

# **Key success factors in procuring warehousing services**

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Abstract  <p>Valmet Technologies Ltd has outsourced their service business lines' main logistics center to an outside service provider. They have faced operational and quality challenges with each new service provider, and these challenges have had a considerable impact within the company.</p> <p>To make the future outsourcings smoother, the strategic procurement process was examined to see if it could offer ways to help combat these challenges. The main research question was "What needs to be done in the strategic procurement process to make the procurement of warehousing services successful?". The question was further divided into sub-questions: "What stages are included in this process?" and "What aspects need to be considered in these stages?".</p> <p>Before starting the research process, a theoretical framework was compiled based on the business needs of the after-sales service business supply chains, warehousing and procurement of services. The study itself was implemented with a qualitative and descriptive approach and with theme interviews as the method of data collection. Experts of different positions and organizations were interviewed about what their view on what needed to be done during the strategic procurement process to facilitate success. These statements were studied against the theoretical background to see what the process needed to include.</p> <p>As a result of the study, a new strategic procurement process was created to fit Valmet's specific needs. The process is slightly different from those found in literature due to the special nature of Valmet's complex products, procedures and service offerings. The process also details what needs to be done in each process step.</p>		
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# 1 Introduction

## 1.1 Objectives and motivation

The title of the bachelor thesis is “Key success factors in procuring warehousing services”. The purpose of the thesis was to examine what kind of steps need to be taken so that the procurement process of an outsourced warehouse for a business provider of after-sales services would be successful. More specifically, the main logistics center of Valmet’s service businesses was used as the research subject. To achieve this, it was also vital to see what constitutes successful outsourcing. The thesis details what the process consists of and what needs to be taken into account during these steps from the view point of warehousing services.

The thesis focused on the strategic procurement leading to a signed contract. There are theoretical sources about the strategic procurement of services in general, but this thesis focused on the field of after-sale service business warehousing with its unique requirements and characteristics. The procurement process after the signing of a contract was not examined in this thesis. Those stages are, of course, an important part of the procurement process as a whole, but they belong more to the day-to-day coordination and management of logistics processes and are a separate topic of discussion.

The main research question was “What needs to be done in the strategic procurement process to make the procurement of warehousing services successful?”. The question was further divided into sub-questions: “What stages are included in this process?” and “What aspects need to be considered in these stages?”.

This thesis was implemented in cooperation with the Valmet Technologies’ service business line EMEA logistics. This was also highly topical to the company as the problems associated with outsourced warehousing had been a major issue in terms of process quality, on-time delivery rate and costs. These problems had, in turn, caused mistrust with the logistics performance which, in its turn, had increased costs due to expediting purchases and allowing longer buffer times between order and delivery.

Moreover, the quality costs caused by late or wrong deliveries had also been an issue.

The current warehousing provider for Valmet's service businesses' main logistics center is very experienced in the field, and the buying company's requirements are quite typical for a company operating in the after-sales service business in high-technology. Thus, it is unlikely that the problems experienced are attributed to these factors. These problems can be avoided by placing the focus on the strategic procurement process of these services so that the contract and other agreements would support the performance, facilitate communication and detail what is expected of both parties. The findings of this thesis can be used in the next procurement process to achieve a better quality level and cost performance.

The result of the thesis is a process description of the strategic procurement of warehousing services with instructions on what to do in each stage. This process description is based both on theoretical sources and on field-specific research. This process description can be used in contract negotiation and searching for new providers. The process description helps in keeping the eyes on the entire process during procurement, and it will also provide means to monitor progress as well as establish a framework for the negotiations. This allows the persons conducting the procurement to focus on the correct issues and to make sure all important points are covered. Through an improved procurement process, the transition from one provider to another can have less impact on performance and quality. Additionally, a contract that supports the business objectives also enables focusing on common goals and a mutually beneficial relationship for both the service provider and the customer.

## 1.2 Research methods and theoretical basis

To achieve the aforementioned goals, the business requirements in the after-sales service business needed to be examined to make sure that the outsourcing warehousing function would support them. In addition, the different aspects of warehousing needed be examined in relation to these requirements. The procurement process itself had to be detailed in order to provide a theoretical framework for the research.

The study was conducted as qualitative research based on interviews of Valmet employees dealing with the outsourced warehousing and their related experiences. In addition, previous literature on outsourcings was reviewed. These methods were best suited for the study as understanding the logistics functions and the different aspects behind them in relation to business requirements required specific knowledge. Not all people connected to logics services possess this knowledge.

### 1.3 Valmet Technologies as a company

#### 1.3.1 The company in general

Valmet Technologies Inc. is a Finnish company that focuses on providing technologies, services and automation for the pulp, paper and energy industries. Valmet employs around 12 000 people globally, and its 2015 net sales were 2.9 billion Euros. Valmet' aims to become a champion at serving its customers. The company headquarters is located in Espoo, Finland. (Valmet in brief 2017).

Valmet is a global company with operations in every habituated continent. The company is further divided into four business lines: services, pulp and energy, paper and automation business lines. The pulp and paper business lines focus on providing completely new paper and board mills as well as pulp and energy plants respectively. In internal communication these businesses are referred to as capital businesses. The service business lines provide spare parts, consumables, maintenance and mill improvement services for the customers. As presented in Figure 1, the services business line is the largest by sales volume. It is also the biggest business line by the number of employees as presented in Figure 2. In 2015 Valmet acquired the automation business line from Metso Inc. The business line provides control and monitoring systems as well as industrial internet solutions to both new and existing plants. (Our businesses 2017)

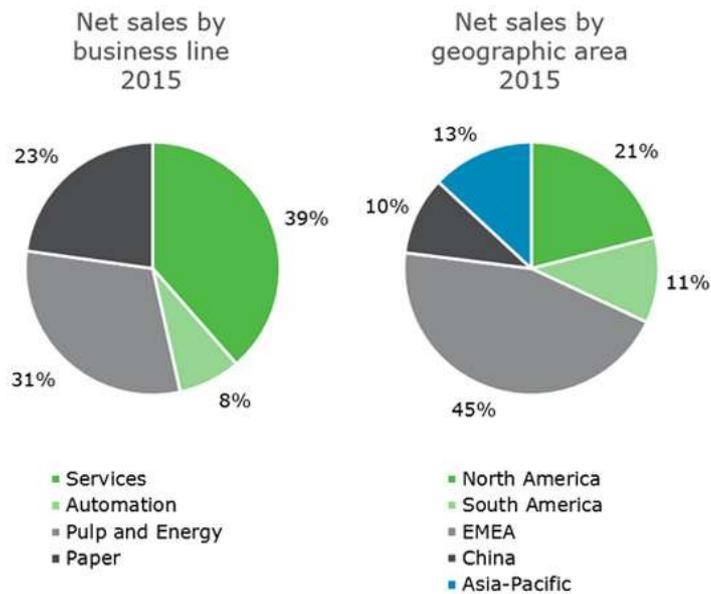


Figure 1 Year 2015 net sales by business line and area (Key Figures 2017)

Valmet's biggest market area is Europe, Middle-East and Africa as presented in Figure 1. These areas also contain the most employees and company locations as presented in Figure 2. As a result of this, most expertise and corporate functions are also located in Europe although the company has numerous service centers and production units in other areas as well.

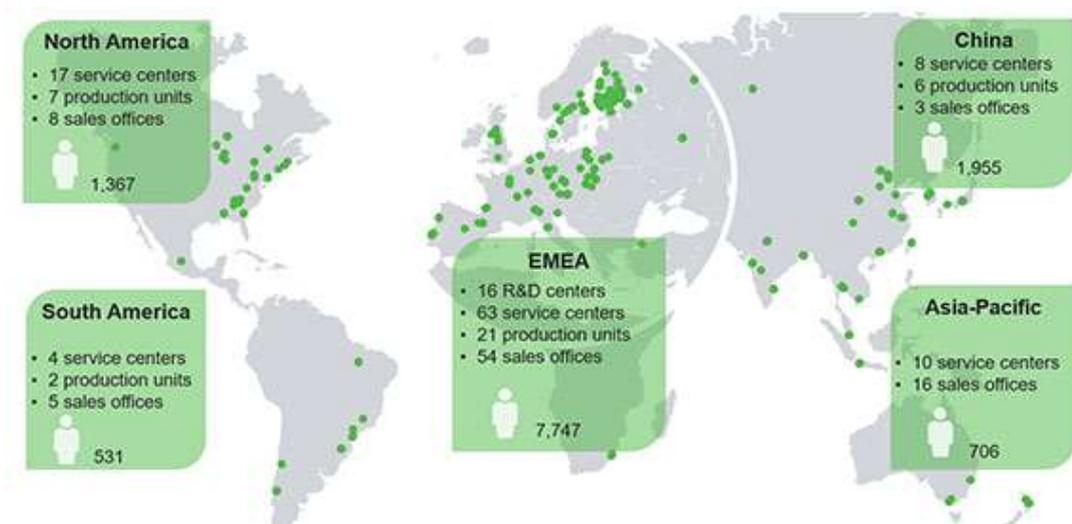


Figure 2 Valmet's global locations and number of employees by area. (Our businesses 2017)

Valmet's core values are customers, renewal, excellence and people. The values are reflected in the company's must-wins presented in Figure 3. The customer must-win

is customer excellence. Valmet wants to be close to their customers and to drive customer performance. The must-win related to renewal is the company's goal to be a leader in technology and innovation. Excellence manifests as excellence in processes. In plain words, this means cost competitiveness, quality consciousness and the implementation of the Lean philosophy. The company's human resource values are realized in driving high performance and the globalization of capabilities so that more expertise would be located in the business regions. (Valmet's way forward 2017)

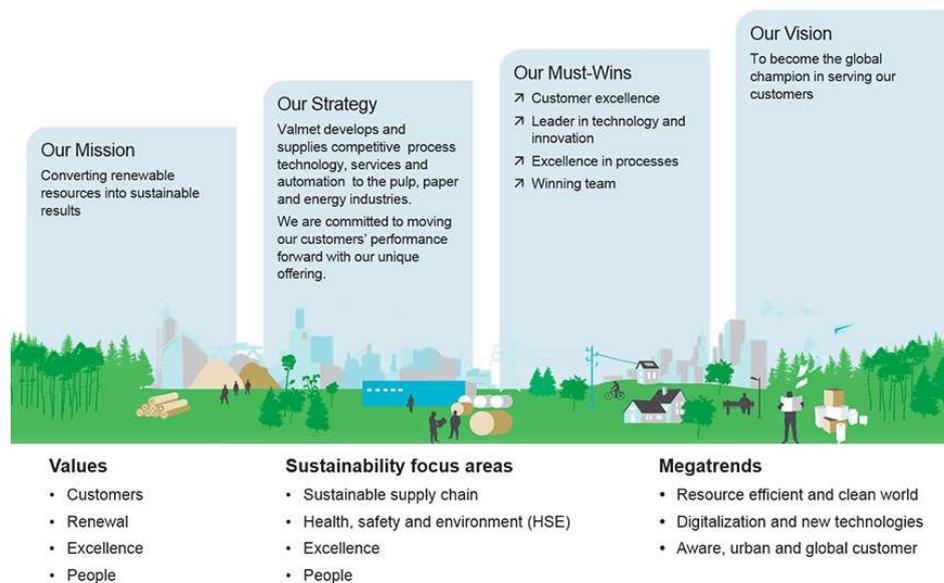


Figure 3 Valmet strategy. (Valmet's way forward 2017)

### 1.3.2 Services business line

The services business line provides after-sales services for around half of the world's 3800 paper and pulp mills in operation today with 70 service centers. These types of services have grown in prominence as paper and board manufacturers want to focus on their core business and outsource maintenance services while fighting against increasing competition. (Services business line 2017).

The services business line operates in a scheduled and quality sensitive environment. As capital costs for paper and board machines are high, down time is very expensive. In spite of this, many companies are reluctant to have large supplies of spares available on site due to the aforementioned cost competitiveness reasons. This puts emphasis on the availability of the right parts and customer lead time for vendors like Valmet. The company operates a 24/7 emergency service to mitigate the risk of machine failures for the customers (Valmet 24 h emergency service numbers 2017).

Likewise, all maintenance and improvement work must be completed with tight shut down schedules leaving little room for error in the supply process.

## **2 After-sales service business supply chain**

There are numerous different definitions to what a supply chain is. However, they do have some common ground: they all define the activities, participants and benefits of managing the supply chain. Supply chain management can generally be defined as the management of activities in the chain of operators that are involved in delivering the product to the customer to maximize the added value to the product. The goal of this is to achieve competitive advantage. The chain of operators is linked together by information flow and by the flow of physical goods. The operators in this chain vary based on who defines, but they usually include suppliers of raw material, manufacturers of components and ready products, the logistics operators, the central firm, distributors and customers. (Defining the Supply Chain 2017)

The field of study is relatively new although the phenomenon has existed for a long time, but it has not been treated as a chain before. The change in the view point offers many possibilities to make the process more efficient, rewarding and one that would eliminate barriers. This, however, does require careful planning and a common will either through a common goal or mutually beneficial contracts. (What is Supply Chain Management? 2011)

Supply chain management sets high-level requirements for each party of the supply chain. These requirements facilitate cooperation. Supply chains are not necessarily chains in nature. Often with complex technologies the supply chains are more like webs, and the flow within the chain is not necessarily to only one direction. There are endless possibilities of how to plan and set up a supply chain, and the composition of a supply chain is not static as suppliers, customers and the central firm experience change. (Daco 2010.)

The focal firm itself may have numerous different types of supply chains based on the types of products and their characteristics, customer needs, schedules and internal resources. Service business warehouses often house many different types of products and, thus, belong to many supply chains. This sets high requirements to its

operation as it must be able to serve each of these changing and complex chains and their changing needs. The warehouse needs to be able to adapt to these requirements and changes. (Types and potential benefits of supply chain management 2015)

## 2.1 Business requirements of an after-sales service business supply chain

After-sales support plays an important role in a company's decision to buy high technology systems. Paper, pulp and board machines have long lifetimes, but they require maintenance and possibly upgrading during their lifetimes. This type of business is highly lucrative for the original equipment manufacturers as it has low risks and long term revenue potential, and it also promotes customer relationships to boost the sales of new machines. It also has higher profit margins as the original equipment manufacturers can leverage their knowledge of the product to offering better value to the customer than competitors. (M. A. Cohen 2005)

In case of unexpected failures, the response must be fast and accurate. Due to this reason, warehousing is vital as it is a way to mitigate the risk of possible failures at the customer sites. Service companies must carry relatively large inventories to accommodate this. The fundamental difference from the manufactured product inventories is that resources need to be deployed before the actual need. The lead time of many spare parts is too long so that they could be manufactured using the just-in-time philosophy especially when to need is difficult to predict. Close cooperation with the technical department is needed to determine which spares are critical to customers. As the same inventory may serve many different types and generations of products, it may have quite a low inventory turnover per product (Morris A. Cohen 2006). Carrying excess inventory is, of course, undesirable as it drives up the net working capital, but a certain service level must be achieved.

Another consideration regarding inventory levels is that global service providers have limited means of predicting where exactly a failure will happen. It is uneconomical to have the same spares in each market area as the need for a specific spare part might be once every two years in the area. For this reason, the central warehouse must have good connections to the global markets in order to make sure that those cus-

tomers' needs are also satisfied. The warehousing must be economical because simple minimizing of inventory levels is not as feasible as it is in production or finished-goods warehousing.

The reliability and punctuality of a service warehouse are of paramount importance. Customers expect the service provider to act quickly and accurately to solve the problem. As the customers are often faced with time sensitive problems, a delayed or incorrect response might lead to even larger problems or losses. The implications of these losses can be considerable as more resources must be used to correct the problem without generating additional revenue. The loss of trust may lead to the change of the service provider or at least considerable amendments in pricing, not to mention that it makes it less likely that the customer would trust the provider with higher-risk investments. (Morris A. Cohen 2006)

The types of services offered by an after-sales service provider set special requirements to logistics and warehouse operations. Many service providers offer reverse logistics services. Reverse logistics refers to operations related to reuse of products and materials. This includes disposing of used items, repairing them for future use and handling customer returns (Robinson 2014). As this process is the opposite of the normal flow of goods, and as the items have been out of the supply chain's control at the customer, it sets some requirements to the supply chain management in terms of communication, planning and assessing the goods. For example, a motor that is sent back to the vendor for maintenance might not have correct identification labels when returned, and, therefore, tracking what actually needs to be repaired and by whom is difficult. The customer can also have special requirements related to how the item is serviced, and tracking these adds an additional challenge. Sending the same unit back to the same customer also requires extra effort. It is also problematic from the liability point of view for the warehouse due to the difficulties in identification, book keeping, data collection and handling of these non-standard items. (Parvenov 2006)

Another example of services that are typical to the industry are service agreements. The contracts vary in their scopes and clauses but usually include a performance level requirement that the vendor is responsible of maintaining to some degree (M. A. Cohen 2008). This may include requirement of what spare parts must be available at

what lead time or might go as far as outsourcing all maintenance activities to the service provider. Managing the spares and equipment needed requires careful planning in logistics and warehousing as well as the financial department. Achieving the availability and time goals is imperative but these type of operations often take place unexpectedly and might not go through the normal procedures leaving possibilities for errors in inventory levels and handling.

Like service agreements, spare part pooling requires some special consideration in terms of supply chain planning. Spare part pooling means that a group of machine owners co-own a group of spares that are usually expensive or otherwise uneconomical to keep in their own inventory. Sometimes these stocks are maintained by the service provider which automatically replenishes it according to certain principles when spares are used. Managing the transactions from a warehouse like this mandate close oversight as there is a risk of mixing the inventory levels and also these pools might also have reverse logistics involved. (Morris A. Cohen 2006)

## 2.2 Key performance indicators

The key performance indicators (KPIs) of after-sales service business should be customer centered. The nature of the business is to fill the customer needs so it is logical that succeeding in this should be the main metric measured. The value proposition of after-sales service is to provide the customer with superior performance and maximum use of assets. Therefore, one main KPI is the time it takes for the service provider to restore a failed product. (Morris A. Cohen 2006). This holds within several other KPIs such as the lead time of products and on time delivery rate.

Lead time varies according to what products are ready in stock and what parts need to be ordered. The probability of having enough items to meet customer requirements is referred to as a service level (Vermorel 2012). Having a high service level decreases the lead time thus increasing customer satisfaction but adds costs due to carrying the inventory. Balancing costs to service level is crucial to determine prices and the overall profitability of the business.

On time delivery rate measures the ability of a company to meet the delivery dates it has promised. It is represented as the percentage of deliveries made as promised.

(Marion 2016). This KPI is affected by the performance of procurements, warehousing and transportation. Sometimes meeting these dates requires quicker transportation or paying expedition fees to suppliers to get items quicker so this too requires balancing costs to customer satisfaction. Also extra resources may need to be allocated to warehousing to make sure that deliveries are processes quickly and accurately.

As with most businesses, the ultimate KPI is the profitability of the business. The supply chain incurs costs from sourcing, warehousing, quality costs, designing, transportation, administrative work among others. The revenue gained from sales must exceed this

### 2.3 Future prospects for after-sales services business

Business will continue focusing on their core businesses so after-sales service providers will continue to play a larger role in the success of the company.

Industrial internet or internet of things refers to machines communication between each other. This can be used to optimize performance, monitor system health and proactively react to maintenance needs. In the future industrial internet and better use of this data are going to drastically change the field by enabling better prediction of the need for spare parts and consumable products. The service provider is going to be able to take a bigger role in the machine performance as they can offer more tailored services that the customer wasn't even aware of. Better forecasting of the actual need would allow lower inventory levels and possibly transfer the entire function of a warehouse from storing location to a transportation hub. This would place even higher stress on the on-time performance and quality of services. (Rio 2015)

Another future trend that could have a huge impact on the business is 3D printing. Spare part manufacturing might move from suppliers to warehouses especially in the case of relatively easy to produce consumable parts. Even now 3D printers are able to print various types of metal, plastics and ceramics. The lead times of some items that are currently hard to produce could drop considerably and the order penetration point would also move to a later time meaning less need for warehousing space. As the technology develops and becomes cheaper to operate some manufacturing

could even move to customer sites leaving the vendors completely out of the picture. The role of a warehouse as a place for storing items might diminish as less inventory would need to be carried and more manufacturing would be done in the house. Currently 3D-printing does not produce consistent enough quality to be used in the business but in the future this is likely to change. (3D Printing 2016).

### **3 Warehousing**

Warehousing is a part of a supply chain. The basic elements of warehousing are space, equipment and people. These are the main resources of a warehouse and they are linked to each other. For example saving on equipment often results in more demand for people and scarcer space in turn requires more resources spent on equipment to achieve similar performance level. (Ackerman, 1997, 20.) The way these assets are utilized is dependent of their availability, corporate strategy and culture (Ackerman 1997, 31).

Warehouses can be divided into private, public and contract warehouses. Private warehouses are owned and operated by the company using its services while contract warehouses are operated and owned by an external operator. Public warehouses serve numerous customers in the same premises and customers buy unbundled services from them. (Ackerman 1997, 15-16.)

According to Ackerman (1997) a warehouse has five basic functions through which it creates value: stockpiling, product mixing, consolidation, distribution and customer satisfaction. Stockpiling means carrying the production surplus that is caused by seasonal differences in demand and production. Product mixing refers to mixing different products to product collections that are delivered to customer. Consolidation and distribution are the opposite functions of each other: consolidation means gathering goods to be sent as bigger batches than they came as from the supplier and distribution means dividing the batch that came from to supplier to smaller batches that are sent to the customer. Customer satisfaction is the fifth function and means carrying inventory to add value to customer for example through flexibility, shorter lead time, convenience and contingency. (13-15)

### 3.1 Functions of warehousing

To facilitate the five functions, activities must be performed. These include receiving incoming goods, inspecting them, shelving the items, picking, packing, shipping and maintaining the inventory. These functions of course vary by business and by type of product. The functions can be handled numerous different ways and some the type of business might require some extra ones.

Clear and detailed standard procedures should be developed for these functions to provide consistent quality and to make sure that new workers get on board quickly (Ackerman 1997, 45). Maintaining the instructions and supervising that they are followed is vital to avoid errors and accidents.

#### 3.1.1 Handling incoming goods

Handling incoming goods is a good example of variation between different businesses. Some businesses require advance notification of incoming deliveries but others don't. This might be cumbersome in resourcing perspective as goods can arrive in waves creating peaks in required personnel levels. (Emmett 2005, 91.)

The decision how to inspect incoming goods is dependent on the importance and volume of the goods as well as available expertise and resources. It might not be feasible to perform 100% inspections on low cost bulk items because it would require considerable resources and in case of defective parts there are plenty of replacement parts. Random inspections or even no inspection at all might be more fitting course of action. On the other hand, some high technology items might require dedicated inspectors to do extensive testing before accepting the goods into inventory. The inspection can be also handled by the warehouse personnel provided they have the necessary knowledge and resources to do it. (Murray 2016)

Correct inspection of incoming goods is vital because often mistakes made at that time end up to be the warehouse operator's responsibility. For example, it is hard to proof that having incorrect inventory levels is caused by incorrect purchase order item quantities after the order receipt. It must be detected at first inspection at re-

ceiving. (Emmett 2005, 91.) The warehouse functions, the type of products, warehouse hardware and the way the warehouse is organized dictate how the put away is organized (Emmett 2005, 96).

Cross docking maybe used in some cases. Cross docking means that the incoming goods are moved directly to shipping area without shelving them. Cross docking is sometimes dependent on the type of product but some systems allow the incoming purchase orders to be flagged as expedited so that they are only cross docked on individual cases to save time. (Vitasek 2007.) The advantages of cross docking include lower costs and faster handling through the warehouse but on the other hand, it requires more planning and information sharing and thus is not suited for all types of products (Supply Chain News: Where does Crossdocking have the Best Operational Fit? 2011).

### 3.1.2 Reverse logistics

As mentioned before, service business warehouses often have reverse logistics services that require the warehouse personnel to consult sales and technical departments for what to do with the incoming items sent back from customers. These items are identified and inspected upon arrival but the rest of the required steps depend on the type of service required. Some items might be in good working order and be returned to inventory while others are recycled or scrapped as faulty. Some items might require additional inspection and be sent for repairs as unitized items. The information systems used in these types of functions are dependent on the company. In more advanced systems the incoming goods might already be labeled so that the warehousing personnel knows right away what to do with them. (Parvenov 2006.)

### 3.1.3 Picking

Picking is the action of collecting items from storage for use. The items might have arrived in different quantities than they are required by the customer and the customer is most likely to need a variety of products to be shipped at one time so the batches that have arrived to the warehouse need to be broken.

Picking the correct items in correct condition and amount is vital for filling the function of a warehouse. The cost of picking incorrect items or incorrect amount of one

item in a delivery batch can render the entire delivery useless. Correcting picking mistakes is often very costly and results in customer dissatisfaction. (Emmett 2005, 98.) This is due to the amount of administrative work required, loss of inventory or expedited shipping (Richards 2011, 116).

Picking methods can be divided to manual and automated picking. Manual picking means that the items is retrieved from inventory without the help of technology. Manual picking is often very labor intensive and thus has very high margin for error. The picking process requires high amount if supervising and administrative work but good planning and proper equipment can decrease the need of workforce and reduce the risk of errors. Automated picking relies partly or entirely on technology in the picking process. They increase efficiency and decrease errors but often have high capital costs. Automated picking methods are not suitable for warehouses with large variety of products especially if the products vary in weight and size. (Barcodes Inc. 2015.)

#### 3.1.4 Packing

After the items have been picked from inventory they need to be packed for shipping. It is ideal that packing and shipping are not handled by the same worker that picked the items so that the items could be checked once more by a second set of eyes to detect possible picking errors (Ackerman 1997, 417). This process also includes preparing a packing list and other delivery documents per company policy.

The amount and type of packing is determined by the mode of transport, the destination, the type of item as well as company policy. The packing needs to protect the items sufficiently from handling, compression, abrasion and moisture but also to make it easy to identify what is in the package. (Guide to Packaging Freight Shipments 2014.) The destination country might have specific rules for example regarding what kind of wood can be used in the packing (ISPM 15 STANDARD FOR WOODEN PACKAGING MATERIAL 2016). Some items, such as those that are oversized, require specialty packing which needs to be custom built for each items. If the package contains dangerous goods, fragile items or other specialty cargo it needs to be marked accordingly both to protect the people handling it as well as the contents. (Emmett 2005, 157.)

### 3.1.5 Value added services

In addition to the basic functions of a warehouse, it might offer other value adding services. Value added services go beyond the typical functions of a warehouse to provide added value to the customer. These can include warehouse manufacturing, light assembly, freight services, packing and purchasing among others. Each customer has its unique requirements so the value adding services vary greatly. This is one of the main factors of value added services as they enable the warehousing provider to differentiate themselves from competitors. This also allows the order penetration point to move forward meaning that the same material can be used as materials for many types of products. (Richards 2011, 121.)

## 3.2 Space and Equipment

### 3.2.1 Location

Warehouse location should support its intended purpose. Considerations in choosing a warehouse location include the availability of workforce, transportation connections, tax incentives, real estate value, authorities, growth possibilities and customer perception among others. Availability of suitable workforce may be challenging in some areas that are not particularly attractive to live in and may hinder the development of the warehouse. (Emmett 2005, 13.) Additionally, some collective bargaining contracts have different pay rates for certain areas which is also worth considering (Terms of employment in commercial sector 1 May 2014-31 Jan 2017 2017, 20-21).

The price of the land, building costs and upkeep are on the top of the list for warehouse managers when considering the location as it affects the overhead costs of the warehouse. The availability of transportation connections is also crucial in enabling fast deliveries and lower transportation costs. Some municipalities offer tax incentives for moving business to those areas due to offers of employment. Conversely, some areas might be reluctant to have warehouses and thus city planning might not extend permits for building warehouses. The availability of land is of course a factor but the location should also consider fluctuations in business: how easy would it be to rent out space if business is low and on the other hand, acquire additional space

to account for growth. Customer perception is another consideration as moving the warehouse close to a key customer could be beneficial to the relationship. (Emmett 2005, 13-14.)

### 3.2.2 Storing solutions and forklifts

When the location has been decided the layout and storing system should be considered. These are dependent on the types of business and the intended purpose of the warehouse. The layout and storing systems are in the heart of the warehousing tradeoffs mentioned earlier as cheap systems are often space consuming and labor intensive while automatized systems are often more expensive. The purpose is to find the equilibrium of these in relation to the business requirements and needs. (Richards 2011, 163.)

Some of the options for storing pallets include wide aisle racking, narrow aisle racking, double deep racking, drive-in racking, mobile racking and push-back racking. These systems have varying levels space utilization with wide aisle racking having the worst aisle to storage ratio. It is however the most popular solution because the others have higher capital and up-keep costs or they require more expensive, special forklifts. Additionally drive-in, double deep and push-back racking are not suitable for all types of products as pallets are stored several deep and thus are most suitable if great quantities of the same product are stored simultaneously. They are also less efficient with the use of first-in, first-out philosophy. (Richards 2011, 164-175.) The characteristics of some of the different racking options are presented in Figure 4.

Performance of racking system	APR	Double deep	Narrow aisle	Drive-in/ drive-through	Live storage	Push back	Mobile	Satellite
Use of floor space	50%	70%	60%	80%	80%	70%	80%	85%
Use of height	70%	70%	80%	70%	70%	70%	70%	80%
Speed of access and throughput	80%	60%	70%	50%	80%	70%	60%	70%
Access to individual pallets	100%	50%	100%	40%	40%	60%	90%	60%
Occupancy rates	90%	70%	90%	60%	80%	80%	90%	80%
Stock rotation	70%	50%	90%	60%	100%	60%	60%	90%
Ease of management and control	60%	60%	60%	60%	80%	60%	60%	60%
Specialist handling equipment required*	No	Yes	Yes	No but restricted	No	Possibly	No	Yes
Ease of relocation	100%	100%	100%	70%	70%	80%	80%	100%
System adjustability	100%	100%	80%	100%	40%	100%	100%	70%

\* It is possible to utilize specialized equipment for other types of racking within a standard environment.

Figure 4 Characteristics of racking systems (Richards 2011, 175)

Items not stored in pallets require other solutions. Cantilever racking can be used in storing long items such as pipes. It lacks vertical beams restricting the length of items. Smaller items can be stored in traditional shelves or in for example paternoster shelving. Small items shelves can be located in mezzanine floors to make better use of the height of the warehouse. (Richards 2011, 177.) Paternosters have an elevator where the shelves are stored and the desired shelf is brought to the warehouse operators level from heights. This system is of course slower and more expensive than traditional shelves but is also very space efficient. (Gleissner and Femerling 2013, 103.)

In the context of outsourced warehousing solutions opting for these more efficient, but more expensive options would require a longer commitment from both parties as those systems are not as versatile to be used with other customers if the contract ends.

The forklift selection goes hand in hand with the storing system selection as some racking systems as they both are dependent on each other as well as the type of operation and products. The desired outcomes in the selection are lower handling costs and handling time, lower energy consumption, space efficiency and safety (Richards 2011, 175.)

Considerations in picking the correct types of forklifts include the height of racking, aisle width, racking type, weight and size of lifted items, desired motors type, speed, costs and versatility. For example, in small warehouses simple stackers might be sufficiently fast and have enough reach while in larger ones reach trucks and counter balance trucks are more suitable. (Richards 2011, 180-185.)

### 3.3 Warehouse administration and management

A lot of management decisions are involved in warehousing. Some of these decisions are derived from business needs and some are operational decisions that are needed to fulfill the basic functions of a warehouse. According to Richards (2011), the main drivers of warehouse management are accuracy, cost control, cleanliness, efficiency, safety and security (28). The warehouse management is under constant pressure to

provide better availability of items with superior accuracy and shorter lead times while simultaneously reducing costs and having flexibility to changes (ibid., 29-31).

The warehouse leadership model varies according to business, complexity, ownership model and company culture. The warehouse manager can have several team leaders for each shift or segment who in turn might have senior warehouse operators responsible for each function. (Richards 2011, 232-234).

### 3.3.1 Resourcing warehouse activities

A warehouse has resources that are driven by processing activities and resources which usage is determined by other factors. Resources driven by the processing activities are affected by even small change of activity levels while resources determined by other functions are more stable. For example, the need for security services is not directly affected by the amount of goods passing through the warehouse while the amount of workforce needed in receiving shipments is. (Richards 2011, 195.)

Resourcing requires finding out a way to measure the amount of work and know the productivity of the workforce. Only then can the resources be allocated accordingly. Task lines should be formulated to see which tasks are performed together and form a single function. The tasks in a task line should also be similar to each other so that they can be compared. Task lines can then be compared to their results and the resources needed to get this result to determine the productivity. When the productivity is known the warehouse manager is able to allocate workforce to different functions according to the amount of work that needs to be completed. (Richards 2011, 198-199.)

For example, if the same person has the task collecting the picking lists and item labels, retrieving the cart, going to the shelf location, checking and calculating the items and transporting the items to the packing area, these should be considered to be as single task line. This should be compared to the results achieved from doing this. Whether to calculate it by items, lines or orders is also to be determined by the warehouse management based on the type of business and products. The number of items collected by one person in an hour can be used as measurement of productivity. (Richards 2011, 195-200.)

Resourcing also requires the warehouse management to be able to measure the amount of work to be done and to predict how it is going to change in the future. The warehouse management needs to be aware of variations of work according to time of date, weekday, time of month or year to make optimal use of resources. There might be peaks where more resources are needed than are available followed by draughts where there isn't enough work to justify the amount of resources needed. This should be reflected in organizing the functions as well as staff training to make the use of staff more versatile. The productivity is also prone to variations according to time, perceived amount of work and skill level of work force. The available resources also have a natural variance due to sick leaves, holidays and breaks among others. (Richards 2011, 200-207.)

### 3.3.2 IT-systems

Technology can significantly improve productivity, reduce costs and increase customer satisfaction. It increases visibility and reliability of the warehousing operations compared to paper based solutions. A warehouse management systems (WMS) can be a module of the enterprise resource planning (ERP) system or be a standalone system. A WMS helps to make better use of the stock at hand, reduces manual labor and errors. It is also more flexible to changes in customer demand. (Richards 2011, 137-140)

A WMS can be customized to individual needs but often includes tools for receiving, shelving, picking items, tracking and analyzing inventory levels, inventory counting and capacity planning (Piasecki 2012). A WMS can be integrated to ERP and transportation systems for real time data sharing. It can also be linked to warehouse hardware to enable for example the use of barcodes or radio frequency identification (RFID) as source of information. A WMS can be configured to be operated by voice, computer or mobile devices among others. (Richards 2011, 143-144.)

Ideally a WMS system should be easy to use and support the daily operation of the warehouse. Any system requires administration but the system should be configured to help the operators rather than be a hindrance to ensure that it is used. It should also be adjustable to changes in functions, volume and structure of the warehouse. (Richards 2011, 144.)

A new system is likely to have teething problems and even mature systems have crashes. For this reason, it is important to ensure that technical is available and to have some redundancy built into the system. (Richards 2011, 145-146.)

### 3.3.3 Inventory management

As mentioned before, a service business warehouse needs to hold a certain service level and this requires some items to be stocked. There are numerous ways of classifying the inventory. One of the most prominent ways is the ABC-classification. This classification divides the inventory into fast-moving, medium-moving and slow-moving inventory from A-class to C-class. This classification can be used to determine which items are worth having in stock. The warehouse management usually does this classification but it is up to the individual company's management to decide what kind of service level they strive for and therefore, which items are kept in inventory. (Richards 2011, 123-124.)

Excessive inventory is discouraged because it ties up capital and generates costs due to warehousing and depreciation (Banker 2016). However, as stated before, stock is needed to fulfill customer requirements. Sometimes purchasers have an incentive to buy more than needed due to economies of scale but this advantage might be lost due to aforementioned reasons. At times, it would not be sensible to buy at all but is necessary to meet customer demand. A balance between the service level, costs and inventory levels should be established. (Richards 2011, 28.) These warehouse trade-offs are presented in Figure 5.

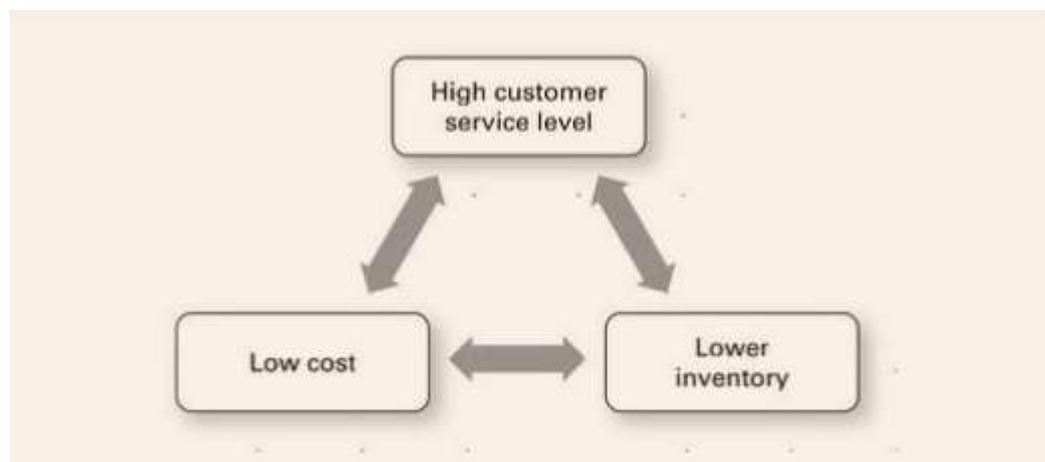


Figure 5 Warehouse trade-offs (Richards 2011, 28)

### 3.3.4 Inventory counting

Warehouse inventory levels must be accurate for the warehouse to be able to fulfill customer orders and for them to be profitable. Corrupted inventory level data can lead to unexpected stock outs, carrying excessive inventory, excessive purchasing due to mistrust towards the inventory accuracy and picking errors. (Emmett 2005, 75-76.)

The discrepancy in the inventory levels can be caused by incorrect picking, off-the-record goods movement, incorrect put away process, wrong identification or poor receipts checking. The main tool to combat these inaccuracies is training on correct procedures and products as well as what are the consequences of these mistakes. The idea is that the personnel and the system would proactively prevent mistakes before they happen. However, a reactive approach is often employed alongside the proactive one: the inventory levels are counted to ensure the accuracy. (Emmett 2005, 76)

There are two basic models of inventory counting: continuous and periodic checking. Continuous checking that some resources are permanently allocated for counting the inventory levels. In this system the workload is quite stable and it is most useful in larger inventories. The other main method is periodic checking. In this method the entire inventory is checked at once at certain time intervals. Periodic checking is best with smaller inventories and simpler items. The inventory counter in continuous inventory checking usually has wider knowledge of products and better skills in checking the items resulting in fewer mistakes. Also, the warehouse can operate normally during these checks. (Emmett 2005, 77-78.)

## 3.4 Cost structure and pricing models

### 3.4.1 Warehousing costs cost components

Warehousing accounts to over 20 percent of logistics costs. The cost components of warehouses are mostly similar to each other but the way they are presented varies (Understanding Warehouse Costs and Risks 2009). Richards (2011) categorizes the costs to space, labor, equipment, overhead and miscellaneous costs. The costs can also be divided to fixed and variable costs. For example, some parts of labor costs are

fixed and some are varying according to the need of labor. This division is dependent on the way the individual company has decided to set up their warehouse: rented workforce can be charged by the hour or by the month. Third party operators also need to make profits and account for their own administration costs which adds another cost element to the list. (Richards 2011, 212-214.)

Space costs are composed of costs incurred from the premises. It includes the rent or depreciation costs depending on whether the building and the land is owned by the company or leased. It also includes the costs of insurance, utility costs, fixtures and their lease or depreciation, maintenance, security, cleaning and waste disposal among others. Depending on the type of warehouse they can also include other costs such as the cost of refrigeration. These costs of course vary by location and type of building or equipment used. (Richards 2011, 213.)

Labor costs are another major part of warehousing. The costs can be divided to indirect and direct labor costs. This division is not the same as is generally used in discussion about wages. In this context, the direct labor costs come from wages, insurance, work clothes, training and welfare costs of the warehouse operators. The indirect labor costs are the same costs but incurred from having administrative and management staff. The rationale behind this the costs that come from warehouse operators are a direct result of the value adding work while management costs are incurred indirectly from managing the former. (Richards 2011, 213.) These costs can be fixed or variable on nature based on the employment models used. Even with permanent contracts some costs such as overtime or bonuses are variable in nature as they are dependent on the volume of business.

Equipment costs originate from the cost of equipment and its operation as well as the costs of packing. These costs again can be variable or fixed in nature according to the business decisions made but packing costs generally are variable. (Richards 2011, 213.)

As mentioned before, the basic elements of warehousing are people, equipment and space. These costs are interlinked as the reduction in one of them usually results in a rise in another element. However, as the warehouses and business are different the rise might not be in the same proportion as the reduction is. In some cases, using more high tech equipment to replace work force might cause as rise in equipment

costs but bring overall saving because the cost of labor is reduced further. There are also regional differences in these because the value of these commodities is varies by region. The business needs need to be taken into account when considering these tradeoffs as well to make sure they are not in a conflict. (Ackerman 1997, 18.)

A warehouse also has overhead costs. Overhead costs are originated from support functions such as company management and administration, marketing and sales IT services, finances and human resources. They also include other components that can be considered as costs of business such as computers, telephones, company cars and office space costs. They vary greatly according to the size of company as smaller companies might not have as large back office organization. (Richards 2011, 214.)

There are also costs that cannot be attributed directly from any of the topics mentioned. These include communication costs, financing services, interest and legal services. (Richards 2011, 214.) Quality reparations can also be included in this category.

These costs combined can be added up to total costs that are composed of the aforementioned costs of handling, storage and overhead. These costs are illustrated in Figure 6.

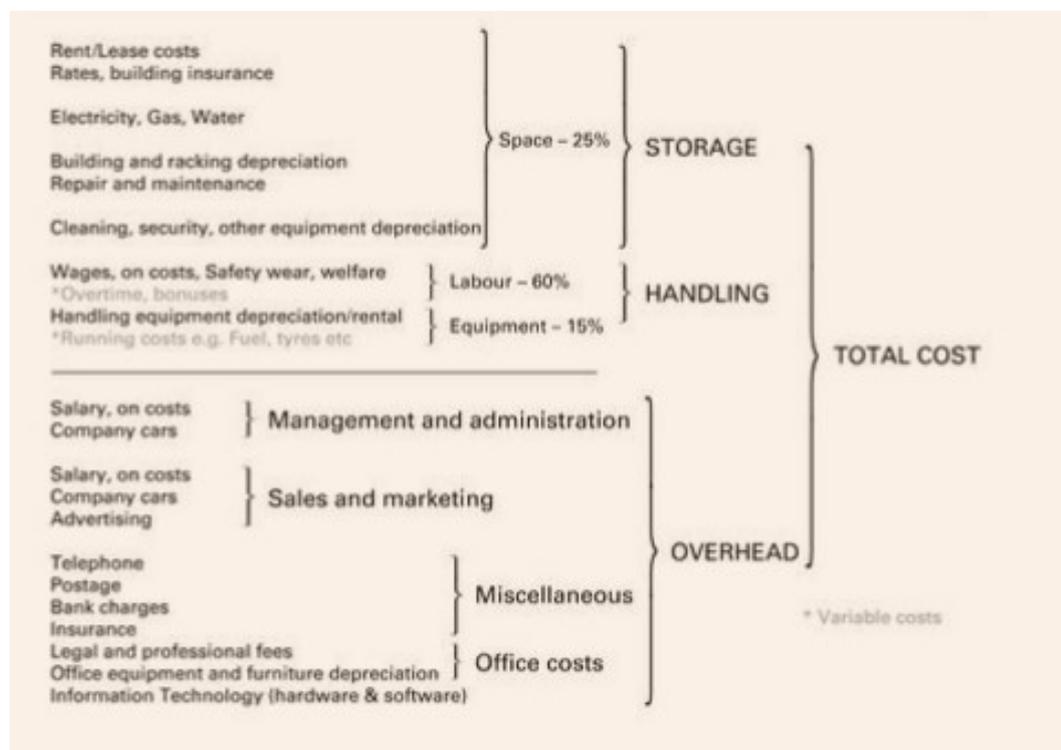


Figure 6 Sample warehouse costs structure (Richards 2011, 214.)

### 3.4.2 Costing models

According to Richards (2011) modern businesses require the manager of function to be able to know what are costs and how allocate the costs to their services to know the true price of a function. This is done so that the profitability of each function can be examined and that unprofitable functions don't encroach on profits from other functions. This is especially important in pricing the services sold to outside customers. (216-217.)

Richards (2011) identifies two costing models for warehouses. Their main difference is the way overhead costs are allocated. The traditional way of calculating the costs of a function is to look at the total costs of a warehouse and divide them according to usage, for example by number of warehouse locations. The overhead costs are calculated as a percentage on top of these costs according to the proportional share of the usage. This model however has its shortcomings as it does not recognize for example that overhead costs are not reduced in the same proportion as the use of warehouse space is. This means that some overhead costs are not allocated at all even though they exist. Also, different activities might not demand the same back office functions so it would be unfair to allocate them those costs (217-218)

The main idea of activity based costing model that overhead costs and other costs that are not directly caused by an activity should be traced step by step back to the activity that makes them necessary. This requires a more careful look at the processes, tasks and the people involved in it to see what support activities enable which main activities. The management time for example can be allocated to each function as a percentage of manager's time it requires and the tools the manager needs can then be priced accordingly. Cost drivers should be identified to make the costing accurately reflect the actual costs. Some of these cost drivers are presented in Figure 7. (Richards 2011, 218-219.)

Activities	Cost drivers
Order receipt	Order volume and order source (EDI, fax, phone or post)
Unload incoming goods	Quantity and unit load (pallets or cartons)
Palletize	Quantity of cartons
Check incoming goods	Quantity and quality of supplier (including returns)
Put away incoming goods	Quantity, cubic volume
Picking	Number of visits to pick location, number of lines, number of units
Packaging and labelling	Number of orders picked
Replenishment	Unit load quantity
Load outgoing goods	Unit load quantity

Figure 7 An example of cost drivers for warehousing activities (Richards 2011, 219)

This way of allocating the indirect costs ensures that no costs are left uncovered and the customer also benefits from cost savings. However, on the flipside for example the cost of unused space is also allocated directly to activities and therefore to internal or external customers. If the utilization drops, it might lead to adverse reactions such as further reduction in the needs of services due to increased cost. It should be established whether these costs are mitigated by working towards better utilization rate by reductions, reallocation of resources or by attracting more business. These costs can also be imbedded to the original margins when costing the activities. Figure 8 illustrates how the costing is organized in reality. These can be broken down into individual activities. (Richards 2011, 219-220.)

	Space: number of pallets	Labour: number of hours	MHE: number of hours	Administration: hours	Overhead A: management hours	Overhead B: other costs
Total capacity	10,000 pallets	100,000 hours	30,000 hours	10,000 hours	20,000 hours	100%
Customer A	3,000	20,000	5,000	1,000	5,000	25%
Customer B	2,500	12,000	3,000	2,000	1,500	15%
Customer C	1,400	25,000	8,000	2,000	1,500	25%
Customer D	900	18,000	4,500	2,500	5,000	15%
Operational leeway/ unproductive hours	1,500	20,000	5,000	2,000	4,000	0
Unused capacity	700	5,000	4,500	500	3,000	20%

Figure 8 Activity based costing example (Richards 2011, 221)

## 3.5 Quality and safety

### 3.5.1 Key performance indicators and quality

To stay competitive, it is important to know how the warehouse performs. This enables focusing on internal or external customer satisfaction, seeing where staff needs additional training, detecting problems before they become major and fostering an atmosphere of continuous improvement. (Richards 2011, 230.)

The main key performance indicators used should support the overall business model and targets. They can generally be grouped to five categories: quality, costs, delivery, safety and people/motivation. (Emmett 2005, 237.)

Quality related KPI's measure how well the tasks are performed according to specifications. Measuring the amount of returns, defects, complaints and the overall service satisfaction are possible measurements for this category. Cost related KPI's include productivity, stock value, amount of overtime and extra expenses. The goal is to keep to the agreed limits set for each of them. Delivery related KPI's include the on-time delivery rate and reliability. These metrics also measure whether the service meets the set targets on delivery time and that right items are sent in right quantities to the right place. (Emmett 2005, 237-238.)

Safety has a big overall effect to the performance of the warehouse. Safety mishaps can cause major costs and damage to public image not to mention worsen staff morale and cause production stops. Safety related KPIs include amount of accidents, near-misses and safety related observations. Generally the observations should be in high level to prevent accidents from happening. Motivation related KPIs measure the work satisfaction of staff, amount of sick leaves, staff turnover, absences and staff appraisal scores among others. (Emmett 2005, 238-239.) Staff morale has a major effect on all the above mentioned KPI's as a motivated staff is likely more productive, makes fewer mistakes and wants to make sure that the quality of their work is high. (Millett 2013.)

Many of these KPI's are ultimately related to people's performance. It is the job of warehouse management to ensure that the employees have proper resources and motivations to do their work properly. (Millett 2013.) Performance related rewarding

can be used to improve efficiency and motivation but it has a risk that employee only focus on the KPI's that are part of the rewarding program and neglect others. For this reason the rewarding should be tied to the overall performance rather than picked lines or number of safety incidents for example. (Performance related pay: Are you doing it right? 2014)

Alternatively, the process related KPI's can be developed through the SCOR-model. It enables benchmarking the entire supply chain against other operators in the field and benefitting from their knowledge to improve ones own processes. (Hudson 2004). It shares many of the same KPI's as described above such as reliability, responsiveness and costs but focuses on the entire supply chain rather than just the warehouse. It also includes agility, which means the adaptability to changes, to the KPI's and takes a more holistic look to the financial performance by measuring asset management efficiency through measuring the return on investment and cash-to-cash cycle time. (Understand the Structure of SCOR 2017)

### 3.5.2 Authorities

The authorities require the warehouse operator to properly train their staff in safe working methods and familiarize them with the equipment used. They must carry out risk assessment for the work place to recognize hazards and mitigate the risks caused by them. (Risk assessment 2014)

Authorities may place some requirements especially for export warehouses. Known consignor is a shipper that is exempt from security checks at airports but has to train its staff so that they know what items are not allowed onboard airplanes (Known consignor scheme 2015). Authorised Economic Operator is exempt from customs checks and must have systems in place so that they can self-monitor that they are shipping items that they are allowed to and that they comply with customs laws (Authorised Economic Operator 2017). Both these schemes are voluntary but many companies opt for them to save costs and speed up deliveries. They do however require extra effort from the warehouse in terms of security and staff training in spotting what goods are allowed (Known consignor scheme 2015; Authorised Economic Operator 2017).

If dangerous goods such as flammable, corrosive or harmful substances are stored and shipped through the warehouse, the warehouse operator is required by authorities to ensure that the warehouse operators are properly trained for handling them and proper protective equipment and procedures are in place. (Emmett 2005, 157.)

## 4 Procurement of services

### 4.1 Definition of procurement terms

Terms in procurement process have many variations some of which mean the same thing in different words. Conversely, some words are used to mean same thing even though they are a distinctly different. For this reason, one should be critical towards sources and be sure to understand how the author defines each term to understand their meaning. These differences partly stem from different views on what steps are involved in the process. According to Van Weele (2010) procurement refers to all the activities required in getting the product from supplier to final destination. It includes the purchasing function, transportation and quality control. The function considers the total cost of ownership (TCO) rather than just price. (7.) In this theory part the Van Weele definition will be used unless specified otherwise. Purchasing is one part of the procurement process as illustrated in Figure 9.

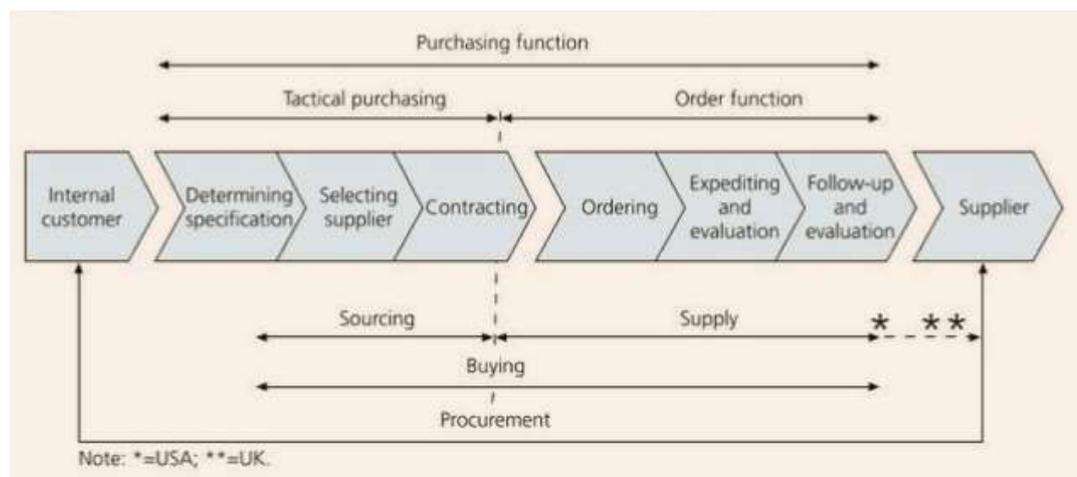


Figure 9 Definition of procurement terms (Van Weele, 2010)

Strategic purchasing and tactical purchasing are one of the terms that are often mistaken for one another. In his article Charles (2016) defines strategic sourcing to include the functions of tactical sourcing but to have longer terms focus and to take more factors into account than tactical sourcing. It is more proactive in its approach. By extension these differences apply to purchasing and procurement processes as well. Van Weele (2010) however does not make distinction between these two terms but simply defines tactical purchasing as the first three steps in his definition of the process, which will be described later.

Terms supply chain management is often used in conjunction with procurement. Traditionally supply chain management has referred to the actions taken after the supplier has been found and the contract has been made: the decision involving logistics, supply network and sourcing materials. The role of supply chain management has however grown in prominence to include the phases before the contract has been made. (Webb 2016.) According to Van Weele (2010), supply includes purchasing and logistics functions needed to supply the goods for the use of the company. There are however several other definitions to it. For example, Johnson, Leenders and Flynn (2006) define it to also include the warehousing and outbound logistics as well as life cycle support in addition to the above mentioned tasks (4-5).

## 4.2 Functions of procurement

Procurement has a major role in most companies. On average the value of purchases account to 50% of value of the sold products. For this reason, its performance has a great effect on the bottom line. (Van Weele 2010, 12-13.) It also has an increasing role in supporting innovation and creation in new types of value (Heikkilä, Vuori and Laine 2013).

The actual goals and tasks of procurement vary by organization and even academic scholars include different steps and goals to procurement. For this reason, the actual process will be examined later. However, some typical, common goals can be established. According to Johnson, Leenders and Flynn (2006) procurement can provide cost savings, provide market information and product innovation, manage supplier relationship to provide efficiency and consistent quality, manage organizational risk

and company image in addition to supporting management strategy through socially and environmentally conscious choices. (9-12.)

Monczka, Handfield, Giunipero and Patterson (2011) see the role of procurement as both tactical and strategic. They list the objectives as assuring supply, doing spend analysis in addition to managing suppliers, contracts, costs and demand. These objectives can have both strategic and tactical aspects to them. For example managing suppliers includes the strategic decisions of selecting suppliers and negotiating contracts but also includes the tactical day-to-day managing and supplier performance measuring. (42-51.) These objectives are fairly similar to Johnson, Leenders and Flynn with slightly different emphasis. These roles are further illustrated in Figure 10.



Figure 10 The tactical and strategic functions of procurement (Monczka, et al. 2011, 42).

One of the major functions of purchasing is to balance costs, risks and value. It is often thought that the sole purpose of procurement is to reduce costs. Achieving this often included switching suppliers to cost competitive countries and reducing the number of suppliers to lower the transaction costs. These actions can leave the company vulnerable to bad quality, supply disruptions and even public image damage. Also, due to aggressive tendering and strict clauses suppliers might not keen to invest their time in product development. Purchasing professionals realized that value, risk and costs are interrelated and the current trend is to manage them as such. Larger

emphasis was placed on managing value and risk to achieve a balance. Some of the tools of managing for managing these are presented in Figure 11.

Managing costs, risks and value are a part of larger phenomena of managing the total cost of ownership. Rather than just the purchase price, total cost of ownership considers the total cost in will incur during the lifetime of the purchase rather than just the acquisition costs. These costs include administration, follow-up, logistics, handling and quality costs. They also include possible maintenance and after sale support as well as possible return or scrapping costs. (Johnson, Leenders and Flynn 2006, 293.)

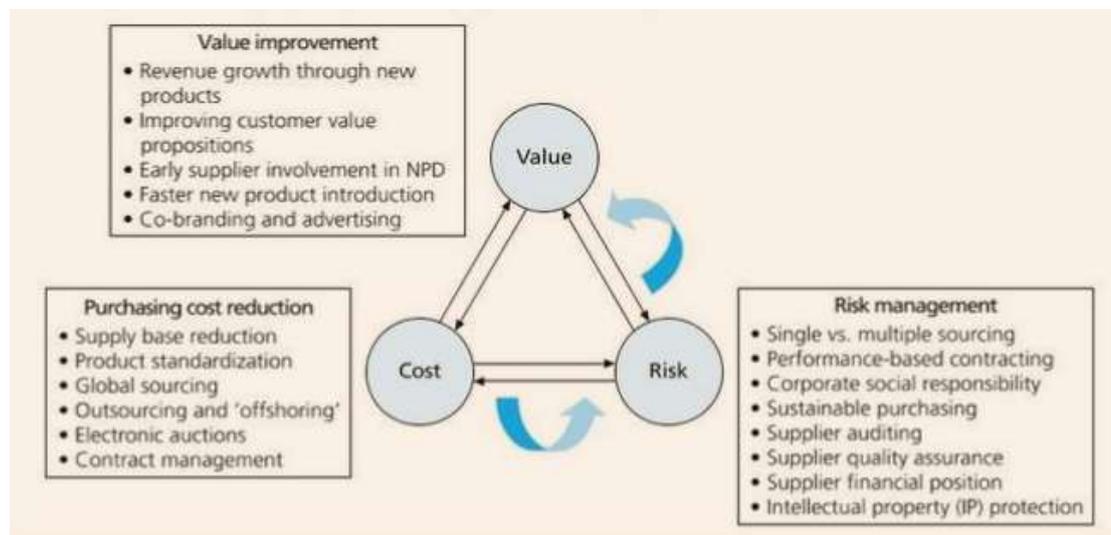


Figure 11 The relationship of cost, value and risk in procurement (Van Weele 2010, 55.)

Managing these costs requires a broader co-operation between purchasing and logistics, finance, engineering and sales to see what is the best option. Great cost reductions can be achieved through this co-operation. In the context of procuring services, contract length can be a major factor influencing the total costs as switching suppliers is often burdensome and on the other hand, supplier's uncertainty can lead to higher overhead costs that are passed on to the buyer. (Johnson, Leenders and Flynn 2006, 293-296.)

#### 4.3 Special considerations for procurement of services

Procurement of business services is different from procuring typical physical items as the relations of power are more equal and the supplier has a greater impact on the

buying company's performance (Heikkilä, Vuori and Laine 2013, 9). Services usually consist of several linked activities. Managing and executing these requires more interaction between the supplier and the customer than many products do. Services are intangible, perishable, heterogeneous and simultaneous meaning that they can't be stored and are often tailor made for the customer rather than being standard. (Van Weele 2010, 92-93.)

Service procurement is mostly indirect procurement. Van Weele (2010) defines indirect procurement as procuring items and services that become the companies value proposition to the material (7). Often direct and indirect procurement are handled by different people. In many cases direct procurement is professionally organized while indirect procurement is left up to the line organizations to handle. This may result in inefficiencies and excess spend caused by lack of expertise in procuring and fragmented contracting. (Johnson, Leenders and Flynn 2006, 56-57)

Business services can be divided into two categories: knowledge intensive business services (KIBS) and industrial services. KIBS have an emphasis on creating enhanced value to the buying company through innovation and include services such as training, consulting and design. Industrial services on the other hand aim to make the buying companies activities more efficient through the provided service. These types of services include for example facility management, travel services and temporary labor. These two categories are not mutually exclusive as for example logistics and ICT-services include aspects from both categories. The category the service belongs to affects the way the service should be procured and how the relationship should be maintained. (Heikkilä, Vuori and Laine 2013, 25-26.) Industrial services often have more precise expectations that can be communicated to the supplier and the procurement process is focuses more on finding out whether the supplier can meet those expectations rather than looking for a cultural match. (Heikkilä, Vuori and Laine 2013, 131.)

#### 4.3.1 Service definition

Due to the characteristics mentioned before, defining services is not as straight forward as defining physical items. The services are usually different for every time they are executed because humans are often more actively involved in producing them and the customer needs also vary. (Van Weele 2010, 93.) The service is difficult to

standardize but on the other hand it does need to be defined so that both parties know what should be accomplished and what to expected. Definition of the service is a vital part when defining the scope and the price of the service. (ibid., 96-98.)

The service can be defined based on input, throughput, output or outcome. Defining services through input means that the capabilities and resources that the supplier must have available are defined. In context of warehousing it could require the warehouse to have certain types of forklifts, number of people and amount space but not detail the actual activities, performance or results that must be met. Definition as throughput means that the process steps that need to be performed are detailed. It might involve an estimate on the inputs needed but does not define the results or output. This requires the company to have a detailed and standardized process that can be conveyed to the supplier. (Van Weele 2010, 96-97.)

Service definition through output involves stating what need to be delivered without placing much emphasis on how it is achieved. It is similar to definition through outcome. The difference between these two is that output is more focused on what technical specifications the service need to meet when it is performed while definition as outcome is more concerned on the economic results that the service has. Both of them rely on specific key performance indicators to see if the service is performed up to specifications. (Van Weele 2010, 96-98.)

According to Van Weele, output and outcome definition models should be favored to leverage the full expertise and cost savings potential from the supplier. They give the highest amount of independency to the supplier but at the same time require higher degrees of knowledge. The definition model should be chosen to fit the service provided as some services are hard to define by output. On the other hand KIBS are hard to define as throughput or output as the process or results might not be known to the buyer. Based on these definitions the responsibilities and accountability must be established to make sure the scope of the service is understood by both parties: what role does the supplier fulfill and what duties are covered by the buyer. (86-97.)

#### 4.3.2 Bottle necks in procurement of services

Unorganized or unprofessional procurement might lead to inefficiencies. Van Weele (2010) identifies seven bottle necks in procurement. The first one is related to supplier or brand specification. Sometimes the procured product or service may be over-specified to that it has non-essential requirements that only limited number of suppliers can fulfill. Inadequate supplier selection is the second bottleneck. The second bottle neck is selecting a supplier whose financial performance is unstable or who has major quality issues. It causes problems to the procurement in relation to the task of securing a steady supply. In service procurement, this poses an additional risk as the dependency on the supplier is higher and due to the uniqueness of the service, it might be very difficult to find a replacement for a supplier that went bankrupt. (47-48.)

A poorly drawn contract or too friendly relationship with the supplier are the third and fourth bottle necks as they might result in suboptimal performance as procurement can't defend the buying company's rights and interests the way they should. Too much emphasis on price is the fifth bottle neck and can lead to delivery problems such as delayed or damaged deliveries and products that do not meet the specifications. In service viewpoint this could mean that the service provided is not what was agreed on and the quality is low compared to expectations. (Van Weele 2010, 47-48.)

Poor administrative process in the buyer's end is the sixth bottle neck. It can also lead to costs and damage in the supplier relationship. Unclear orders, invoice payment problems and lack of follow-up are some examples of these. The seventh bottleneck, delivery problems, is often related to this. (Van Weele 2010, 47-48.)

These problems can be avoided by setting clear guidelines in ethics, administrative and supplier selection processes. Also, having legal aid in drawing contracts instead of using the supplier's version might prevent contractual disagreements. The specification and requirement identification phase should be done in co-operation with the internal customers to make sure that the products are not over-specified but meet the requirements. (Van Weele 2010, 48.)

When specifically looking at the field of logistics, Richards (2011) identifies the top reasons for failed outsourcing to be inefficient management by the supplier, difficulty in managing and selecting the supplier and hidden costs. These reasons are further described in Figure 12.

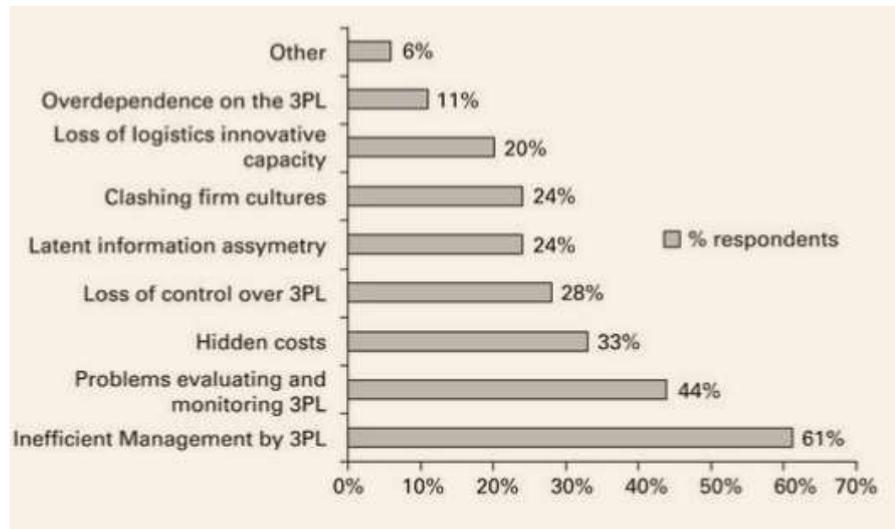


Figure 12 Reason for failed logistics outsourcing (Richards 2011, 263)

## 4.4 Outsourced logistics

### 4.4.1 Motivations for outsourcing

Outsourcing is generally used to enable companies to focus on their core business. It is the business they have most expertise in and thus the one they can leverage for a competitive edge. Specialized service providers might have better expertise, motivation and resources to develop their perspective fields to stay on top of the game than companies who perform the same functions out of necessity. Therefore they might not be able to gain costs savings and to develop their process for better value. (Ackerman, 1997, 35-36.)

Outsourcing can create costs savings due to changing fixed costs to variable ones and making better use of resources. On the other hand, outsourcing might result in high dependency on supplier which comes with a risk, especially if confidential information is compromised. It might also result in the need of having extra resources dedicated for monitoring the supplier performance so careful consideration of the benefits is essential. (Van Weele 2010, 164-166.)

Outsourcing logistics has generally been highly popular (Van Weele 2010, 161). It is partly because it has great variance in business volume. This variance requires the logistics functions to be expanded and streamlined according to demand, which can be cumbersome. A third-party provider who focuses on the business is better equipped to allocate resources more efficiently per demand across customers in different fields (Ackerman 1997, 35-36.)

#### 4.4.2 Scope of outsourcing

Outsourcing can be partial or turnkey outsourcing. Partial outsourcing means that only a part of a function is outsourced but their co-ordination and management is not. This may result in problems when it comes to responsibility for the function. It is opposite to turnkey outsourcing where the entire execution of a function is outsourced including the responsibility. The differences between these scopes is highlighted in Figure 15. (Van Weele 2010, 162.)

	<i>Labour outsourcing</i>	<i>Mixed outsourcing</i>	<i>Complete outsourcing</i>
Contractor provides ...	<ul style="list-style-type: none"> <li>■ Some employees</li> </ul>	Some or all of the following: <ul style="list-style-type: none"> <li>■ Employees</li> <li>■ Materials</li> <li>■ Process and Systems</li> <li>■ Technology and Equipment</li> <li>■ Facilities</li> <li>■ Management/Supervision</li> </ul>	<ul style="list-style-type: none"> <li>■ Employees</li> <li>■ Materials</li> <li>■ Process and Systems</li> <li>■ Technology and Equipment</li> <li>■ Facilities</li> <li>■ Management/Supervision</li> </ul>
Host firm provides ...	<ul style="list-style-type: none"> <li>■ Some employees</li> <li>■ Materials</li> <li>■ Process and Systems</li> <li>■ Technology and Equipment</li> <li>■ Facilities</li> <li>■ Management/Supervision</li> </ul>	Some or all of the following: <ul style="list-style-type: none"> <li>■ Employees</li> <li>■ Materials</li> <li>■ Process and Systems</li> <li>■ Technology and Equipment</li> <li>■ Facilities</li> <li>■ Management/Supervision</li> </ul>	<ul style="list-style-type: none"> <li>■ Programme management</li> </ul>

Figure 13 Differences between different models of outsourcing (Van Weele 2010, 162.)

In logistics, these types of outsourcing are generally referred to as first, second, third or fourth party logistics (PL). First party logistics (1PL) refers to logistics that are handled in-house by company's own staff. Second party logistics (2PL) refer where certain logistics activities are bought from external suppliers but the co-ordination and management is still done by the buying company. Purchases are on case by case basis. Third party logistics (3PL) mean that entire functions are outsourced but the high level management is still done in-house. The suppliers themselves can outsource the services but are still in control of them. Fourth party logistics (4PL) where the entire

supply chain, including its management, is outsourced. These type of contracts allow the supplier to decide on all the logistics services required, such as selecting warehousing providers, couriers and forwarding companies. (Norall 2013)

Outcome service definition is not suitable for partial outsourcing as the supplier does not have control over all the activities affecting the KPI's used to measure the effect. (Van Weele 2010, 97.)

#### 4.4.3 Charging models

There are numerous charging models for charging internal and external customers for services. In his article, Brunelle (2015) identifies five distinct models

In cost-plus model of charging the customer sees all the costs incurred. This enables them to discuss cost savings and enables the customer to see the effect of their own actions. In this type of charging the profit margin for the supplier is agreed beforehand and is tied to performance level. Higher performance allows the warehouse to charge a higher management fee. This type of model is also known as the open book model. (Brunelle 2015.)

In activity based pricing, pay per unit and pay per use models the customer charged based on usage or activities as described earlier in the costing model chapter. (Brunelle 2015.) These models can be referred to as closed book contracts because the customer does not see the actual costs. This model usually includes a minimum charge level based on usage or activities to guard against slumps. The provider is also likely to include a certain profit margin to each of the charges. This model does not allow transparency and might not have incentive for the customer and the provider to work together towards cost savings as only one of them would benefit from them. Additionally, lower than expected volumes might eat into the supplier's profits and conversely the contract might become more expensive than envisioned during high seasons for the customer. The price level won't fluctuate according to actual costs like they do in open book model but the actual cost does. (Richards 2011, 225.)

A fifth model is percentage of sales revenue model. In this model the supplier earns a percentage of the revenue that it generates. In this model the supplier is in a vulnerable position as it does not see the performance of their customer. For this reason it is not very suitable for partial outsourcing. Usually a minimum fee is determined in to

make sure that the supplier is paid even if the customer is having low business volume. (Brunelle 2015)

These models can also be combined so that certain charges are open book and some closed book. For example, the cost of premises and equipment can be open book but labor and management costs are based on activities and are thus closed book. (Richards 2011, 225.)

The charging model is of course dependent on how the service is defined. Sales revenue model for example fits best with outcome definition. Activity based pricing can be used with input, throughput and output models by charging based on time, transactions or results respectively. (Heikkilä, Vuori and Laine 2013, 42.) Open book models can be utilized if the throughput definition is used (Van Weele 2010, 35).

#### 4.5 Strategic procurement process according to Van Weele

Van Weele (2010) describes the typical procurement process to consist of six steps: define specifications, select suppliers, contract management, ordering, expediting and evaluation. The first three steps constitute the strategic procurement process examined in this thesis. The whole process is detailed in Figure 16. In addition to this general process, he also offers specific instructions for procurement of services. It consists of defining the scope of the work, selecting service providers and contracting services (ibid., 96-99).

	Define specification	Select supplier	Contract agreement	Ordering	Expediting	Evaluation
P&S Role	• Get specification	• Assure adequate supplier selection	• Prepare contract	• Establish order routine	• Establish expediting routine	• Assess supplier
Elements	• Functional specification • Technical changes • Bring supplier-knowledge to engineering	• Prequalification of suppliers • Request for quotation	• Contracting expertise • Negotiating expertise	• Develop order routines • Order handling	• Expediting • 'Trouble-shooting'	• Supplier evaluation • Supplier rating
Documents	• Functional specification • Norm/spec control	• Supplier selection proposal	• Contract	• Order	• Exception report • Due date listings • Invoices	• Preferred supplier list • Supplier ranking scheme

Figure 14 The Van Weele procurement process (Van Weele 2010, 28)

#### 4.5.1 Defining the scope of work

In the first step of procurement of services, the scope of outsourcing should be established. The requirements are computed based on the definition of service described in sub-chapter 4.3.3. Of course this requires the buyer to establish what the supplier needs to accomplish or conversely, what kind of qualifications or process the supplier must have. (Van Weele 2010, 96.) This step also includes the do-or-buy decision (ibid., 32-33).

#### 4.5.2 Select supplier

The second step is to select the service providers. There are four stages in this step: determining method of subcontracting and the pricing model, preliminary qualification of suppliers, preparing request for quotation (RFQ) and selecting the supplier.

In the first stage, it is determined whether the subcontracting is partial or turnkey as described in sub-chapter 4.4.3. The charging model should also be decided. (Van Weele 2010, 34.)

The second stage is to draw a bidders' long list. The type of tendering is also determined. Tendering refers to the buyer asking the suppliers to bid for the contract. In closed bidding the buyer conducts market research to get a rough idea which suppliers could accomplish the required activities and draws a bidders' long list. (Van Weele 2010, 36.) The market research involves studying who are the actors in the market, what are their market and negotiation positions, what kind of technologies they have and what kind of regulatory aspects are involved in the field. The study should also include geographical implications such as political situation and monetary developments in supplier countries. (Van Weele 2010, 134.)

A request for information (RFI) is sent to the supplier on the bidders' long list to get more specific information about their organizations, capabilities and references. (Van Weele 2010, 36.) The track record and general qualifications should be examined to see if they have experience in the field and the process should also include finding out do they have the expertise, process and financial standing to provide the service. This also involves determining the supplier's capacity. (ibid., 98.) If the buyer opts for open bidding, bidders' short and long lists are not drawn and the bidding is open for all (ibid., 36).

Based on the results of the RFI's the most qualified suppliers are selected to bidders' short list. This list usually contains three to five potential suppliers. In the third stage a RFQ is sent to these suppliers requesting them to bid for the work. The RFQ makes it easier for the buyer to compare the suppliers. (Van Weele 2010, 36.)

In the fourth stage the RFQs are compared and different aspects, such as quality, financial and legal, are weighted. The focus is on the total cost of ownership (TCO), not just the actual prices. Risk analysis is done for strategic or critical supplier to assess the technical, quality and financial risk associated in selecting the particular supplier. (Van Weele 2010, 36-37.)

#### 4.5.3 Contracting

The third step is the actual contracting of services. The contract includes the definition of when the service has met the specifications and provide grievance procedures in case of disputes. (Van Weele 2010, 98-99.) It also includes pricing models used, potential incentive or penalty clauses, administrative process used as well as legal clauses. It can also include confidentiality requirements. (Van Weele 2010, 38-40.)

## 4.6 Strategic procurement process according to Heikkilä, Vuori and Laine

According to Heikkilä, Vuori and Laine (2013) the procurement process consists of six steps. These steps are requirements and specifications, supply market knowledge, designing interaction between buyer and supplier, supplier selection, contracting and delivery follow up. (31.) The first five steps fall within the scope of the thesis. These steps are presented in Figure 17.

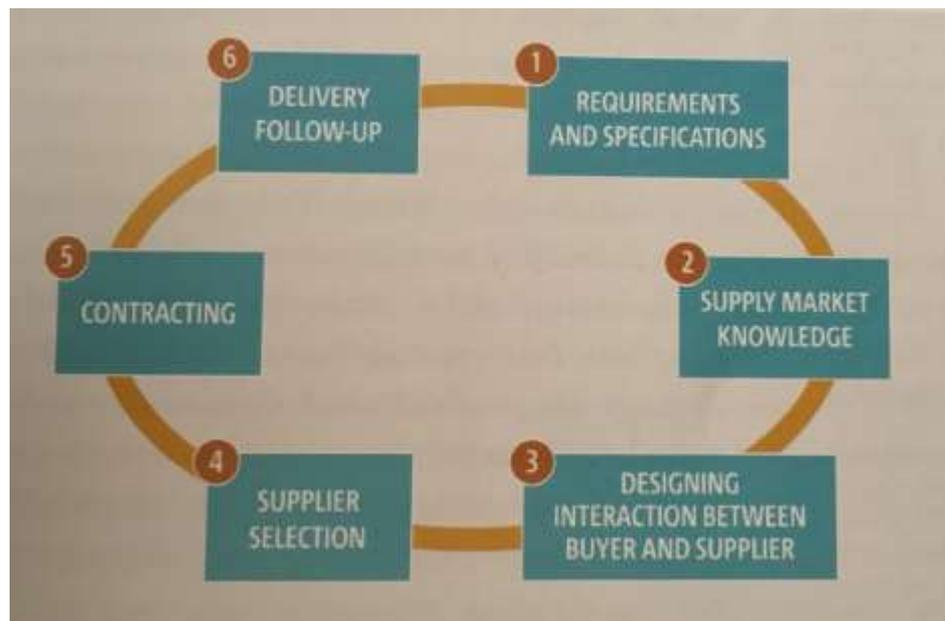


Figure 15 Procurement process according to Heikkilä, Laine and Vuori 2013 (31)

### 4.6.1 Requirements and specification

Requirements and specification is the first step of the process. Heikkilä and his colleagues say it involves finding out what needs to be done to meet the business requirement, in what form and scope. It also involves the do-or-buy decision. It means determining whether the activities are best to be done in-house or by suppliers. (31.)

### 4.6.2 Supply market knowledge

The second step is collecting market knowledge. The Activities-Resources-Actors (ARA) model is designed to assist in doing this. This model is derived from viewing services as service systems, which consist of sequential or simultaneous activities or a combination of both. Sequential activities must to be performed in a specific order

for the next actor to complete their task while simultaneous activities must be performed at the same time with each other. These linked activities form the service. These activities are performed by different actors who need resources to do them. Understanding the interrelation of activities is vital as is understanding what actors have resources to complete which of the activities. This enables the buyer to see what is involved in fulfilling the requirements, map potential suppliers and verify the do-or-buy decision after determining if the buying company has access to resources other actors don't have. (Heikkilä, Vuori and Laine 2013, 20-25.) The ARA model is further detailed in Figure 18.

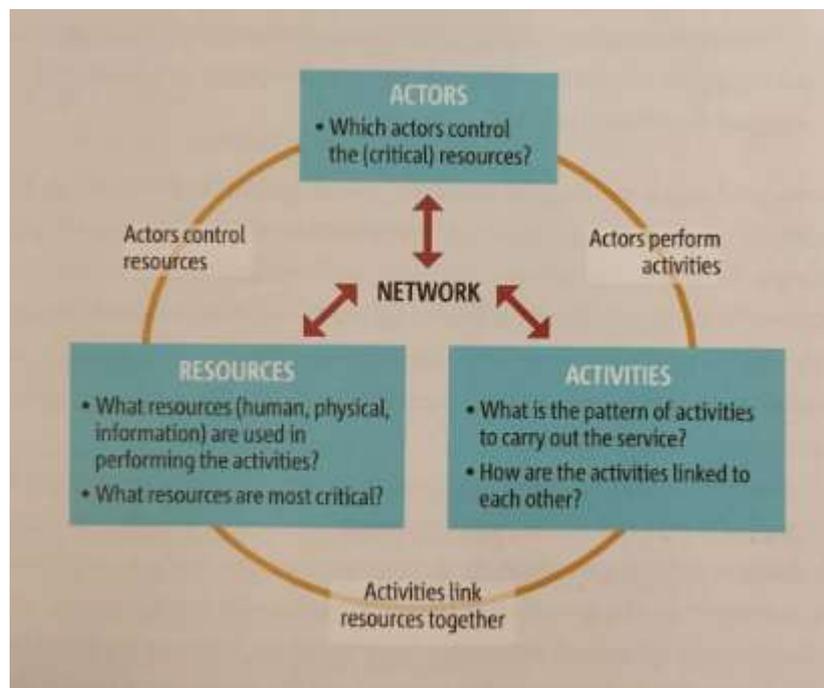


Figure 16 The activities-Resources-Actors model (Heikkilä et al. 2013, 21)

#### 4.6.3 Designing interaction with the supplier

The third step is designing interaction with the supplier. According to Heikkilä, Laine and Vuori (2013) a well-designed communication and interaction framework is crucial to the success of outsourcing. The step requires the buying company to specify the methods and tools for interaction with the supplier. It also requires them to think who are going to be involved in this communication and what kind of expertise should they have in addition to deciding the main topics of communication. The frequency should also be decided. For this reason, its design should start early in the process to make sure that the supplier is capable of meeting them and that the contract supports their implementation. This step is also important in making sure that

the supplier knows what is expected of them right from the start. Miscommunication or lacking information can lead to situations where both parties are unhappy with the performance and quality. (32.)

Working communication and interaction is crucial especially in knowledge intensive business services as their value proposition is based on information. The actual channels and topics are dependent on the business. In more simple services the communication can be standardized but more complex services call for deeper co-operation as the customer might not have a ready solution for completing the activities. Determining whether the service is simple or complex might not be straightforward due to the varying resources of suppliers and buyers. (Heikkilä, Vuori and Laine 2013, 33-35.)

Another consideration if deciding the communication methods is the degree of silent information within the buying organization. The buyer might not have documented the details of their process thus making it hard to establish standardized and codified communication. This type of situation would also require more open and intensive communication between the parties to make sure that the silent information is transmitted to ensure the service delivery. (Heikkilä, Vuori and Laine 2013, 135-136.)

#### 4.6.4 Supplier selection

The fourth step of the process is to select the supplier. The first part of this step is to send the request for information (RFI) to potential suppliers on the bidders' long list mapped during market research. The purpose of the RFI is to obtain information about the suppliers' operational processes, capacity, expertise, structure, key staff and references from past cases. This stage might also include site visits and potentially audit the suppliers to get to know the potential suppliers better and also to check they suit the company culture. (Heikkilä, Vuori and Laine 2013, 37.)

The most promising suppliers get to be on the bidders' short list. A request for proposal (RFP) is sent to these suppliers. The RFP is a way for the suppliers to give their suggestion about the best way of executing the service. These proposals are evaluated and some aspects from them can be included on the RFQ in addition to the specification laid out in the previous steps. The RFQ is sent to the suppliers on the

bidders' short list for them to give their bids. The bids must be given in the terms laid out in the RFQ for equal comparison. This also sets requirements for the RFQ as it must be comprehensive enough to include the necessary specifications and pricing information. These bids are evaluated based on the total cost of ownership, commercial requirements and content. (Heikkilä, Vuori and Laine 2013, 37-39.)

#### 4.6.5 Contracting

The fifth step is contracting. The contract drawn should be concise and give guidelines how to proceed in varying situations. It should define the service as described in subchapter 4.3.3. The contract should include setting the scope, goals, requirements, KPIs and pricing. It should also dictate information sharing, grievance procedures and details on termination of the contract. Ideally the contract should be flexible to adapt to changes in business needs and harvest the innovations of the supplier. The contract should be prepared in co-operation between the parties to make sure both understand its contents. Misunderstandings in the contract are a major reason for failed outsourcing (Heikkilä, Vuori and Laine 2013, 37-43.)

## 5 Research

### 5.1 Research methods

#### 5.1.1 Selecting the research method

This research was conducted with a qualitative approach. Qualitative research is used to provide understanding to one of the research subject's qualities while quantitative research is used to interpret the subject based on numbers (Qualitative Research 2010).

Outsourcing warehousing services requires very specific information about business needs, warehousing as well as procurement knowledge. This knowledge is largely based on understanding the interplay of these three fields which requires a thorough understanding of each function. Although the success of an outsourcing can be measured in numbers, the figures themselves have limited meaning as the meaning is provided through understanding the overall picture and the phenomena behind the numbers. For example simple cost calculations do not provide enough information as

to how it can be made better. Figures cannot quantify this phenomenon to a degree in which it would be comprehensive enough to be used to explain what needs to be done in the procurement process. Therefore, a qualitative approach was needed.

Scientific research cannot provide much insight to the questions presented as the theoretical background cannot take the situation of the individual company into account. Empirical research was needed to obtain the company specific information. The research was descriptive because it is best equipped to answer the “what”-question of this thesis and it is also the most suitable for process driven research. Explanatory research would have been better in explaining why things happen the way they do but that itself wouldn't have helped in improving the procurement process the way looking at what needs to be done did. The research questions are not comparative in nature and it would be difficult to compare the process due to aforementioned differences between individual companies.

As mentioned before, the needs and targets of outsourcing are company specific. For this reason, this thesis did not try to give a blanket answer to how each and every procurement process for service business warehouses should be conducted. Instead, a case study was conducted of the individual needs of Valmet's service logistics center and how they should be considered when procuring the service.

There are high amounts of tactile information present in the company regarding logistics operations. The company has a very large range of service offering and the logistics center must be able to accommodate for numerous supply chains of different types of products, often at very strict and ever changing timetables. For this reason, the day-to-day procedures and requirements might not be laid out in the written format for each type of service. Harnessing this knowledge was best accomplished through interviews of the key people involved in handling the logistics operations.

Interviews provide deeper knowledge on the researched matter than quantitative methods and also allow the research subjects to have a greater impact on the result. Interviews can be structured, semi-structured or unstructured. Structured interviews have precise questions and are the easiest to complete but conversely offer the least amount of room for the interviewee to bring up their own views. Unstructured interviews have an opening question but have no guidance after that. They allow the greatest room for the interviewee but are very labor intensive, time consuming and

hard to analyze. Semi-structured questions have multiple key questions but they are more open in nature than in structured interviews. (Gill, et al. 2008.)

The interviews will be semi-structured as they provide more depth than structured interviews but are less labor intensive than completely unstructured interviews. These interviews will be theme interviews as these give more room for the experts to voice their views and ideas about the strategic procurement process. The number of times the themes and subthemes were mentioned and the contents should be detailed in the research analysis.

The themes that arise from the interviews can be used to modify the procurement process to the company's needs. They can highlight what needs to be done in each phase and how much emphasis should be placed to different activities within the procurement process.

The researcher has a greater role in obtaining the information in interviews, semi-structured and unstructured in particular, than many other forms of research (Gill, et al. 2008). Therefore high amount of care must be placed to ensure that the interviews are impartial and the views of the interviewer will not guide what is said by the experts. This is taken into account in research topics to make sure that they don't steer the conversations to certain themes. During the actual interviews the interviewer should not introduce discussion to other matters than what has been brought up by the interviewees. Any follow-up questions should not be so precise that they can't be answered by more than one way. The same is true during the analyzation process. During the analyzation, themes introduced by the interviewees must not be omitted from the research and they must be treated objectively.

## 5.2 Research introduction

As mentioned before, the data collection was conducted as a themed interview. The research questions were "What needs to be done in the strategic procurement process to make the procurement of warehousing services successful?", "What stages are included in this process?" and "What aspects need to be considered in these stages?". The interview topics were derived from these questions and the themes that arose from the theoretical part. They are all designed to be as open as possible

to yield more information. The interviews also start with easier to answer topics and progressively turn into more challenging ones to help the interviewees in tuning their minds to think about the matter.

There were five main topics of discussion in the interviews. The first topic was “what constitutes a successful outsourcing”. This topic brought insight to the expectations of what should be accomplished in the procurement process. The topic was derived from the main research question.

The second topic was “business requirements of service business”. The topic was chosen because it was one of the theoretical framework topics. It is also crucial to the logistics function and through it, the procurement process, as fulfilling the needs is the main goal.

The third topic was the procurement process. These discussions were vital in giving insight to the experts view on how the process should be organized and what sort of considerations should be included.

Contracting was a separate topic although it is part of the procurement process. It was discussed separately because it is the physical result of the procurement process. It should contain all the work included in the procurement process to make sure the procurement is a successful one.

Communication with the supplier was the final topic of discussion. According to Heikkilä, Laine and Vuori (2013) it is crucial to the success of the procurement process in total. Logistics services usually require a high amount of information sharing which also adds to the importance of it being discussed.

The interviewees will also be given the opportunity to talk freely about other topics they deem important. The interviews are recorded and a rough transcript will be written from each interview detailing the main points. The interviews will be conducted in Finnish to make sure that the interviewees are comfortable and can express themselves accurately and freely. In accordance to guidance from Gill et. al (2008), the interviewees were informed about the use, anonymity and objective of the research in the invitation. The invitation to the interviews can be found in appendix 1.

The interviews were conducted with seven professionals from Valmet's supply chain and sales organizations. One of the interviewees belongs to upper management, three belong to middle management and three to the operational white collar work force. Out of them, six have been involved in one or more warehouse outsourcing.

These people were chosen because they combine the views of procurement, logistics and business. The interviewees represent a wide group as many different organizational levels are present. Also, the sales organizations viewpoint was covered. Due to the high amount of tactile information as well as a major role in the follow up process, the operative logistics represent almost half of the interviewees.

On average, the interviews lasted approximately 43 minutes with the longest being 55 minutes and the shortest 28 minutes.

### 5.3 Findings

Through talking about the aforementioned topics, several themes arose. The main themes were slightly different from the topics at some cases and each contain three to five subthemes. The subthemes and the number of occurrences are presented in table 1.

Table 1 Subthemes and their occurrences

Charectarictics of a successfull outsourcing.	Number of occurences
Unnoticeable	9
KPI's	7
Cost savings	4
	20
Special requirements of Valmet's service business warehousing	
Challenging customer requirements	33
Challenging products	24
Challenging processes	10
	67
Procurement process	
Starting the process	10
Process renewal	20
Requirement definition	25
RFQ process	38
Choosing the supplier	20
	113
Contracting	
Pricing	49
Quality and Liability	18
Development	8
Drawing the contract	22
Responsibilities	6
	103
Communication with the supplier	
Long term focus	51
Involvement in all levels	36
Setting up the communication	30
	117

### 5.3.1 Characteristics of a successful outsourcing

The theme "Characteristics of a successful outsourcing" arose from topic "what constitutes a successful outsourcing". Compared to the topic, it focuses more on how the success can be measured rather than when the outsourcing can be deemed a success. When investigating the success factors of an outsourcing, it is important to know what is a success and how it manifests so that there would be a goal for the work. Three subthemes were discovered from the conversations. These subthemes are presented in table 2.

Table 2 Subthemes of characteristics of successful outsourcing

Characteristics of a successful outsourcing	Number of occurrences
Unnoticeable	9
KPI's	7
Cost savings	4
	20

These subthemes represented the different goals and qualities of a successful outsourcing. The most commonly mentioned trait was that the outsourcing should be unnoticeable to customers and other staff within the company. There should not be any disruptions to the deliveries and the service level should be at least as good as before the outsourcing or switching of suppliers. One interviewee however noted that It needs to be accepted that there will be disruptions. The person however agreed that in a successful outsourcing the disruptions should be avoided and they should not be long and that there is no room for rehearsing because the operative business does not stop.

A second subtheme revolved around how to measure the success. All the people who brought this topic up identified the on time delivery rate as a method of measuring the success. Some of them specified that both the inbound and outbound rates should be examined. They should stay within the tolerances set by the buyer. Two of the interviewees also noted that the number of quality feedbacks from the customers should also be counted in to the KPI's. They said that the company should be measuring in- and outbound on-time delivery rate as well as the number of quality feedbacks.

Some of the interviewees also noted that achieving cost saving was also an important measure of the success.

### 5.3.2 Special requirements of service business warehousing

Theme "Special requirements of Valmet's service business warehousing" was derived from topic "business requirements of service business". The theme is more specialized and revolves around the peculiarities of Valmet's business rather than the actual requirement figures etc. Knowing the requirements is the basis of fulfilling the service so defining them is important part of the process (Heikkilä, Vuori and Laine 2013, 32).

The subthemes of this topic focus on the challenging aspects of the business and what they include. All the interviewees stated that there are some aspects of Valmet's service business that pose additional challenges to warehouse service providers. These aspects are grouped to customer, product and process challenges as presented in table 3.

Table 3 Subthemes of Special requirements of Valmet's service business warehousing

Special requirements of Valmet's service business warehousing	Number of occurrences
Challenging customer requirements	33
Challenging products	24
Challenging processes	10
	67

The first subtheme covers the special customer requirements that are present in Valmet's service business. The interviewees highlighted the importance of fulfilling the customer needs. One person stated that Valmet may not be the cheapest but has to be the quickest and must have the highest quality. This of course translates as requirements for warehousing as another person stated that the Warehouse actions are the most visible quality to customers.

The interviewees raised requirements for the warehouse ranging from location and responsiveness to reliability and quality. They all tie together to Valmet's company strategy as being near to the customer (Join us on a Shared Journey Forward 2017). One interviewee also brought this up by saying that the needs stem from company strategy. Being close to customers can at times be hard because as one interviewee pointed out that Valmet has a varied customer base. Despite that, the warehouse needs to be able to react quickly to unexpected customer requirements and offer reliable service. One of the experts stated that the customers are strict about deliveries and that there are numerous penalty clauses about the deliveries.

Most of the persons interviewed also pointed out that Valmet's products are not standardized and that it is a challenge for the warehouse. One of them said that the range of items is large, the items are not packed and the variation in size is huge. Similar statements were made by others and in addition the challenges placed on facilities, documentation and identification were mentioned. One person also stated

that dealing with the items requires experience because the systems are not supportive.

Processes were also stated to cause challenges to warehousing. One of the interviewees stated that the large numbers of exceptions make the processes unusual. This person continued by giving an example that mill improvements are especially challenging because they are not handled in ERP. These projects often include design work and may have design-to-order parts. This creates challenges for the entire supply chain from purchasing to logistics. These projects might not be able to make use of existing parts and the inventory utilization is less efficient. Handling complex, non-standard parts is troublesome in terms of identification, correct handling and exporting.

### 5.3.3 Procurement process

Procurement process is both a topic in the interviews as well as a theme. By occurrences, it was the most discussed theme in the interviews. The procurement process is the main topic of the thesis and the interviewees had a lot of insight about the process and what should be taken into account in it. The subthemes and their occurrences are presented in table 4.

Table 4 Subthemes for procurement process

	Number of occurrences
Procurement process	
Starting the process	10
Process renewal	20
Requirement definition	25
RFQ process	38
Choosing the supplier	20
	113

The first subtheme is starting the process. Some of the interviewees said that the necessity of the outsourcing should be carefully re-examined to see if a new supplier should be selected or the current contract be renegotiated. One of them said that switching service providers is not simple and that there are big risks involved and a price should be calculated for that risk. Most experts stated that the supplier should be chosen according to bidding. Some also added that the supplier market should be

studied prior to starting the process. According to the market should be researched to find out potential alternatives who could meet the requirements".

Another theme that arose was that process renewal should be achieved from outsourcing or switching suppliers. The procurement process should be used to rethink the company's own requirements and procedures. One person suggested that a lean-project should be executed before setting requirements for the suppliers to develop the company's own organization and harmonize processes. Another person said that when choosing the supplier alternatives should not be dismissed outright and that Valmet should leverage supplier's core knowledge. The buyer should keep an open mind to what the supplier offers as an alternative to executing the required functions. However, one person had a completely opposite view on this. According to this person the buyer should trust their own view and evaluate suppliers based on that. This person stated that the company is in the best position to know what needs to be done based on their experience. Most of the interviewees fell in the middle of these opposites stating that supplier's knowledge should be used but evaluated carefully based on Valmet's knowledge. They said that experience must be utilized when renewing the process but the supplier must be supported in finding a way to work that is also suitable for them.

Third subtheme identified from the interviews was requirement definition. The scope of the outsourcing should be decided. One interviewee said that it should start by examining from wider scope what should be outsourced. This person continued that the management should think what is worthwhile to move as very limited outsourcing might not yield real benefits.

According to the interviewed, the requirements should be closely detailed and most noted that extra effort should be placed to account for numerous exceptions in the process. One of them said that examining if past requirements were too strict or loose is a good way to start the process. Another one stated that setting requirements for facilities was not as important as the exceptions of operating procedures.

One of the interviewees noted the importance of schedule in the requirements planning. This person stated that the timetable must be carefully drawn to fit the business with emphasis on scheduling the go-live to fit the business. That person also

added that time must be reserved to get to know the suppliers' offering and to compute the buying company's requirements. This should include an extensive pre-study of requirements. This person also warned one must not get too comfortable of references or with their own knowledge as it can be deceiving. Certain humility and willingness to learn is needed.

The RFQ-process was the most discussed subtheme. One of the interviewees stated that the RFQ is the single most important part of the process. This person continued that it should include a draft of the contract to make sure the suppliers know what they're getting into. Based on the number of occurrences the RFQ process is viewed as important by others as well. One of the experts stated that the RFQ should include process descriptions and required conditions. It should also define exceptions. Another one stated that the entire process should move from grand scale requirements to details so that the supplier could get the general picture better.

Almost all the experts highlighted the importance of supplier knowing the business and understanding what they should offer. One of them said that it must be made sure that the supplier knows what is expected of them and that peculiarities of the business are discussed. Another one expressed similar opinions by saying that there should be interviews with the suppliers to see that everyone is on the same page. One of the interviewees stressed the importance of sticking to the company's own requirements and trusting the buying company's own knowledge.

Similarly, many of the interviewees highlighted the importance of meeting the suppliers and introducing them to the business. One person suggested that the buying company should arrange a kick-off meeting to know what the suppliers are offering. Some also stated that it is important for the potential suppliers to be able to visit the current premises.

One of the experts placed a lot of emphasis on creating a fair game for the bidders. That person stated that all the suppliers must understand the requirements the same way. As a way of achieving this, that person suggested that questions about the RFQ should be answered collectively so that each supplier has the same knowledge. The matter was not brought up by other interviewees.

Choosing the supplier is the final subtheme of the procurement process. Many of the interviewees brought up the importance of references when making the decision: According to them references and experience of similar business are important. However, one of them added that references must not cloud critical thinking.

Beyond that, the importance of a cultural fit was brought up by three experts. They said that the strategies of both companies must be in line and continued that the requirements and offerings must also match. One of them added that the organization and management systems must fit together. These people viewed it as a basic requirement because they viewed that a mish-match in strategy will cause disagreements and problems later on, especially if the financial performance is not what was expected.

One of the interviewees stated that the supplier must be financially sound to be able to run the warehouse as it is resource intensive at times. This was also highlighted by Van Weele as financially unsound suppliers is one of the seven bottle necks of outsourcing (Van Weele 2010, 47). The price was not brought up by any of the interviewees apart from one who said the cheapest alternative is not always the best.

#### 5.3.4 Contracting

Contracting is an important part of the procurement process as it is the “result” of the strategic procurement process. It is also important in determining whether the service has been executed properly. The subthemes and their occurrences are presented in table 5.

Table 5 Subthemes and occurrences for contracting

Contracting	Number of occurrences
Pricing	49
Quality and Liability	18
Development	8
Drawing the contract	22
Responsibilities	6
	103

Pricing is the one of the most talked about subthemes that arose from the interviews. Most of the interviewees agreed that pricing should be activity based: the buyer and the supplier should agree on certain countable activities which are billed.

One of the interviewees stated that activity based pricing is preferable because then Valmet does not have to think about resourcing. This person continued that it is also beneficial as the cost fluctuates according to volumes and the model is more transparent compared to other models. On the same note, that person added that the cost-plus model is labor intensive and should be avoided. Others did not mention this pricing model at all. Three of the interviewees noted that activity based pricing is the easiest for checking invoices and that it is easier to supervise than hourly pricing. One of them added that invoicing is more transparent with activity based pricing and that there is less gray area in the division of costs. Activity based pricing was also viewed as more objective. However, one interviewee thinks that hourly pricing is the best way. This person said that activity based pricing might not be the best alternative due to the varying product base and that hourly pricing would have less surprises.

Most of the interviewees noted that some of the work is bound to be left outside the activities. Many interviewees called for clear procedures for deciding on who orders that work and how it is charged. One of the experts added that procurement of extra materials or work is more transparent when the costs are redeemed based on receipts. Another one said that pre-determined activities must cover 98-99% of operations. Hybrid pricing was not viewed favorably by one of the interviewees due to a risk of paying for the same work in time and in activities.

Performance based pricing is agreed on by all the interviewees. One interviewee said that a bonus should be paid if targets are exceeded and items aren't lost while another one stated that there should be clearly determined boundaries for acceptance. This person continued that penalties should be in place for exceeding them. One of the interviewees also noted that sub optimization should be avoided by constructing the KPI's in a manner that covers the essential business activities. Two of the interviewees also noted that the contract should be mutually beneficial and these penalties shouldn't cause losses to the supplier. According to one of them, the goal is not to cause losses to the supplier as it is not good in the long run and is counterproductive to development".

Quality and Liability is the second subtheme that came from contracting. It includes statements about how potential delivery disruptions and quality defects should be considered in the contract. One of the interviewees called for Valmet to take a strict

stance over what is deemed acceptable and how it is accomplished. This person also highlighted the importance of resolving quality problems without delay. One of the interviewers also noted that there should be a mechanism around the KPI's with responsible persons and clear procedures to ensure problems are dealt with swiftly. Other echoed the sentiment that quality problems should be dealt with in a timely manner.

The interviewees called for clear procedures in dealing with lost items such as how much time is given to look for them. Some also called for clear inventory counting procedures to ensure that lost items don't cause delivery disruptions as having accurate inventory is the ground work for quality".

Many of the interviewees stated that continuous development should be agreed on prior to signing the contract. Some of them asserted that development projects drive motivation and that it is important to involve the supplier in it.

Subtheme "Drawing the contract" revolves around how the contract should be set up to accommodate Valmet's requirements. An interviewee noted that previous contracts should be studied to see what clauses work and what don't. Most interviewees said that there should be flexibility imbedded in the contract. One person added that there should be room for the relationship to also grow. This could include adding other supply chain activities to the contract or taking some out. Another interviewee added that the contract should not have too constrictive clauses about implementation and daily work so that the operative level staff don't have their options cut. This person was especially worried about clauses that could inadvertently make the implementation harder.

Subtheme "Responsibilities" has statements how the duties should be divided between the parties. Two people mentioned that the contract should state whose IT-systems are employed and how this system affects the procedures and resourcing. Another person said that the facilities should be mutually agreed upon. One person said that high-level training should be Valmet's responsibility.

### 5.3.5 Communication with the supplier

Communication with supplier also proved to be a very popular theme. It revolves around how should the communication be organized between the parties and even

within the company in regards to the warehouse outsourcing. It also has statements what kind of goals the communication should have and what it should include. The subthemes are presented with the number of mentions in table 6.

Table 6 Subthemes for communication with the supplier

Communication with the supplier	Number of occurrences
Long term focus	51
Involvement in all levels	36
Setting up the communication	30
	112

The first subtheme is “Long term focus”. Almost all the interviewees placed emphasis on making sure that both parties are committed to the relationship and it should be mutually beneficial. The subtheme shares the top place as the most talked about subtheme. Many interviewees said that the relationship should be treated as a partnership and that the boundary between the companies should be diminished. The level of integration and commitment should be high and the personnel should know one another. It was also noted that both companies should work towards a common goal. Some noted that switching suppliers is a painful process and thus it pays off to invest in the relationship. Many also said that the desire to have a close relationship should be made clear in the procurement process.

Most of the experts stated that the communication should be open and honest. Both parties should be able to admit mistakes. According to them, intensive communication increases openness. This sentiment was shared by most interviewees and some added that for example business predictions should be shared with the warehouse so that they can have appropriate resources. This was viewed especially important as high staff turnover caused by unpredictability was said to have adverse effects on quality through motivation.

The second subtheme is “Involvement in all levels”. All of the interviewed persons agreed that the procurement process should be done with many different stakeholders and organization levels represented to provide the best result. They viewed especially important that those dealing with the daily challenges are involved because they know the process and the exceptions the best and can see what is feasible.

Many noted that the operational staff from potential suppliers should be included in the process to get the information flowing on all levels.

One person noted that it is important that the warehouse operators are involved in the process as they have large amounts of silent information. This person also noted that the entire organization should be kept informed about the progress of the procurement and outsourcing to avoid slumps and mistrust within the company as a loss of trust within the organization has a price.

One of the interviewees noted that it is important to the top management to be committed in the relationship as they hold the executive power to steer resources and make larger decisions, especially in conflict situations. This person said that if the co-operation doesn't work at the executive level, it can't work at lower levels. Another person noted that the management will most likely have more experience in procurement but the operational staff knows the process and realities better.

The third and final subtheme was “setting up the communication”. It states how the communication should be organized in reality and how it can be facilitated through the contract. Most interviewees advocated for regular meetings with the supplier. This was viewed especially important if the supplier is not located close to the buyer. Some highlighted that regular meetings enabled the sharing of silent information that would not happen if the communication would consist of only contacts about operational problems at hand. Some interviewees also said that regular meetings are important in building team spirit and trust as well as keeping situational awareness.

One of the interviewees said that ideally the contract should have an appendix detailing the communication procedures. It should dictate the frequency, general content, responsibilities and who should be involved in it. This appendix should be already visible when sending the request for quotation so that the buying company knows that the supplier is committed to it.

## 6 Analysis

### 6.1 Selecting the process

The interviews provided a lot of insight to the specific requirements of Valmet's service business warehousing in relation to procuring the service. Based on this insight, neither the Van Weele model nor the Heikkilä et al. model fit the business in an optimal way. The interviewees brought up reasoned arguments for steps and procedures not present in either model that are worth pursuing. More emphasis was placed in planning the process altogether: the timetables, making sure the company is ready for outsourcing, selecting the persons involved and setting goals. Perhaps the Van Weele and Heikkilä et al models were designed to be used by dedicated purchasers who are regularly tasked with buying services. They assume that selecting the right people and goals is made in advance, perhaps when creating the department. In case of Valmet, no ready team exist for that purpose and buying warehousing services is more like a project than day-to-day procurement. Therefore, these structures need to be created as the first step.

Van Weele model is rather ambiguous at times. It assumes that certain tasks are performed, although it does not mention them as distinct process steps. For example organizing communication and market research are more of an afterthought although they are essential parts of the entire process.

The Heikkilä et al model has many of the desired features such as deciding on communications early on and doing market research to aid the bidding. Therefore, the Heikkilä et al model needed to be modified to fit Valmet's requirements. However, it too lacks some of the features and performs certain tasks in different stages than brought up by some of the interviewees. For example, gathering supplier intelligence should be accomplished prior to computing the specifications as they very well change after learning about new service possibilities and resources that were unknown. It seems counterintuitive that the requirements would be set prior to knowing what is available.

The Heikkilä et al. model also includes a request for proposal from the suppliers. It was universally agreed on that Valmet's own model should act as a base for the outsourcing and it could be modified only after careful examination. Therefore this step is omitted.

## 6.2 Process steps

As mentioned in the previous chapter, a new model needed to be created. The Heikkilä, Vuori and Laine model was used as a base for this.

### 6.2.1 Preparations for procurement

Based on the research, setting up the actual requirements and specification should take place only after optimizing the company's own operations, selecting the people involved, setting the desired timetable and doing market research. The outsourcing should be treated as a project so this pre-study would definitely be needed. The goal of the project should be clear in the minds of everyone involved.

Many interviewees called for a closer look at the buying company to make sure it is in a position to know exactly what they require and also be sure that their other processes facilitate the supplier's optimal performance. Some suggested that a LEAN process analysis project should be initiated to get rid of inefficiencies and non-essential requirements that can possibly add costs and make the co-operation harder. These excess requirements were mentioned by Van Weele as one of the seven bottle necks of procurement (Van Weele 2010, 47-48).

A LEAN project prior to starting the process would be very beneficial as these situations are ever present at Valmet with the highly complex items, customer relationships and processes. The buying company can be "blind" towards these inefficiencies without noticing that they can actually be very cumbersome to the supplier. Therefore, this step was added to the procurement process.

The initial scope would of course be needed to be set prior to this to know what aspects should the LEAN-project cover. Due to the complexity, turnkey outsourcing is not preferable as a scope. Similarly, outsourcing the entire supply chain as fourth party logistics would require considerations beyond the scope of this thesis as it would cover a much larger range of activities and functions.

Doing a LEAN project would also be a great way of leveraging the operational staff's knowledge and expertise in the process. This was one of the most consistently brought up wishes. It would also be a great way of making sure that they feel involved in the process and increase their commitment in case there are disruptions when implementing the outsourcing. The most suitable representatives from operational staff can be selected to take part to the actual procurement process to provide a different viewpoint.

The LEAN project would also aid in making sure that the top management is informed and committed to the outsourcing as they could verify the scope through reviewing the results of the project.

Most of the interviewees advocated a closed bidding where only pre-select suppliers would be included in the bidding. Heikkilä et al. model has a separate step for gathering market knowledge with the ARA-analysis. The LEAN project could also act as groundwork for doing the ARA-analysis as the management could see the process steps involved and recognize the essential resources through it. The ARA-analysis also gives the company a chance to verify both the do-or-buy decision and the desired scope.

The feasibility of system integration should also be examined. As one of the interviewees said, Valmet's current ERP is hard to integrate. Therefore, potential suppliers need to be aware of this and the specification should be built to so that the candidates can give accurate offers based on using the buyer's systems. Some suppliers may have completely different working methods that are based on their respective systems.

### 6.2.2 Requirements and specifications

The interviewees almost universally agreed to activity based pricing based on transactions. According to Heikkilä, Vuori and Laine 2013, this means that the process needs to be detailed as throughput (42). Throughput specification is also superior to other ways because, as mentioned by all the interviewees, Valmet's items, customer demands and general business processes pose extra challenges to warehousing. Although the supplier might be an expert in warehousing, Valmet most likely has the most knowledge in dealing with these challenges through experience and thorough

understanding of the company. One interviewee advocated hourly pricing, but as many others pointed out, it is harder to supervise and is less transparent.

The specifications need to include warehouse general process, task lines, quality markers and volume predictions. Special emphasis should be placed in computing the requirements for project deliveries as they are unusual in many ways and are the most sensitive to disruptions. The desired value-added services must also be described although these can change later according to scope and offerings. Also, the business needs should be computed within these specifications: the required response time, the ever changing priorities and customization to individual customer needs regarding deliveries. These specifications need to be accurate so that the candidates can do their cost calculation properly.

Location and facilities should also be decided at this point. The location requirements are set by Valmet's strategy of being close to customers. For this reason the location should enable fast deliveries to customers and therefore have excellent transportation connections. Many interviewees mentioned that some of the products can be large and heavy while others are small and hard to identify. These business requirements should be detailed but this would be a great place to leverage the supplier's expertise on warehousing to let them give suggestions to how the items are actually handled and stored. Many interviewees advocated for renewal and this would be a perfect place for it.

The desired communication methods and guidelines should also be computed as requirements to ensure that they support the business. Emphasis should be on earning trust, openness and mutual benefit.

If the buying company has agreed to accreditations or government programs such as authorized economic operator or known consignee, they too should be weighted in. Dangerous goods handling should also be considered.

Past contracts can act as a base for computing these requirements to see if they were too loose or tight. Reviewing it can also tell if some requirements are missing altogether. The requirements set should line up with the company's overall strategy, because as many people mentioned, a mismatch between the strategy and what is actually done is bound to cause problems.

### 6.2.3 Supplier selection

Although it was not specifically mentioned by any of the interviewees, sending RFI's can aid in fine tuning the company's own requirements. It would help in knowing what kinds of services are out there and potentially also aid in setting the scope. Some interviewees also mentioned that the buying company's organization model, strategy and financial standing are important deciding factors so using the RFI is definitely needed. It is less labor intensive than a RFQ and exposes less information about Valmet's own operations to the potential suppliers.

One of the interviewees said that communication procedures should be an appendix on the contract and this should be prepared with the RFQ to make sure the supplier commit to it. This lines up perfectly with the Heikkilä et al. model.

However, this person went even further saying that the draft contract itself should be an appendix on the RFQ. The reasoning behind is the same as with setting up communication procedures early on: make sure that all the potential suppliers are on the same page and know what they commit to. Nevertheless, it should be made sure that the contract has room for negotiation to make sure that it too matches both companies' strategies and goals. The buying company is in a risk of restricting itself too much and not being able to leverage the full development potential of the supplier's knowledge and resources if too much is decided beforehand. Overall it would help in achieving the desired result and would be a great addition to the procurement process.

The draft contract should include clauses how the liability is divided, how the communication is generally organized and what are the responsibilities of each party. Collaborations in development and more precise communication protocols as well as incentives and prices are to be discussed during the actual contracting. The KPI's are also best discussed after having more in-depth discussions with the supplier. This is to ensure that they match both companies' strategies and operations.

During the RFQ process there should be active communication between the suppliers and the buying company. One of the interviewees suggested that all the questions from the candidates should be answered together so that everyone can benefit from

the answers and everyone has the same picture. This does seem like a wise thing to do as then the bids would be more comparable.

Alterations to the process should not be permitted until the supplier has been chosen so that the game remains fair and the bids can be compared. Due to numerous exceptions to the processes, any alterations to these processes should be discussed together to make sure that they don't harm the business. The warehouse is in a focal point of many different kinds of supply chains and process models within the company so wide understanding of all the supply chains is needed.

#### 6.2.4 Final selection and contracting

When choosing the supplier, the cultural and organizational match, total costs, added value and proficiency should be weighted. The buying company should use discretion when evaluating the prices. The company's own knowledge of the cost structure can be used to make sure that the supplier has understood what needs to be delivered. If the supplier's offer is considerably below what the company has calculated themselves, they might not have a clear picture what is required or it is likely that they will cut corners. As one interviewee stated, the cheapest might not be the best. A scorecard of the important factors and their emphasis can be utilized. The emphasis of each feature stems from the company strategy. The company strategy must-wins for example offer clear guidelines what should be favored.

The buying company should request the suppliers to have their operative main contacts be involved in the process. This opinion was raised by many and it does make sense as that way there will be a deeper understanding of the business as well as more trust between the parties. It can also be used to make sure that interpersonal relationships function as they should because, as many people pointed out, the communication with the supplier needs to be intensive and lack of trust has a price.

Reference visits both to current operations and the suppliers' premises are also a good idea because they provide a lot of silent information that neither party might not have thought to ask or tell.

The final contract should include clear division of responsibilities between the parties and the pricing should be organized accordingly. Many interviewees advocated performance based pricing, which is supported by the theory. However, as noted by one

of the interviewees, penalties should not cause losses as this could cause the central management of the supplier to cut resources and further deteriorate the situation. Similarly, the KPI's used as the markers for bonuses should be comprehensive enough to discourage sub-optimization. The KPI's used may be quality, delivery, cost, people or safety related as described in chapter 3.5.1. but the buying company is most likely interested in quality and delivery KPI's. Warehouse administration should be agreed so that the inventory counting model and administrative processes support reliable and responsive deliveries.

Flexibility should of course be in-bedded to the contract as both companies needs evolve over time and it's most often cheaper to renegotiate the existing contract than procure a new one. Changes such and new technology and changing customer needs need to be considered.

The pricing model should be activity based as mentioned earlier. Effort should be placed on covering as much as the business activities as possible to prevent hybrid pricing and increase efficiency. The actual methods of resourcing these activities can be left up to negotiation, but the contract must still include the required process steps and performance attributes in receiving, put away, picking and packing should be detailed so that quality issues can be addressed efficiently. Also, the value-added activities such as manufacturing, reverse logistics and repairing should be described in detail. This is where operative staff comes in handy as they know what kind on day-to-day activities the warehouse has. They can also help in formulating the costs based on volume predictions as described in chapter 3.3.1 and 3.4.1.

Considerable effort should be placed on ensuring that both parties understand what is agreed to. For this reason, each meeting should have a memo that both parties read and sign. Misunderstandings in the contract are a major reason for failures in outsourcing (Heikkilä, Vuori and Laine 2013, 37-43).

## 6.3 Process description

The procurement process is explained in the previous sub-chapter is detailed in table 7.

Table 7 The warehousing procurement process

Preparations for procurement	Requirements and specification	Supplier selection	Final selection and contracting
<ul style="list-style-type: none"> <li>•Decide who are involved</li> <li>•Operational level staff should be involved in checking specifications and supplier offers</li> <li>•Top management needs to be informed and committed to the project</li> <li>•Plan the project timetable</li> <li>Define initial scope</li> <li>Design goals</li> <li>•Review internal processes</li> <li>•Perform a LEAN-project on the logistics to optimize specifications</li> <li>•Check IT system flexibility for integration</li> <li>•Verify scope</li> <li>•Leverage market knowledge to select potential suppliers</li> <li>•Use ARA-analysis</li> <li>•Calculate potential risk</li> <li>•Verify do or buy decision</li> <li>•Verify scope</li> </ul>	<ul style="list-style-type: none"> <li>•Start from large scale requirements and move to exceptions</li> <li>•Required process (Use throughput definition)</li> <li>•Task lines</li> <li>•Process exceptions</li> <li>•Desired throughput levels</li> <li>•Desired value-added services</li> <li>•Inventory management services</li> <li>•Facilities (size appropriate, enough space, handling equipment)</li> <li>•Location</li> <li>•Desired communication procedures and specification</li> <li>•Requirements set by authorities</li> <li>•Review past contract and collect feedback to verify specifications</li> <li>•Make sure that requirements line up with strategy</li> </ul>	<ul style="list-style-type: none"> <li>•Send RFI's to potential suppliers</li> <li>•Verify your requirements and scope</li> <li>•Ensure cultural and management model compatibility</li> <li>•Check financial standing</li> <li>•Perform a bidding with chosen candidates</li> <li>•Prepeare draft contract</li> <li>•Use past experience as a guideline</li> <li>•Take into account flexibility, avoid constrictive clauses on unsure things like IT</li> <li>•Prepare RFQ</li> <li>•Use past experience as a guideline and list requirements</li> <li>•Make a clear list what is covered by activities and what is not</li> <li>Answer all the suppliers collectively</li> <li>•Stand behind your requirements to make fair comparison</li> </ul>	<ul style="list-style-type: none"> <li>•Introduce the candidates to current operations</li> <li>•Demonstrate proficiency and look for references</li> <li>•Select supplier basedon TCO, cultural match , resources and commitment</li> <li>•Ask for supplier input for process</li> <li>•Discuss how responsibility for deliveries and liability are divided</li> <li>•Build in quality tools: <ul style="list-style-type: none"> <li>•Bonus/penalty system</li> <li>•KPI's</li> <li>•Quality feedback handling</li> <li>•Quality improvement protocols</li> </ul> </li> </ul>

## 7 Discussion

The objective of this thesis was to find out what constitutes a successful outsourcing, what kinds of process steps are there and what should be done in each step. The result of this thesis was a new process description of how warehouse service procurement should be executed. Therefore, the main research questions were answered.

This model was specifically designed for Valmet's service business, but parts of it may be applicable for other heavy industry warehouses with similar business requirements, such as fast response times and extensive range of items and different types of services. The model takes a more project like approach to procurement that later turns into day-to-day co-operation and partnership. The model can be used as itself as a guideline during the next outsourcing process. It can be introduced to the people involved in the outsourcing process and through that, bring consistency to the procurement process as everyone involved can know exactly what needs to be done and therefore have better situational awareness. Using this model in future outsourcings can also yield benefits in scheduling the project due to less time needed for doing research on procurement. In case of disruptions or unexpected changes, it is easier to get back in track if there is a ready process description where the correct place can be found.

The model does not address specific suppliers or specific numeric requirements. This was a conscious decision as these do vary greatly over time so focusing on them would have restricted the research. Also, the actual requirements vary according to what is emphasized in the company strategy, what is the current service offering and company structure and how they convey to logistics. Also, financial aspects in the form of actual figures were not discussed because each procurement will have different figures based on scope, market situation and negotiating power of each party. A separate research could be done comparing the benefits and cost of different costing models as there was some contradictory opinions as to which model is the best one.

The validity and reliability of the research was covered by having many different organizations and organizational levels represented in the interviews. Having theme interviews is generally less reliable than having structured interviews but the high emphasis on theory when analyzing the results helped in overcoming that. Other interview types would have restricted the results to the viewpoint of the researcher as that person would have had more power to decide what is asked.

Future research topics also include the implementation of a warehouse outsourcing as many interviewees pointed it out to be very demanding. During the research, not many literally sources could be found about that topic. Also, the service businesses' special requirement on logistics functions could be examined further. Again, not

many sources could be found on this. It may be caused by companies not treating their repair and spare parts business as a service business the way Valmet does. At least this view point is relatively new in the industry.

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## Appendices

## Appendix 1. Invitation email to interviewees.

Hei

Olen tekemässä opinnäytetyötä varastopalvelujen strategisesta hankintaprosessista. Tarkoituksenani on tutkia minkälainen hankintaprosessi sopii parhaiten Valmetin palveluliiketoiminnan vaatimuksiin ja minkälaisiin asioihin prosessissa tulee kiinnittää huomiota varastopalvelujen hankinnan onnistumisen takaamiseksi.

Olisiko sinulla mahdollisuus antaa haastattelu tähän liittyen?

Haluaisiin haastatella sinua seuraavista aiheista:

- Millainen on onnistunut ulkoistus (What constitutes a successful outsourcing)
- Valmetin palveluliiketoiminnan vaatimukset varastotoiminnoille (Business requirements of Valmet's service business warehousing)
- Hankintaprosessi (Procurement process)
- Sopimuksen luominen (Contracting)
- Toimittajan kanssa kommunikointi (Communication with the supplier)

Haastattelu toteutetaan keskustelunomaisesti teemahaastatteluna eikä siinä siis ole tarkkaan määriteltyjä kysymyksiä. Keskusteluaiheet on valittu tukemaan opinnäytetyön aihetta ja haastattelun loppuun on varattu aikaa muista aihepiiriin liittyvistä asioista keskusteluun. Haastattelukieli on suomi ja haastattelu kestää arviolta 45-60min. Haastattelun tulokset esitetään anonyymisti.

Tässä on ehdotus ajankohdasta, mutta voit tietenkin ehdottaa myös toista aikaa jos se sopii sinulle paremmin.

Terveisin

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