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# IMPROVING PURCHASING PRACTICES IN PROJECT MANAGEMENT

## – A new operating model for site purchasing

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# IMPROVING PURCHASING PRACTICES IN PROJECT MANAGEMENT

## - A new operating model for site purchasing

The aim of this thesis was to study the current procurement process and purchasing practices of the case company, as well as to study the new operating model of the company, especially with regard to small and urgently needed spare parts. The purpose was to determine and study the reasons for choosing the new operating model and the benefits it brings which will enable the case company to create a competitive advantage in the future and simplify its operations in order to save time and money.

The study was conducted by interviewing both the purchasing and logistics manager of the case company. The theoretical part of the thesis deals with procurement on a general level, project management, project purchasing and the purchasing process after which the new operating model of the case company is reviewed.

The results of the thesis can be utilized by developing the new operating model to be more versatile and refining it for new uses, so that the efficiency of operations could continue to be guaranteed precisely from the purchasing department point of view. The diversity of project activities, especially in the shipbuilding sector, requires flexibility from the project organization, which is why the development of a new operating model must be taken into account in the future as well.

KEYWORDS:

Purchasing, procurement, project management, improving purchasing

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# HANKINTOJEN KEHITTÄMINEN PROJEKTINHALLINNASSA

## - Työmaaostojen uusi toimintamalli

Tämä opinnäytetyön tavoitteena oli tarkastella toimeksiantajayrityksen nykyistä hankintaprosessia ja ostokäytäntöjä, sekä tutkia yrityksen uutta toimintamallia erityisesti pienten ja kiireellisesti tarvittujen varaosien osalta, jotka eivät kuulu suoraan projektin hankintalistalle. Tarkoituksena oli selvittää ja tutkia uuden toimintamallin valitsemiseen johtaneet syyt ja sen mukana tuomat hyödyt, joiden avulla toimeksiantajayritys voi luoda kilpailuetua tulevaisuudessa ja yksinkertaistaa toimintojaan ajan ja rahan säästämiseksi.

Tutkimus toteutettiin haastattelemalla toimeksiantajayrityksen sekä osto- että logistiikkapäällikköä. Opinnäytetyön teoriaosiossa käsitellään hankintoja yleisellä tasolla, projektinhallintaa, projektiostamista sekä ostoprosessia, jonka jälkeen käydään läpi toimeksiantajayrityksen uusi toimintamalli.

Työn tuloksia voidaan hyödyntää kehittämällä uutta toimintamallia monipuolisemmaksi ja jalostamalla sitä uusiin käyttötarkoituksiin, jolloin toiminnan tehokkuus pystyttäisiin jatkossakin takaamaan nimenomaan osto-osaston näkökulmasta. Projektitoiminnan monipuolisuus etenkin laivanrakennusalalla edellyttää joustavuutta projektiorganisaatiolta, minkä vuoksi uuden toimintamallin kehittäminen pitää ottaa huomioon tulevaisuudessakin.

ASIASANAT:

Osto, hankinta, hankintojen kehittäminen, projektinhallinta

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# LIST OF ABBREVIATIONS

| | |
|---|---|
| FAT | Factory acceptance test |
| IMO | International Maritime Organization |
| ITT | Invitation to tender |
| MOQ | Minimum order quantity |
| MPR | Manufacturing progress report |
| MRO | Maintenance, repair, operating |
| NPR | Non-productive purchases or non-product related |
| ORSY | Order with a system |
| PO | Purchase order |
| PR | Purchase Request |
| RFI | Request for information |
| RFQ | Request for quotation |
| VAT | Value-added tax |

# 1 INTRODUCTION

Procurement is one of the key elements in project management and successful purchases are an important factor when it comes to a high-quality outcome that meets the need of the customer. From each point of view, whether the actor in question is an enduser, a customer or a project organization, it is important to carry out a project according to the customer's needs. Regardless of the field of activity or the business model, approximately 50-80 % of the total costs of an average company is formed by goods, services purchased from outside and materials. When indirect purchases and investment type of purchases are counted in the annual share of average purchases in industry and trade will rise to 80 % of the total costs of a company (Iloranta & Pajunen-Muhonen, 21–22).

The economic importance of procurement in project management or in any field of business is inevitable. Due to the large share of procurement costs of a company, it is crucial to understand the role of procurement expertise and how it has a rather significant importance on company competitiveness. The more the organization is ready to invest in searching, finding and attracting suitable suppliers with great knowledge and competence, and cooperates with them in the most efficient way, the more the organization is likely to profit. Moreover, it is also important to understand the role of an efficient supply chain and supply networks, and not only is the organization able to e.g. reduce overall costs, shorten its lead times, improve quality and even provide faster product or service forms, but it can also achieve a strengthened position in its field of business and improve its sales margins or increase the revenue. In addition, even though purchase savings are considered important, one should always think of what value-added benefits could be received from different suppliers and how the organization is able to increase them (Logistiikan maailma, 2020a).

## 1.1 Company overview

Company X is a project-oriented global company operating almost on each continent providing full turnkey solutions for the marine and offshore industries. This full service contractor is specialized in building and modernizing vessels and offshore units, and with its expertise of cost-efficient and logistically-convenient solutions, projects will be carried

out successfully by meeting the expectations of the customer and also by following the regulations of International Maritime Organization, IMO. By providing innovative and long-lasting solutions, Company X prioritizes its customers with the help of advanced technology and professional employees working worldwide. The concept of Company X is based on an ability to work at any shipyard around the world. This gives the company not only an advantage to be mobile but to adapt to new environments easily and use the local office, for example, for sourcing suppliers. In order to suit every customer's unique needs, Company X ensures a high quality outcome with the help of its own project team including project manager, project planner, project engineer, purchasers, global sourcing and logistics.

The reason why Company X was particularly chosen for this study is because its interests meet the author's interests and the author is one of their employees. Both parties have agreed to cooperate during this thesis and the final conclusion and results will be taken into account by Company X when thinking of future solutions that could be implemented in future projects.

## 1.2 Objectives, methods and scope

The research scheme of this thesis was to survey the present situation of Company X and its current process of purchasing. The thesis also focuses on site purchasing of the company, and considers what could be developed in the near future. Normally all purchasing actions taking place in one project are handled by one or two persons. After having closed a deal with a customer, a careful designing work is begins. The purchasing department will follow the schedule determined by the customer and project planner but sometimes there is a need of spare parts or tools noticed by the site team working at the shipyard (also referred as site). Therefore, a concept of a spare part container was introduced and adopted in Company X.

This research discusses the main factors that led to choosing this concept for Company X, and the overall goal was to introduce an idea of development by using a similar container as well. The reader will receive a deeper insight to this study by being introduced to the theoretical framework shown in the beginning of this thesis. The theoretical framework includes basic information of procurement, project management and development of procurement. After having studied those carefully, the reader is able to jump in and have a closer look at a real-life case.

The research itself is based on qualitative research. In order to achieve a deeper level of understanding, a variety of sources, such as literature and latest articles were used in this study. Furthermore, the author's own observations and experience as well as coworker experience were utilized for this thesis in order to gather valid data. To further understand the aim of this thesis there are three research questions to be answered as follows:

- Why is a new operating model for site purchasing needed?
- What advantages are there to having a spare part container at site?
- How should site procurement be improved at Company X also in the future?

The scope of this thesis covers the purchasing process concerning standard purchasing and purchasing actions impulsed by the site team at shipyard, its current situation and how site procurement could be enchanced at Company X in the near future. The aim was to achieve a better understanding why small items must not be purchased separately, but together or by using the concept of a spare part container at site in order to avoid e.g. extra freight costs or waste of time and money.

# 2 PROJECT PROCUREMENT MANAGEMENT

There are certain specific characteristics when it comes to project procurement. In this chapter the reader will be introduced more closely to the organization of procurement in projects and how it could be developed.

## 2.1 Procurement

Wherever there is a dynamic and challenging environment, there will also be a business. Over the last years markets have been undergoing constant change, such as globalization and technological improvements, and relationships with suppliers and stakeholders has changed. It is important to be flexible and mobile all the time when it comes to procurement management and supply chains (Walters & Rainbird 2004, 219). According to Huuhka (2019, 17), one of the major reasons for changed procurement in particular is globalization. Currently, it has become more common to talk about value chains in addition to supply chains. A value chain is a business model and a chain formed by different companies that have the full range of activities that create a product or service. However, within a one company there is also a value chain formed by organization procurement, marketing, production, distribution and after-sales service departments. Value chain is ofter referred to an American Michael Porter who has brought the term of *competitive advantage* to daylight. In this Porter's model there are nine generic activities broken down into four supporting activies and five primary activities. The support activities consist of company human resource management, infrastructure, technology development and procurement. The primary activities include inbound logistics, operations, outbound logistics, marketing and sales and customer service. A company needs to find a way to perform these activities with less costs than the competitor (Sakki 2014, 5–6). This thesis focuses on procurement activities and how to find a suitable way to keep the overall costs suitable by improving the purchasing process. The Porter's model of value chain is presented below.

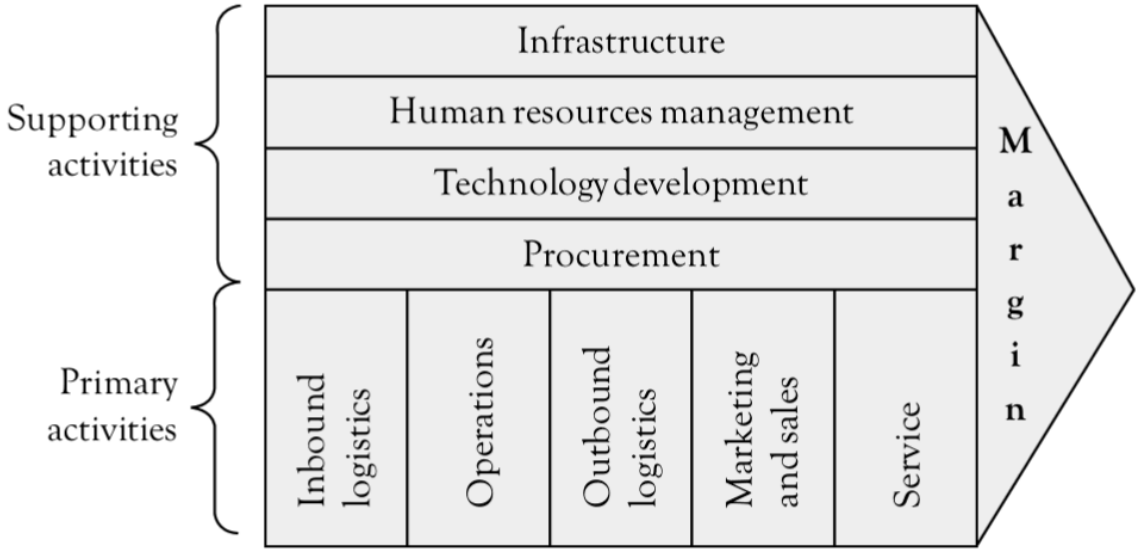


Figure 1 Michael Porter's value chain

Procurement can be defined as management of external resources and in order to maintain organization operations, management, development and maintenance a variety of products and services are needed. Moreover, without any diverse expertise from outside of the organization, it is considered to be rather difficult to maintain the operations as well. Procurement aims to utilize the possibilities of existing suppliers so that the needs of an end customer will be met whereas the wider interests of an organization will be maximized at the same time (Iloranta & Pajunen-Muhonen 2018, 53). It is also a responsibility of procurement to develop a world-class supplier base by looking for new suppliers worldwide as well as developing and maintaining the effective relationships with the existing ones (Weele 2018, 14).

According to Weele (2018, 283–284), purchasing tasks, responsibilities and authority can be divided into three different levels which are strategic level, tactical level and operational level. The strategic level considers all purchase decisions that have an impact on the market position of the company in the long run and these decisions are mainly the responsibility of top management, whereas product, process and supplier selection related decisions are made in the tactical level. The tactical level decisions usually have a medium-term impact and they require coordination and cooperation between other disciplines within the company, such as manufacturing and logistics. The operational level, on the other hand, covers all activities related to ordering and

expediting function. Daily operations in the operational level include e.g. ordering of the materials, monitoring and evaluation of deliveries and supplier performance.

Purchases can be classified in many ways: usage, nature, economic importance, group or supplier. Moreover, procurements can be grouped into direct and indirect procurements. Direct procurements are used in order to produce the main products or services of the company, such as raw materials and different components whereas indirect procurements consist of everything that are not related to final product or services. Indirect procurements could be such as office supplies, spare parts, chemicals etc. They can be called also MRO procurement (Maintenance, Repair, Operating) and moreover, travel and IT consulting services are included in indirect procurement. The economical importance of indirect procurements is significant and the total share of indirect procurement in a company is approximately 40 %. Therefore, companies have lately invested in this as well (Logistiikan maailma 2020b).

The five main categories of procurement according to Iloranta & Pajunen-Muhonen (2018, 59) are the following:

1) recurrent production purchases
2) procurement of project-type production
3) investments
4) indirect purchases
5) forwarded commodities

This classification has proved to be extremely functional and helpful when thinking of suitable tools or methods for procurement management. The categories listed above differ from each other when it comes to goals and practical operations model. What is remarkable is that this classification is only related to the internal needs of companies instead of external ones. The first category consists of materials, subcontracting and services related to recurrent production purchases. In terms of continuity of a production process, the materials must be available all the time since if something is missing the production line will stop the whole process (Iloranta & Pajunen-Muhonen 2018, 60).

The second group is procurement of project-type production and the group includes materials, subcontracting and services especially related to project-typed business. It is typical for this group is that the content of procurement varies in each project and the challenge of these type of purchases is that they need to be completed in a hurry, planned thoroughly, negotiated and all of this has to be completed in a thight schedule

(Iloranta & Pajunen-Muhonen 2018, 60–61). Also in this thesis, project procurement in particular is under survey.

Investments are not always even identified as procurements. Sometimes they are handled as project-typed purchases and therefore the risk of not fully using the knowledge increases. These can be typically defined as one-time purchases, and the only thing making them different from project-type purchases is the size of the purchase and different handling in bookkeeping (Iloranta & Pajunen-Muhonen 2018, 61).

Indirect purchases, as described earlier in this thesis, can be called also non-productive purchases or non product related, NPR. The items in this category are normally to be purchased only when in need and actions are most likely completed without any specific coordination (Iloranta & Pajunen-Muhonen 2018, 62).

The fifth and final category according to Iloranta & Pajunen-Muhonen (2018, 65–66) is forwarded commodities. A great example is importing companies that work for their client in their own country and utilize the goods and follow the given marketing strategies and recommended list prices. However, also a free, individual service oriented dealer may search for needed items from plenty of different suppliers and invite a tender in order to receive the best offer available.

In the future there will be procurement challenges as well. The challenge of having a balanced economy when the rest of the countries are developing, the population of the world increases and the climate is changing is inevitable. These challenges are directly related to procurement because instead of tactical procurement the strategic point of view will become more important. The pressure of savings will be aimed at procurement directly (Huuhka 2019, 17).

### 2.1.1 Small-scale purchases

According to Pelin (2012, 12), small-scale purchases, such as spare parts, are based on weekly checks at site and with the help of the weekly observations, the lack of this type of purchases can easily be noticed. It is important to understand that the number of small-scale purchases should be decreased in every organization. Decreasing could be handled by including the small purchases together with other purchases or by centralizing small purchases for few suppliers only that are located near the site. It is more likely that small needs are purchased either by phone or goods can easily be picked

up. The reason for pick-up could be transportation costs and usually when it comes to small-scale purchases, it is recommended to think of the delivery costs all the time.

## 2.2 Business environment of a project

Project business is project-related managed and target-oriented activity that serves the company to achieve its goals (Artto, Martinsuo & Kujala 2011, 17). Projects are also about a change, and to achieve that effort and resources must be directed on certain outcomes (Leech 2004, 13).

Pelin (2011, 23–24) defines project as a set of work which is carried out as determined, in order to accomplish a one-time result. Project is not a new term as projects have already existed back in the days when pyramids were built. Both current projects and pyramids have been carried out by one company in the lead with the most responsibility and in cooperation with subcontractors. The key person is the project manager who simply is in charge of everything related to the project implementation. The other people in the project could be responsible to someone else than the project manager and as soon as their work in the project is completed, the resources are not maintained any longer but released for other existing projects. Furthermore, there could be subcontractors or consultants that have signed a contract with the project management. It is also to be mentioned that a project has either an internal or external customer who finances the project.

Lock (2013, 1–2) has specified four types of projects that can be seen in our daily lives:

1) *Construction projects* i.e. construction, petrochemical industry, mining and quarrying projects which are normally seen public. These projects are characterized by implementation at site in unpleasant or even dangerous conditions and also quite far away from the headquarters of the company managing the project.
2) *Manufacturing projects* are aimed at producing a specific machine, ship, airplane or other technically defined heading or technical entity.
3) *Management change projects* i.e. operations that include managing, leadership or coordination to produce the desired outcome such as relocating an office or installing of a new information system.

4) *Scientific research projects* which aim to achieve a deeper level of understanding of science without knowing whether the result is going to be useful or complete waste of time.

This thesis focuses on manufacturing projects due to Company X's business in the marine and offshore industry. Ships or vessels are completely produced according to specifications of a customer and the outcome always varies.

### 2.2.1 Project management

The main challenge for a project to be carried out successfully is to achieve the goals set in the beginning of the project, meet the expectations and the requirements. There are many different factors affecting the positive outcome of a project such as technical, social and economical factors but also the project management itself and leadership. Leadership as a term consists of plenty of skills, expertise, methods and tools that are needed for a successful project but depending on which phase the project is at a particular moment of time, leadership style could change. It is also to be considered rather important that the goals and objectives need to meet the requirements and expectations of different stakeholders, e.g. organizations, associations, official and unofficial group of companies or even project staff. (Artto, Martinsuo & Kujala 2011, 35).

According to Artto, Martinsuo & Kujala (2011, 36), project management can also be seen as tools and documents, data areas and processes or as expertise and attributes of the project manager and other project team. These three approaches help understand different points of views which need to be taken into account when thinking of a successful project. The first approach is more guidance and tool-oriented and this approach is based on e.g. tools developed and documentation agreed for the project management. Tools could be forms, instructions or techniques that enable planning and follow-up (Artto, Martinsuo & Kujala 2011, 40).

Project management as data areas and processes, on the other hand, is the first and the most well-known of these three categories and it refers to the project data areas that should be covered. The project is divided into scope, schedules, costs, human resources, communications, risks, quality and procurement management. This list follows the ISO10006 classification and enables the operation of the project to be

reviewed in accordance with the standard model (Artto, Martinsuo & Kujala 2011, 37–38).

Project management as expertise and attribute consists of all skills, expertise, attitudes and attributes that each project staff member should have. However, also technical, commercial and field-specific knowledge and skills need to be presented in order to carry out a successful project management (Artto, Martinsuo & Kujala 2011, 38–40).

## 2.3 Procurement as a part of project management

There is always a need for outside material and cooperation in a project regardless of the size of a project. Procurement management is basically based on looking for the outside resources, choosing and using of them, contractual matters, cooperation management and furthermore, it is a responsibility of procurement to track orders and have follow-up control. The company managing the project and in charge of procurement and buying is called *customer* whereas suppliers or subcontractors are called *sellers.* In case the same supplier delivers multiple projects it is called *project supplier*. Together subcontractors could form a supply chain which is a network of suppliers delivering resources needed to carry out a successful project (Artto, Martinsuo & Kujala 2011, 175–176).

There can be multiple reasons for procurement when it comes to a project. It can be related to purchasing of raw materials, materials, tools or equipment. Normally, companies try to focus on their core expertise in their field of business whereas other resources could be outsourced because of temporariness. Sometimes, there is a lack of human resources, expertise and equipment in a project that are borrowed outside, which is quite often easier and cheaper than using the company's own resources. It is also important to understand that by using outside resources which bring new ideas, new ideas and methods can be learned. Not only risk can be divided between the project management and the outside resource but local subcontractors can also bring local expertise to the project (Artto, Martinsuo & Kujala 2011, 176).

The aim of procurement in project management is to procure materials and services in the most overall profitable way possible. This is not necessarily directly related to price but more like the relationship between the cost and benefit impacts in terms of various of different factors. Procurement costs also consist of the time used for procurement

management, risks of procurement, the communication pressure within the project resulting from the procurement and time invested in developing trust (Artto, Martinsuo & Kujala 2011, 177).

According to Pelin (2011, 243–244), procurement can be defined roughly as delivery of equipment and materials. It is also reality that a project can be delayed because of procurement. Scheduling of purchases and controlling them is a crucial part of project management. In order to keep suppliers on time withouth any delays, it is necessary to organize, plan and control the suppliers on a daily basis. Sometimes the quarters in charge of procurement come from outside from the organization and therefore, controlling and guiding procurement and purchases differs primarily from engineering and construction by nature.

Pelin (2011, 243–244) also mentions that a project includes both smaller and larger purchases. All must be controlled but it is to be noticed which of them are crucial when it comes to the schedule of the project. At some point, it must be determined which of the purchases must be included in the project schedule and controlled with the help of a variety of methods. Goals that can be set for procurement are low purchase price, late capital commitment, sufficient time to deliver and achievement of qualitative objectives.

Purchasing is also attached to word *right*. Basically, materials have to be delivered to the right quality, right specification, at the right place, at the right time, in the right amount, in the right condition and at the right price. It is possible that certain matters are not right when delivered and it could be tolerated well but in case there were more than few issues wrong problems could arise immediately (Lock 2013, 59).

### 2.3.1 Tasks and responsibilities of procurement

If nobody has the complete responsibility of all purchases to be completed within an organization, the situation can easily turn into a so-called wild west. In this case each person or part of the organization will follow only their own interest, budget or financing. Without any specific or mutual plan of purchasing that should always be completed in advance, a plenty of extra acquisitions or visits in a local hardware store take place. Mostly when speaking of e.g. field of reconstruction it is impossible to know what is behind the wall that needs to be demolished – therefore it cannot be defined what purchasing actions have to be completed. The worst case scenario would be

decentralized purchasing which refers to multiple different acquisitions completed by multiple people within the same organization. The problem with several small purchases from a variety of suppliers completed by different people can lead to lack of awareness – who bought and what? Furthermore, this phenomenon causes problems for the purchase follow-up, for example, both backorders and part deliviers cannot be fully tracked and returns and refunds are harder to be implemented (Iloranta & Pajunen-Muhonen 2018, 142–144).

Tasks and responsibilities of procurement listed by Pelin (2011, 245) are as follows:

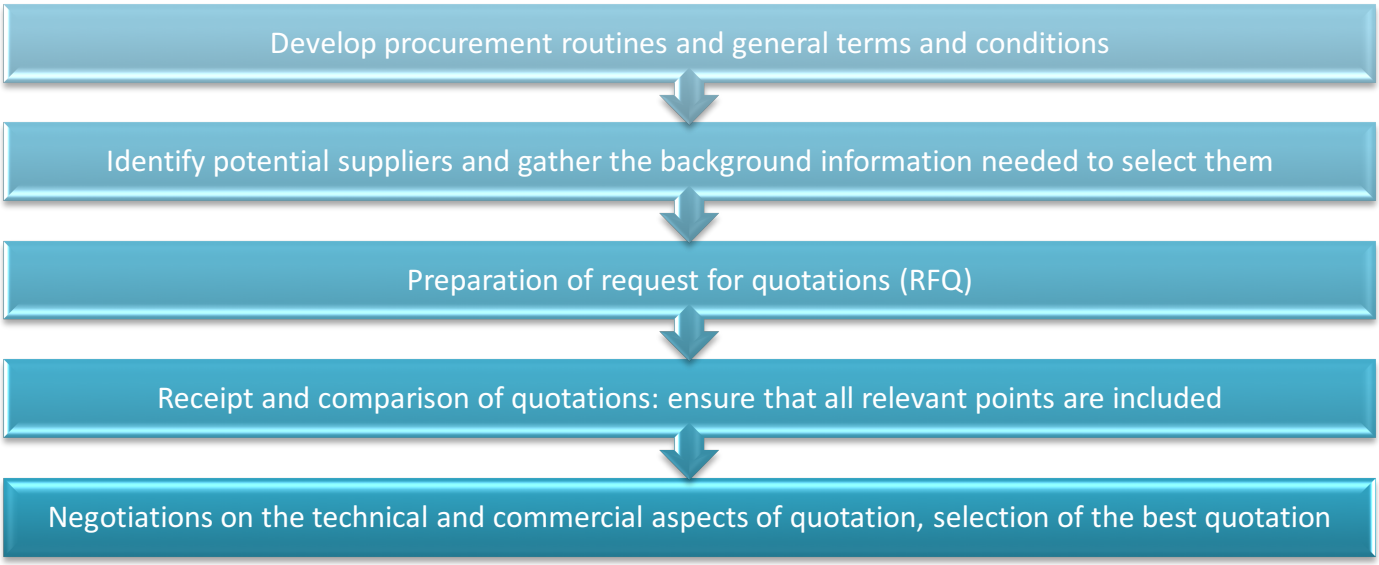


Figure 2 Tasks and responsibilities of procurement (Pelin 2011, 245).

According to Junnonen & Kankainen (2012, 34) a successful procurement needs a person in charge. Having enough time to invest in the matter is necessary and it is to be secured. Sharing of responsibility depends on each organization but together in a procurement meeting the group of procurement professionals make sure that purchasing will happen on time according to the schedule set for procurement actions.

### 2.3.2 Planning & Scheduling

Planning, in the first place, means determing all the project tasks on their preferred calendar dates whereas scheduling has basically the same idea but it is also about scheduling people and fitting them into the plan in a way that they are not either too

inactive or overloaded. With the help of an effective plan the project manager is able to set out the starts and finishes of each project task at reasonable and practicable times. It is the project manager's responsibility to control that tasks are being started on time. An effective plan includes informative details that enable monitoring and controlling, e.g. tasks could be broken down into multiple tasks and duration should be maximum two weeks so that the project manager is able to have tasks under control and control the progress sufficiently. As a conclusion, a detailed plan will provide more accurate dates that can be checked and controlled during the progress. However, the information given should not be too detailed yet because there is no need for multiple people in the same department to check the same tasks more than once. It is also to be considered that tasks given should follow each other in a logical sequence (Lock 2013, 39), e.g in shipbuilding, wall panels cannot be installed before the walls have been isolated.

A planning and scheduling tool invented for very simple projects is called a bar chart or Gantt Chart (after an American engineer called Henry Gantt). A bar chart is similar to an office holiday chart. When it comes to a project plan, the tasks are listed on the left-hand side and the times on the right-hand side. The farther to the right they are set, the later the tasks are planned to start and finish. Bar charts can be quite visually effective and it a useful tool for different departments within an organization (Lock 2013, 40–41). Below is a bar chart from Lock (2013, 42) presenting a plan for a garden pond.

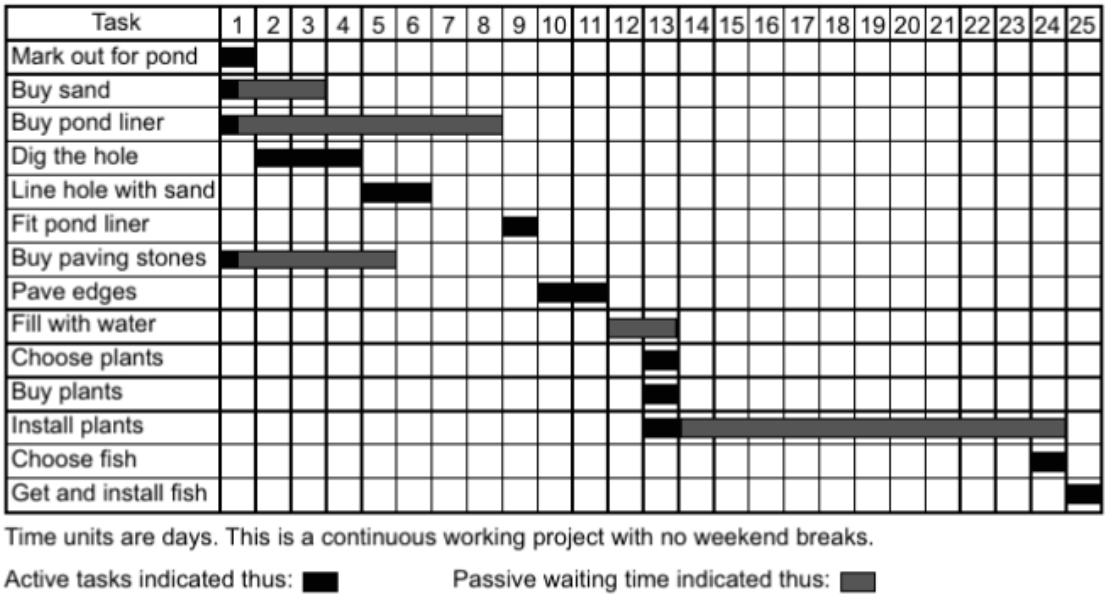


Figure 3 Bar chart for a garden pond project from Lock (2013, 42).

Creating a project schedule and staying within the agreed schedule is one of the key factors in project management. By creating a schedule it can be secured that deliveries will take place at the right time and procurement process will be implemented early enough. It is also a significant tool for timing all large purchasing units and individual critical purchases that can be classified as per the size of the purchase or long delivery time. All procurement actions are thought carefully through and they will be scheduled so that assembly can be implemented in the right order at site. That way the procurement schedule is also connected to the planning schedule. A procurement schedule is made on a weekly basis and it includes information such as required point of time, when the RFQ has been sent out, due dates for quotations, order date and delivery date. In case there were any changes on the schedule, they must be marked clearly on the procurement schedule as well (Junnonen & Kankainen 2012, 35–36). Later in this thesis, the procurement schedule is called PR tracker which is short for procurement tracker.

## 2.4 Stages of a procurement process

In this paragraph, the stages of a procurement process are introduced to the reader more closely in a chronological order from the point of defining specification to the point when evaluation is made. In order to define the procurement process the information has been collected from various sources, e.g. Ritvanen et al. (2011), from Weele (2018) and Lock (2013). Each of these writers introduces their model of procurement process from different point of views and therefore, some differences may occur when it comes to the stages of the process. Lock (2013) in his book *Naked Project Management* is more focused on the project management point of view whereas the rest of the sources, Ritvanen et al. (2011) in *Logistiikan ja toimitusketjun hallinnan perusteet* and Weele (2018) in *Purchasing and supply chain management* concentrate more on the supply chain management and procurement point of views. The most detailed information was given by Weele and Lock which are then naturally in the spotlight when introducing the stages. The linear process model according to Weele is presented below.

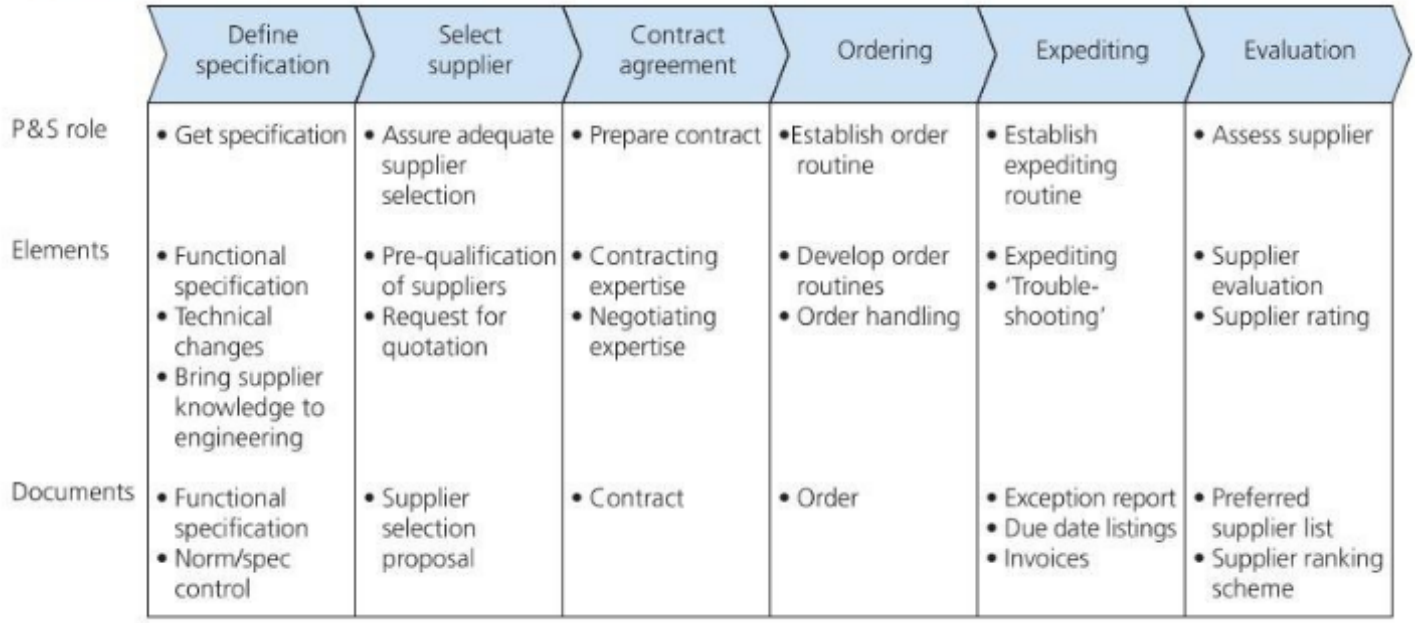


Figure 4 Purchasing process (Weele 2018, 28).

Purchasing process or procurement process includes all the activities that are needed in order to acquire products, services or raw materials. The most important activities are forecasting, purchase orders, delivery control, reception, warehousing and order payments. It is crucial to understand that not every purchasing process is the same. Therefore, the number of stages in the process can vary depending on the nature, order or contract of the purchase in question. The process itself can be either longer or shorter, and a good example is that RFQs are not always sent out to suppliers which makes the process in that case. Sometimes though, it is necessary to look for new suppliers in the beginning of the process and especially when the supplier is new and unfamiliar, samples must be requested before signing a contract (Ritvanen et al. 2011, 39).

For special or expensive items, the purchase order procedure can be a little different as the nature of it is different as well as mentioned above. In this case, significant size of purchases for projects, especially non-catalogue goods or services have another kind of procedure than the products chosen from supplier standard product catalogues (Lock 2013, 61). This procedure is used for Company X purchases due to the unique need of customers in the field of shipbuilding. However, as the stages are introduced later in separate paragraphs, the differences will be explained as well.

### 2.4.1 Define specification

Before any purchasing actions there must be a need. The need for a product can be a brand new order or a recurring purchase. The need must be analyzed and availabilities must be checked in advance (Kissflow, 2020). In this first stage of the purchasing procedure, the purchasing requirements are determined and it is to be decided whether the company wants to produce the goods by their own or are the goods to be contracted out. This so-called ''make-or-buy'' question is faced by many companies (Weele 2018, 37) but when it comes to Company X, nothing is produced by them due to their core business which is project management and therefore, everything must be bought.

There are two types of specifications: functional and technical. Functional specifications simply describe the functionality of the product when it is used. Technical specifications, on the other hand, are detailed information that describe the technical properties and characteristics of the product. Mostly there are technical drawings made by engineering which are crucial when sending out the RFQ. Usually in the purchase of construction work or project-typed work, the technical changes can occur during the project but it is the responsibility of the buyer to ensure that the supplier is able to receive the latest changes and drawings which then the supplier ideally confirms to be approved (Weele 2018, 36–37). According to Lock (2013, 61) the designer, engineer or other technical person in the project creates a detailed purchase specification which is to be carefully bought.

### 2.4.2 Select supplier

Lock (2013, 61–63) introduces an extra step before sending out a RFQ. He mentions that the specification is sent first to the potential suppliers and it is issued as an inquiry specification. This type of inquiry could include information such as packaging and delivery requirements. Only afterwards, the purchasing department is able to sent the inquiry to the possible suppliers and attach a standard form including information of commercial conditions, for instance place of delivery and terms of payment etc. This type document can also be called as invitation to tender (ITT). When sending out the RFQ, all the potential suppliers are asked to respond by a certain date and most of the times, when the schedule in a project is quite tight, all suppliers missing the deadline will be almost automatically disqualified. However, after having received offers from the

suppliers, the buyer and the technical person together decide which of the received offers are ticking all the boxes when it comes to both the technical performance and commercial terms. At this point, it is likely to receive suggestions from the potential supplier. Often helpful suggestions made by the suppliers can be useful and the outcome can be different than the technical person has thought in the beginning. However, it is important to have a clear understanding between the supplier and the buyer what should be made.

According to Weele (2018, 37–39), the supply market search can begin right after the purchasing requirements have been defined. He writes about separate steps that can be helpful when selecting the possible supplier. The steps are the following:

1) Determining the method of subcontracting
2) Preliminary qualification of suppliers and drawing up the ''bidders' list''
3) Preparation of the request for quotation and analysis of the bids received
4) Selection of the supplier

Firstly, it is to be decided whether to choose for turnkey or partial subcontracting. Turnkey subcontracting means that the responsibility of the entire assignment is in the hands of the supplier where as partial subcontracting divides the assignment into parts, usually to multiple suppliers and the coordination is the responsibility of the buyer. The buyer has to be sure that the continuity of the whole project activities are taken care of or otherwise it can turn out to a major catastrophe (Weele 2018, 37–39).

The suppliers need to meet the requirements of the buyer and based on each supplier's response a bidders' long list is gathered. The list indicates which suppliers are possibly the most suitable for the assignment. After that, request for information (RFI) are sent to these suppliers and they are supposed to give references of their prior projects and experience which are then useful information for the buyer. It is also possible to visit the suppliers facilities in order to have a clear idea of their capability. Out of these suppliers a few will be chosen and a RFQ will be sent to those. Sometimes the situation can be so poor that not a single supplier is available and therefore, the supply market research will continue. After receipt of the quotations, the purchasing department will start an evaluation based on technical and commercial issues. All aspects, such as technical, logistic, quality, financial and legal aspects are carefully weighed. However, price is not always the key factor here. Rather than focusing on the individual product price, it is more important to look closely to the total costs that the product will have over its lifetime. Finally, one or more suppliers will be selected (Weele 2018, 37–39).

Ritvanen et al. (2011, 39–40) are not focusing on the detailled information given by the technical person but instead contrating more on the RFQ form. A RFQ should include such information as below:

1) Product or service
2) Technical and commercial requirements
3) Quantity and unit
4) Delivery time and place
5) Contract validity period & option
6) Deadline and place for tenders

However, in case there is a long-term contract between the buyer and the supplier, there is no need to send a RFQ. The RFQ is to be formulated in a way that comparing offers would be as smooth as possible. Especially important is also to know what the buyer is buying since there is no room for errors. RFQ should not also be too strictly formulated so that the suppliers would be able to send suggestions (Weele 2018, 39. According to Ritvanen et al. (2011, 40–42) an offer should include specific information about the product or service and purchase conditions. In addition to that, all possible brochures, samples and references are supposed to be presented in the offer. Comparison of the offers is one of the hardest tasks in the procedure. It is important to have all needed information, such as terms of payment, delivery terms, quality, warranty, order quantity etc. The most used selection criteria are quality, delivery time and price. In some cases the criteria can be rated which means some criteria can be emphasized more than the others.

### 2.4.3 Contract agreement

According to Lock (2013, 64–65), majority of the companies prefer to draft a contract of their own and both parties should have their solicitors who check the document thoroughly to ensure that is reasonable for both parties in question. Lock is focused more on the pricing and terms of payment in his text and according to him the terms of payment are one of the most important sections of a contract. The contract in project management type of companies not only includes the total price, but sets out a series of stages which indicate the parts of the total contract price that need to be paid. This ensures, at least in the large purchases, that the supplier has a steady income and is able to purchase the materials needed whilst the work is still ongoing. Typically it is determined in the

contract that the customer or client must first pay a cash deposit on signing the contract and as the project proceeds successfully further payments can be taken care of. Often the progress can be gauged by the milestones which are achievements of certain tasks during the project. Milestones are normally easily identifiable great events such as installation of cabins (in shipbuilding). However, before any invoices can be paid, the client must be assured that the amount of work claimed matches the invoice.

Pricing could be handled in various ways but Lock introduces only two ways which are fixed price or fixed rates. Fixed price, also known as lump sum, is one of the preferred ways to quote a purchaser. Fixed price ensures that there will be no surprises, and commitments are listed clearly in the quote. Though, the supplier could possibly add below-the-line costs, e.g. items like escalation and contingency sums. Cost escalation is basically defined as changes in the cost or price of certain goods or services in a given economy over a period. Contingency sums, on the other hand, are a amount of money, normally given as a percentage, included in the project budget to allow for the small errors. A reasonable percentage could be between 5-10% (Lock 2013, 66–67).

Weele (2018, 39–41) says the industry has an impact on the content of the contract. The technical content of the purchase agreement naturally is depending on the product but specific commercial and legal terms and conditions can be different in each contract because of the market situation, purchasing policy, product characteristics or company culture. Weele also agrees with Lock that it is common to insist on a fixed price since it allows a better cost control and budget management.

In case an equipment is bought, it is highly recommended that optional prices for possible future deliveries of spare parts are mentioned also. Moreover, it is to be taken into account that when buying from foreign suppliers, currency risks can take place. For contractors operating internationally, e.g. in the offshore industry, this can be quite tricky to deal with due to the length of the projects. As a solution, it is either possible to contract materials and services in the same currency as the other party or to include currency exhange clauses in the contract. Terms of payment, however, are defined as Lock – it is common to pay in several stages, i.e. milestones, due to the large investments made by the supplier in order to produce the desired product. Advance payments are also playing an important role when it comes to big purchases (Weele 2018, 39–40).

The contract should also include information of penalty clauses and warranty conditions. The supplier has to assure that the delivered goods are of good quality and completely

in accordance with the agreed requirements, specifications, conditions, drawings etc. It is also common to require the supplier to take care of the maintenance and spare parts for a period of time. All in all, these above-mentioned issues must be recorded in the general purchase conditions to avoid any unnecessary work (Weele 2018, 40–41).

According to Ritvanen et al. (2011, 42–43) there are five types of contracts:

- One-off agreement: Includes occasional purchases
- One-year contract: Deliveries for a specific contract period are agreed. When concluding annual contracts, prices, delivery method and quality issues are agreed upon
- Framework agreement: Include call-offs, warehousing and special supplier models. The purpose of the framework agreement is to take advantage of volume advantages, reduce the costs of purchasing process, ensure the availability of the goods and services and agree on delivery terms.
- Project agreement: Is made separately for each project. This is also the most used agreement in construction and shipbuilding industry.
- Partnership agreement: Is close in nature and is concluded only with very good suppliers.

Ritvanen et al. (2011, 43) also list the following issues to be mentioned in a contract:

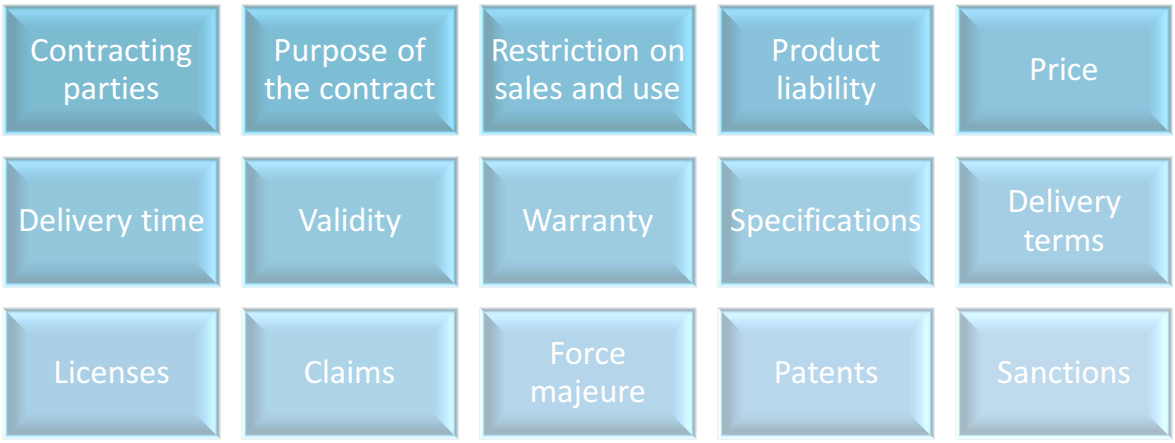


Figure 5 Content of a contract by Ritvanen et al. (2011, 43).

The people in charge of buying should look more closely into the terms and conditions and clarify the responsibilities and risks of each party (Ritvanen et al. 2011, 44).

### 2.4.4 Ordering

Lock (2013, 63–64) briefly says that before the actual order, the project company could ask for a reissued purchase specification with an accompanying purchase request (PR) from their technical people. In this way, the purchase department receives an authorizations from the technical department and thus are allowed to move on with the actual purchase order (PO).

According to Weele (2018, 44) the order can be placed after having agreed on the terms and conditions of the contract. Sometimes, the contract can represent the actual purchase order. Though, in some cases as in routine buying, buyers negotiate a call-off contract which enables bulk orders over a period of time with multiple delivery dates. This is typically related to projects, when everything is not needed at the same time but products can be called off stock when they are actually required.

Like Lock, Weele (2018, 44) also mentions that purchase orders are initiated through a purchase requisitions. Information and instructions should be clearly given to the supplier and a PO should include information such as order number, product information, unit price, number of units required, expected delivery time and date, delivery address and invoicing address. All this information must also be reflected on the delivery documents and invoice due to trackability and matching. After having sent out a PO, the supplier is in most cases requested to send an order confirmation for each purchase order received.

Ritvanen et al. (2011, 44) state that a PO can be placed without a written contract. In this case, there is a high risk so the larger the purchased product or service is, the more recommendable it is to have a written contract.

### 2.4.5 Expediting

It is not always a quick process from the point of purchase order to the expected delivery date. During that time the purchasing department is in contact with the suppliers regularly checking the status of the order. To avoid project to be halted it is crucial to check that suppliers are proceeding as agreed because surprises can lead to poor outcomes. In case of a very complex technical goods it is preferred even to visit the supplier premises during the production if possible (Lock 2013, 64).

Weele (2018, 44) emphasizes the good and precise work completed in the earlier stage. If these activities have been executed properly, there will be less work to be completed in expediting. Suppliers need to meet their agreements and buyers workload cannot be undervalued. Weele also mentions three types of expediting. The first one is where the supplier informs the missing materials that have not arrived in time which means the buyer has to take immediate action. Instead of this, the type two is called a preventive approach. There will be a status check a few days before the delivery date to avoid any unnecessary surprises. The last type is called advanced status check which is used for critical purchases and critical suppliers. Supplier is checked on a regular basis by the buyer. Afterwards, when products have been delivered they need to be inspected whether they meet the requirements set in the beginning. An acceptance test could be performed at the supplier's site before shipment, at the user's site after delivery or when the products are put to use for the first time. Nonetheless, problems could occur anyway, such as quality is poor or delivery is late. In these cases the buyer must be informed immediately by the supplier and mistakes should be corrected in the future.

Ritvanen et al. (2013, 45) unfortunately write hardly anything about the process. The only point is to keep checking the status of the order and claim when necessary.

### 2.4.6 Evaluation

The overall insight into this paragraph is based on the comments of Weele (2018) due to the lack of information from *The Naked Project Management* by Lock and *Logistiikan ja toimitusketjun hallinnan perusteet* by Ritvanen et al.

The purchase process continues after the delivery of the goods. Purchasing and supplier information need to be updated, project evaluations must be made, excess work needs to be arranged etc. To make this stage easier for the buyer, the supplier must be open and report e.g. all extra expenses to the buyer to remain the costs clear. In case the supplier is new, documentation should be completed carefully. It is recommended to keep track of all details such as quality and delivery record, competitiveness and innovativeness. This way the vendor can be rated afterwards and suppliers can be compared in the future. The aim is to keep the supplier info up-to-date for future projects and contracts (Weele 2018, 45).

As a conclusion, every stage of the purchase process matters. There is no room for ineffective stages due to its impacts on the whole process (Weele 2018, 46).

## 2.5 Improving purchasing process

This paragraph introduces key elements that have affected positively project procurement and courses of action that should be avoided listed by Tevelson et al. (2012). The writers have listed a few of do's and don'ts for successful companies listed below.

Do's

- Creating transparency on category spending across the project portfolio.
- Ensure the participation of the procurement for each concept phase of every project.
- Ensure that sufficient time is left for procurement to receive the best possible offers from the supplier.
- Develop a clear definition of the responsibilities and required skills for project procurement managers, especially in large-scale projects.
- Build a dedicated team of procurement experts capable of both overall and project-specified procurement.
- Establish a total-cost-of-ownership (TCO) assessment for critical equipment and investments.
- Monitor the performance of the project and partners based on key performance indicators (KPI), such as project progress, procurement efficiency and cost-effectiveness of suppliers.
- Systematic evaluation of alternative contracting or contracting models and the use of an incentive scheme based on the size and complexity of the project.
- Active monitoring of compliance with procurement processes, including suppliers involved in the project procurement.

Don'ts

- Acceptance of ambiguities in cases exceeding project specifications and use of standard project templates in project definitions.

- Avoid communication with key procurement stakeholders.
- Select the suppliers too early through incomplete contracting.
- Optimize categories with too broad and imprecise targeting.
- Put insufficient focus on control of the efficiency of subcontractors in procurement.
- Overlook project-specific dynamics.
- Fail to define the personal development and role of contracting entities.
- Fail to accurately calculate savings.
- Focus too restrictively on project delivery.

# 3 CASE COMPANY DAILY OPERATIONS

In this chapter, the reader will be introduced more carefully to Company X's current situation. This chapter is based on both the author's and her colleagues comments and observations at Company X, i.e. Vice President of Purchasing and Estimation and Logistics Manager.

## 3.1 Company X today

Company X is working in a very dynamic and agile field of business. The project management company handles its everyday operations from its headquarters. The everyday operations consist of engineering, procurement, sales, marketing and development as well as weekly project team meetings and monthly meetings within each department. Local offices around the world take care of their daily operations on their own but after all, they are responsible for the headquarters, and all operations are managed by the head office.

As a project organization, Company X's procurement is categorized as project-typed production. Its goal is to fullfil the customer's need according to their requirements in a way that all technical aspects are throughly considered. Together as a solid team the project manager, project planner, project engineer, procurement and logistics ensure that the project will be carried out successfully. Weekly project team meetings ensure that all relevant points are noticed and all members, especially the project manager has become aware of the matters. All members of the team do not work necessarily throughout the whole project but can be released for another project when possible. However, they need to be always available for questions related to the project they were involved.

### 3.1.1 Procurement and sourcing

The procurement department includes the head of procurement, vendor managers, purchasers and logistics manager. Sourcing is taken care of by the sourcing manager. Global sourcing is the key actor for procurement department since most of the suppliers

will be sourced and analyzed before they can be chosen as Company X's official suppliers.

As the most important geographic business areas at the moment for Company X are Europe, Asia and Canada, the company has divided their suppliers and subcontractors into three different pools which are US/Canada, Europe and Asia. The goal of this grouping is to have a pool of pre-qualified material suppliers and subcontractors for these three areas. When a project begins in one of these areas, the suppliers can be selected straight from the list. However, before a supplier can be selected they have to go through the pre-qualification process which means a prequalification questionnaire and cashflow and material qualification survey are always completed. PQ package will be used in the following categories:

- Wet units
- Doors
- Cabin furniture
- Prefabricated service kit, electricity
- HVAC, if turnkey
- Cabin installation work
- Public & corridor installation work
- Background work
- Food handling

If the project needs a deeper survey then also a system audit is performed to the named categories or suppliers. One last key element in the supplier selection is the non-disclosure agreement a.k.a. NDA. NDA needs to be signed and returned by the supplier.

After all the documents have been successfully received the contracts can be signed. There are three different type of agreements and contracts depending on the scope of supply.

- *Frame agreement* for materials, components and machines
- *Turn-key agreement* for work including materials and installations
- *Engineering contracts* for engineering and supervising at site

In this case the frame agreement is the most common agreement when it comes to operational level of procurement. They are used mostly the same for each suppliers in order to avoid any complexity and unnecessary paragraphs that may cause conflict

afterwards. This is also a convenient way to place purchase orders since pricing will stay stable as long as the frame agreement is valid between the two parties. The content of the frame agreement is the following:

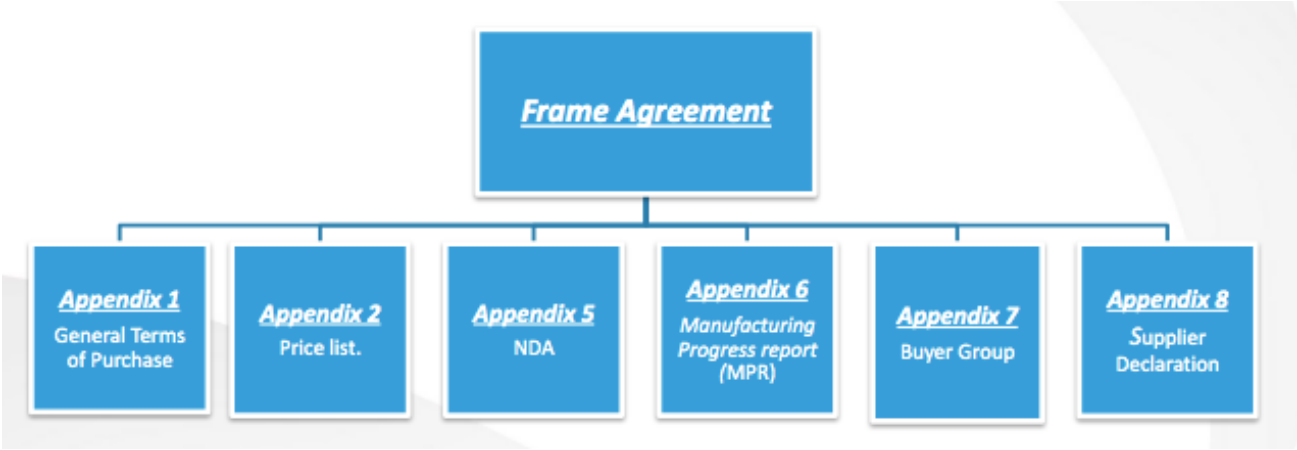


Figure 6 Frame agreement in Company X.

The figure above is missing appendices numbers 3 and 4 due to their non-applicability for every supplier. No. 3 includes specific quality or quality control requirements, and no. 4 information of inspection of product or acceptance procedure.

Apart from the frame agreements, there are also prices that are negotiable. Sourcing can take place locally as well. For instance, in case there is an ongoing project in Asia, local employees are supposed to be in contact with the local suppliers and also source for new ones to keep the prices competitive during the whole project and always search for the best possible quality available.

All in all, Company X is able to be wherever the customer is and its worldwide located offices are valuable factors in their business. Even though the project is managed from the head office, it will not only be an advantage so that tasks can be indicated to right people but also the expertise of local employees can be fully utilized.

## 3.2 Warehousing and Wiima Logistics

Wiima Logistics takes care of all the deliveries of Company X. Wiima Logistics is a 4PL company providing variety of logistics solutions and services using different service providers to minimize costs and boost customer logistics. By consolidating and

warehousing services globally, Wiima chooses the right partners for the logistical needs of each customer (Wiima Logistics www pages, 2019). Wiima Logistics is also a reliable and long-time logistics partner of Company X and works worldwide so that every project can have a full advantage of this logistics concept. Normally, all deliveries should be transported by sea or road to minimize freight costs and extra fees but in certain cases it is unavoidable to use seafreight and therefore, every now and then there are goods that need to be airfreighted or railfreighted e.g. to China or wherever the project is located. These may not be the cheapest ways but in order to avoid further sanctions and payments due to the possible project delay it could actually be a beneficial way to avoid the consequenses.

It is also important that when having a project on another continent, consolidation can be taken into account. Consolidation is crucial when something cannot be procured locally but from another continent. According to an article (*What is consolidated shipping and why it is important?* 2017), consolidated shipment consists of multiple combined shipments from variety of shippers in one full container. By using consolidated shipping, the shipper is able to ship goods more cost-efficiently, damage risk will be reduced and goods can be tracked and controlled more carefully. Furthermore, when something is bought locally, the local Wiima Logistics will take care of it so its operations are fully covered worldwide.

Warehousing is minimized at the case company. As the project is managed from the head office, there is no need for storaging the goods there. The intention is to ship goods straight from the supplier warehouse to the shipyard. In case this is impossible to arrange, there is a rather small warehouse which can be used, e.g. if goods need to be consolidated before shipping or there is no space at the shipyard warehouse, and the supplier will not keep the goods at their premises, the goods can be stored in the case company warehouse. However, in case the goods need to be brought there only for a short while, they also need to be shipped soonest.

## 3.3 Purchasing process in standard cases

As mentioned before in this thesis, Company X is a project-oriented company providing full turnkey solutions to its customers worldwide. When the scope of the project has been determined the engineering department is able to start the designing work. In some cases, a help of a few outsourced design offices is needed as well. A person nominated

as a project planner will then together with help of the project team create a schedule which needs to be followed thoroughly throughout the whole project so that it would keep ongoing without any delays.

### 3.3.1 Define specification

Each piece that belongs to the scope of Company X in a specific project needs to be procured. In this case Company X does not need to decide whether to produce by themselves or buy it since their core business is to focus on the project management. Thus, separate purchase request will be sent out to procurement to handle. Purchase requests are prepared by the engineering department and they include drawings and technical specifications, such as dimensions, color and amount, of goods to be bought. The information given is necessary and will be utilized when sending a request for quotation to possible suppliers. Technical drawings must be always included in the RFQ but however, technical changes can occur and the latest version of those must be always sent to the supplier in order to receive the right goods.

It is also mentioned in the PR if there is e.g. a requirement of marine certificates. The International Maritime Organization, IMO, is the world's largest and most important maritime organization. One of the most important aspects of maritime safety is the correctness of the construction and fire protections of the materials and these requirements are regulated by the committee under the IMO (International Maritime Organization, 2020).

### 3.3.2 Select supplier and ordering

When the PR has been received, a request for quotation needs to be sent out at least to 3-5 different suppliers. At this point, when the suppliers have already gone through a pre-qualification process and have been accepted as Company X's official suppliers, contracts and prices are already valid. This concerns most of the purchases. In very large purchasing entities on the other hand, such as wall panels, there is a supplier that has been chosen early in the beginning of the project due to the size of the purchase.

After having received feasible quotations, a suitable supplier will be selected. It is also important to check that the suitable supplier has all the required certifications and is

capable of delivering the goods on time. When it comes to the technical specifications, further questions might be received from the supplier that can only be answered by the engineering. Sometimes this step can last for a while before everything is confirmed. However, it is necessary to receive all required information since at least large purchases are sometimes tailor-made to meet only the needs of one specific project.

After everything is clear for both parties, supplier and Company X procurement, a purchase order can be placed. Normally, a PO is made in the Company X ERP, which is called Liinos, and all the PO details must be included, such as delivery and invoicing addresses, PO number, delivery time, price, product, quantity and the case company's general packing instructions. PO must be also confirmed by the supplier, preferably by email.

### 3.3.3 Expediting

It might take several weeks from the point of order to the goods being ready for shipping. However, it is crucial to be on time and follow the schedule set for the project to avoid any unnecessary surprises. Purchasers must be up to date when it comes to the POs and check their status regularly. In case the supplier is behind the schedule, the reason must be sorted out. This type of preventive action is vital due to the project schedule. Status checking is as important for all types of purchases no matter what size they are.

There are few items that are chosen for a FAT inspection. FAT is a short for *factory acceptance test.* It is chosen to be used for first batches of particularly chosen items, such as doors, furniture, wet units to avoid any mistakes before any further batches are manufactured. The FAT inspection is always made at supplier premises before shipping.

Another practice for these above-mentioned items is to keep track of MPR, a short for *manufacturing progress report* which is maintained and controlled by the project purchaser. Each item supplier chosen to use MPR is supposed to send an updated report of their production on a weekly basis, e.g. there are 1124 wet units to be manufactured for one vessel and the total quantity is divided into smaller batches. By using MPR Company X is able to prevent delays and question the suppliers production schedule.

When the goods are ready for a pick-up, delivery can be arranged to shipyard by Company X's logistics partner, Wiima Logistics. Moreover, there must be an invoice waiting for checking after delivery. Normally, it can take several days to get one invoice

paid to a vendor due to the long process of Company X which involves at least 3 people per one invoice and furthermore, at least one person will have the invoice for doublechecking during this process. The system is considered rather complex and certain steps are actually unnecessary and could be avoided in the near future.

### 3.3.4 Evaluation

As stated in the theoretical framework, the purchase process continues after the delivery of the goods. The case company is one leap ahead due to their division of supplier pools and list of approved suppliers after they have passed the prequalification questionnaires and signed the needed documents. The evaluation, in this case, has either a positive or negative effect on the approved suppliers listing meaning that suppliers which did not perform as expected will be removed from the list. This is a helpful tool for future projects when suppliers must be considered again. The goal for the case company is to keep the supplier data up-to-date and look for the best possible options to be able to deliver a succesful outcome for its customers worldwide.

# 4 WÜRTH ORSY

The following chapter gives the reader a deeper insight of what were the motives that have led to the current concept used at shipyards. What is the concept in the first place, why is it used and how could it be utilized at other shipyards? The reader will be also introduced to the spare part container called Würth ORSY itself used already at one shipyard, as well as the outcome and further ideas of improvement at the end of this chapter.

## 4.1 Motives

Before the concept of a spare part container at a shipyard was adopted, all purchase orders for urgently needed spare parts for e.g. installation material as well as all other purchases were handled by Company X purchasing department in the same way. The stages of the process can be seen earlier in Chapter 3.

There are quite a few motives that has led Company X to choose a spare part container. It is evident that normal purchase orders managed by purchasing department from Company X's head office will follow the schedule set in the beginning of the project and that process should stay untouched. However, small purchases, such as consumable installation material, impulsed by a site team of a shipyard must be considered differently due to the urgent need of the material at site.

At Company X there are usually one to two persons in one project taking responsibility for procurement actions; one of them is titled as Vendor Manager and the other one Purchaser/Purchase assistant. Together they follow the purchase requests given by the engineering team of the project and act accordingly. Every now and then, when something urgent occurs actions must be quick and decisions concerning the most suitable suppliers have to be made in less than few hours from the given impulse. These sort of impulses, as mentioned before in the thesis, are mostly consumable installation material, such as screws, silicon, tapes, sprays etc.

Sometimes when decisions cannot be made quickly enough, there is also a possibility that the site team could go to a local hardware store and obtain the material they need directly from there. That will be of course charged from Company X later against a

receipt. One primary problem with the site team purchasing items locally on their own is the lack of information between the site team and purchasers and double actions cannot be therefore excluded. Everyone in a project team must be organized and clear processes should be available in order to avoid e.g. any further lack of information.

One of the main factors that has led Company X choosing a concept of a spare part container is the waste of time and money. Time and money used in sending out request for quotations to different suppliers, supplier selection, looking into possible questions asked by the supplier, placing a purchase order and picking up single items for an urgent shipping.

Mostly there is also a minimum order quantity (MOQ) for certain items or some items might not be even available at the supplier's warehouse immediately when the need is urgent. Sometimes items sent from a different country can even cause large-scale delays when it comes to the continuation of the project itself. Time management is vital when it comes to project management. It is crucial to follow the schedule and every employee should be using their time in a way that it is profitable for the company. If a single purchase order takes a lot of time, it is considered waste of time and money. However, considering project management in the field of shipbuilding, it is absolutely necessary to treat each purchase, whether it is e.g. an urgent small purchase or a major purchase for the flooring of the ship, in a way that it is needed to be handled. Every action an employee makes is surely increasing the costs for the employer, since salaries have to be paid.

Waste of money can also be defined as extra freights. Extra freights in this case refer to freights that are not counted in a budget in the beginning of the project. If, for example, the site team informs the head office they need one package of screws to be shipped to the shipyard, the cost of the package could easily climb up to 150€ (no VAT incl.). Shipping in this case from Finland to Germany could be by road and sea, and the delivery time is going to be at least a few days from placing the purchase order not forgetting the booking of a suitable transportation. During this time, the site team would have had time to acquire the needed item locally and moved on with the installation work. Moreover, freight costs could vary significantly, and factors influencing on freight costs could be such as fuel costs, the labor market for commercial drivers, demand for freight, customer loyalty, vehicle capacity, government regulation, geopolitical events and one's reputation as a merchant.

When thinking of doing business, freight costs are one of the key elements that need to be considered carefully since most of the times they are highly uncertain (Chan, 2012). Even though freight costs can be managed somehow, today in 2020, the world is facing something different – COVID19-pandemic. This has had also its impact on freight costs, e.g. cargo flights during COVID19 is a booming business for transportation companies whereas companies using the their services need to take a closer look at the shipping costs. The influence of the pandemic can be seen as longer transit times and shot-up prices on cargos, and especially air cargo prices are somewhat three times higher than last year (2019).

Moreover, e.g. air crafts do not only carry people but cargo as well. The consequenses of the pandemic have also affected the air freight capacities between China and Europe which has vanished nearly by 60%. The number is almost 80% between China and the U.S. (Wade, S. 2020). The increase of the transportation costs can be noticed also at Company X, and the pandemic has had an great effect on shipping goods to other continents for ongoing projects. A spare part container at site also allows Company X to cooperate with Würth only with each other and thus, there is no need for third parties to be involved. Also Wiima Logistics and the case company's own personnel, such as procurement department, can be left out. All actions are taken care of by Würth and no purchase order need to be placed.

## 4.2 Würth ORSY

Würth ORSY, a short for *order with a system*, is a complete storage system tailored particularly according to Company X requirements and located at a shipyard wherever Company X has an ongoing project. In this thesis, this innovative and practical system is also referred as a spare part container. Würth ORSY was chosen after Company X invited multiple suppliers to tender, and Würth had all the needed items available worldwide. The other reason for selecting Würth as a partner was the mutual understanding when it comes to contractual matters, especially in terms of costs.

The spare part container located at shipyard is provided and maintained by an international company, Würth, that is specialized in e.g. screws, tools, installation material etc. Having a container at site allows the site personnel to maintain the working pace continuous without any disturbance. The container is well-organized and logically arranged. With its shelving system it is ensured that a sufficient quantity of the products

required at site are always available and in stock. After both parties agreed on the contractual terms, the parties operate the service together. Company X is then able to decide which spare parts or items it chooses in the container. Together the different teams i.e. site, procurement, logistics and engineering can create a list of needed materials at site. The list includes all consumable installation materials. This material list is then sent to Würth and they will provide materials and fill these in the container. Each product has a barcode which enables scanning when the material is bought. At the moment, there are more than 150 different items in that container chosen by Company X.

All material inside the container are owned by Würth and Company X pays a monthly rent for it. The case company can pick up any needed material from the container and scan it with the scanner located inside the container. Only when materials have been scanned the material is bought by Company X and the ownership of that material changes. Summa summarum, a monthly rent will always be charged by Würth and in addition to that, all the materials scanned by the case company.

The container is constantly open which allows the shipyard personnel use it at anytime, and project will continue as planned. Würth restocks the spare part container every Monday, Wednesday and Friday, and the inventory is made every six months. An invoice with detailed information of items scanned will be sent monthly to Company X. After the project has ended at site, Company X will return the container to the supplier and unused material will stay at the supplier's ownership.

Würth ORSY has definitely multiple advantages. It saves money since procuring consumables can be rather time-consuming and tiny mistakes may cause a horrifying end meaning that materials are always available in the container which gives peace of mind for the customer. ORSY also makes things easy, i.e. the solution used in ORSY is simple and there is no complexity at all when Company X does not need to take care of the restocking.

As an unique system, ORSY is more than a shelf. It is a combination of different logistical systems which are linked together. It is also a complete storage of small parts and material in one container. With the help of this new operating model for site purchasing there is no need to pay expensive freights for courier services but materials already exist and can be paid right after the pick-up from the container. By using Würth ORSY, it is

also ensured that procurement has sufficient amount of time to concentrate on planned purchases and actively monitor all purchases that have been issued.

### 4.3 Outcome & improvement ideas

As stated in the previous paragraph, Würth ORSY has a number of advantages. Efficient supply chain is more than a chain of operations. It is about communication, relationships with suppliers, shipments being on time and a decreased number of logistical errors (Mooney, 2019). With the help of the spare part container, Company X has succeeded to reduce its overall costs, such as freights and wages. For instance, if sealing compound called SikaFlex is needed at China shipyard, it is normally supposed to be shipped by sea which takes approx. 8-10 weeks to arrive there. If the procurement cannot not follow the schedule and ship it early enough whether it is their fault or that of the supplier's, they need to ship the 500 pcs of sealing compound to China by air. This costs about €4000. In contrast to airfreight, it would cost approximately €2000 to ship the same consignment by sea. In terms of wages and time, people can be released for other tasks and they do not need to take care of the purchase orders or any related tasks.

ORSY container also refers to shorter lead times. When material is always available, plenty of steps can be left out. There is no need for sourcing, PO, additional questions of the products, transportation booking, shipping and receiving. Also, the material will be correct and the quality will be assured since the supplier is the same. The products are well-known, and before any decisions are made concerning the range of products, quality can be assured by testing samples.

As Company X is a project-typed organization adapting to wherever the customer is located providing full turnkey solutions to its customers, Würth ORSY could be used in several other projects and tailored right for the needs of that project. It is easily adaptable to any shipyards or locations, and depending on the scope of work, there could be other materials than consumables only. The idea of the container could be converted as a tool container for subcontractors. Tools chosen to the container could be determined together by Company X and its subcontractors in a way that they would not have to pick up the tools anywhere else. However, it would be wise to agree on the terms related to breaking or stealing a tool, since it is a major risk for Company X in case one of those scenarios would happen.

Due to the global COVID19-pandemic, commercial shipbuilding has been hit hard. During the summer 2020, there were further signs of recovery but in September 2020, the situation is certainly overcome. Early in February 2020, the virus disrupted supply chains when China was suffering the COVID19 among the first ones. The logistics network of the country was not fully working, but due to e.g. quarantines, lockdowns and factory closings, a number of shipping containers were waiting at docks and therefore, containers could not been shipped back to e.g. Europe (Bradsher & Chokshi, 2020). This led to lack of containers and Company X was influenced by that matter. As a conclusion, the Würth ORSY container could be used in every single project that Company X will work on in the future. The risk of not being able to ship goods from a different continent to another, is probably faced later as well.

Moreover, new contracts have been ceased and ongoing projects are on hold. It is stated on the website of Safety4Sea, that the whole of Europe could lose its maritime technology sector to Asia. Therefore, approximately 1 million jobs would be lost only in maritime technology, and without shipyards in Europe, Europe would be completely dependent on Asian markets (Safety4Sea, 2020). The impacts on Company X would be inevitable also but having created a new operational model that could be developed together with Würth, actions could be managed from the headoffice also in the future.

Due to the increased demand for hygiene products, it is also a great opportunity for Company X to take action and concentrate on how to develop their business in a way that future challenges could be avoided. Providing more hygiene-oriented solutions to its customers and using the latest technology could bring a major competitive advantage and being a responsible leader in their industry could pay off when it comes to new deals. Instead of focusing too restrictively on project delivery, Company X should concentrate on possible suppliers of professional hygiene solutions and how to bring their customers aware of that.

# 5 CONCLUSION

The objective of this thesis was to understand the current process of standard purchases and the role of site purchasing at Company X, and see how the site procurement could be enhanced in the near future as well. Shipbuilding industry is a very agile and project-typed field of business, and the case company creates unique solutions to their customers. With the help of the research questions this thesis tried to understand why the new operating model for site purchasing is needed, what advantages there are when a spare part container is brought to the shipyard, and how to improve site procurement also in the future. When writing this thesis, the writer was in contact with the company and its employees, mainly the vice president of procurement and estimation as well as the logistics manager, to gather the valid data. The information was also based on the writer's own observations and experience while working at the procurement department of the company.

The importance of this thesis for the case company was high due to the topicality of the new operating model that had been adopted recently. The model will be definitely utilized in future projects, perhaps in a different way though. However, the COVID19-pandemic has had an impact on this thesis as well. The case company must be concentrating on other matters in order to keep its business ongoing during these times.

The thesis was divided into different stages: the theoretical framework, the case study and the improvement ideas as well as conclusions. The theoretical framework of this thesis was based on three different topics which were the basic information of procurement, project management and development of procurement. All of these topics were important to understand when reading further about the case study of Company X. Project-typed procurement differs from standard purchasing due to its unique needs and variety of products that need to be bought throughout the project. In terms of time, a tight schedule is also made in the beginning of the project which needs to be strictly followed due to the building of the vessel. There is no room for delays or otherwise every step in the process will be delayed and the outcome could be even a sanction due to a too late delivered vessel. Timing is thus a significant factor when it comes to this industry.

The outcome of this thesis was that the invention of Würth ORSY container has been a major improvement for the company operations at site, especially thinking of the small-scale purchases i.e. consumable materials. The most important motives to acquire the

container to the shipyard were to reduce the overall costs, such as freights, and release the procurement personnel for other tasks. After having received the spare part container to the shipyard, the quality of the consumables has been assured due to the same supplier, lead times have been cut since all materials are constantly available in the container and the container is automatically restocked by the other party, Würth, as well. In addition to that, there is no longer a need for expensive freights that most likely need to be couriered to the shipyard as the need is urgent, and no sourcing for the consumables is needed any longer. Finally, the container is a great improvement for Company X site operations due to its adaptability to other locations as well.

As a conclusion, it can be stated that this type of spare part container can be used in other projects as well. Since all material can be selected by the customer itself, it is highly recommended to use the container in other projects in the future. It gives a great advantage when the container is already located at the shipyard wherever the next project of the company takes place, since consumables are not only needed in the middle of the project but throughout it. Having all the materials sent to the shipyard to be installed is a very convenient way to have the material available all the time and even restocked automatically.

The implementation of this thesis was a combination of independent work and research as well as communication between the writer and the case company. This thesis was a great example of a new operating model especially for site purchasing. A number of motives have led to the idea of acquiring the Würth ORSY spare part container and discussed in Chapter 4. It is a fascinating aspect that Company X is working in a unique way, adapting itself to wherever the project is located, and having a worldwide located offices gives the advantage of local expertise and familiarity with the language spoken there.

The challenge of this thesis, on the other hand, was to find further reasonable and possible ideas of development. The concept itself is already rather flexible and has been adjusted exactly to the needs of Company X. The Company has invested in this idea and created a well-organized solution in order to improve site purchasing, making it more cost-efficient with decreased capital commitment. However, the improvement ideas discussed earlier, were introduced to the case company after the thesis was completed. The ideas were received with great respect by Company X, however, the current situation of COVID19 has halted almost each project the company has at the moment. Thus, the implementation must be postponed into the future. In addition to that, it is to

be considered that the results of this thesis may not be suitable for any other companies than the company in question.

Finally, the future is unsure currently. As said earlier, the COVID19-pandemic has had a great impact particularly on the shipbuilding industry in a negative way. How can Company X face the future challenges, and when will the shipyards open again? At some point, the commercial shipbuild was already showing signs of recovery but in September 2020 the pandemic seems to be spreading quickly again. Company X has a number of challenges to think of such as how to meet the standards of hygiene in terms of shipbuilding. Maybe a spare part container could also include items that could be useful for hygiene?

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