual handling of transactions such as orders and payments. Using traditional procurement of MRO supplies can be difficult to manage with personal interactions because procuring and maintaining MRO supplies consists of a complex undertaking that often involves several parts, suppliers, inventory stockpiles, and multiple decision makers spread all over a company who have different agendas and little communication with each other (Genesis Solutions, 2002; Foroughi, 2012).

Due to a complexity with traditional procurement, many companies are trying to automate their procurement activity using Information Technology (Larsson & Strandberg, 2006). According to Jonsson (2004), adoption of e-procurement for the procurement process has be-

come common since the year 2000. E-procurement is a non-paper based purchasing process which works in such a way that software enables users to automate transactions and focus mostly on buying organizational activities such as order placement, catalogue management, payment and reporting (Gunasekaran & Ngai, 2008). It is a technological alternative used to improve traditional procurement of MRO and solve challenges. Since e-procurement reduces a company's cost, it also helps to manage purchasing activities and improves productivity (Peleg, Lee & Hausman 2002).

As stated in the report of DHL MRO Indirect Supply (2009), well-managed MRO purchases can bring particular benefits for the efficiency of the company. This can be seen in Figure 1 which shows the significance of efficient procurement of MRO supplies.

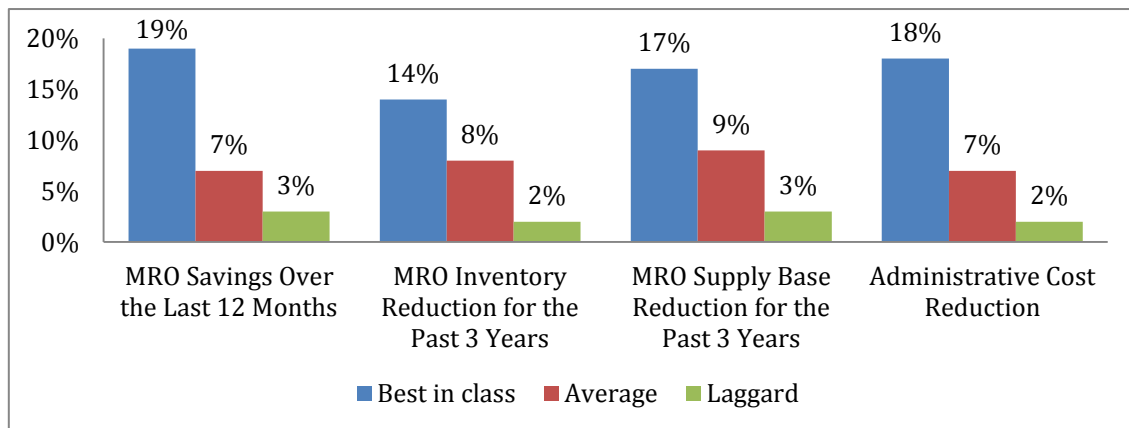


Figure 1: The Benefits of an Efficient MRO Supplies Management
Source: DHL MRO Indirect Supply Report; Supply Chain Management Review(2009)

The above figure presents that the best-in-class companies have reduced MRO cost (Aberdeen Group Study). These companies have well-managed MRO supplies compared with the others. The report reveals that there is a wide gap between these three types of companies.

Many companies are trying to optimize their information technology resources in order to remain competitive in the market (Moore, 2007). According to Foroughi (2007) e-procurement enhances the MRO procurement process in many ways and it can be economically implemented which offers significant return on investment. Reese (2003) claims that e-procurement enhances the traditional process because it enables companies to make better decisions related to rationalizing their supplier by providing a broad overview of the market. Furthermore, Moore (2007) argues that e-procurement can help the organization to maintain lean inventory levels because the inventory databases can be linked to the suppliers' ordering system at which suppliers will automatically replenish inventory levels. Organizations began to plan and strategize the main ally of Information Technology (Joia & Zamot, 2002).

In general, companies adopt either traditional procurement or e-procurement for different reasons. Likewise, the challenges associated with the use of traditional procurement and its impact has led companies to consider e-procurement. The benefits and increasing popularity of e-procurement in MRO supplies are driven by the need to be efficient in the whole trans-

action process in order to reduce cost and save resources. (Gunasekaran, McGaughey, Ngai & Rai, 2009).

1.2 Problem Statement

MRO supplies are used by companies regardless of the industry type, operations or size of the organization. It helps to sustain the operation of any organization. As stated in the report of DHL MRO Indirect Supply (2009), proper management and procurement of MRO supplies can reduce the cost of the company and provide efficiency in the process.

The use of traditional procurement within MRO purchases is still common nowadays and it involves many steps and interaction with other departments and suppliers (BDC report, 2012). As mentioned earlier, there are problems associated with using traditional procurement for instance the delays in the MRO traditional procurement cycle due to mistakes in procurement requisitions, unnecessary and iterative steps in the procurement process, a large number of controls, checking and authorisation, and same-data entry into different applications (Panayiotou, Gayialis & Tatsiopoulos, 2004).

Because of these problems, Sheng (2002) confers that the Internet-based procurement systems would support substantial cost and efficiency improvements. Modern information technologies, such as the use of e-procurement provides support for supply chain management (Foroughi, 2007). This technology can bring cost reduction, time savings and improvement of communications at each step of the MRO acquisitions process. E-procurement helps a company to reduce transaction time, cost for the whole process of procuring MRO and helps the company to be able to purchase the right supplies it needs in a cost effective manner (Foroughi, 2007; Varghese, 2012)

Over the last few years, the adoption of e-procurement has rapidly grown in various organizations. It recently became a major enabler of significant productivity improvements in various businesses (Ageshin, 2001). The literature presented that adopting e-procurement can enhance the traditional procurement process and provides benefits for companies. However, it is not clearly presented on how e-procurement enhances the traditional procurement and which areas are being improved. Therefore, the authors are interested in contributing to this gap and investigating as to how e-procurement increases efficiency to the traditional procurement. Several literature concerned with e-procurement adoption, benefits for the buyer and suppliers and driving factors for the organizations but have little coverage on the MRO supplies procurement and its impact on the process as opposed to traditional procurement of MRO supplies (Islam and Tzu, 2012). Also, there has been very little information regarding procurement of MRO supplies within small-sized companies. As a result, the authors are challenged to contribute within this gap focusing on the MRO supplies within small-sized companies in the Netherlands.

I.3 Research Purpose and Questions

The purpose of the research is to analyse how e-procurement enhances traditional procurement process of MRO supplies within the small-sized companies in the Netherlands.

In order to achieve the research purpose, it is important to identify questions which could guide in focusing areas to study. Therefore, the research questions are:

1. How does e-procurement enhance the traditional procurement of MRO supplies within the small-sized companies in the Netherlands?
2. What are the challenges and benefits of MRO e-procurement to the small-sized companies in the Netherlands?

I.4 Delimitations

This thesis discusses only the MRO procurement process on the buyer's side and not the seller's side. Since MRO supplies consist of diverse items, the thesis primarily concentrated on the office supplies because of the difficulty in finding companies engaged in buying equipments or other repairing materials in the Netherlands. Furthermore, the authors focused on the concept of e-procurement in general as applied to MRO supplies and not on the various e-procurement types such e-auctions, e-markets and many more in order to avoid confusions for the readers.

I.5 Disposition of the Thesis

In this section the disposition outlines the structure of the research. The study is composed of seven chapters plus appendix and references.

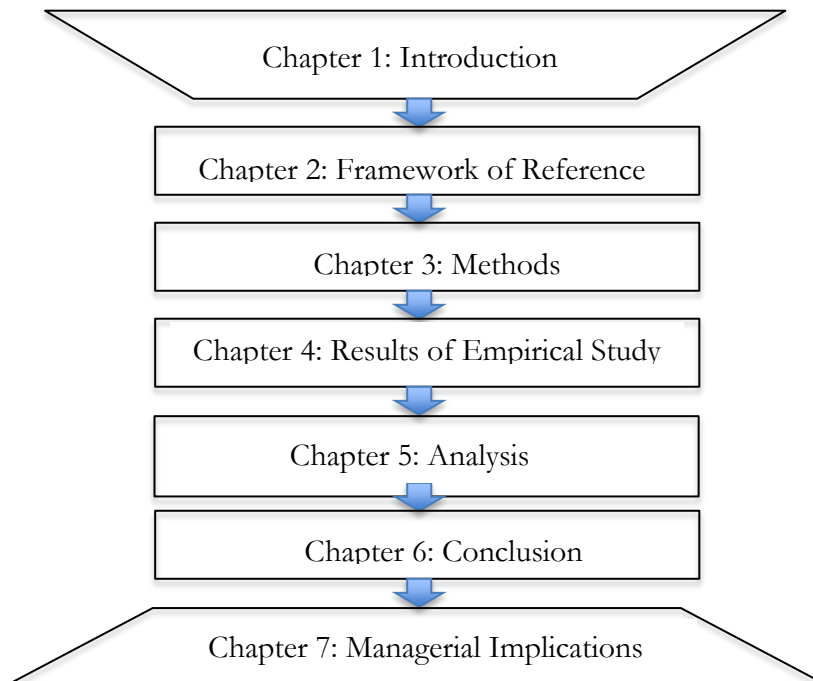


Figure 2 : Disposition of the thesis

- Chapter 1** This chapter outlines the background of the research and problems followed by the stated purpose.
- Chapter 2** This chapter aims to provide theories that cover the relevant issues for the research and the guide for answering the questions and meeting the purpose. It involves e-procurement, MRO supplies, the traditional procurement and e-procurement and the efficiency impact.
- Chapter 3** This chapter shows the methods and approach being used in carrying the research. It explains the process and the gathering of data both secondary and primary.
- Chapter 4** This chapter presents the empirical data derived from the interviews of the sample companies. It consists the background of the companies, current procurement process and problems related to the process.
- Chapter 5** The chapter presents the analysis of the authors based on the empirical study and framework of reference.
- Chapter 6** This chapter shows the conclusion and returns to the purpose of the thesis and answer the research questions.
- Chapter 7** This chapter presents the managerial insights and guidance for further research regarding the topic.

2 FRAMEWORK OF REFERENCE

This section starts with presenting the definition of e-procurement and MRO supplies, followed by the traditional procurement of MRO supplies including the challenges. Next, is the MRO e-procurement together with the benefits and challenges followed by the impact on procurement efficiency.

2.1 Definition of E-Procurement

E-procurement focuses on creating efficiencies and their goal is to make the traditional purchasing procedures more efficient and cost effective (Wu, 2007; Turban, King, Lee & Viehland, 2006). It has become popular nowadays and has rapidly become a successful and ever-going reality (Puschmann & Alt, 2005). As parallel to this popularity, it is vital to understand the scope of e-procurement. The literature presented various definitions, characteristics, frameworks and practices of e-procurement. For instance, Carayannis and Popescu (2005) assert that electronic procurement has been widely described, in its most basic form, as using electronic means using the internet, web or email to buy products and services over the Internet while Moon (2005) argues the use of reverse actions, purchasing cards and integrated automatic system in the e-procurement. Nonetheless, McConnell (2009) claims that authors perceived the description of e-procurement in different ways because they tend to look from different standpoints involving economic and geographical areas. For example, Muffato and Payaro (2004) link e-procurement to the industry of motorcycles while Hawking, Stein, Wyld and Foster (2004) associate e-procurement to the SME's sector.

The diverse viewpoint about e-procurement has sometimes led to confusion for some people and industries. There are also instances finding the exact difference between e-procurement to e-purchasing. Thus, Przymus (2003) simplifies and suggests that e-procurement is the acquisition of goods and services without the use of paper procedures. Regarding the non-paper based process, e-procurement is the streamlining of corporate purchasing processes by eliminating traditional paper-based documents such as purchase orders and requisition forms (Teo, Wei & Benbasat, 2003). In application to the MRO purchase, this means that e-procurement is being done online which lessens the used of any paper works. One of the explanations of e-procurement is provided by de Boer, Harink and Heijboer (2002) which details that e-procurement refers to the process of creating and approving purchasing requisitions, placing purchase orders and receiving the goods or services ordered via a software system based on Internet technology.

In this thesis the definition being used is from Coyle, Langley, Novack and Gibson (2013) stating that “*e-procurement is the use of electronic capabilities to conduct activities and process relating to procurement such as buying, selling, processing and negotiating.*”



2.2 Procurement Process

In this section the process of procurement in general will be presented.

The process of procurement has become complex because of the involvement of several functions. These functions may differ within companies regardless of industry type and procurement needs. Van Weele (2002) states that the procurement process varies depending on if the purchase concerns a new-task situation, a modified rebuy or straight rebuy. In the literature, several procurement processes have been presented but described in similar ways. For instance, Rizal (2010) shows procurement process from requirement needs, sourcing, vendor selection, order processing, processing, purchase order monitoring, good receipt, invoice verification and payment processing. However, in this thesis the procurement process summarized by Larsson and Strandberg (2006) is used. Neef (2001), claims that the activities below are good potential to be transferred to e-procurement.



Figure 3: Procurement Process
Source: Larsson and Strandberg (2006)

Supplier Selection

Every company has its own way of selecting suppliers. According to Van Weele (2002) one strategy to select supplier is to arrange an agreement with a specific supplier for the delivery of the products. Competitive bidding within the supplier can be another approach and the bidding starts with a request for quotation (Larsson & Strandberg, 2006; Turban, King & Chung, 1999).

Request for Quotation

According to Wise (2011) request for quotation consists of terms such as quantity, determination of product options, and final pricing or delivery terms. After the selection process, the companies can give the RFQ to the suppliers. This process often requires much communication between the buyer and the concerned suppliers, since requests often include much information that has to be discussed and questioned (Neef, 2001). Larsson and Strandberg (2006), stated that RFQ can be sent through post or email.

Signing of Contract

This is the process where the buyers have selected the supplier for the company. According to Neef (2001) the signing of contract involves approvals regarding technicalities and finan-

cials. This results in negotiations between the buyer and supplier in order to establish an agreement and thereby a contract where both parties are satisfied (Van Weele, 2002).

Order Placement

Van Weele (2002), argues that based on the agreement in the signed contract of the terms, conditions and legal, the buyer will place a purchase order with the selected supplier. In the traditional way, this is done by collecting the paperwork and the information is transferred, by hand, to a purchase order form and then usually faxed to suppliers and accompanied further by phone calls to confirm the receipt (Larsson & Strandberg, 2006). Paper-based order placements are sometimes prone to errors and sometimes discovered late but the online order form will be rejected if there are any errors, so the customer can correct it immediately (Giunipero & Sawchuk, 2000).

Delivery and Receiving Supplies

According to Larsson and Strandberg (2006) this is the stage of checking the packing slips and describing the content of the shipment. Dobler and Burt (1996) state that in order to reduce administrative costs to this activity, the receiving can be done using an online computer-based system, coupled with bar code order identification or by having the receiving report filled in electronically.

Payment

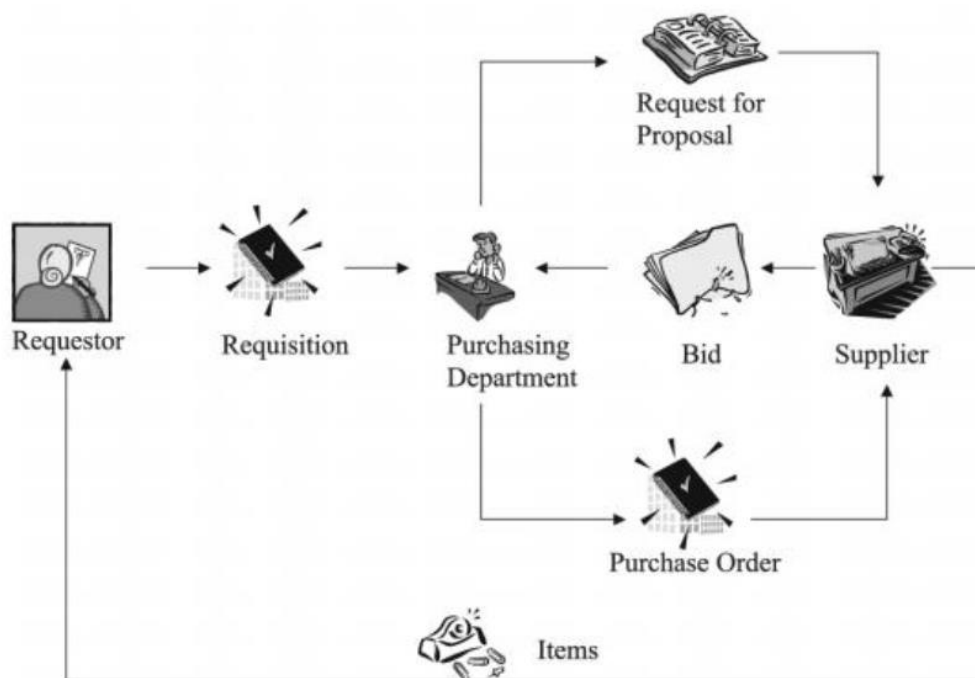
Payment method can be done traditionally or online. However, Dobler and Burt (1996) claim that a usual process consists of an immediate control of the purchase order, receiving the report and the invoice and if everything is correct, payment is carried out.

2.3 MRO Supplies

Gelderman, Semeijn and Lek (2008), defined MRO as supplies consumed by a firm rather than used to form its output. MRO supplies are indirect goods or non-production goods which are vital for the everyday operations of the company but may not be important to the production of final goods (Gelderman et al 2008). MRO supplies indicate to the non-productive materials which are used by the companies to assure regular work of productions and facilities (Meier and Stormer, 2009). Neef (2001) describes MRO supplies as blue collar type of procurement which is frequently sourced from single suppliers. Furthermore, Gebauer and Segev (2000) argue that MRO supplies are associated with inefficient procurement procedures and managed by non-purchasing experts. On the other hand, Gelderman et al (2008) link MRO supplies to a considerable waste of money, time personal capacity and holds excessive stock and unsatisfied internal customers. In this thesis the definition of MRO being used is from Jin (2011) stating “*MRO are supplies which used on daily business transactions related to equipment, office supplies and other materials and may include also the fuels required for the production, services and other tangible assets.*”

2.3.1 Traditional Procurement of MRO Supplies

MRO supplies are important to run the business. They might be a small part for the company but still play a critical role. According to Michalides, Ho, Boughton and Kehoe (2003), MRO procurement process indicates that companies buy MRO supplies by assigning an order with a number of suppliers through internal documentation like purchase requisition and orders from the procurement department of the company. In handling the request of MRO supplies, DHL MRO Indirect Supply Report (2009) shows that MRO supply functions have operated in a silo separate from many companies' particular procurement departments; and while most procurement activities have moved to centralized procurement experts, MRO supplies have continued to be managed at a site level with little or no system support. Since, little or no support has been given to the MRO supplies within traditional procurement, it produces various problems. As a result, MRO supplies are ordered inappropriately and stored in warehouses or stock rooms which increased the MRO inventories, low level of productivity and supplies obsolescence (DHL MRO Indirect Supply Report, 2009). To get a profound understanding of the traditional procurement process when dealing with MRO supplies, the illustration made by Keen and McDonald (2000) is used.



*Figure 4: MRO Procurement Process
Source: Keen and McDonald (2000)*

Request: The process begins from the requestor's request and submission of purchasing request to the purchasing department. According to Keen and McDonald (2000) the requestor fills out the requisition for the supplies/ equipment /services required for a given department or project. The requestor can be an individual person or the department of the entire organization.

Purchasing Department: Keen and McDonald (2000) claim that the next stage is the execution of the purchasing activities by the purchasing department that will send out a request for proposal to locate supplies or directly purchase an order. The request for proposal is sometimes called as request for information (RFI) or request for quotation (RFQ). Purchasing department employees are taking care for a lot of tasks (Keen & McDonald, 2000). For instance, locating supplier/s, sending the order, checking on the shipment status, handling all the associated paperwork, and dealing with payments. Moreover, the purchasing department selects the best supplier based on a company's requirements (for example: low price, high quality, fast delivery, easy and fast communication with suppliers) and send the purchase orders (Keen & McDonald, 2000).

Delivery: Keen and McDonald (2000) state that after suppliers receives the orders, the MRO items will be delivered to the company or the requestor.

2.3.1.1 Problems of MRO Traditional Procurement

In the literature, different problems linked with the traditional buying process of MRO are mentioned. Kong and Gray (2006) claim that traditional procurement is time consuming because of the different stages and phase of the process. Additionally, Alan Daniel stated during the interview with Atkinson (2002) that the large spending of the company in MRO procurement is mainly for the transaction process which brings inefficiency and difficulties. According to Hawking et al (2004) traditional procurement is based on slow manual processes and even slower processes for handling transactions. Some challenges which consumed a lot of time in traditional procurement are checking of errors and invoicing. Furthermore, Van Weele (2005) and Le Sueur and Dale (1998) said that the most common challenges in procuring MRO supplies are; disproportional workload, an extensive range of items and suppliers, many company-specific items and a low and irregular demand for items. Other challenges associated in traditional MRO procurement are inefficient buying of MRO, redundant and disconnected processes and maverick buying (Subramaniam & Shaw, 2004). Due to these problems, the efficiency and satisfaction level of the companies are at risk.

In line with the risk to the efficiency level of the company, Puschmann and Alt (2005) argue that the paper-prone and labor intensive processes for MRO procurement cause large inefficiency and considerable error potential. This statement has been proven based on the literature revealing the errors in requisitions and invoicing, time delays and unnecessary steps in procuring MRO. Due to these challenges, many firms are still missing opportunities for efficiency savings in their MRO buying because MRO supplies are often purchased outside the formal purchasing organization, and user-friendly tools are not available to support this process (Kilpatrick, 2001).

The DHL MRO Indirect Supply Report (2009) enumerates key problems in the traditional procurement of MRO and these are; end users lack of complete understanding and transparency of MRO cost, supply chains are fragmented and inefficient, manufacturers lack of visibility into their MRO supply chain and spend much time ordering and finding parts. All these key problems are related to the handling of suppliers, purchasing processes of MRO, cost related issues and time cycle. Moreover, McConnell (2009) has summarized and seg-

mented the problems that MRO traditional procurement brings to the companies. He segmented it into sections; *process*, *people* and *compliance* issues.

Process	
Slow Manual and Transaction Process	Large Volume of Paper Generated
Increased Handling Errors	Complicated Procedures
Difficulties Expediting Delivery	Bureaucratic Processes
Excessive State Intervention	Too Many Suppliers
Lack of Centralised Control	Lack of Buyer Influence
Lack of Product Standardisation	
People	
Resistance to Change	Low Regard for Procurement
Compliance	
Ignoring Strategic Procurement	

Figure 5: Problems in MRO Traditional Procurement
Source: McConnell (2009)

The figure above shows the different themes of problems in the traditional procurement. It can be seen that the process section has the most problems occurring in the buying of MRO supplies. This can be linked to the issues related to slow transactions and chaotic management mentioned by other authors.

To summarize, traditional procurement of MRO supplies is time consuming, inefficient in the process, slow in execution of transaction, a disproportional balance of workload and considered potential to errors which increases administrative and inventory cost. It involves large volume of paper-based works and documents, bureaucratic process because of additional checking and authorization, search and negotiation time, order processing and slow information exchange.

2.3.2 E-Procurement of MRO Supplies

As mentioned previously, e-procurement has gained popularity because of the benefits acquired. According to Genesis Solutions (2002) procurement of MRO supplies is a complex undertaking, often involving several items and suppliers who have different agendas and little communication with each other. In line with this, the adoption of MRO e-procurement can help to enhance the traditional way of MRO procurement. The use of e-procurement

makes a significant impact to reduce MRO procurement costs, order lead times, inventory stock levels and maverick purchasing (Singer, 2003).

According to Varghese (2012), the aim of e-procurement is to be able to purchase the right supplies in a time and cost effective manner. With the use of advanced information technology, MRO buyers can have easy access to the various MRO supplies. By having the opportunity to evaluate the offers of the suppliers, it could help the company to find the best, cost saving and effective supplier. Furthermore, the process of authorization, payment methods and reporting are done electronically. Verghese (2012) states that the reduction in maverick spending and maintaining inventory levels can help the companies or buyers to save between 5-10%. Paperless communication and invoicing saves from 50-70% of time required when using e-procurement (Varghese, 2012).

In order to understand the process of e-procurement of MRO supplies, an illustration will be used (Hammer & Champy, 1993). This will help to differentiate from the traditional procurement. The figure below indicates the involvement of electronic systems in performing the steps.

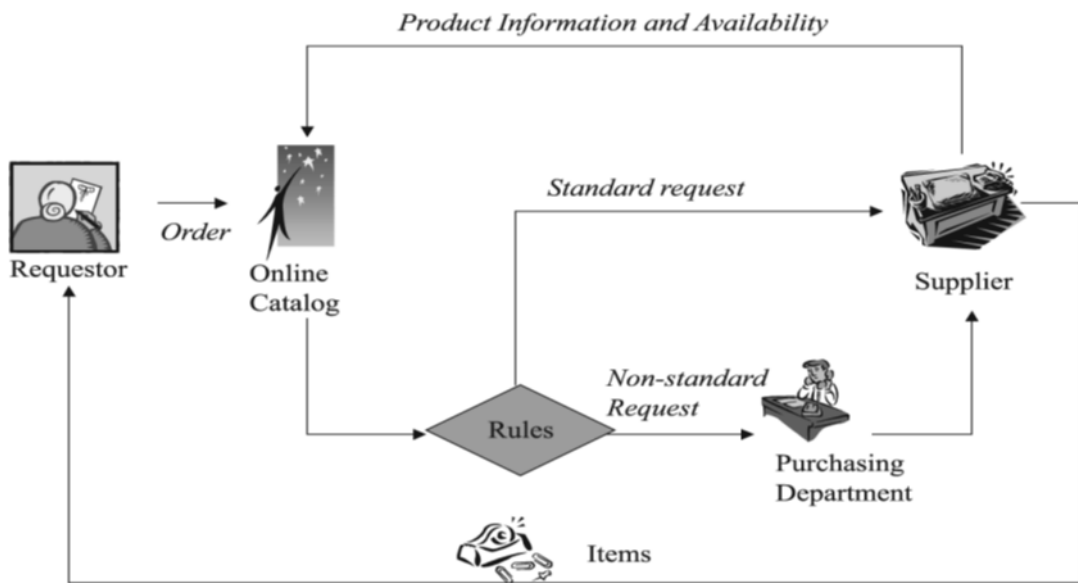


Figure 6: MRO E-Procurement Process
Source: Hammer and Champy (1993)

As shown in the figure above, online catalog offers an opportunity for the initiator of the process to interact with parties involved.

Requestor

After identifying which MRO supplies are needed, the requestor will use the online catalog to find products and identify a potential provider. The requestor can be a direct user of a person-in-charge in buying products (Hammer & Champy, 1993)

Online Catalog

This refers to an online access tool which has the opportunity to show offers. Based on the figure above, the requestors directly browse the online catalog in order to find the products' information and availability as well as the corresponding rules (Hammer & Champy, 1993).

Standard and Non-Standard Request

The standard request will be sent directly to the supplier while the non-standard to the purchasing department and this department will communicate with the supplier. After the supplier receives the request, the standard items will be delivered to the requestor. For the non-standard items, the product information and availability will be posted on the online catalog that the requestor has access to.

Purchasing Department

Based on the figure above, the purchasing department deals with the non-standard request and communicates to the suppliers regarding to this request.

2.3.2.1 Benefits of MRO E-Procurement

The benefits of e-procurement drive the companies to shift from the traditional process. McConnell (2009) claims that a number of key benefits identified in the relation to private sector organizations relate to reducing costs as the achievement of these is one of the key attractions of e-procurement. McConnell (2009) has summarized and segmented the benefits of implementing e-procurement. This can be seen in the figure below.

Process	
Improved Buyer/Supplier Relationship	Reduced Price
Reduced Administrative Cost	Reduced Inventory Cost
Improved Management Information & Communication	Lower Cycle Times
People	
Improved Citizen Services	
Compliance	
Improved Financial Control	Improved Contract Compliance

Figure 7: Benefits of MRO E-Procurement
Source: McConnell (2009)

In the figure above, McConnell (2009) associated the cost to the administrative and inventory which impacts to the profit of a company. On the other hand, Coyle et al (2013) state the benefits of the e-procurement as follows:

- **Operating Cost**
 - Reduce Paperwork
 - Reduce Sourcing Time
 - Improve Control Over Inventory and Spending
- **Procurement and Sourcing Efficiency**
 - Find New Supply Sources
 - Improve Communications
 - Improve Personnel Use
 - Lower Cycle Times
- **Procurement Prices**
 - Improve Comparison Shopping
 - Reduce Overall Prices Paid

Furthermore, a benefit revealed by Reese (2003) stating that e-procurement enables companies to make better decisions related to rationalizing their supplier base by providing a broad overview of the market. This covers the large numbers of suppliers that handle the **different** offers. Bedell (2002) argues that CFOs can have confidence that employees are adhering to corporate contracts made with suppliers, trace company spending trends, and negotiate better prices on future contracts.

Several researches have also reveal the benefits of the MRO e-procurement, such as the reduction of errors made by the employee, increased internal customer satisfaction to the end-users because of the readiness of supplies in maintenance, repair and operation, wider geographical coverage to find the best supplier, convenience in purchasing supplies, improved relationship and collaboration between suppliers and buyers.

To summarize, there are benefits which a company can take advantage of when using e-procurement within MRO purchase. These are the faster execution of each procurement process, increase efficiency, less cycle time, transparent buying, able to handle large numbers of suppliers, less paper-based works, reduction of cost and errors and most importantly the accuracy in handling MRO supplies. The benefits have impacts on the operations and could help the company to solve the challenges associated with the traditional procurement process.

2.3.2.2 Challenges of MRO E-Procurement

The success of adopting e-procurement varies across different companies. Some companies invest for the technological application of e-procurement and they prosper in achieving their goals but others fail. It is vital to understand that there are factors which trigger the success or failure of implementing e-procurement. Despite the advantages given by adopting MRO e-procurement, there are threats which should be taken into careful consideration. Varghese

(2012) presented a summary of the problems in MRO e-procurement which consist of lack of IT infrastructure, company culture and diminishing inventory.

Bedell (2002) claims that suppliers need to have the capacity to handle different e-procurement systems customers. The incompatibility of the platform also varies from the investment ability, size and type of the organizations. Some companies do not want to invest much in their technology regarding the procurement of MRO supplies. Moore (2003) argues that most companies are still using decades-old equipment and parts whose documentation is paper-based and lacks the digital format necessary for e-procurement systems. They may lack the IT infrastructure and capital necessary to provide e-procurement and fear that e-procurement will enable buyers to leverage price concessions (Singer, 2003). Another challenge mentioned by Varghese (2012) is the culture of the company. The culture involves how ready the people within the company are to use e-procurement. It is necessary that employees are well-trained and have the knowledge to use the system. Bedell (2002) claims that since e-procurement systems are a self-service tool, end users sometimes resists using it. Employees are said to comply with the purchase of contracted items only 65% of the time, causing companies to miss out on the 22% in cost reductions possible through compliance with contract terms (Aberdeen, 2006).

The last challenge cited by Varghese (2012) is the diminishing inventory. After the successful adoption of e-procurement, the dependencies on several links will increase which can cause disruption in the production of supply chain (Varghese, 2012). Several companies would prefer buying MRO products directly to the supplier rather than online. However, Singer (2003) argues that they are overlooking problems of traditional MRO procurement like excess safety stocks and the impact of delays on work order planning and scheduling which might cause destruction to the production or operation of the business.

To sum up, in spite of the advantages given by the implementation of MRO e-procurement, it is vital to take control of several factors such as the compatibility of the platforms, readiness of the employees, and inventory control.

2.4 Efficiency in the E-Procurement

Efficiency refers to the relationship between planned and actual sacrifices made in order to realize a previously established goal (Van Weele, 2005). Purchasing efficiency typically includes the time involved and the number of steps required to complete an order. A main attribute of increased procurement process efficiency might be the reduction of product searching costs and time: e-catalogues could be defined and uploaded by the supplier or third party without requiring the customer to be highly involved (Atkinson, 2000). Croom (2005), states that an important objective of e-business is an overall reduction of procurement process costs. The main value-adding mechanism for e-MRO procurement lies in the reduction of transaction costs (Knudsen, 2003) .

A study in automotive industries revealed that improved procurement efficiency in general and control over maverick spending in particular are benefits that have both been realized as expected for non-production goods (Howard et al., 2006). Croom and Johnston (2003) state

that employees with access to e-procurement systems appreciate their “ease and speed of use” and now refrain from such maverick purchases. According to Puschmann and Alt (2005) another way of increasing the efficiency of the MRO procurement process is by lowering the number of authorization stages. Based on a benchmark study of five companies that successfully implemented e-marketplaces for indirect procurement, Puschmann and Alt (2005) found the reduction of authorization stages is an e-marketplace effect that significantly contributes to a more efficient MRO procurement.

E-procurement systems can provide automatic requisition approval based upon authorization rules (Kim & Shunk, 2004). Puschmann and Alt (2005) argue that the implementation of e-marketplaces has provided organizations the opportunity to redesign business processes. Howard et al. (2006) have conducted a case study at Ford Motor Company demonstrating that minimizing paper transactions is a benefit both expected and realized. In the empirical study by Croom (2005), 46% of the respondents expected the adoption of e-procurement to improve the information flow with their supply-chain partners. In business, time is valuable as a matter of money, which in other words is, the more an organization can lower staff time included in buying, the faster it issues a purchase order, the more it can diminish operational costs.



3 METHODS

This part starts with presenting the qualitative type of research, abductive approach, case study as a strategy and literature studies. Next, the sampling and collection of empirical data will be discussed, followed by interview process, structure and analysis of empirical results and lastly the research credibility.

3.1 Qualitative Research

Saunders et al. (2009) presented two different research directions - quantitative method and qualitative method. Quantitative is applied to generate or use numerical data by implementing any data collection technique (such as questionnaire) or data analysis (such as graphs or statistics) while qualitative is applied for non-numerical data by implementing data collection technique (such as interview) or data analysis procedure (Saunders et al, 2009).

From a wider perspective it can be said that qualitative research is used to explore meaning and patterns, inconsistencies and conflicts in people's thoughts and behaviors (Jaye, 2002). It concentrates on words and observations to express reality and attempts to describe people in natural situations (Amaratunga, Baldry, Sarshar & Newton, 2002). There is a criticism against qualitative methods since it is hard to provide the necessary credibility for the results; the problem arises because qualitative is an observation based method where different observers may record different results and observations (Seale & Silverman, 1996). In scientific research qualitative research is often used to study phenomena about which relatively little is known. This is of high importance in the context of this thesis since MRO e-procurement is not widely used and the sources of information are limited. Considering the previously mentioned arguments, the authors are using qualitative method research in order to generate and analyze data deeply and precisely.

3.2 Abductive Approach

There are different ways or approaches that are deemed necessary to put into consideration while conducting research. According to Yin (2003), when approaching research work, the best method to be adopted for the study depends solely on the research purpose of that study. Research approach can be divided into three categories namely: deductive, inductive and abductive. Deductive research looks at the theory in general and latter narrows it down to the specific. While, inductive approach is in which data will be collected to develop theory as a result of the data analysis (Saunders, Lewis & Thornhill, 2009). In this research, the abductive approach has been used. According to Saunders et al (2009) abduction is a combination of inductive and deductive approach and instead of moving from theory to data or data to theory an abductive approach moves back and forth. The theories relevant to answer the research questions and meet the purpose are being collected and discussed. The theories are firstly presented in general perspective. Then the authors collected primary data to specify and develop theories.

3.3 Multiple Case Studies

Research strategy, which might be employed in a business research as Saunders et al. (2009) stated, are as follows: experiment, survey, case study, action research, grounded theory, ethnography, and archival research. None of them is superior or inferior when it comes to the question of which to implement. The guide of choosing one suitable strategy as Saunders et al. (2009) explained is whether it will help you answer your research questions and fulfill your

objectives. It also depends on the extent of existing knowledge, the amount of time and other resources at hand as well as the philosophical underpinnings.

The strategy chosen for this research is case study, specifically multiple case studies. As stated by Robson (2002), a case study is a strategy for doing research, which involved an empirical investigation of particular contemporary phenomenon within its real context. A multiple case studies focused upon the need to establish whether the finding of the first case occurred in other cases and, as a consequence, the need to generalize from these findings (Saunders et al. 2009). The authors used multiple case studies instead of single case because the research covers companies from different industries. Furthermore, the authors would like to know whether the findings in one company is the same as the rest. Also, a single case study is limited in generalizability and several information processing biases (Eisenhardt, 1989). To react to this bias is by applying multiple-case studies (Leonard & Barton, 1990).

3.4 Literature Studies

In order to gather more ideas to support the purpose of the research and guidance to answer the research questions, a literature study is needed. This study contains concepts such as e-procurement, maintenance repair operations, traditional procurement and the adoption of e-procurement within MRO. Consequently, first an essential literature study related to the concepts was conducted by the authors in order to get a wider perspective and familiarity within the issues. This was done at Jönköping University library using available library resources. Also, the authors asked the assistance of the employees in the library in order to locate suitable literature. The data collection in this context means to read literature and study the reality through interviews. Thereafter, relevant articles were searched in the library's databases by subject using ProQuest ABI/INFORM, Emerald, ScienceDirect and Taylor & Francis ebooks. Moreover, journals from Industrial Marketing Management, Information Resources Management, European Management Journal and International Journal of Purchasing and Materials Management were used. Next to that, topics related to the concepts were searched. The aim of the literature review is to give insights about the general perspective of e-procurement and traditional procurement within MRO supplies.

3.5 Sampling and Collection of Empirical Data

Knowing how and where to collect empirical data is important to every research because it gives an understanding for the formulation of the conclusion. One of the methods in collecting empirical data is through an interview. But before the interview process, it is important to identify which sample of companies, groups or objects are going to be involved in the research. There are two types when selecting a sample; one is probability and the other is non-probability. According to Saunders et al (2009) in probability sample, the chance or probability of each case being selected from the population is known while the probability of case being selected is unknown to the non-probability sample. In non-probability, there is no sampling framework. This is often the case when sensitive and personal data is collected based on trust between the researcher and the participants (Blaxter, Hughes & Tight, 2006).

In this research, a non-probability sampling has been selected or to be more exact, a purposive sampling method. Purposive sampling the authors need to use judgment to select cases that will best enable them to answer the research questions and meet the purpose (Saunders et al 2009). Therefore, the sample companies from the Netherlands were chosen through existing contacts within the authors professional networks. Prior to the interviews with the companies from the Netherlands, the authors had interviewed four companies from Russia,

Philippines, Sweden and France. However, the authors decided to eliminate these countries because of the risk of getting reliable findings due to the variances of countries. Furthermore, interviewing one company per country would not add a credible outcome to draw a conclusion. The changing of countries has led to more specific and focused interviews for the new sample companies in the Netherlands. It serves as a baseline in concentrating areas which are more relevant in helping to meet the research purpose and answer the research questions.

The process of contacting the companies from the Netherlands started by sending emails and followed up by a telephone call. From the 5 contacted companies, 4 agreed to participate in the research. The companies were chosen because they were aligned to the focus area of the research, capable in helping to answer our research questions and were based on the authors' research criteria such as the need of MRO supplies in the company and the regular or non-regular buying of the items. The companies are small-sized organizations and from different industry sectors. By having different types of industries, it ensures a broad representation of the companies' procurement process of MRO in the Netherlands. Additionally, the authors have asked the help of the supervisor Mr. Per Skoglund in finding an expert within procurement. The aim of the authors to interview an expert was to gain more insights regarding e-procurement areas. The supervisor gave two contacts and at the end, only one expert contacted by the authors agreed to participate in the interview. The expert is a professor from Audencia Nantes School of Management in France who has a profound knowledge about the focus of the research. In total, the study carried out for this thesis was based on 8 interviews.

3.6 Interviews

In order to gain more understanding on how empirical data has been collected, the process of the interview will be explained in this section. According to Saunders et al (2009) interviews can be standardized or non-standardized. In this research a non-standardized interview has been applied which involves a one-on-one interview with the respondent. In the interview, a semi-structured interview was used by the authors which dealt with a set of themes prepared in advance. This type of interview gives the opportunity for the authors to omit or ask additional questions depending on the flow of the interview (Saunders, et al, 2009).

Semi-structured interviews allowed interviewees to express freely their views in their own terms. The 7 respondents were interviewed using Skype and the expert was contacted via email. The interview was not recorded because of the request from the respondents. Due to this, the authors carefully noted the conversations and asked for a repetition of answers if not well-understood. At the end of the interview, the authors summarized the conversation to the respondents in order to control the correctness of the documentation.

Moreover, the name of the companies and respondents were not revealed and stayed anonymous except the expert due to the policy restriction in giving information and using names of the companies. The set of questions being asked during the interviews were attached in the Appendix.

Respondents	Industry	Role	Employees	Method	Duration
Respondent 1 Respondent 2	Job Agency	Manager Assistant Manager	22	Skype Skype	30 Minutes 30 Minutes
Respondent 3 Respondent 4	Marketing Company	CEO Manager	15	Skype Skype	35 Minutes 30 Minutes
Respondent 5 Respondent 6	Educational Sector	Office Manager Assistant Manager	38	Skype Skype	35 Minutes 35 Minutes
Respondent 7	Consulting Service	Project Administrator	12	Skype	30 Minutes
Thomas Johnsen	<i>University Prof.</i>	<i>Procurement Expert</i>	<i>N/A</i>	<i>Email</i>	<i>N/A</i>

Figure 8: Overview of the Interviews

3.7 Structure of the Analysis

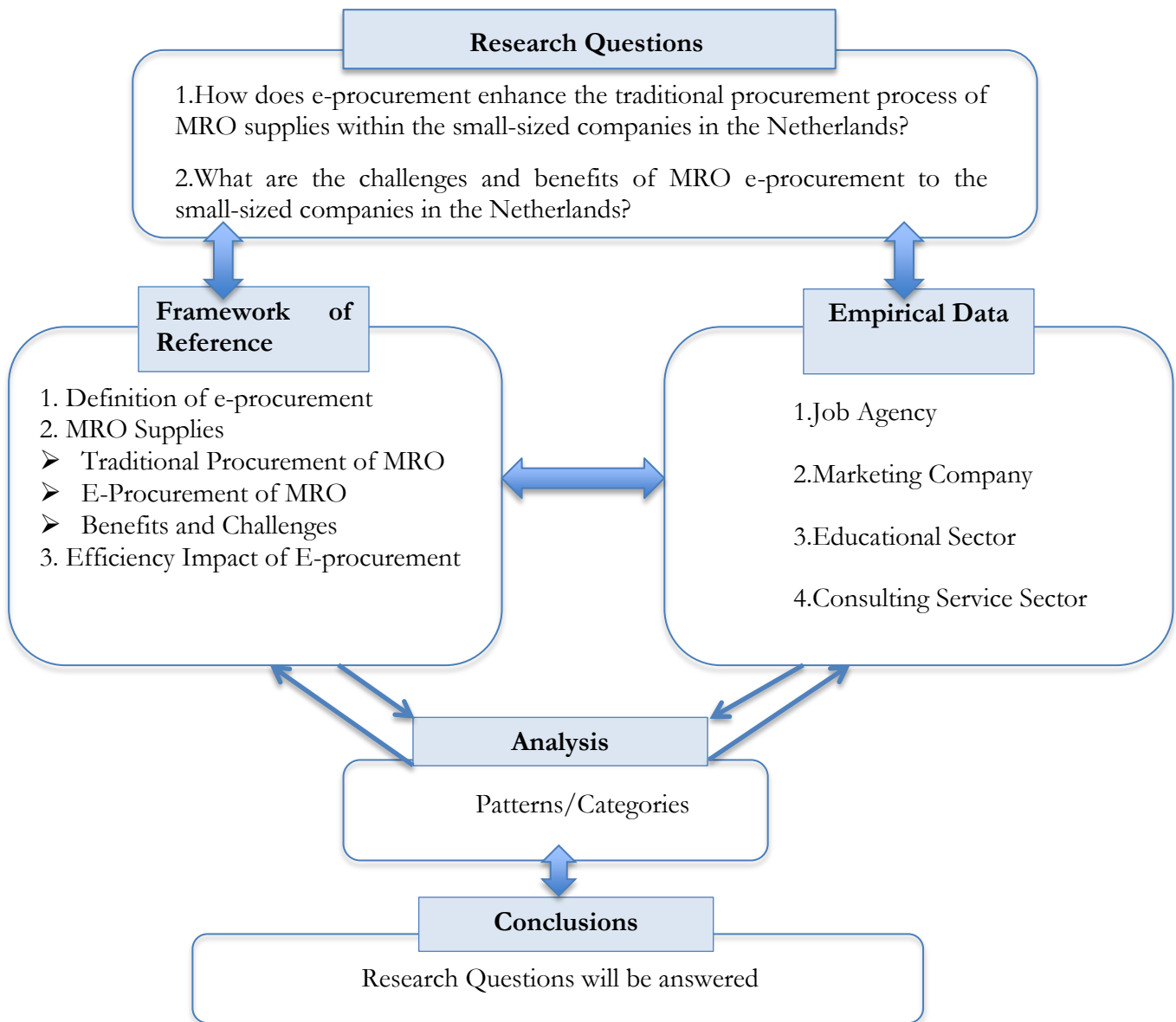


Figure 9: Structure of the Analysis

The figure above shows the structure of the analysis. From the research questions, the authors studied the theories and collected empirical data. Both theories and empirical data were analyzed. In the analysis, the authors used categories in order to come up with the conclusions which lead to answer the research question and meet the purpose.

3.7.1 Analysis of Empirical Data

According to Hardy and Bryman (2004), qualitative research is characterized by the interaction of data collection. It has further implications for the analysis part which will be confronted by a mass of paper or electronic files that need to explore, analyze and transform in order to address research objectives and answer the research questions (Saunders et al., 2009). Analyzing qualitative data for this research will take a form of a step-by-step analysis.

First of all, the authors read carefully the notes from the interviews. Then, first impressions were noted and after that the authors re-read the responses one by one and line by line. Secondly, labelling of relevant words, phrases and connections are made. These labels were about the procurement process, cost, differences, impacts and activities. This way of labelling is called coding (Saunders et al, 2009). In coding, the authors concentrated on the repeated words or phrases, explicitly stated responses and similarity with the theories. Also, finding patterns within the codes was performed. Thirdly, the authors decided on which codes are important and then created categories by bringing the codes together. Saunders et al (2009) claims that using categories offers a more flexible route to analysis which would allow to amend its use to the needs of the research. This method of analysis will allow the researchers to analyse a huge amount of narrative data at a deeper level. Grouping the interview responses per questions and finding categories helped to get to the core of the problem and to find answers to the research questions. In addition, it helped to draw conclusions for this research. Lastly, the authors label the categories which are relevant and connected to each other.

3.8 Research Credibility

In every research, it is important to have credible research findings. According to Saunders et al (2009) all researchers take issues of quality seriously if they wish others to accept their research as credible. To assess the credibility of the research, it is important to observe the consistency of the empirical data results, answers during interviews, the bias, and the error from the researcher.

In order to avoid the interview bias, the list of questions was designed in advance and a copy was sent to the interviewees. In this way, the interviewees will have time to carefully read the questions and be prepared rather than listening to questions asked by the interviewer during the actual interview. To ensure the clarity of each question, a pilot testing before the actual interviews was done. During the actual interviews, all answers are noted by the interviewer, using a good tone of questions and not interrupting the interviewees while saying their answers.

4 RESULTS OF EMPIRICAL STUDY

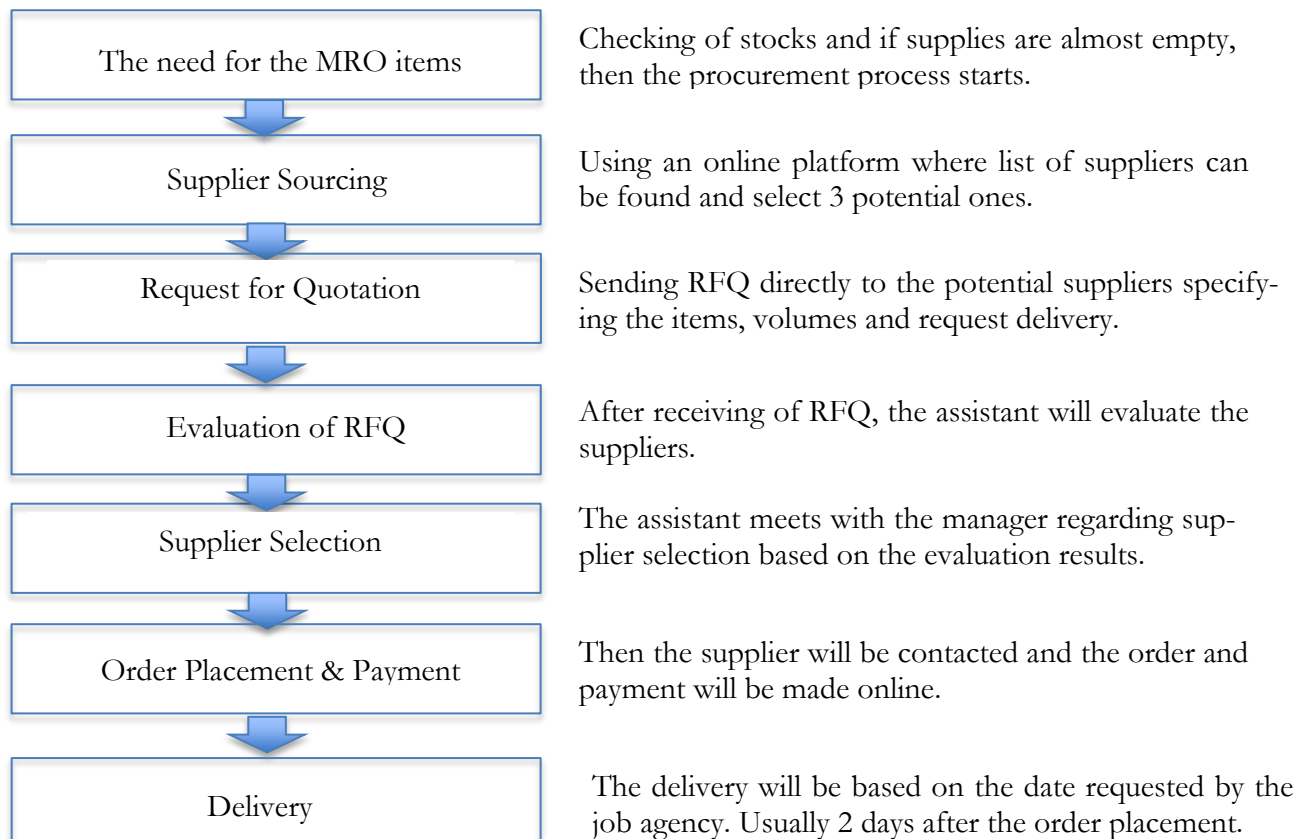
This part presents the empirical data derived from the interviews with four companies from the Netherlands and the expert. Each company will be presented by outlining its industry background. This includes the respondent's role on the MRO purchase, the current procurement strategy in buying MRO supplies, benefits and problems related to the current procurement process.

4.1 Job Agency

The job agency is a small-sized company based in the Province of Friesland in the Netherlands. The company sources talents, experts and skilled workers for their clients within the region. Respondent 1 is responsible for the whole operation and respondent 2 assists in any activities, particularly in purchasing MRO supplies for the office. The supplies they frequently buy ranges from papers, pens, stamp, forms, rubbers, folders, cards, ink and other stationeries needed for the office operation. These items are being purchased once a year. Formerly, the company was using traditional procurement and bought items directly from the supplier. Due to the complexity, time issues and workloads of traditional procurement together with the popularity of online buying, the company decided to switch to e-procurement.

4.1.1 Current MRO Procurement Process

The company is using e-procurement when buying the MR supplies. This strategy has been used for almost 7 years. The process of procurement is as follows:



4.1.2 Benefits of Current Procurement Process

There are several steps involved in purchasing of MRO supplies in the company. The positive contribution of e-procurement is that it helps to reduce lead time when doing the process. As compared to the previous use of traditional procurement, the company spent weeks just to find the supplier that dealt with the items they needed. As respondent 1 said, *“I needed to go to the supplier’s office before just to inform our needs and went back again to our office to fulfill my duty. And during that time, I did not have assistant with me.”*

Respondent 1 explained that the traditional way was time consuming and had impacts on other responsibilities. By having access to the online platform, which potential suppliers are connected to, the respondents are able to handle several clients at their own time and schedule. As respondent 2 said, *“Using electronic procurement makes my work convenient and I can easily see and compare the offers of various suppliers”*. She explained that it is easy to compare and deal with suppliers. By having e-procurement, they can manage to evaluate the suppliers’ offers and shortlist according to the company’s criteria.

Moreover, the process such as payments, communication, order placement, RFQ request and evaluation, delivery follow up and others are made online. As a result, it saves the company’s paper resources and time. Additionally, respondent 2 emphasized that by utilizing e-procurement, the company has the opportunity to have a structure of responsibilities and lessens the possibility of making mistakes in orders and other administrative tasks. By using e-procurement, the company is able to trace the process efficiently, increase suppliers’ relationship and select the best suppliers. The respondents believe that the process of buying MRO supplies using e-procurement is more convenient, organized, transparent, easy to follow and control. Also, it helps to save money and reduces time and administrative costs.

4.1.3 Challenges of Current Procurement Process

As of now, the respondents have not experienced challenges regarding their procurement process. But the only concern they have is the internet connection problem and other technical issues which might affect the online communication, order placement and payments. Since, they have not yet faced this challenge, the company has a back-up plan for that situation. Respondent 1 said that if problems of connection and computer systems occur, they will wait for a few days and if the situation cannot be fixed, then they will be forced to apply the traditional process. Respondent 2 believes that if this situation happens, it can be fixed easily in order to sustain the control of their MRO stocks.

4.2 Marketing Company

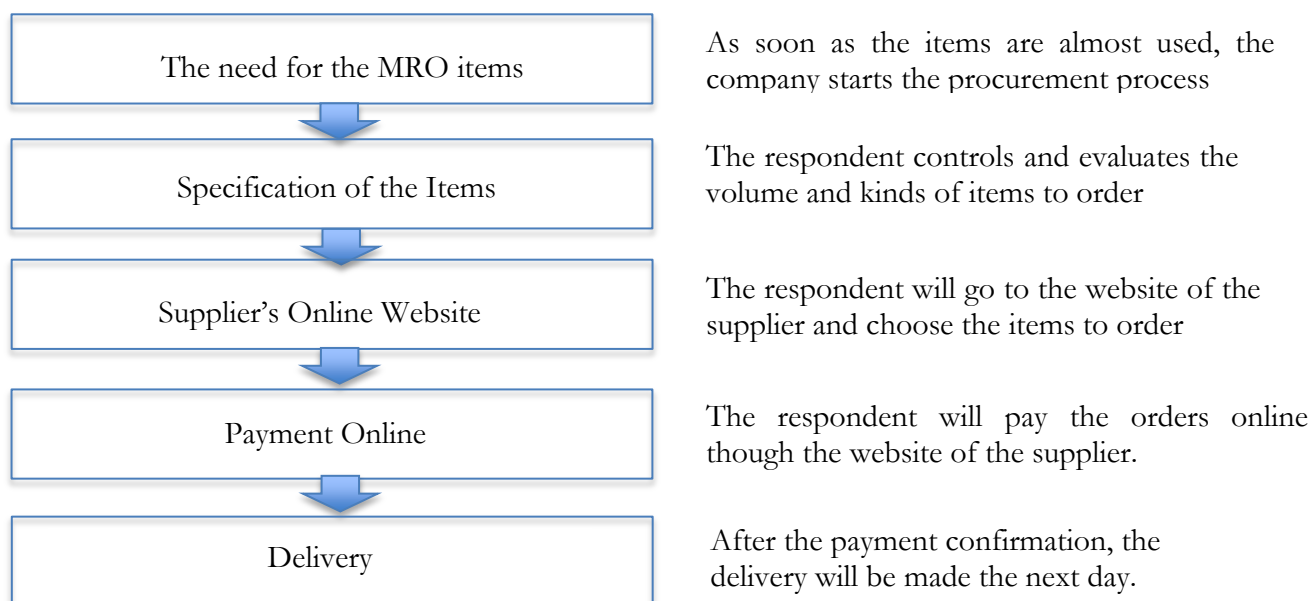
The company is a small-sized organization with 15 employees working to provide various marketing services for their clients. It is situated in Groningen City where most of the clients are within the area. Respondent 3 is the CEO and the owner of the company. She is responsible for the operation and leading of the team. Respondent 4 is a manager who deals with the clients and helps to manage the operation including the procurement of MRO items for the company. Respondent 4 said, *“MRO items are very important to keep the business operation. We*

always need different kinds of paper to print for the reports, brochures and others. Without these items, we do not know how to show our uniqueness to the clients.”

Also, respondent 3 explained that having a reputable supplier is vital for their MRO needs. As she said *“We need to have a good supplier who can provide our needs such as putting the logo in most of the supplies that we are requesting such as papers, also to make business cards, pens and others.”* Currently, the company is using e-procurement. They have not tried to use traditional procurement because e-procurement was very common during the time when the business was established in Groningen. The company has only one supplier at the moment where they have agreed conditions and other value added services.

4.2.1 Current MRO Procurement Process

In buying the MRO supplies, the company is using e-procurement. However, this process is the simplest among all with the use of online communication, online buying, computers and technology for billing and orders. Since this is a small company, they do not have the advanced software used to handle procurement and manage various suppliers. The respondent mentioned that they have only one supplier at the moment for their MRO items which imply that they do not need to source, evaluate or select suppliers. Also, there is no standard frequency per year in buying the items. As long as the supplies should be refilled, then the procurement process will start. The process of buying MRO supplies are as follows:



4.2.2 Benefits of Current Procurement Process

The respondents mentioned various benefits of the current procurement process. First of all, the process is very fast and there is efficiency in time management. From orders to payment and delivery, the company has access and gets confirmation using the website of the supplier. With this, respondent 4 can easily manage the orders, trace transactions and pay the cost.

Since, the company has a contracted supplier, they do not need to evaluate numbers of potential suppliers.

Additionally, they do not need to perform tasks involving paper-based work. The same as in the billing and payment method which are processes that are performed electronically. Constant communication between the two parties is not necessary due to the contractual agreements and terms and conditions. Whenever there is an issue to discuss, the respondent can directly email or call the person in-charge. The use of e-procurement enables the company to buy, compare and select more items at one time. Furthermore, the faster process, reduction of paper cost and time has led the company to save money on their yearly expenses.

4.2.3 Challenges of Current Procurement Process

The respondent mentioned that as of now, there is no challenge or problem linked to their current procurement process. This is due to several reasons; First, they are a small company with only 15 people working together. They can easily control the items and decide as to when the orders will take place. But the respondent said, that maybe in the coming future, if they will be having 25 or more employees, then it might be needed to restructure the procurement process because of the increasing number of employees which is associated to the increasing number of demand of the supplies. Secondly, they already have an agreement with the supplier which makes the procurement more easier to perform. The company has before-hand arrangements and contracts with the supplier. Lastly, the company has a good relation with the supplier and they are satisfied with the product and service offerings.

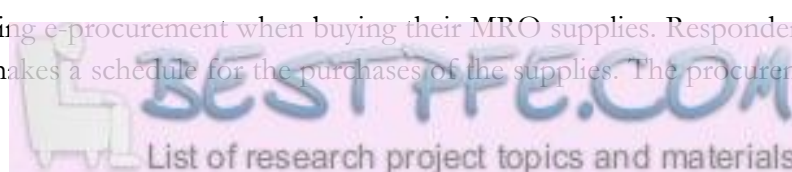
4.3 Educational Sector

The organization provides educational services to the high school students ages 13-18 years old in the province of Friesland in the Netherlands. Currently it has 38 employees working as teachers and office & maintenance personnel. Respondent 5 is a manager of the school. She is responsible for coordinating activities and operation. Respondent 6 is the assistant manager who helps in the daily office activities, assists the manager and teachers and purchases the MRO supplies needed for the whole organization. The latter is responsible for controlling the MRO stocks and plans for the procurement. The role of respondent 5 is to approve the MRO request from the respondent 6.

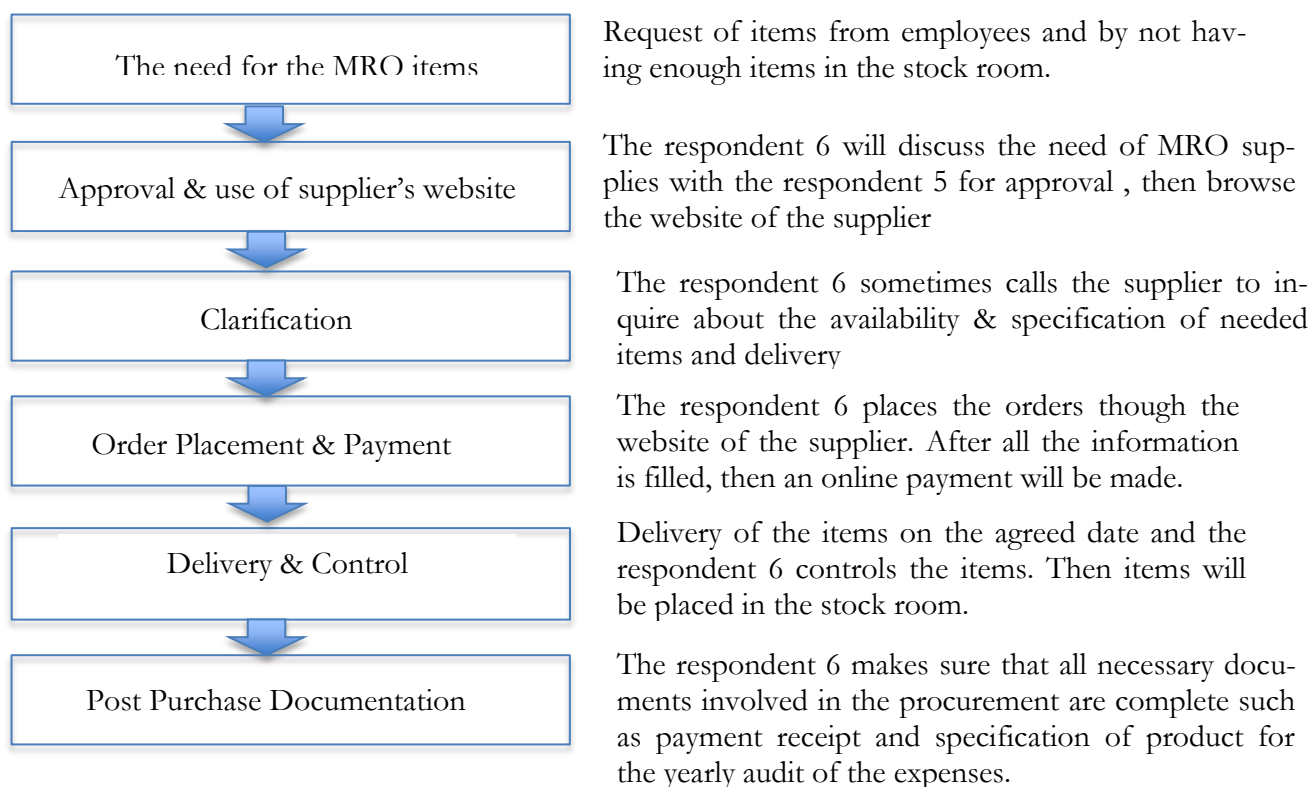
According to respondent 6, MRO items are important for their daily activities in order to provide the best service for the students and for the employees to be able to function well. Respondent 5 said, *“The most common MRO items we purchased are papers, pens for the employees, pens for writing the board, erasers, ink for printing, folders, plastic organizers, card boards and other small sized stationaries.”* She further explained that these items vary in size, material either paper or plastic, color and volumes.

4.3.1 Current MRO Procurement Process

The school is using e-procurement when buying their MRO supplies. Respondent 6 controls the stocks and makes a schedule for the purchases of the supplies. The procurement process



is usually performed 3-4 times a year. This electronic process has been used for 9 years by the school. The school was established in the year 1954 and from that time until the year 2005, they were using traditional process in buying the items needed for their school operation. The school deals with only one supplier within the region. But every two years, they have control of the supplier's performance, quality of products and service and most importantly the cost of the items. After the evaluation, respondent 5 and 6 will decide either to find other suppliers or stay with the current one. As of now, the school has collaborated with the same supplier for 5 years already. The procurement process is as follows:



4.3.2 Benefits of Current Procurement Process

The respondents mentioned different benefits provided by the current e-procurement process of MRO. One of these is the ability to order and deliver products in a faster way. Respondent 6 said, *“The way we buy the MRO items is not time consuming. I can order the items anywhere as long as I have the internet connection. It is very convenient particularly for my role fulfilling other agendas. It makes my work easier!”* Respondent 6 detailed that using e-procurement makes the process efficient in terms of having a quick response, access to the offers of the clients, and payment method. Although, the respondent 6 needed to have approval with the respondent 5 before placing an order, she believes that the process is very convenient.

Moreover, respondent 5 said that by using e-procurement, they have transparency and structure of the whole transaction process. Before when they were using the traditional procurement process, they mainly relied on the paper receipts and other documentation which sometimes got lost or misplaced. Also, by having access to the offers of the clients, it enables

to them to select the types of products that are needed for the school. Furthermore, as everything is mainly done online, the organization saves in using paper and saves time in meeting the suppliers. Correspondingly, respondent 5 said, *“It is an advantage for us that we have agreed a contract with one supplier. Of course before making an agreement we make it sure that they are the best one. By having an agreement, we do not need to source, evaluate and find suppliers every time we purchase the items.”*

Likewise, the respondent can trace the progress of the process since they have an online account in the supplier’s website which enables them to monitor the payment and delivery. In line with the process, respondent 6 said that e-procurement helps to reduce making errors when ordering the product and preparing any documentation as compared to the traditional procurement which involves many paper work and processes.

4.3.3 Challenges of Current Procurement Process

The challenge that respondent 6 mentioned is the process of finding a time to discuss with respondent 5 about the MRO request and for approval. However, this seldom happens in the process. Apart from that, other challenges are the possible technical problems when placing an order online. Respondent 6 said, *“In our previous supplier, we experienced several problems when placing an order online. It was the time we found out that our browsing system was not compatible to their system. That situation resulted to time delays and impact of our trust to them.”* With the current supplier, they have compatible systems with us and the process is managed efficiently.

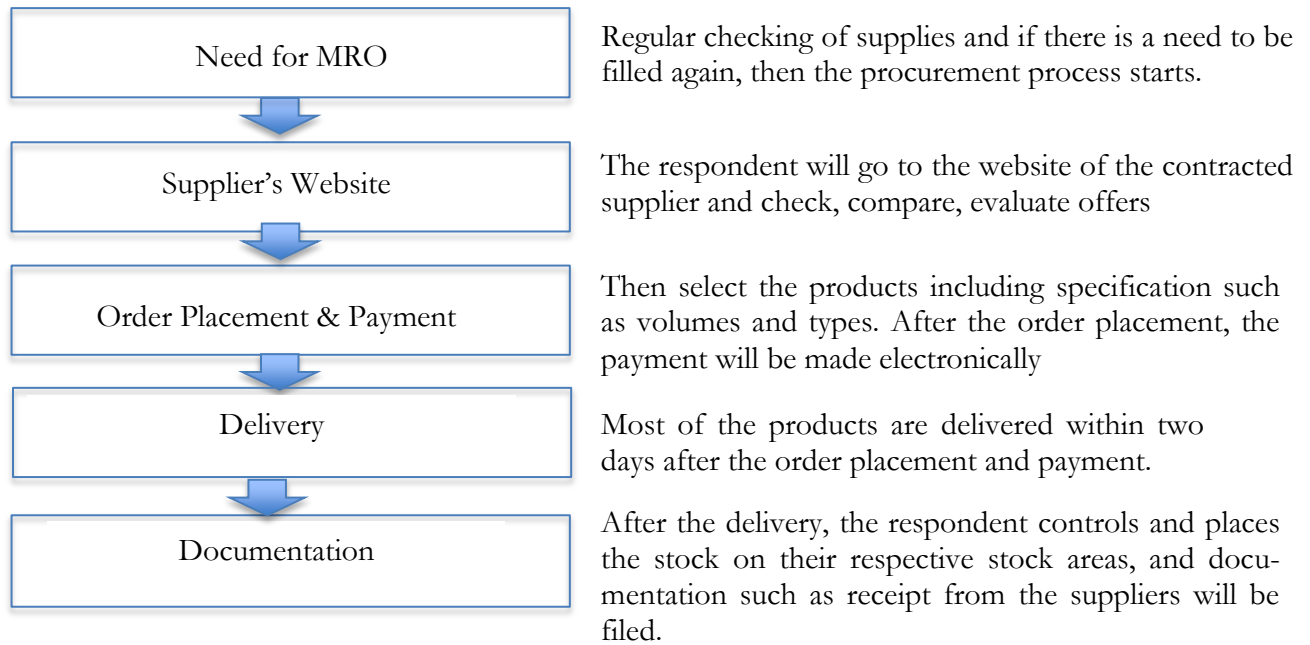
4.4 Consulting Service Sector

The company is situated in Utrecht Netherlands. It has a total of 12 employees at the moment which provide business consulting services to the clients regarding starting up of a venture, outsourcing, marketing and communication and financial advise. The respondent is the project manager responsible for the procurement of MRO supplies and any items for the office.

The company is using e-procurement and has been using this strategy for 5 years since the beginning of its operation. The common MRO supplies being purchased are papers, pen, cardboards, tapes, stapler, folders, ink for printing, cartridge, glue, markers and other stationeries. These items are bought twice a year.

4.4.1 Current MRO Procurement Process

The company is currently using e-procurement when buying the items. They have only one supplier which already made a contract agreement beforehand. The company has an online account access in the website of the suppliers. It is a business-to-business transaction and thus the company avails lower cost when buying a product in bulk or volume as compared to the business-to-customer transaction. The process is as follows:



4.4.2 Benefits of Current Procurement Process

The adoption of e-procurement brings several benefits for the company particularly for the respondent's role. For instance, by having access to the website of the suppliers, it allows the respondent to browse various items, compare quality, brands and prices of the products. The respondent said, "*e-procurement of MRO gives me the opportunity to select the best product at a good price and place order electronically.*" Another advantage is the less time consumption when buying the products. The process is easy and traceable in every transaction from the order placement, to payment until the confirmation from the suppliers. There are no several controls, authorization, waiting of responses and intensive checking to be made. Aside from that, it helps to reduce the use of papers in the company. The respondent said that there is no need to write all the MRO supplies needed and print it to submit to the suppliers.

Also, with e-procurement, the company has managed their stocks well and provides standardization of the process. It helps to avoid situations such as non-availability of supplies when needed. In case of some clarification or problems, the respondent can directly email or call the suppliers. This situation helps to improve the communication between the parties because of the easiness to send and receive information and the fast reaction from the suppliers.

4.4.3 Challenges of Current Procurement Process

The only challenge that the respondent mentioned is the possibility of overlooking other suppliers' offers because the company has an agreement with one supplier at the moment. Formerly when making an agreement to the supplier, the company has done sourcing and supplier evaluation in order to find the best supplier. The respondent wants to know other suppliers' products and costs but restructuring the process would cost significant time. At

the moment they are satisfied with the performance, service and products of the suppliers. Therefore, there is no need to consider other suppliers. She added that it was not worth it to spend valuable time and money for sourcing of suppliers just to buy the MRO products for 12 people.

4.5 Interview with the Expert

Mr. Thomas Johnsen is a Professor of Purchasing and Supply Management at Audencia Nantes School of Management in France. He stated that e-procurement enhances the traditional procurement process in different ways. Firstly, e-procurement reduces paper work within the process as opposed to the traditional procurement. Secondly, it reduces transaction cost for the buyers and helps to increase competition among the suppliers within the market.

When asked about the MRO perspective, Mr. Johnsen explains that MRO is one of the obvious areas for the adoption of e-procurement because of the need to reduce the transaction cost involved within the category. Furthermore, there are several advantages that companies can get when dealing with MRO e-procurement. Aside from the reduction of cost, the suppliers' relationship improvement and the control of the MRO supplies. Moreover, Mr. Johnsen claimed that the size of the company, type of industry and MRO purchases play an important role when implementing e-procurement. This is due to the fact that some e-procurement systems require resources that small companies may not have.

4.6 Summary of the Empirical Study

To summarize, all companies are using e-procurement in buying MRO supplies. The respondents stated that MRO supplies are vital for the daily operations. The job agency and educational sector are the ones who experienced using traditional procurement. The marketing and consulting service companies have directly engaged in using e-procurement right from the start of their business. The respondents discussed that e-procurement is more convenient for the process and it enhances some factors of the traditional procurement way. For instance, the time issues in processing. The e-procurement process reduces the lead time when doing the process because there is no need to meet the suppliers face-to-face to discuss the requirements. Also, all the transactions are done online which gives the opportunity for the user or person in-charge to do whenever they want. As compared to the traditional procurement process, they need to make appointments with those suppliers, schedule a store visit and communicate frequently. The use of e-procurement saves money by not using papers for every transaction. This was also mentioned by the expert as one of the ways how e-procurement enhances the traditional process.

Moreover, when buying the MRO products, they can have the opportunity to compare and evaluate from other brands or types which could save financial resources. Aside from that, most of the companies are dealing with one supplier. As a result, sourcing and evaluating po-

tential suppliers is not needed when procuring MRO supplies. By having one supplier, they enjoy the low cost of buying in bulk or volumes of MRO items. Only the job agency was the one dealing with various suppliers and selecting the best possible one during MRO procurement. In this strategy they can have a look at the various offers and capacity of the potential suppliers. Furthermore, the respondents mentioned that by using e-procurement for their MRO supplies, it helps them to have a standard and structured purchase and control of the MRO supplies. When buying the items, it helps to take control of the process because of the information and validation through online account. In the payment method, the company has the opportunity to directly pay the order and receive confirmation from the supplier. Moreover, communication is enhanced because of the fast reaction and exchange of information online between the two parties. Furthermore, the expert discussed that MRO is one of the obvious areas for e-procurement where the efficient communication helps to reduce cost. The figure below shows the general summary of the interview from the companies.

Company	MRO Frequency of Buying	Supplier	E-Procurement Impact	Challenges
Job Agency	Once a year	Sourcing of supplier and select the best one	<p>Process</p> <ul style="list-style-type: none"> ➤ Reduce Lead Time ➤ Reduce the use of paper ➤ Structure of Work ➤ Reduce Errors ➤ Connection and Selection of Suppliers ➤ Control of Transaction <p>Cost</p> <ul style="list-style-type: none"> ➤ Reduce of Paper Use ➤ Saves Money and avails lower cost of MRO 	Online Technical Issues
Marketing Company	No standard frequency (They order when items are almost empty in the stocks)	One contracted supplier	<p>Process</p> <ul style="list-style-type: none"> ➤ Reduce lead time; Fast and Efficient ➤ Reduce the use of paper ➤ Quick confirmation ➤ Easy to manage the orders ➤ Opportunity to trace the transaction and payment ➤ MRO shopping -buy, compare, evaluate. <p>Cost</p> <ul style="list-style-type: none"> ➤ Reduce paper cost 	No challenges so far

			➤ Avails Lower Cost of MRO	
Educational Sector	3-4 times per year	One contracted supplier	<p>Process</p> <ul style="list-style-type: none"> ➤ Fast delivery ➤ Reduce lead time and paper ➤ Quick response and confirmation ➤ Quick payment method ➤ Transparency and structure of the process ➤ Access to MRO offers; compare & evaluate ➤ Easiness to track and trace the process ➤ Reduce in making errors <p>Cost</p> <ul style="list-style-type: none"> ➤ Reduce paper cost ➤ Avails lower cost of MRO 	<ul style="list-style-type: none"> ➤ Waiting time for approval ➤ Technical Issues
Consulting Service Sector	2 times per year	One contracted Supplier	<p>Process</p> <ul style="list-style-type: none"> ➤ MRO shopping convenience (compare and select products) ➤ Easy and Traceable-Less Time ➤ No several controls, and authorization ➤ No intensive checking ➤ Manage MRO stocks well – avoid scarcity/non availability of supplies ➤ Reduce the use of paper ➤ Standardize process ➤ Quick Response; convenient communication <p>Cost</p> <ul style="list-style-type: none"> ➤ Avail low cost of MRO items ➤ Reduce paper cost 	Overlooking of other supplier's offer

Figure 10: Summary of Empirical Data (Own Illustration)

5 Analysis

In the analysis the authors give a discussion based on the framework of references and the empirical data. Categories will be used to find a pattern and create a new knowledge. The authors present how e-procurement enhances the traditional process followed by the benefits and challenges.

5.1 How Does E-Procurement Enhance The Traditional Procurement of MRO

Foroughi (2007) stated that e-procurement enhances the traditional procurement of MRO supplies through the automated process of executing the purchases. Based on the literature, the process of buying MRO consists of a series of stages. The stages differ between the traditional procurement and e-procurement. Keen and McDonald (2002), presented the traditional process by starting with the requestors need of the MRO, the purchasing department's reaction to the request which involves the sending of RFQ and purchases orders to the suppliers up to the delivery of the MRO to the requestors. This process involves several back and forth transactions and information before proceeding to the next stage of procurement. As a result, the process consumed more time and resources.

On the other hand, when using e-procurement Hammer and Champy (1993) showed the process by starting on the requestor's request and the use of an online catalog. This catalog shows MRO offers from the suppliers where the requestors can directly place an order if it is a standard request. The responsibility of the purchasing department is with the handling of a non-standard request. As can be seen between the traditional procurement and e-procurement, the latter helps to have *lower lead time of the process* as compared to the traditional procurement. This is also aligned to what the four companies from the Netherlands have stated that the use of e-procurement is *less-time consuming*. For instance, the Marketing Company stated that the use of e-procurement helps to have efficient process and time management. This is because of the access to the online catalog or website of the suppliers. This is the same as what McConnell (2009) claimed that e-procurement helps to have lower lead times within the process of purchasing.

Moreover, e-procurement enhances the traditional process by means of *dealing with the suppliers*. The Job Agency from the Netherlands stated that buying MRO supplies is convenient compared with the traditional procurement. The company has the opportunity to *handle various offers from the suppliers* and select the best one since MRO procurement is a complex undertaking consisting of various suppliers (Genesis Solutions, 2002). Additionally, the *communication between the two parties are enhanced due to the direct confirmation* from the order placement to payments. This can be seen in the current communication status of the four companies from the Netherlands that the communication between the companies and suppliers is enhanced due to the faster response and direct confirmation of the process status as contrasts to the traditional procurement of MRO supplies which takes several days to receive a response (McConnell, 2009). Moreover, Croom (2005) claimed that the adoption of e-procurement improves the flow with the suppliers. Regarding the whole process of procurement, the

companies stated that e-procurement gives the opportunity to have a structure and traceable process. The Marketing Company stated that with the use of e-procurement, the orders and tracing of transaction and payment are more manageable.

Moreover, McConnel (2009) said that e-procurement helps to *reduce cost* when buying the MRO purchases as compared to the traditional process. This statement is aligned to the responses from the companies that e-procurement gives them the opportunity to save money because of the *reduction in the use of paper* within the procurement process. Furthermore, the expert Mr. Johnsen, claimed that e-procurement *reduces transaction cost* involved within the various categories in the MRO. This is because of the *faster execution and confirmation of transaction and less potential to errors*. According to Genesis Solutions (2002) the procurement of MRO supplies is a complex undertaking which involves several items and suppliers. Therefore, by applying e-procurement the company has the opportunity to reduce costs within the process. This can be seen in the situation of the companies from the Netherlands who discussed that e-procurement requires less consumption of paper and other office supplies. Varghese (2012) stated that e-procurement enhances the traditional process through the *paperless communication and invoicing* which can save a significant amount for the companies.

Furthermore, in order to identify as to how exactly e-procurement enhances the traditional procurement within MRO purchases, the series of processes when buying MRO will be shown. The process is based on the data from the theories and empirical.

MRO Need/Request: The process of MRO procurement starts with the need of the MRO and the execution of request from the requestor (Hammer & Champy, 1993; Keen & McDonald, 2000).

Supplier Selection : According to Van Weele (2002), one strategy to select a supplier is to arrange an agreement with a specific supplier for the delivery of the products. By using e-procurement, the *agreement can be directly done online*. In the empirical data, it is shown that the job agency was the only organization that performs the supplier selection when buying the MRO supplies. However, other companies have undergone selection and continued working with the suppliers as long as the requirements and service level agreements are met. The four companies from the Netherlands work with the suppliers and evaluate performances in order to make a decision as to continue or end the contract and collaboration with the suppliers. The e-procurement enhances the supplier selection stage of the traditional procurement process because of the availability to have *access online and connect with various suppliers* offering MRO products without the need for face-to-face contact, offline searching and gathering. This *reduces the use of paper-based work, reduce transaction costs and helps to find the best supplier and improve communication and relationship*. Furthermore e-procurement helps the company to handle several suppliers at one time and enhances competition within the suppliers.

Moreover, in traditional procurement, selecting suppliers involves a series of steps. Foroughi (2012) stated that traditional procurement consists of various supplies and multiple decision makers spread all over the company who have different agendas and little communication with each other. With the adoption of e-procurement, it would help the companies to *contact suppliers from other location and manage them together*. Furthermore, the companies have the chance

to *assess the MRO offers*, background, product quality and ability of the suppliers in one time. With the use of e-procurement, this activity can be done in a *faster and efficient way*. In terms of selecting the final supplier, the use of e-procurement makes the selection perform in a faster way because of the quick response and two-way electronic communication as opposed to the traditional procurement that consumes paperwork and extra time in the process (Atkinson, 2000). However, the final selection stage involves meeting with the people involved within the MRO purchases as mentioned by the respondents. For instance, the assistant manager of the job agency informs the manager about the selection issues. Moreover, Reese (2003) stated that e-procurement enables companies to make *better selection and decisions related to rationalizing their supplier by providing a broad overview of the market*.

Request and Evaluation of RFQ : With the use of e-procurement, sending requests for quotation and evaluation of the response are more *convenient and cost effective* than the use of the traditional process. This can be done online without any use of paper resources. Also, the response from the suppliers is faster and automatically received as can be seen in the case of the Job Agency. Furthermore, evaluation of the responses from the suppliers can be easily compared electronically and shortlisted the potential ones. E-procurement *enhances the traditional process because the companies can simply inquire, send and receive information regarding the specification of the MRO items*. Since MRO items are low value and indirect materials, the application of e-procurement in request for RFQ would give the comfort to include all those items. Dealing with such items in traditional procurement would bring hassle and inconvenience for the companies.

Order Placement: According to Larsson & Strandberg (2006) traditional procurement is done by collecting the paperwork; and the information is transferred, by hand, to a purchase order form and then usually faxed to suppliers and accompanied further by phone calls to confirm the receipt (Larsson & Strandberg, 2006). It can be seen that this process consists of a series of back and forth transactions and information which results in a slower transaction process and several interventions that involve large volumes of papers and complicated procedures (McConnell, 2009). With the use of e-procurement, it enables companies to have a *faster and efficient handling of transaction* with lesser use of resources (Reese, 2003). This statement is aligned with the situation of the four companies from the Netherlands when placing an order using e-procurement. The companies revealed that using e-procurement makes the browsing and placing of an order more convenient, faster and efficient through the access to the supplier's website. They can easily place any types of MRO items and further evaluate other products.

Moreover, Foroughi(2007) said that e-procurement can enhance the MRO procurement process in many ways and can be economically implemented and one way is in the placement of orders. As can be seen in the types of MRO items ordered from the four companies; the items are low value involving several quantities and categories. As mentioned by Croom(2000), these items have a low contribution of total purchasing cost and do not get more attention which ends up uncoordinated and decentralized. By using e-procurement, the companies can have the opportunity to *coordinate the buying of the supplies*. In short, despite the less attention given to these supplies, the company can have a structured buying as what the

companies from the job agency, marketing, educational sector and consulting services mentioned. Furthermore, Aisbett et al (2005) stated that e-procurement can *reduce unnecessary process undertakings*. The same as what the expert explained that e-procurement reduces paper-based work and longer transaction process and cost. Based on this situation, e-procurement enhances the traditional process through the automated placing of orders.

Payment : Paying for the ordered MRO items electronically makes it *convenient* for the respondents. It provides *direct confirmation from the supplier* and *structure of the process*. According to Aberdeen Group (2006) paying electronically completes the e-purchasing cycle, by providing data to the buyer's financial systems. These systems provide buyers with comprehensive data on what was actually transmitted and what was paid. Digital signatures also play an important role to prevent theft and misuse of data and information (Aberdeen Group, 2006). The four companies from the Netherlands are paying the MRO supplies' cost on the website of the suppliers through the use of online banking systems. The *process can be traced* by the companies and they can identify whether or not the payment has been received by the suppliers. The tracing provides an *opportunity to track financials and outflows of their account*. Moreover, the four companies discussed that when paying the orders online, they get verification automatically. This helps to have assurance regarding the successful buying and payment to the suppliers. Furthermore, the suppliers can identify and provide the orders as soon as the confirmation is received. The situation gives the *efficient flow of process* from placing orders to payment as opposed to the traditional procurement.



5.1.1 E-Procurement Model

After analyzing how e-procurement enhances the traditional procurement process, the authors discovered a model which specifically cited the enhanced areas using e-procurement within the small-sized companies in the Netherlands. The model can be a contribution to the literature citing the current e-procurement status of the small-sized companies. This model illustrates that within the small-sized companies only a few stages of procurement are done electronically. Thus, the enhancement and benefits of e-procurement are limited only to these areas.

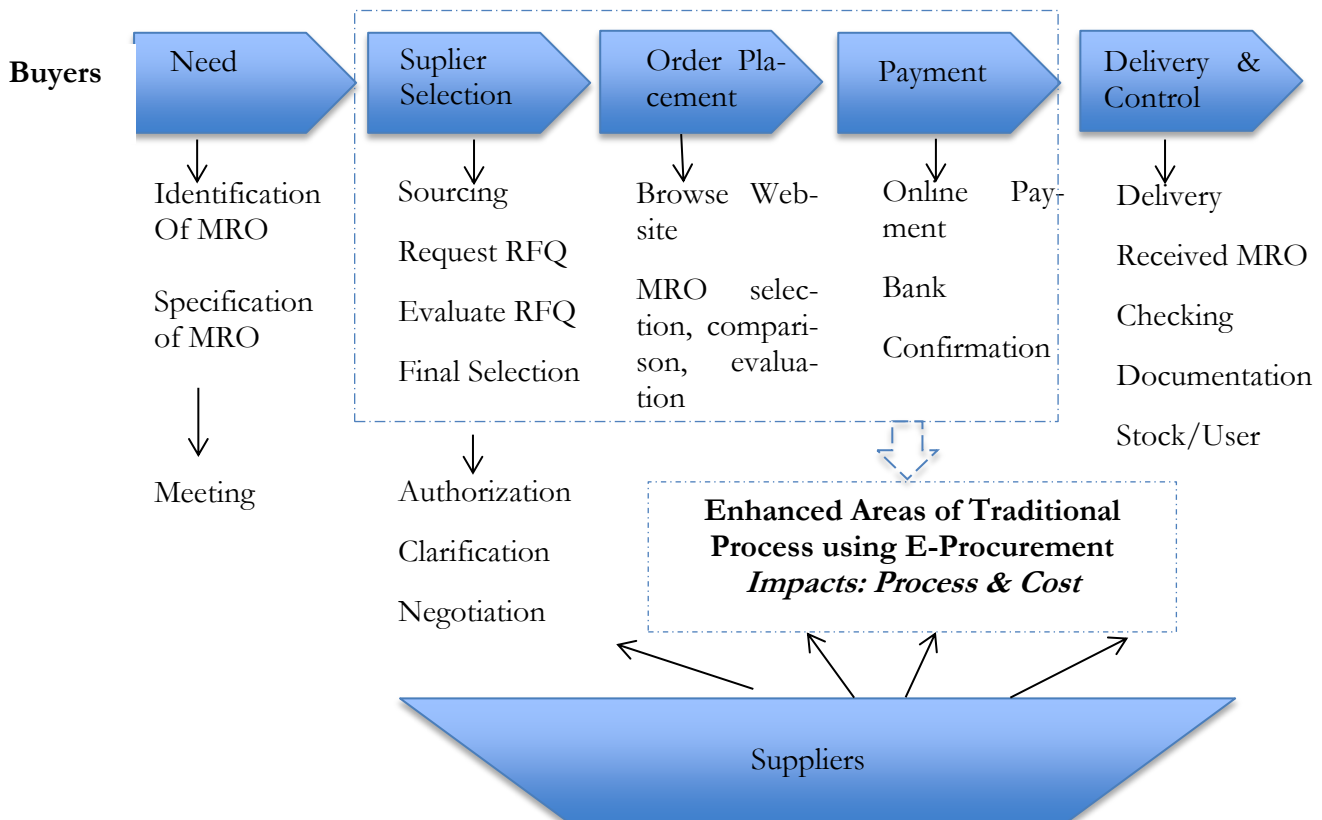


Figure 11: E-Procurement Model (Own illustration)

The figure above is based on the stages identified in the current procurement process of the small-sized companies in the Netherlands. It shows that within the stages enhanced by e-procurement, *process and cost* are the main factors that heightened as opposed to the traditional procurement.

Buyer: In the companies, the buyer is the person executing the procurement process. In the figure shown by Hammer and Champy (1993) and Keen and McDonald (2000) they refer to the buyer as the requestor.

Need: This is where the procurement of MRO begins. The companies in the Netherlands have different frequencies in buying their MRO products. This stage involves identification and specification of various MRO categories needed for the company. Furthermore, some of

the companies from the Netherlands needed to meet with the superiors in order to discuss the procurement of MRO supplies. The companies traditionally handled the identification and specification of MRO supplies.

Supplier Selection: This stage is one of the areas which show how e-procurement enhances the traditional procurement process of MRO supplies. The companies from the Netherlands source suppliers, send and evaluate RFQ and make a final selection electronically. This means that the execution of activities on this stage is faster and more convenient involving less-paper based work and shorter lead time in awaiting responses as opposed to the traditional process. E-procurement helps to reduce transaction cost in finding the suitable MRO supplies for the companies. On the other hand, authorization of every decision regarding the MRO procurement, clarification with the suppliers and negotiations are made mostly face-to-face, via email or phone.

Order Placement: As discussed earlier, order placement is now easy to do with the use of e-procurement. The literature stated that buying of MRO supplies is a complex undertaking because it involves several parts and suppliers. Thus, the use of e-procurement provides efficiency for procurement of the companies. This is due to the access to the website of the suppliers which presents the various MRO items, corresponding values and amounts as well as the brands and types. With this, the companies can receive direct confirmation of the orders from the suppliers. By having access to the website, the respondents have the convenience to shop, connect and access to the various offers of the suppliers. Respondent 7 from the consulting service sector mentioned that e-procurement gives the opportunity to select the best product at a good price and place an order electronically on the website. As compared to the traditional process, the company should go directly to the stores to see the items, call the suppliers to inquire or hop from one store to another selling MRO items. This visibly implies time consumption, extensive use of paperwork and extra expenses from the companies. By having e-procurement, the companies can directly see the MRO items needed wherever and whenever they want to browse.

The respondents from the four companies stated that e-procurement gives the opportunities to compare the various offers, types of products and volume cost of the MRO supplies. Since these supplies consists of many categories and small parts, the comparison using e-procurement made it easier and more convenient during the purchase. Furthermore, the companies can cover and see the various MRO items on the website at one time of shopping. Besides, e-procurement helps to evaluate those supplies and select the best supplier based on the needs and requirements from the companies. This is what Aisbett et al (2005) stated that e-procurement reduces maverick purchasing of the items. Also, Varghese (2012) claimed that e-procurement is able to help in purchasing the right supplies in an effective manner. In traditional procurement, the comparison, evaluation and selection are firstly done manually based on the RFQ from the clients. Additionally, by looking at each product's specification, evaluation and selection, companies should visit each supplier's stores which impacts cost and time consumption. However, with e-procurement, the risk factor for buying many indirect items online like MRO supplies are very low (Foroughi, 2007). Foster

(2000) claimed that if something goes wrong in buying office supplies, the company will not sink because of that error.

Payment: The methods in paying for the ordered MRO supplies using e-procurement is traceable and easy, compared to the traditional process. Within e-procurement, the four companies can directly transfer the amount of the order to the suppliers. Receiving confirmation and tracing the payment are one of the enhancements. The reduction of paper based work and transaction cost saves a significant amount for the companies. Furthermore, they can easily trace their financial expenses regarding the MRO purchases. This is due to the online payment system, easy bank settlement and direct confirmation of the activity.

Delivery: Activities within the delivery stage are still performed in the traditional way. The four companies in the Netherlands have no advanced software that automatically manages the inventories, controls and checks availability of MRO. The delivery is after the order placement and payment where the buyer or companies are informed of the delivery status online. Documentation which involves the filing of receipts or invoices is manually handled by the companies.

Suppliers: In the above stages of activities, the suppliers role is to react to the request of the buyers. The supplier selection, order placement and payment method stages are dealt by the suppliers online. While other stages are mainly executed in the traditional process.

5.2 Benefits of MRO E-Procurement

Foroughi (2007) stated that e-procurement provides benefits for the company and enhances the MRO procurement process in many ways. The benefits that the empirical and theoretical data revealed are related to process and cost perspective. The companies claimed that when buying MRO supplies using e-procurement, it reduces lead time. It helps to become efficient in the transaction and involves a fast reaction and confirmation from both parties. This situation provides opportunity for the companies to execute the procurement process in a timely manner without the problem of waiting for the responses in several days. Furthermore, the reduction of lead time gives the chance for the company to be productive. They can allocate the time by doing other responsibilities. Likewise, it helps to have structured and centralized buying process which results in an effective buying of the needed MRO. Since MRO supplies composed of small and several complex parts, buying these in the traditional way can be prone to errors. However, with the use of e-procurement, it reduces the chance of making mistakes because of the standardize buying and convenient accessibility when placing orders.

According to Foroughi (2007) buying practices that do not conform to the corporate policy can be avoided when using e-procurement of MRO and the time to process the requisition can be reduced per order. Moreover, the companies discussed that e-procurement gives the opportunity to connect, manage and handle suppliers. By having a connection with the various suppliers, it would lead to the possibility of finding the best quality and price of the products. Bedell (2002) cited that when handling MRO purchases using e-procurement CFO's can have the assurance that employees are obeying corporate contracts made with

suppliers, trace company spending, trends and negotiate better prices for the future contracts. This situation provides benefits for the company to get the best price offer in the market.

Additionally, Moore (2007) stated that e-procurement gives companies the chance to have a better control of the company spending with MRO. This is aligned to what the 4 companies divulged that e-procurement helps to have a structured control of the buying transactions. Also, the companies added that with e-procurement they can manage the orders easily and reduce the buying of unnecessary items. Aisbett et al (2005) said that e-procurement provides better leverage of contract negotiations and lessens the chance of maverick buying. Furthermore, Reese (2003) claimed that it helps to make a better decision in buying the MRO because of the broad overview of the offers. This statement brings into line to the explanation from the four companies that e-procurement gives them the opportunity to have the organized flow of the process which helps for making decisions.

Moreover, one of the benefits given by the use of e-procurement as cited by the four companies and the expert is the opportunity to save money by reducing the transaction and administrative costs. For instance, the completion of the process reduces the use of paperwork or other printing materials. If there are no papers to use or print, then it would save money for the company. It would save the use of resources which means a reduction of expenses. Foroughi (2007) said that in traditional procurement, processing of each paper-based order and payment are very costly, however the use of e-procurement can help to solve this dilemma. Furthermore, e-procurement provides the chance to purchase MRO supplies in volume or bulk for the companies which lead to a lower cost of the items. The companies mentioned that aside from the negotiation with the suppliers, they can additionally avail the offers in the website of the suppliers. Buying several items at once would save them time and money. Also, it provides a variety of options when buying MRO supplies which helps the companies to find the product at a reasonable price.

5.3 Challenges of MRO E-Procurement

Despite the benefits revealed by the companies and the literature, there are challenges when using e-procurement. The companies revealed that using e-procurement when buying MRO from the suppliers can be also difficult in line with the internet connection and the compatibility of the system or browser between the parties. Foroughi (2007) claimed that problems with integration to backened systems which many have incompatible platforms are a stumbling block to many e-procurement efforts. Bedell (2002) stated that suppliers need to be able to handle the system of the clients and be compatible with them. Additionally, Moore (2003) stated that most companies are still using decades-old equipment and parts whose documentation is paper based and lacks the digital format essential for the e-procurement.

The companies from the Netherlands have not experienced huge problems with their current process because of the simplicity of the transactions together with the size of the companies and number of suppliers being dealt with. Since, most of them have already contracted an agreement with one supplier, there is the possibility that they might overlook the offers from other potential suppliers. This situation applies for the educational sector, marketing

company and consulting service sector where only one supplier has been contracted. Additionally, the literature claimed that e-procurement creates a new set of responsibilities for purchasing departments because of the tasks to manage content in the supplier catalogs website regarding price, offer and other data (Foster, 2000). The companies have mainly one person responsible for the procurement process including sourcing of information.

To sum up, the companies identified several benefits and challenges regarding the current procurement of MRO. The overall efficiency and convenience within the e-procurement process has led to a structured transaction process while selecting suppliers and buying products. Moreover, e-procurement has reduced the administrative cost because of the less paper work and time being used while purchasing the supplies. The reduction of inventory cost provides the opportunity for the company to handle the items efficiently and stock according to the needs of the company.

6 CONCLUSIONS

In this part, findings from the analysis are gathered together to present the most important aspect of the study, to answer the research questions and to fulfill the research purpose.

The purpose of this research was to analyse how e-procurement enhances the traditional procurement of MRO supplies within small-sized companies in the Netherlands. In order to meet the purpose, research questions were needed in order to give direction to the studies. Thus, the research questions were: how does e-procurement enhance the traditional procurement of MRO supplies within small-sized companies in the Netherlands and what are the challenges and benefits of e-procurement. To fulfill the purpose and to answer the questions, the authors aimed to examine the traditional procurement and e-procurement within MRO purchasing and identify the developed areas and the corresponding benefits and challenges of e-procurement.

From the result of the analysis, the authors have concluded that e-procurement enhances the traditional procurement of MRO supplies within the small-sized companies in the Netherlands through the reduction of paper-based work, process efficiency, shorter lead time within the process, reduction of transaction and administrative cost, improved communication and relationship, the opportunity to track the process and get prompt confirmation within the e-procurement process as well as the improved management of MRO supplies. All of these drive the improvement of the traditional procurement of MRO. The literature implied that MRO supplies are a complex undertaking which involves several parts, types and ranges of price and quality. By using e-procurement, it will lead to have an efficient selection of the products from the supplier and control of spending. The four companies from the Netherlands presented the different MRO items which are considered important to keep the operation run. These supplies vary in functions, size and importance which needed to be handled carefully in order to avoid maverick buying and procurement of unnecessary MRO supplies. Mr. Johnsen, the expert stated that MRO procurement is one of the obvious areas for the companies to adopt e-procurement. In line with this, the authors have concluded that nowadays MRO items are receiving more attention as opposed to the literature stating that these items have received less attention due to the low contribution to total purchasing turnover (Gelderman et al, 2008). It is evident that currently the small-sized companies from various sectors in the Netherlands are giving attention to the proper procurement and management of the MRO items because of the significant cost savings and process efficiency.

Furthermore, the authors have concluded that within the procurement process of the small-sized companies from the Netherlands only a few stages are applied with e-procurement. This means that the enhancement and advantages are only limited to these activities. These stages are the supplier selection, order placement and payment stage. In the supplier selection, the sourcing of the potential suppliers, request for information and quotation and the final selection have been implemented in a faster and more efficient way as opposed to the traditional procurement process. Furthermore, placing orders from browsing the supplier's website, selection and evaluation of MRO supplies have been easily performed at any availa-

ble time of the buyer. The payment method increases the transparency and control of expenses within the e-procurement. This is due to the reduction of paper-based work, reduction of lead time and transaction cost, and the efficiency in supplier selection, communication and overall procurement process. With that, the authors have illustrated a model citing the actual MRO procurement process of the small-sized companies in the Netherlands. The model presents the three stages where e-procurement is applied. This means that the other process such as the identification and specification of needs and the delivery and control are performed in a traditional way. The authors have concluded that this is due to the limited budget from the company to automate the whole process and use advance e-procurement system that can guide them from the inventory control, specification to supplier sourcing, placement of order until the delivery and documentation.

Because of the modern technology, the companies are seeking ways to properly manage the MRO supplies. The use of e-procurement has become popular to the companies because of the benefits that can be acquired. First of all, this strategy gives the opportunity to have an efficient process and control of the transaction and expenses. Secondly, the relationship and the communication between the suppliers and buyers have been improved because of the reduced lead time and quick confirmation from both parties. Since the implementation of e-procurement reduces the use of paper and other materials, the company can save money and thus reduce administrative cost, transaction cost and inventory cost. This is favorable for the operation which can be a competitive advantage particularly in the long run. Moreover, the use of e-procurement results in satisfaction of the users within the company and avoids scarcity of the supplies when needed. This is due to the control and structure of the buying process from the beginning to the delivery of the items.

Despite the benefits provided by e-procurement, the authors have concluded that companies faced challenges regarding e-procurement within MRO supplies. The small-sized companies from the Netherlands revealed that the Internet connection and the incompatibility of the browser or system between the suppliers and buyers is one of the main challenges. The authors have concluded that this challenge can be faced by any industry type of company and kind of procured MRO. Therefore, selecting the best suppliers plays an important role to avoid such situations. Research showed that contracting one supplier for longer periods of time might cause the overlooking of other suppliers' offers. Only the job agency was the one dealing with various suppliers before buying the MRO supplies which gives them assurance to find the best suppliers and get the product at the right quality and price. Conversely, other three companies have also source and select suppliers, and decided to continue the contract as long as they are satisfied with the service and products.

To sum up, e-procurement visibly enhances the traditional procurement process within MRO purchasing by means of the identified stages being electronically handled from the supplier selection, order placement until the payment method. Additionally, the identified benefits trigger on how e-procurement enhances traditional process. The authors have concluded that the automated stages commonly occur within a small-sized company because large companies have the capacity to automate all transaction process from the start of the needs to the delivery of the MRO process. This can also be seen in the information given by

the expert that the size of companies, type of industry and MRO items play an important role in the adoption of e-procurement. This is also a consequence of financial capacity of the company, number of employees involved and the amount and variety of MRO items being needed.

The implementation of e-procurement has brought benefits for the companies which help with the operation and competitiveness. From the efficient process of every transaction, to the reduction of administrative, transaction and inventory cost, e-procurement has proven its contribution for the companies. However, the compatibility of the systems and browser is the common challenge for the small-sized companies in the Netherlands.

7 MANAGERIAL IMPLICATIONS

This thesis has yielded findings for the managerial insights on MRO e-procurement. The managerial implications offer remarks, wider understanding for the focused topic and suggestions for further research within the procurement of MRO.

The findings from the first research question have contributed by means of automated execution and more specifically the following three areas: supplier selection, order placement and payment stage. Enabling practitioners to better understand the strengths and weaknesses of the enhancement of e-procurement as well as the benefits and challenges that might occur from the three above-mentioned areas.

The first area, supplier selection will enable practitioners to strengthen their sourcing of potential suppliers; request for information/quotation and the final selection of suppliers by means of faster and efficient way compared to the traditional procurement process. By incorporating the second area, order placement, the companies will strengthen their competitiveness and efficiency with regard to placing orders from browsing on the supplier's website, selecting and evaluating of MRO which can be easily performed at any available time of the buyer.

Third and last area, payment stage will be beneficial to practitioners because it increases the transparency and control of expenses within the e-procurement. This is due to the reduction of paper-based works, lead-time, transaction cost, the efficiency in supplier selection, communication and overall procurement process. The abovementioned three areas present the efficiency to enhance the traditional procurement within MRO supplies. The efficiency can help to increase a company's understanding of its needs and what makes these three areas important in MRO procurement.

For future studies, it would be interesting to analyze the outcomes obtained from established e-procurement initiatives by investigating not only on small-sized companies but also medium-sized and large enterprises within the same market. Investigating medium and large enterprises would give a holistic view of the similarity or differences of the e-procurement process and findings. Another alternative could be investigating companies not only within Netherlands but also comparing one or two organizations from other European countries. This would give an interesting knowledge if difference in countries influences the process of e-procurement of MRO. Furthermore, it would give an understanding if e-procurement is connected with the local country policy. A study in the background of different countries, their cultural influences on e-procurement implementation would provide a contribution for the purchasing literature.

The authors find it interesting the fact that seller firms perspective on e-procurement implementation for MRO materials could be studied in the future. This is to identify if there are a parallel benefits or challenges between the two parties. Finally, a significant study focused on the importance of supplier participation in the e-procurement process, would be of great use in order to obtain a broader understanding of both buyer and supplier perspectives.

8 REFERENCES

- Aberdeen Group (2006). *The Maintenance, Repair and Operating Supplies Benchmark Report: Strategies for Improved MRO Spend Management*.
- Ageshin, E. (2001). *E-Procurement At Work, A Case Study*. Production and Inventory Management Journal First Quarter, Northeastern Illinois University
- Aisbett, J., Lasch, R, and Pires, G. (2005). "A Decision-Making Framework for Adoption of e-Procurement." *International Journal of Integrated Supply Management* (1) 3, 278-293
- Amaratunga, D., Baldry, D., Sarshar, M. and Newton, R. (2002). Quantitative and qualitative research in the built environment, *Work Study Journal*, 51, 17-31.
- Atkinson, W., (2000). E-Procurement is a Natural for MRO Purchasing. *Purchasing' ABI/INFORM Global* 129,5 page 23.
- Baião, J., and Seco, A. (2000). Gestión de los recursos de tecnología de la información en el contexto de la modernización gubernamental. BID.
- Bedell, D. (May, 2002). "Solving the Headaches of eProcurement." Corporate Finance. Retrieved 27-2-2014 from www..../pqdweb?TS=1045444536&RQT=309&CC=2&Dtp=1&Did=000000121053487&Mtd=1&Fmt
- Bryman, A., and Bell, E., (2007). *Business Research Methods*, 2nd ed., New York: Oxford University Press.
- Carayannis, E. and Popescu, D., (2003). Profiling a methodology for economic growth and convergence: *Learning from the EU e-procurement experience for central and eastern European countries, Technovation*, Volume 25, pp1-14.
- Coyle, J, Langley, CJ, Novack, R and Gibson, B (2013) 9th edition *Managing Supply Chains A Logistics Approach*, South Western Cengage Learning, page 573.
- Croom, S. R., (2000), "The impact of web-based procurement on the management of operating resources supply", *The Journal of Supply Chain Management*, pp. 4-13.
- Croom, S., and Johnston, R. (2003). E-service: Enhancing internal customer service through e- procurement. *International Journal of Service Industry Management*, 14(5), 539-555
- De Boer, L., Harink, J. and Heijboer, G. (2002) 'A conceptual model for assessing the impact of electronic procurement', *European Journal of Purchasing and Supply Management*, Vol. 8, No. 1, pp.25-33.
- DHL Report (2009) MRO: Indirect Supply "Driving New Efficiencies in the Indirect Supply Chain. *A White Paper from the Americas Leader in Supply Chain Management*.



- Dobler, D.W., and Burt, D.N. (1996). *Purchasing and Supply Management* (6th ed.). Singapore: McGraw-Hill Companies, Inc.
- Easterby-Smith, M; Thorpe, R. and Lowe, A. (2002), *Management Research: An Introduction* (2nd ed), Sage Publications, London.
- Eisenhardt, K.M. (1989). Building Theories from Case Study Research. *Academy of Management Review* 14 (4): 532-50
- Eng, T.Y. (2004). *The role of e-marketplaces in supply chain management*. *Industrial Marketing Management*, 33, 97-105
- Foroughi, A (2007). *MRO and eProcurement: Opportunities and Challenges*, College of Business, University of Southern Indiana.
- Gardenal, F., Angelo, A. and Manzo, V., (2006) “A model to measure E-Procurement impacts on organizational performance”
- Gelderman, C. J., Semeijn, J., and Lek, I., (2008), “Analysis of E-marketplace attributes: Assessing the NATO logistics stock exchange”, *International Journal of Defence Acquisition Management*, Vol. 1, pp. 1-21.
- GenesisSolutions.com. (2002). *“Integrated MRO Supply Management: A Three Dimensional View.”* WhitePaper, Retrieved 27-02-2014 from www.GenesisSolutions.com
- Greener, Dr. S., (2008). *Business research methods*, Dr. Sue Greener & Ventus Publishing ApS.
- Gunasekaran, A. and Ngai, E.W.T., (2008). “Adoption of e-procurement in Hong Kong: An empirical research”, *International Journal of Production Economics*, Vol. 113, pp.159–175.
- Gunasekaran, A., McGaughey,R.E., Ngai, E.W.T., and Rai, B.K.,(2009),”E-Procurement adoption in the Southcoast SMEs”, *International Journal of Production Economics*, Vol. 122, pp. 161–175.
- Hashim, M. (1997). *“Clients’ Criteria on the Choice of Procurement Systems – a Malaysian Experience”*. In *Procurement – A Key to Innovation*, 273-284. Canada: CIB Proceeding.
- Hawking, P., Stein, A., Wyld, D.C., and Foster, S., (2004), “E-procurement: Is the ugly duckling actually a swan down under?”, *Asia Pacific Journal of Marketing and Logistics*, Vol. 16, No. 1, pp. 3–25.
- Howard, M., Vidgen, R., and Powell, P. (2006). Automotive e-hubs: Exploring motivations and barriers to collaboration and interaction. *Journal of Strategic Information Systems*, 15, 51-76
- Jaye, C. (2002). Doing qualitative research in general practice: methodological utility and engagement, *Family Practice Journal*, 19(5), 557-562.

- Jin, H., (2011). "Demand based on MRO, Procurement management research of logistics enterprise", in *Business Management and Electronic Information (BMEI)*, 2011 International conference in Guangzhou, China, IEEE Xplore Digital Library, pp. 476- 481.
- Johnson, P., Buehring, A., Cassell, C., and Symon, G., (2007). "Defining qualitative management research: an empirical investigation", *Qualitative Research in Organizations and Management: An International Journal*, Vol. 2 Iss: 1, pp.23 - 42
- Joia, L. A., and Zamot, F. (2002). *Reverse auctions in the Brazilian government: A case study*. Retrieved 21 February 2014 from www.ebape.fgv.br/academico/asp/dsp_opb_artigos.asp
- Keen, P. and McDonald, M. (2000). *The eProcess Edge: Creating Customer Value and Business Wealth in the Internet Era*, McGraw-Hill, New York, NY.
- Kilpatrick, J. (June, 2001). "The Supply Chain e-Business Top 100 Buy: Moving from Indirect to Direct Procurement," SupplyChainBrain.com. Retrieved 26-02-2014 at www.supplychainbrain.com/archives/6.01Buy100.htm?adcode=1
- Kim, J.I., and Shunk, D.L. (2004). *Matching indirect procurement process with different B2B e-procurement systems*. *Computers in Industry*, 53, 153-164
- Knudsen, D. (2003). Aligning corporate strategy, procurement strategy and e-procurement tools. *International Journal of Physical Distribution & Logistics Management*, 33(8), 720-734.
- Larsson, T. and Strandberg, D. (2006). *How Purchasing Process Can Be Automated & Its Effect on the Supplier Relationship*. Master Thesis; Jonkoping International Business School
- Leonard-Barton, D. (1990). A Dual Methodology for Case Studies: Synergistic use of a Longitudinal Single Site with Replicated Multiple Sites. *Organization Science* 1(3): 248-66.
- Li, H. and Yang, T., (2011), "Research on the procurement platform for MRO materials based e-commerce", in *Management and Service Science (MASS)*, 2011 international conference, IEEE Xplore Digital Library, pp. 1-5.
- Masterman, J.W.E. (1992), *An Introduction to Building Procurement Systems*, E & FN Spon, London
- Maxwell, J. A. (2005), *Qualitative Research Design: An Inductive Approach*, London: SAGE Publications
- McConnell, D.J. (2009) 'An analysis into the factors affecting the uptake of applications of e-procurement, within the UK public sector' *Doctoral Thesis Loughborough University* page 11.
- Michaelides, Z.; Ho, J.; Boughton, N.; and Kehoe, D., (2003), "The development and evaluation of internet-based supply of non-production (MRO) items", *International Journal of Logistics: Research and Applications*, Vol. 6, No. 4.

- Moon, M.J. (2005) 'E-procurement management in state governments: Diffusion of e-procurement practices and its determinants', *Journal of Public Procurement*, Vol. 5, No. 1, pp.54-72.
- Moore, J. (2007). "E-Procurement Pays Its Own Way: Strategic Sourcing and eProcurement Transform Purchasing in DeKalb County, GA." FCW.COM Retrieved 27-02-2014 from <http://www.fcw.com/article98118>
- Muffatto, M. and Payaro, A. (2004) 'Implementation of e-procurement and e-fulfillment processes: A comparison of cases in the motorcycle industry', *International Journal of Production Economics*, Vol. 89, No. 3, pp.339-351.
- Panayiotou, N.A, Gayialis, S.P., & Tatsiopoulos, I.P. (2004). An e-procurement system for governmental purchasing. *International Journal of Production Economics*, 90, 79-102.
- Peleg, B., Lee, H.L., and Hausman, W.H., (2002), "Short-term e-procurement strategies versus long-term contracts", *Production and Operations Management*, Vol. 11, No. 4, pp. 458–479.
- Przymus, N. K., (2003). *What Minneapolis, Minnesota Can Learn from Other Governments*, Metropolitan State University.
- Puschmann, T., and Alt, R. (2005). Successful use of e-procurement in supply chains. *Supply Chain Management: An International Journal*, 10(2), 22-133.
- Rajkumar, T.M., (2001). E-procurement: Business and technical issues. *Information Systems Management* 18 (4), 52–60.
- Robson, C., (2002), *Real world research: a resource for social scientists and practitioner-Researchers*, Oxford: Blackwell.
- Saunders, M.; Lewis, P.; and Thornhill, A., (2009), *Research methods for business students*, 5th ed., Pearson Education Limited, England.
- Schoenherr, T. and Tummala, V.M.R., (2007) Electronic Procurement: A structured literature review and directions for future research. *International Journal of Procurement Management*, Volume 1, Number ½.
- Seale, C. and Silverman, D. (1997). Ensuring Rigour in Qualitative Research, *European Journal of Public Health*, 379-384.
- Singer, T. (January, 2003). "MRO eProcurement: Where Is It Now?" *Plant Engineering*. Retrieved 27-02-2014 from [ww...pqdweb?TS=1045443175&RQT=309&CC=2&Dtp=1&Did=000000278488351&Mtd=1&Fmt](http://www.pqdweb?TS=1045443175&RQT=309&CC=2&Dtp=1&Did=000000278488351&Mtd=1&Fmt)
- Tashakkori, A. and Teddlie, C. (2003). *Handbook Of Mixed Methods In Social And Behavioral Research*, London: SAGE Publications
- Teo, H.H., Wei, K.K., and Benbasat, I.,(2003) Predicting Intention to Adopt Inter-organisational Linkages: *An Institutional Perspective. MIS Quarterly*, Volume 27, No 1, pp 19-49.

- Turban, E., King, D., Lee, J., and Viehland, D. (2006). *Electronic Commerce 2006: A Managerial Perspective*, Pearson/Prentice-Hall, Englewood Cliffs, NJ,
- Turina, N., Radujkovic, M., and Car-Pusic, D. (2007), “*Design and Build*” *In Comparison with Traditional Procurement Method and Possibility of its Application in the Croatian Construction Industry*. Faculty of Civil Engineering in Croatia.
- Van Weele, A.J. (2005). *Purchasing and supply chain management—Analysis, strategy, planning and practice* (4th ed.). London: Thomson Learning.
- Varghese, A (2012). ‘*Recent Impacts of e-Procurement on the MRO Industry*’, *Reliability Web.Com-A Culture of Reliability*. Retrieved 26-02-214 from http://reliabilityweb.com/index.php/articles/recent_impacts_of_eprocurement_on_the_mro_industry_maintenance_repair/
- Wise, Robert P (2011). *Mississippi College Law Review*, Fall, 2011, Vol.30(3), p.491-522, *Peer Reviewed Journal* Cengage Learning, Inc.
- Wu, F. (2007), "Antecedents and outcomes of e-procurement adoption: an integrative model", *IEEE Transactions on Engineering Management*, Vol. 54 No.3, pp.576.
- Yin, R. K., (2003), *Case study research –Design and methods*, 3rd ed., Thousand Oaks, Sage Publications, California.
- Yu, A.T.W., and Shen, G. (2013) "*Problems and solutions of requirements management for construction projects under the traditional procurement systems*", *Facilities*, Vol. 31 Iss: 5/6, pp.223 – 237

9 APPENDIX

A. Questions for the Companies

Company and the respondent

1. Could please tell me about your company?
2. What is your position and responsibilities within the company?
3. What types of MRO supplies do you purchase and how frequent they are being purchased?
4. Could you please explain the functions and importance of these MRO supplies for your company?

Procurement Strategy

5. In buying those MRO supplies you mentioned, are you using the traditional procurement or electronic procurement?
6. If you are using traditional or e-procurement, could you please give the details of the procurement process? (*From the start to the end of the process*)
7. What are the challenges you faced with current procurement strategy? Give examples e.g. process, ordering, waiting time, contact with suppliers, bureaucracy, paper works etc.
8. How these challenges affect your company operations and goals?
9. How do you solve these challenges? Are you taking any actions in order to avoid the occurrences of these challenges?
10. What are the critical success factors of e-procurement in the MRO buy and to your company?

Technology

11. Do you have any systems used in procuring the supplies?
12. How do you contact your potential providers?
13. How do you select the best suppliers?
14. Are there systems used to monitor and control the procurement process?

B. Questions for the Expert

1. How do you think e-procurement enhances the traditional procurement process?
2. Do you think MRO (maintenance repair operations) can be efficiently and effectively purchased using e-procurement as opposed to traditional procurement? Why?
3. Could you elaborate common benefits and challenges of using e-procurement within MRO purchases?
4. Do you think the size of the company, type of industry and purchases play an important role when implementing e-procurement? Why?