The warehouse outsourcing review and analysis at Actiw Oy

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Description

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Abstract

The topic was chosen on basis of Actiw Oy´s current status of needing to increase the warehouse space to help with the business growth. Therefore, looking into an option to outsource Actiw´s existing warehouse operations was chosen as the focus. The main task was to gather and analyze possible service providers and to find out if they were suited for Actiw´s requirements. Service providers were searched from three different countries, chosen based on the most suitable locations in terms of Actiw operational needs.

The research process stepped off by discussing the most important factors for the company that they would want to achieve with outsourcing. Secondly, background data was gathered from company internal systems. This data was then used to produce a questionnaire that was later used to conduct the interview process to gain the needed information and data related to the outsourcing process and the service providers. After which the goal was to find suited service providers and ask for quotations for their services.

The best suited service providers were mapped out, analyzed, and chosen based on the factors and the set criterion for these. All the information and the scores for each service provider were gathered into an Excel chart. The best warehouse outsourcing service providers that was recommended had the best overall service level out of all the other companies asked. However, not forgetting about the possibilities that the 4PL service provider could offer.

Keywords/tags (subjects)

Outsourcing, 3PL, 4PL, Service provider, Information flow, Warehousing, Value creation, Material flow, Actiw Oy

Miscellaneous (Confidential information)

Appendices 1 and 3 are confidential and removed from the public thesis. The basis for secrecy is section Information on any business or professional secret of a private business, the State, a municipality, some other public corporation or a corporation, institution or foundation (Act on the Openness of Government Activities, section 24, paragraphs 17 and 20). The period of secrecy is five (5) years, the secrecy will end on 9 May 2028.

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1 Introduction

Global trends are working and leading towards maximizing the efficiency and productivity to achieve the best results with as little waste as possible. Global innovator companies like Actiw Oy that are working towards a greater degree of efficiency in the global market for outbound logistics, are contributing to the efforts.

The main objective of this thesis is to review, gather and analyze different possible warehouse outsourcing service providers and compile them for Actiw Oy. This compiling is done in a way that they can then examine the data and make decisions based on the analysis made. The gathered information is collected in an Excel chart, which is easy to understand and is straightforward to edit in the future, if there are some changes in the service ranges of the service providers or changes in priorities needed by the company. It´s only necessary to change the evaluation numbers (0-4) for that service. This will lead to the total service score for the company to change, which will then be re-calculated automatically in the chart.

To achieve the objective set out, it was essential to make enquiries for different possible warehouse outsourcing services providers and communicate with them so that their service level could be determined. It is seen to be crucial information to be determined, since the information that can be gathered from free online sources might be only half of the truth in many cases. Companies are not openly willing to share their information online that is needed to achieve the goals in this thesis. One of the main goals of the analysis is to get the service providers to make an offer for their possible outsourcing services for Actiw.

The thesis also contains essential information related to the warehousing of goods, outsourcing of warehouse services and some financial aspects related to the process of outsourcing. These are fundamental to make the thesis into a connected body, so that it is expandable and usable for other companies and not limited to Actiw Oy.

1.1 Research questions

The research questions for the thesis are as follows:

-What kind of financial effects outsourcing can have on a company? The first question answers, what are the possible benefits and challenges of outsourcing processes.

- What kind of effects does warehouse outsourcing have on day-to-day operations? This question relates to the idea about what affect the outsourcing might have for the company. What kind of effects will outsourcing have on company processes and efficiency?

-How should information flows be managed in a warehouse outsourcing situation? Third and final question seeks to find the answer to the importance of communication between the service provider and the outsourcing company.

1.2 Focus of the research

This decision was made to focus on third-party logistics (3PL) service providers in this research. This is because first-party logistics (1PL) and second-party logistics (2PL) will not be sufficient, and the fifth-party logistics (5PL) was out of the question. This decision was made with the consignor company Actiw, which were most interested about the 3PL outsourcing level. Even though this level of outsourcing was chosen, the conversation with the consignor company´s representative lead to the increased interest towards fourth-party logistics (4PL) service providers. Therefore, one 4PL service provider was chosen to be added to the research for comparison purposes, to analyze what they had to offer. Moreover, this was done since 4PL service providers usually operate via a 3PL service provider. Therefore, they only manage the logistics information flow, everything else is handled by their 3PL sub-contractor. It should be also noted that some of the companies offered both 3PL and 4PL services. However, the focus was aimed for the 3PL service offering.

The motives behind the outsourcing levels chosen were based on Actiw´s current status, and their needs and additionally their drive to be the leading in their area of expertise. Moreover, their desire to keep better control over their operations as much as possible, led the choice naturally opt for 3PL service providers, rather than 4PL. This is because, 4PL service providers usually take over the whole warehousing and logistics of the client company. This did not therefore match with their current company vision.

1.3 Current status of operations at Actiw Oy

The current status of Actiw´s warehouse operations are somewhat complicated and problematic. All traffic except the main frame assembly and gate are cycled through their warehouse in Naarajärvi, Finland. This warehouse contains their after sales and parts baseline inventory, for their products. The baseline inventory is maintained to ensure a resonable turnover time for their product related projects, since some specialized components have long delivery times. They also store their project based parts here untill departure. This combination of long term storage goods for the baseline inventory for the different products, the spare parts and project-based parts have stretched the current warehouses capacity to its maximum.

The current status of the warehouse has led them to be looking for possible solutions to levitate the pressure on their pre-existing warehouse. One main solution that they have determined to be the possible option was to transfer their warehouse processes, to third party service providers. Therefore, the objective of the thesis was set out to find different outsourcing options for their warehouse. The company´s motive for the outsourcing comes from the fact that their operations are running at maximum capacity. They are also possibly trying to find cost savings, better service level for their customers, and focus on their core-competences, which is not in warehousing.

Decision was made that the outsourcing partners location would need to be in near proximity to Actiw´s places of operations. This choice was made purposefully to make it easier to follow up on the service provider, in case of the need for visiting their warehouse was deemed necessary. For example, products being informed to be damaged during shipping to the service provider, therefore there is a need of expertise from Actiw´s side to determine the severity of the damage.

1.4 Actiw Oy

Actiw Oy is an outbound logistics loading and automation solutions provider, for a wide range of customers from pulp and paper industry to third-party logistics, (3PL) companies. Their journey started in a small town called Pieksämäki, in Southern Savonia Finland, back in 2008. (Actiw Oy, n.d.). Their turnover was 10 081 107 euros in 2022 (Actiw, 2023).

The company's main products that can be found from their website include the LoadMatic, LoadPlate and LoadForming. LoadPlate and LoadMatic are their loading solutions for loading cargo into containers and truck trailers. While LoadForming is part of their automated warehousing solutions. (Actiw Oy, n.d.).

The company´s vison is to provide high quality and efficient automated outbound logistics solutions, to improve safety and productivity of product loading processes (Actiw Oy, n.d.).

1.5 Actiw´s loading solutions

Actiw´s loading solutions consist of two main products called LoadPlate and LoadMatic, where LoadPlate is the semi-automated and LoadMatic is the fully automated loading system. Both loading solutions work with regular non-modified truck trailers and containers. In other words, no modifications for example, welding of guides or installation of rollers etc. are needed to the trailers and containers to be able to load cargo with the two systems. This makes it extremely convenient for the implementation of their systems into pre-existing company warehouses. (Actiw Oy, n.d.). From interviews it came up, that their loading solutions excel in petroleum industry, since they have the demanding certifications needed for the industry.

1.5.1 LoadPlate

LoadPlate is the company´s solution for loading long or otherwise difficult products to hand load like lumber, steel rolls, beams etc. The LoadPlate can load up to 30 tons of cargo into a 40-foot container in about 5 minutes, after the plate has been filled with the intended cargo. The system can help reduce the risks of damaging the delicate or long products while loading manually with forklifts, loaders, cranes etc. Overall benefits include: loading cost reductions, better efficiency of use of space, improving worker safety and less equipment’s acquisitions are needed. (Actiw Oy, n.d.). The figure 1. below is from Actiw´s company website, that shows the LoadPlate in use.

Figure 1. Actiw LoadPlate.

1.5.2 Loadmatic

LoadMatic works in the same way as the LoadPlate but it´s optimized for high flow movement of palletized goods, it is also capable to load industrial sacks. The LoadMatic is mainly designed to have their LoadForming buffer stock in between the warehouse and the machine, or directly connected to a customers´ automated warehouse. It can also work as a standalone unit. The benefits of the two systems are about the same, the other offers a greater level of automatization. (Actiw Oy, n.d.). The figure 2. below is from Actiw´s company website and shows the LoadMatic with its preface loading area.

Figure 2. Actiw LoadMatic

1.6 Actiw´s warehousing solution

Their warehousing solution consists of LoadForming, which essentially works as a sequencer or buffer stock for their loading solutions to achieve a fluent material flow through their system. This gives a greater degree of automatization into the loading process, which decreases overall need for loading operators and loading equipment. This also means that there are less likely to be accidents to workers and possible damage to goods. All this leads to better all out efficiency and lower costs for the users of the equipment. (Actiw Oy, n.d.).

1.6.1 LoadForming

LoadForming gives the opportunity to temporarily store and delay incoming pallets before they reach the waiting area of the LoadMatic. This way there is minimal delay time between the forming of the load and the time before the LoadMatic can load the next pre-formed set into the trailer or container. The LoadForming also gives the chance to load more than one LoadMatic at a time. Meaning that the system can divide pallets coming from the buffer stock to several loading docks and at the same time sort the pallets to the correct docks for departure. The LoadForming solutions are tailor made for the company´s customers' needs and desires. The system can be a standalone unit connected to the loading system or connected straight in line with the production line itself. (Actiw Oy, n.d.). The figure 3. is an example from Actiw´s company website for their automated buffer stock LoadForming.

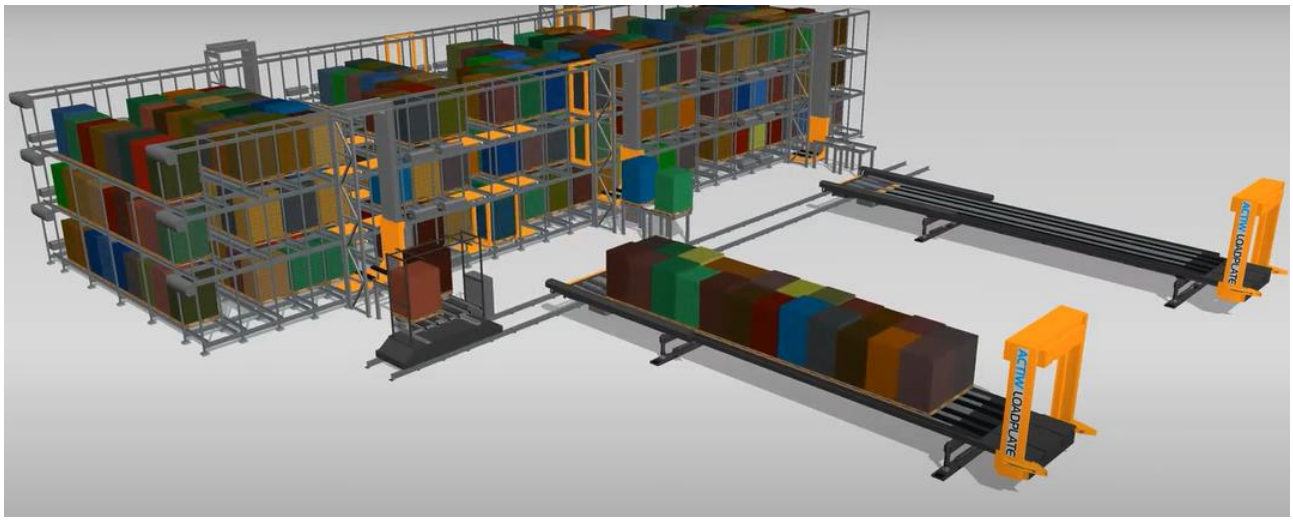

Figure 3. Actiw LoadForming.

2 Warehousing

Warehousing is one of the most vital elements in modern supply chains. Warehousing can create better overall flow and efficiency at is best. Warehousing operations can take place several times during a product´s supply chain, from the warehousing of the products raw materials before taking them into production, to the warehousing of final products waiting for them to be sent out for final customers. (Rushton, Croucher & Baker, 2022, pp.271-272).

2.1 Warehousing process

The warehousing process usually starts even before the inbound parcels even reaches the warehouse. They receive a notice either via an ERP or WMS system that there are inbound parcels on the way. On arrival parcels are sorted to existing spaces that are usually designated by an ERP or WMS system. (Richards, 2022, p.114). On the other hand, when an order is received, the system can then indicate that certain parcels need to be picked from the warehouse and transferred to outbound area ready for departure (Richards, 2022, p.143). In some cases, some form of value-adding services can occur before actual departure takes place like packing or re-packing of products before they are transferred to dispatch area (Richards, 2022, p.217).

2.2 Goals of warehousing

The main goals of warehousing root from the fact that it is possible to maintain a higher service level, without needing to make everything flow perfectly from beginning to the end. The warehouse acts as buffer for sudden shifts for example, shifts in raw material demands for scars resources or long manufacturing processes for specialized parts. (Rushton et al., 2022, pp.272-273). Furthermore, the warehouse performs as a distribution channel for different parts of the supply chain. In other words, the products get transferred through the warehouse to other locations by the process of cross-docking. Cross-docking happens when products arrive at a dock at a warehouse and transferred straight to another dock for dispatching, without being stored in the warehouse. (Rushton et al., 2022, p.347).

3 Outsourcing

There always comes a time when a company will have to decide between make or buy. To make would mean that there is a need for investing capital into for example, infrastructure or transportation equipment and on the other hand, to buy would mean that at least some part of company functions would need to be bought as a service. (Weele & Rozemeijer, 2022, p.76). The decisions might need to be made regularly due to the fact that so many functions can be outsourced in logistics.

Outsourcing can be defined as a transfer of the company's in-house activities to third-party companies. In other words, the objective of outsourcing is to switch the responsibility of parts of its processes to another specialized company. Therefore, the company can focus better on other aspects of their company´s core competences. (Weele & Rozemeijer, 2022, p. 79). For example, the company can undertake work that brings more added value to their products and to final customers. The overall value creation and cost savings possibilities related to outsourcing are the main reasons for outsourcing company operations. The companies can change fixed costs invested in warehouses into variable costs. This way companies can free up invested capital and use it for other activities. (Rushton et al., 2022, p.604).

3.1 Outsourcing selection process

Rushton et al. (2022) notes that, the outsourcing process starts from reviewing the possible need to outsource company actions and the service type (pp. 611-612). For example, if warehouse operations are deemed to be necessary to outsource. They also have to decide at what levels they want to do this. After this it is relevant to deciding the goals that are desired to be gained from the outsourcing process. Rushton et al., (2022) notes that, only then can the identifying of potential service providers in the specific area begin (p.614). It is in the best interest of both parties that the company looking for the service providers scouts out real possible options, for example that they do not waste time on companies not providing wanted service levels. While gathering the list of possible services providers, it is good practice to gather all the possible information related to the process that they are seeking to outsource, ready for the next steps in the selection process. (Rushton et al., 2022, pp. 614-616). This readiness gives the opportunity for the company to quickly respond to possible questions from service providers.

Next steps in the process involve requests for information or RFI´s for short, from possible service providers. This can be done simultaneously with a request for quotation or RFQ for short. Alternatively, the RFQ can be sent after the RFI´s has been answered. (Rushton et al., 2022, pp. 615-617). Sending the RFQ at the same time is a way to try to use time more efficiently, this can however lead to more variety in answers received. When all the RFI´s and RFQ´s have been received they should be gathered up and prepared for evaluation and comparison. After this the tenders can be evaluated and compared to each other (Rushton et al., 2022, pp. 622-623).

The final steps of the process are focused on choosing the service provider, making risk assessments, and making contracts (Rushton et al., 2022, p. 610). When choosing the service provider, it is essential to analyze the RFI and RFQ, to get the whole picture about, what the service provider is offering, and do they match with their goals. Next would be the making of risk assessment for the outsourcing process and at the same time for the possible service provider (Rushton et al., 2022, pp. 627-628). Lastly composing a contract that is accepted by both parties. It is crucial to compose the agreement in a way that as much as possible is agreed in case of problems, for example possible fines for late deliveries (Rushton et al., 2022, p. 632). Additionally, setting out service level agreements or SLA´s for short.

After all these previous steps have been made the implementation of the outsourcing process can commence. This implementation step is important to handle correctly so that it is fully implemented and not left halfway (Rushton et al., 2022, p. 633). The last process step that Rushton et al. points out, involves managing the service provider relationship between the companies (p. 633).

All planning and information have to be clear, and well planned to be able to achieve the predetermined goals set out for the outsourcing process, for it to be successful. The outsourcing process is summarized in the figure 4 below (Rushton et al., 2022, p. 610).

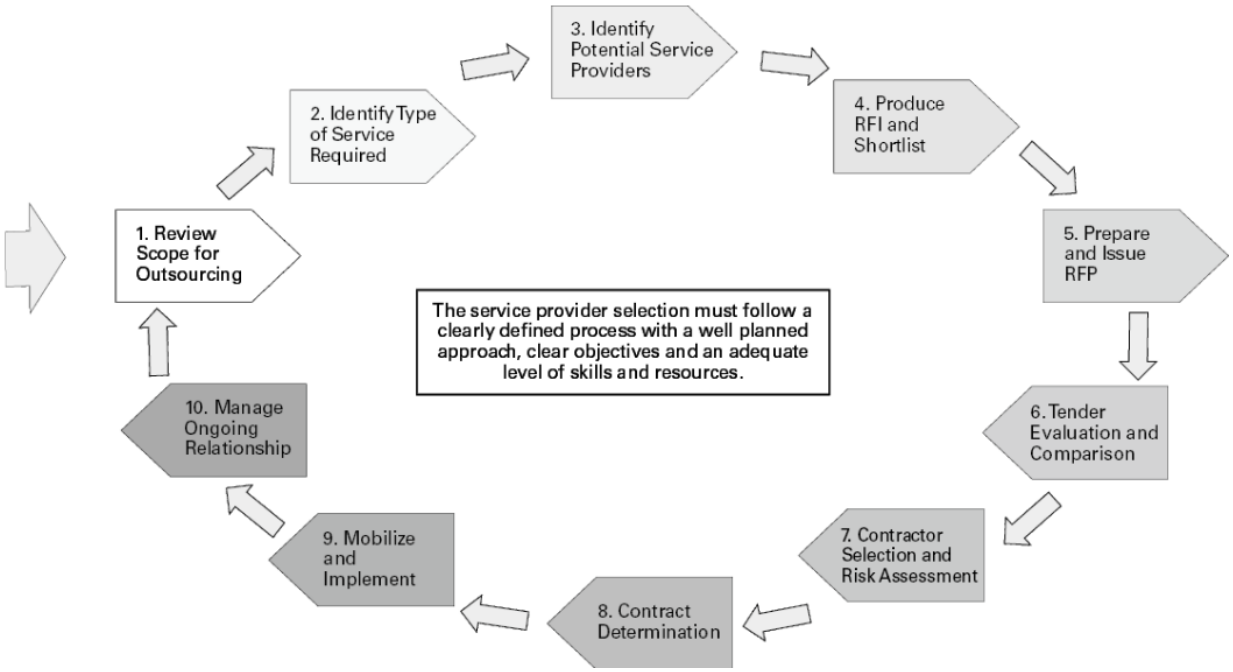

Figure 4. Outsourcing selection process.

3.2 Different levels of logistics outsourcing

The different levels of outsourcing can be divided into five main groups: first-party (1PL), second-party (2PL), third-party (3PL), fourth-party (4PL) and fifth-party logistics (5PL) (DSV, n.d.). As the transition progresses from one to five, the logistics get more distant from the company´s day to day operations.

1PL can be defined as a company that keeps all functions in-house. The company also has full control of all assets and must execute all actions themselves. They are responsible for the end-to-end logistics for their products. This is one of the most cost-effective ways to operate, if the company is near their customers and can provide transportation to them. (Rushton, Croucher & Baker, 2022, p.580).

2PL is the first step that can be called outsourcing. Here the company outsources their delivery needs, in a way that they do not need to transport the goods to the customers anymore. This is carried out by a variety of different logistics transportation companies that offer transport services. (DSV, n.d.). This is not that widely talked about as outsourcing anymore, since even some of the smallest companies nowadays use transportation companies to ship their goods.

3PL is the next step of outsourcing, which usually involves the transfer of company warehousing and transportation handling to contracted *third-party* service provider companies. (Maersk, n.d.). 3PL can also be called offshoring, the overall idea is to find lower cost options for handling of logistics (Weele & Rozemeijer, 2022, p. 80). This is the main type of outsourcing according to Jeff Bermans findings from the Armstrong & Associates report, which indicates that 90% of domestic Fortune 500 companies use 3PL services (Berman, 2017). Fortune 500 companies are five hundred American biggest companies that are ranked by total revenue produced every year (Fortune.com, n.d.).

4PL involves outsourcing the whole logistics management of the network function to a service provider. 4PL can also be called integral outsourcing (Weele & Rozemeijer, 2022, p. 80). This type of outsourcing is unique in a way, due to the fact that the service providers might not have any own facilities but in term use 3PL service providers to do business. (DSV, n.d.). They can manage the whole logistics supply chain from deliveries to the planning of shipping for products warehoused. Essentially 4PL service providers takes care of their clients supply chain and is engaged in the operations finding the best solutions for the client. These partnerships are usually more long-lasting relationships that last for years. (Maersk, n.d.).

5PL is the final level of outsourcing, which is a relatively new in the field of logistics (DSV, n.d.). It involves the total management of the clients supply chain network. The service providers use latest technologies like artificial intelligence to automate and streamline processes for the client. The idea here is to use IT in a way that all information is shared between parties involved in the supply chain. This way all parties are connected and know what is going on in the supply chain. (Maersk, n.d.).

3.3 Comparison of levels

The previous different levels of logistics outsourcing compiled in a chart, for better understanding of the factors involved and for fluent comparison. The charts example for the different levels is a vegetables farmer that grows their own crops. The blue areas in the chart represent the functions in that the corresponding level that have been outsourced. Each level adds some degree outsourced operations to the process.

1PL	2PL	3PL	4PL	5PL
Vegetables	Vegetables	Vegetables	Vegetables	Vegetables
Store	Transport	Warehouse service	Planning & handling	Planning, handling & integration
	Store	Transport	Warehouse service	Warehouse service
		Store	Transport	Transport
			Store	Store

Table 1. Different levels of outsourcing.

3.4 Types of logistics outsourcing options

There are lots of possible combinations of outsourcing options. Every outsourcing situation is unique and are usually tailored by the requirements of the client, obviously with the service providers opportunities in mind. Weele & Rozemeijer (2022) suggests, that the main types of outsourcing are fully, integral, and partial outsourcing (pp. 80-81).

Firstly, fully outsourcing the warehouse process, which can also include offshoring, would involve transferring all warehouse functions over to a service provider (Weele & Rozemeijer, 2022, pp. 80-81). This involves the need for the client company to transfer their products from their warehouse to the service providers warehouse for future storage and handling. There is also a possibility here to transfer the pre-existing warehouse property, equipment, and labor to the outsourcing company (Weele & Rozemeijer, 2022, pp. 80-81). However, this is more uncommon way to conduct warehouse outsourcing.

Secondly, partial outsourcing is described by Weele & Rozemeijer (2022) to involve the hiring of a service provider to come operate in the clients pre-existing warehouse, to use their facilities, with their equipment. (pp. 81-82). For example, the client company does not need to hire new workforce neither manage them. Instead, the outsourcing service provider handles this process for them.

On the other hand, then the hybrid outsourcing option would be a combination of the previous two options. This involves the outsourcing of certain parts of the warehouse and retaining some functions inhouse. (Maersk, 2023). For example, a warehouse that has a combination of project-based warehousing and spare parts stock, would choose to either outsource the project-based or spare parts part of the warehouse process, and the other one would be kept inhouse.

Lastly, the opposite option to the outsourcing of company processes would be not outsource. Depending on company´s situation this option should always be considered during the outsourcing planning process. Outsourcing is not the only option when thinking about making operations more efficient, therefore other possible options should be looked into additionally on the side.

4 Risks and advantages of outsourcing

Outsourcing has numerous opportunities and uncertainties related to its implementation. The question comes down to what the company that is outsourcing operations is desiring or looking for from a service provider. (Weele & Rozemeijer, 2022, p. 82).

4.1 Strengths, Weaknesses, Opportunities and Threats analysis

SWOT-analysis or strengths, weaknesses, opportunities and threats analysis is a tool used to assess the company´s internal strengths and weaknesses, also including threats and opportunities in external environments. SWOT-analysis is usually started with stating a clear objective that is set out by the company. The idea is to gather all the ideas for the four categories and then *capitalize* on the ideas brought forth. (Bordoloi, Fitzsimmons & Fitzsimmons, 2023, p. 33).

The SWOT-analysis is good starting point when thinking about new company endeavors. The SWOT-analysis is best done before any actions are done towards what the company is aiming for. This makes the objective clear and precise so that time is not wasted later in the project. (Rushton et al., 2022, p.98). For example, when trying to gain vital knowledge from possible service providers. The analysis is usually involving a co-operative atmosphere, that engages many parties inside the company to be involved in the process. This co-operation leads to greater understanding about the whole company´s situation and affairs. This way best possible results for the SWOT-analysis can be achieved. (Rushton et al., 2022, p.98).

4.2 Risk

Risks of outsourcing are related to increased dependencies in other companies and service providers. Other risks are related to communication and financial issues. (Weele & Rozemeijer, 2022, p. 85). For example, handling of service provider relationships and overall communication channels with other parties might be tedious. Financial risks are related to creating value for their products through the outsourcing process (Weele & Rozemeijer, 2022, pp. 91-92). This can for example, involve making more efficient logistics, to give customers faster turnover times. According to Rushton et al., (2022) risks assessment is a step that is repeatedly neglected by companies making outsourcing decisions (p. 627). As for every advantage there are disadvantages present. The correct handling of these risks can gain excellent yields for companies.

4.2.1 Risk assessment

Risk assessment can be done via a risk assessment matrix. The risk assessment matrix assesses risk based on two factors, the negative impact caused by an effect on the company and the likelihood of the risk happening for the company. (Weele & Rozemeijer, 2022, p. 92). After the risks have been assessed in the matrix, companies can make plans to avoid the risks or ways to mitigate the risks from happening. (Weele & Rozemeijer, 2022, p. 92). The idea of a matrix is to visualize the issue at hand so that it´s easier to understand and comprehend. It is also easier to compare and contrast before actions were taken versus after actions were taken.

The following example matrix is from Weele´s and Rozemeijer´s, procurement and supply chain management book. (2022, p.93). The matrix consists of three different levels in which the impact and likelihood of events happening are evaluated. (pp. 92-93). The factors are then placed into the matrix according to the criteria set out by a company. The company can then physically see and visualize which factors are important ones. In general, the farther away the factor is from the origin the more critical it is for the company. The matrix is also divided into three stages of urgency, low, medium, and high (pp. 92-93). These can be represented as semi-circle boundaries, that can be seen in the matrix below (pp. 92-93). When a factor is above the high stage for example, Factor 2 in the matrix is both high on the impact and occurrence, therefore this should be a factor that the company should address it with haste. On the other hand, factor 7 which has both

low impact and low occurrence should not be the prioritized in this case, since there are critical risks that need to be given focus. (pp. 92-93).

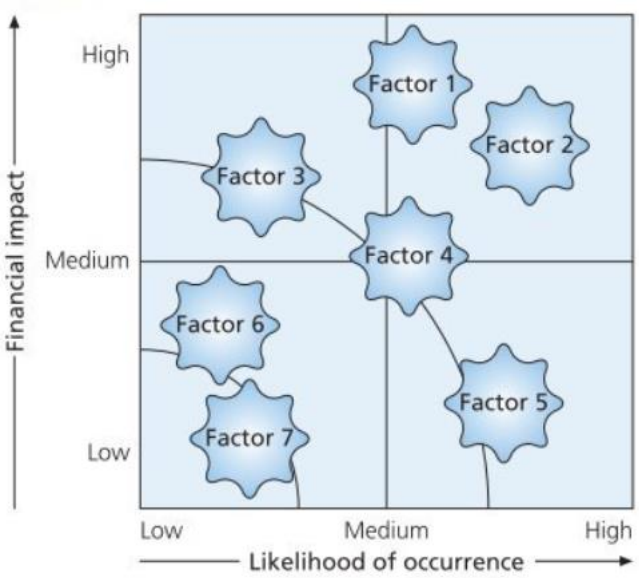

Figure 5. Risks assessment matrix

4.3 Advantages

Primary advantage that companies are trying to achieve is lower logistics operating costs. Additional advantages are related to the possibility of reallocating company resources and capital to alternative areas to focus on core-competences. (Weele & Rozemeijer, 2022, p. 82). For example, when offshoring companies can reach global markets better. This is dependent on the location of the company, but the objective of offshoring could be to get a more predominant global stance in the market (Weele & Rozemeijer, 2022, p. 82).

Other advancements can be seen as freeing up internal company resources like capital from warehouse or the transfer of responsibility to other companies through outsourcing. This can work as a way of mitigating risks related to company operations. (Weele & Rozemeijer, 2022, p. 82).

Another major advantage could be value creation activities (Rushton et al., 2022, p. 593). Rushton et al. (2022) include the following activities as value adding:

- Production and assembly, that can include the final assembly or final manufacturing of products before they are dispatched for final customers. Additionally, this can include labeling and printing the correct language instructions for the destination country of the products. (p. 594).
- Inbound logistics, which refers to the fact that services providers could offer services like provision and flow of goods to a manufacturing company. This can for example include temporary storage of raw materials before transporting them to the manufacturing site. (p. 594).
- Aftermarket and service-parts, means the storing of spare parts stock for clients so that they are more quickly to be sent out or closer to the markets, if headquarter is located in a more remote area. (pp. 594-595). For example, if a company has their headquarters in China and their main customers are located in the United States of America, it might be reasonable to have a 3PL service provider somewhere close to the US, if not even in the US. Even if the products are manufactured in China, the 3PL service provider would therefore have a buffer stock between the company and its customers.
- Return and reverse logistics operations, if a shipped product or part is incorrect or damaged the service provider takes care of the returning process. (pp. 595-596). Also, they might possibly repack and re-store it if possible. In the case of a damaged product, they can ship the product to the client company for inspection or repair.
- Lastly Rushton et al., describe information management, that the service provider can offer different kinds of information collection or distribution services. For example, the average delivery times for products, offer fulfillment software or handle invoicing of shipments. (pp. 596-597).

Additionally providing better service levels for customers. Bordoloi et al. (2023) defines service level as “the percentage of demand occurring during the lead time that can be satisfied from inventory” (p. 437). In other words, this means that, if the warehouse is running out of stock, and just before the stock runs out the new batch or order of products arrive at the warehouse replenishing the stock. This would be referred as a 100 percent service level because products are always in stock. Service level itself is decided by the company and can be used as a strategic tool (Bordoloi et al., 2023, p. 437).

There are countless different opportunities, therefore these are only some of the main reasons companies may find outsourcing as a desirable option. Additionally, as stated before the advantages are easily mirrored to the dis-advantages point of view.

5 Following up on progress

The following of progress is one of the factors that can be overlooked when things seem to be working out. Companies are happy to see more money freed from investments in infrastructure and or equipment. (Rushton et al., 2022, p.634). Therefore, they might forget about the fact that they should be following their outsourcing partners progress more closely. The risks come from here, if the service provider company practices poor communication, problems might get pushed

to the side. It would be good to get to the bottom of the problem, before it catches up and starts to have a negative affect for both companies. (Rushton et al., 2022, pp. 637-639).

The key in progress follow up is a collaborative partnership and most importantly open communication between the parties. Through good communication it´s easy to follow progress. Communication is best established through the integration of company´s ERP-system and or WMS. Both parties are able to get on time information, when needed and at the same time all actions are recorded and logged into the system for later use. (Rushton et al., 2022, p.634).

Later use can include: data analysis, reports, trends, goal setting, budgeting, performance tracking via KPI`s etc. (Rushton et al, 2022, p.641). According to Rushton et al. (2022) it is good practice to nominate a company employee to solely manage the outsourcing service provider relations (p.641).

5.1 Key Performance Indicators

KPI´s or Key Performance Indicators are predetermined sets of indicators or factors, that help with the evaluation of the current performance of actions and processes (Twin, 2023). For example, companies can choose to use return ratio as a KPI for succeeding in sales. If the ratio is high for the returned packages, this means that customers are not satisfied in the product. On the other hand, fewer returns means that the customers are pleased with the product.

Companies will have different KPI`s and therefore choosing the correct KPI`s for the company is crucial. Correct use of KPI`s can have positive outcomes for companies. (Richards, 2022, p.401).

5.2 Categorising KPI´s

KPI´s can be separated into several groups strategic, operational, functional, and leading. (Twin, 2023).

Strategic KPIs are usually used by company management and leaders to get indication about the company´s overall performance. (Twin, 2023). Therefore, it only provides adequate information

and doesn't give much detailed figures. Examples of strategic KPIs can include return on investment (ROI), profit margins, and revenues (Twin, 2023).

Operational are more focused and usually have a timeframe for the measurement. The objective of these KPI´s is to measure company actions at a monthly or daily level. Operational KPI´s are often used by managing staff. These KPI´s can be used for example, to see how specific areas inside the company are performing. (Twin, 2023).

Functional KPIs are usually used inside departments to get more specific measures for their performance. For example, the functional KPI´s can be used to keep track of new vendors that have register within their company information system each month. (Twin, 2023). Additionally, perfect orders, invoiced correctly, time taken for deliveries and in term of costs total costs per shipment (Richards, 2022, p.62). These KPIs can be used as strategic or operational but usually provide better value for specific set of users. (Twin, 2023).

"Leading/Lagging KPIs describe the nature of the data being analysed and whether it is signalling something to come or signalling that something has already occurred" (Twin, 2023, Categories). For example, for leading and lagging KPI´s, number of overtime hours worked and profit margins. This might lead to noticing that overtime work hours lead to mediocre manufacturing quality. Profit margins are seen as a result of done operations in the company and are therefore considered lagging indicators. (Twin, 2023). This is simply because the information comes afterwards the operation, that has been done prior. Additional examples include cost per unit dispatched, damaged units and stock accuracy (Richards, 2022, pp. 405-407).

5.3 Service level

The service level of the service provider can be an important factor to consider, since it can have an effect on delivery times, orders correctness, and customer satisfaction. This can be for example followed by order fulfilment or perfect order methods. (Rushton et al, 2022, pp. 49-51). Therefore, the follow up of service level can be determined, with the use of different KPI´s (Weele & Rozemeijer, 2022, p. 132).

Rushton et al., (2022) finds, four different ways to measure order fulfilment (p. 49). The following were mentioned: “number of orders completely satisfied”, “number of lines delivered from a single order”, “number of line items or cases delivered from a single order”, and “value of the order complete” (p. 49). Essentially, all measures aim to find the answer to if the order was sent fully or if there was something missing from the order.

On the other hand, as Rushton et al. (2022) notes, the perfect order aims to measure the same intent of fulfilling orders, however it takes it from a wider point of view. (pp. 50-51). The perfect order can additionally include measures for on time delivery, complete order, no problem delivery, order accuracy, and invoice accuracy. These are then totaled up to get the actual service level achieved for the customer and their orders. (p. 50). They note that, the perfect order can be more accurately measured in this way (p. 50). However, they conclude that a more common way to this is through on time, and in full or OTIF for short. (p.50). OTIF is therefore measured based on the factors of order being delivered on time and in whole, nothing missing. This is calculated as the number of perfect orders divided by the total amount of orders shipped times 100 percent. (p.50).

6 Financials of outsourcing

The question to make or to buy is a shared venture that almost all companies need to go through in the company´s lifetime. Both decisions involve making financial investments either into own facilities or creating new supplier relationships to buy the needed products. (Heizer et al., 2017). The decision to buy can involve the outsourcing of company processes, when partnering up with knowledgeable partners.

Why outsource? Outsourcing most often have financial reasons behind the, *Why outsource?* These reasons can involve the expectation of lower operational costs like lower labor costs due to no need for own labor, if this kind of aspect of the company is outsourced. Even though it is recommended to leave someone in charge of the outsourcing (Weele & Rozemeijer, 2022, pp. 82-85). Overall cost savings from not needing to invest capital into more assets that are not easily freed up. From an accounting view fixed cost in accounting can be changed into variable cost through outsourcing. (Rushton et al., 2022, p. 602).

Why not? Outsourcing forms more managing related costs that can get costly if not managed correctly. Also, services are usually expensive, so in the short-run it might be cheaper, but it can be totally different in the long-run. (Rushton et al., 2022, p. 602). Therefore, company ambitions to see cost savings might be relatively short lived.

Depending how the outsourcing happens, whether the client company sell their facilities away in the process, or keep it, the capital would then be removed from the balance sheet or stay tied up (Rushton et al., 2022, p. 603). Therefore, if the facilities and equipment are sold, the released capital can be seen as positive. The gained capital can be used for development or investment purposes. On the other hand, if the capital stays tied in, they will need to use time and resources to decide, what they are going to do with them. (Rushton et al., 2022, p. 603). For example, can they utilize the space and equipment. Additionally, when it comes to warehouse personnel, decisions need to be made if there is no personnel transfer to the outsourcing company. Company may have other value adding tasks available for the warehouse personnel. (Weele & Rozemeijer, 2022, p. 95).

6.1 Different pricing models of outsourcing services

O´Byrne (2020) argues that the main possible pricing rate models for outsourcing include: fixed pricing, percentage of sales, cost plus, variable unit costs and monthly fee plus variable unit costs (O´Byrne, 2020). However, the addition of activity-based costing was deemed necessary, since the growing popularity of the costing method (Richards, 2022, p. 381).

- *Fixed pricing*, as the model applies, the costs are fixed. The costs are calculated by the service provider to cover running expenses and leave room for profit. Running expenses may include warehouse or equipment rent, heating, labor etc. (Rushton et al., 2022, p. 618).
- *Percentage of sales*, as the models name proposes, the service provider takes a royalty from the sales made by the means of their service. This model is best suited for operations with larger companies that have large amounts of parcel traffic to make the model profitable for the service provider. (O´Byrne, 2020).
- *Cost plus* is a model that involves calculating the total cost of doing a process and adding a predetermined profit margin on top of the total cost (Rushton et al., 2022, p. 619).
- *Variable unit cost* is a model that is based on the inbound and outbound flows of parcels or stock-keeping units or SKU´s for short (Rushton et al., 2022, p. 619).
- *Monthly fee plus variable unit costs*, this model is a hybrid style method. There is a fixed fee that the company has to pay each month and then there is a variable cost for per units handled by the service provider. (O´Byrne, 2020).

- According to Richards (2022) *Activity-based costing*, is designed based on time used on activities, that are carried out in the warehouse (pp. 381-382). In other words, the method involves detailed knowledge of company processes and the time it takes to execute them to be able to calculate costs of the processes (Richards, 2022, pp. 381-382). Costs can therefore be targeted better, and conveys transparency, and makes it easier for the client company to calculate costs, for example on a monthly level.

6.2 Financial risks

According to Weele & Rozemeijer (2022), financial risks can be related to performance risks, contractual and or commercial factors (pp. 91-92). Performance risks are related to the uncertainty of what the true costs of the outsourcing will be when the process has been fully transferred and implemented. Alternatively, is the outsourced warehouse operating at an efficient level, that it is not costing extra to the client for unproductive or slowly done activities (Weele & Rozemeijer (2022), p. 92). This is dependent on the agreed payment method, which is closely connected to the contractual risks that follow the performance risks.

Contracts can be complex, tedious to read and formed in a way that both parties are willing to hear the conditions (Weele & Rozemeijer (2022), p. 92). The risks involve not making coherent contracts that can be then reviewed, if conditions are not being met. Additionally, when talking about payment methods in the performance risks, the methods and payment amounts should be clearly stated in the contract. When they are clearly stated, additional charges cannot be added without informing the client about the extra costs (Weele & Rozemeijer (2022), p. 92).

Lastly commercial risks are related to the fact that outsourcing can be a totally new endeavor, and the cost structures, key cost derivers, and underlying cost parameters are new for the client company (Weele & Rozemeijer (2022), pp. 91-92). Therefore, there is a large opportunity to pay too much for the service. Weele & Rozemeijer (2022) note, that commercial risk can also involve the risk of intellectual property loss, if sensitive information is leaked by the service provider to possible competitors. (p.92) This is an aspect that should be considered once again in the contract between the service provider and the client company.

Additional three risks that can also have effects on financial aspects for the client company. First are errors made by the service provider during packing or shipping (Rushton et al., 2022, p. 603).

For example, shipping wrong products or bad packaging that leads to unusable goods being received by the customer. Also, the customer can receive too few or too many products. The customer will of course blame the client company not the shipper. This can lead to extra costs and loss of customer confidence. These once again are factors that should be addressed in the contract between companies (Rushton et al., 2022 pp. 640-641).

Secondly, the increased dependency on the service provider. There is a possibility that the outsourcing company might have financial issues of their own, which could lead to bankruptcy. This should not be an issue if the outsourcing warehouse partner is well-established company. On the other hand, if the company is a smaller or start-up company the possible risks could increase drastically. (Weele & Rozemeijer, 2022, p. 85).

Lastly, depending on the way outsourcing is implemented, the loss on company assets. Therefore, the company will not be able to capitalize or utilize those assets anymore if needed. This loss of assets might be quite large depending on the scale of the company outsourcing the operations. (Rushton et al., 2022 p. 605).

7 Information flows

ERP/WMS-systems are primary contributing factors that help in timely and accurate communication, and information flows between and inside companies. (Richards, 2022, pp. 242-243). Information flows are crucial to be able to handle the material flows in the supply chain. Richards (2022) concludes that the ever-growing technological world needs the better the communication and information flows to handled, the complex and long supply chains (p. 242). The better communication also can lead to less mistakes being made, that can then in turn lead to problems.

7.1 ERP and WMS systems

Enterprise resource planning or ERP for short is an IT based system that can hold, distribute, and execute order processes in one standalone system. All the company data and or information can be held in one place, and at the same time makes it is easy to access when needed. (Rushton et al., 2022, p.384). Rushton et al. (2022) notes, that ERP-systems are usually used in the handling, planning, and management of supply chains (p.384). Therefore, it can be concluded that, the ERP-

systems are vital elements of day-to-day company operations. Without the system managing company processes can get challenging if not impair work.

Warehouse management system or WMS for short, is on the other hand a warehouse management system. As the name implies, the idea is to handle the warehouse related aspects of the company or supply chain. This system is usually a separated from everything else however, it is most likely connected to a *main* ERP-system. There by the two systems are capable to communicate with one another. Sophisticated ERP-systems can have an internal WMS built into the system, this can then be shared through the same system. (Richards, 2022, p. 243). Making it even easier to operate, since there is single system being used. Separation is done to streamline work happening in different departments for example, between the office and warehouse. Warehouse staff do not need to have extra information that may hinder their work, and vice versa. (Richards, 2022, p. 244). The offices might have access to the warehouse information if needed, since they are usually have the managerial role in the company.

Shortly concluding, both systems play a crucial role in companies' operations, and in supply chain management. Without one or the other operations can be drastically affected.

7.2 Integration

ERP-system integration is an excellent idea to improve the information flow between the service provider and the client company. "ERP integration is the method by which a company connects its ERP software with other, specialized applications and processes – across your entire business" (SAP.com, n.d.). Integration usually involves partially connecting ERP-systems in a way that client and service provider can transfer information between one another. (SAP.com, n.d.). This information can be related to in- and outbound orders or for example, sharing of inventory amounts, product codes, and other logistics related information (Heizer et al., 2017, pp. 494-496). This kind of information flow is ever growingly important in the technology filled world.

Integration can be a costly, and challenging process especially if the systems are not cross-compatible with each other (Phillippi, 2023). Therefore, client companies might need to change or adapt their systems to work with the service providers systems, which can lead to even more cots. This is because the service providers are less likely to change systems to suit their client needs. Phillippi

(2023) argues, that ERP implementation costs can reach up to 750 000 dollars for midsized companies. For this reason, service providers are most likely unwilling to compromise taking on new systems or adaptions to build new relationships with clients. Unless there are big incentives for them to do so.

8 Methods and research process

8.1 Methods

This thesis was a combination of a case study and a research-based development project for Actiw Oy. The research included the following research methods to gather the needed data for the research.

- Literature works were used to gather the needed theoretical background for the thesis, which was used to back up the research conducted.
- Company´s internal data and information, that was accessible form their Netvisor and other systems were used to gather the needed data and information for this thesis. For example, the average annual quantities of shipments flowing outwards and inwards. This was seen to be necessary to be able to start working on finding the correct type of service providers for them. Additionally, to know what to request from the possible service providers.
- Open internet sources were used to find the possible service providers and other related information to complete the tendering processes. Additionally, some theory background and other relevant information was gathered while searching for potential service providers. Additionally, some internet sources were used to support some aspects in theoretical background. This was seen to be necessary since for example, 5PL is a new term that was not at least found in conventional literature texts.
- Request for information´s, RFI´s for short were used to gather data and information from the service providers after they were searched via online sources.
- Questionnaire was mainly used as the RFI, to gain the information needed to see if the company was well suited to be a service provider. This questionnaire was used in tandem with the request for quotations, RFQ´s for short. These were used for the different possible outsourcing service providers found via online sources and were reached by email or phone.
- Interviewing was additionally used to gain information that might have been otherwise tough to obtain. For example, interviewing company employees to get more information, that was otherwise not in the system, to fill in possible gaps in the data. Interviewing was conducted in an open manner, which was guided by the RFI questionnaire produced for this thesis. Additionally, questions were specifically crafted for the service provider companies being interviewed.
- Meetings were held with interested companies when conversations continued on from the original contact. The option of having face-to-face meetings was given so that they could come to Actiw´s headquarter and see current warehouse operations. These meetings were scheduled accordingly to both parties' schedules, and alternatively option to have them held through Teams meetings or Google meet.

8.2 Research process

Research process started with the gathering of the main attributes Actiw was looking for, from a possible outsourcing service provider. These were firstly gathered into notes, which were then formed into a questionnaire document. This was determined to be the best form, for the upcoming requests for information, *RFI´s* for the service providers. This was decided to be the only way to logically get the necessary information related to the requirements Actiw was looking for, from service providers. This was seen as a better alternative than making a long explanation about what the company does, what they want and need. This was possibly seen to be uninteresting for the possible service providers. Links to the main products and the company website were included for the purpose of letting them choose to investigate the company in more detail, if they were interested.

Mockup version of the questionnaire was circulated through Actiw´s office for approval and was additionally tested with two logistics field workers. The workers wished to remain anonymous, it was agreed that only their roles would be mentioned, the other worked in warehousing and the other in management side. The received feedback was taken into consideration, while finalizing the questionnaire. After all attributes were collected and reworked as needed, the decision had to be made where to start searching for the service providers.

However, before this, it was seen necessary to make an information packet, that could be attached to the RFI´s. The data and information were collected and compiled into a chart and put into the RFI and, or RFQ. This was done in a way that the possible service provider could determine the logistics flows requirements requested from them.

The decision was made to choose three different countries to search possible service providers from. Firstly, it was chosen to have Actiw´s home country, Finland as the first option, where to search from. Finland was chosen, because it was seen to be the easiest to control, for example communication could be done by using own mother tongue, and onsite visits would be quicker if needed in the future. The two additional countries were decided that they would need to be relatively close to Actiw´s home country, Finland. Therefore, Estonia and Latvia were chosen as the two additional countries. These countries were chosen for their near proximity to Finland, which

was a predetermined factor discussed, and also since some of Actiw´s manufacturing is already in the Baltics.

After the countries had been chosen, the search process was initiated with free online searches in the three different countries. This process was guided by a few example companies from Finland, on behalf of Actiw. Possible service provider companies were flagged and marked up for later steps. Moreover, it was decided that one larger company that operates in all three countries would be chosen to see if there are differences to be observed. At this point the search accumulated to a total of thirty-six potential companies. The list was systematically worked through to narrow the list and find the best possible options. The filtering led to a combined total of fourteen options chosen from Estonia and Latvia, and a total of ten from Finland. This was done so that there would be a more feasible number of companies in the included and that they would be more likely to be able to offer an applicable solution. Therefore, more companies were looked through, but only these twenty-four were taken into the final questioning pool.

The process continued by sending out RFI´s to the selected service providers picked out from the three countries. It was determined that in the view of some time restraints, there should be an effort to make the process faster. Therefore, the RFI was combined and sent with the RFQ. These were sent out to those service providers that were determined to be able to provide the service for Actiw. Additionally, the ten Finnish service providers were phone and or Teams interviewed for faster and more precise answers. This is because, if the question was understood incorrectly, it was easier to try to get the intended answer to be received from the question. This could not be done that easily via email. There was a higher chance to get an answer from the companies this way. Additionally, the information package was translated into Finnish and sent after the call or interview meeting had ended to the service provider.

The thesis process essentially ended as discussed in the meetings held with the supervisor, that was to present findings and results. At the end of this the information and related information would be handed over to Actiw´s representatives. These for example included final draft version of the thesis, the Excel worksheet and offers received from service providers. The final draft was given for them to check it through, that no sensitive information had made it through to the final version.

8.3 The service providers

The service providers consisted of a wide range of logistics and warehousing experts. They all mainly offered 3PL outsourcing services. The 4PL company that was taken as reference point here was company J. Only one was chosen, even though the idea of 4PL interested Actiw, the focus was chosen towards 3PL service providers. The questionnaire was sent to company J in Estonia, however it was later referred to the companies Finnish headquarter for handling. This happened, since the company also operates in Finland, and they decided that they should take care of the Finnish client asking for services. Therefore, the contact came from Finland even though the questionnaire was sent to Estonia.

The beginning service provider list consisted of thirty-six companies from the three different countries. Twenty-four of these were chosen to be taken for the final selection, ten from Finland, seven from Estonia and also seven from Latvia. From these thirty-six, one big company was chosen that operates in all three countries. One bigger company was also chosen commonly that operated both in Estonia and Latvia, so that the differences in service and pricing could possibly be observed in the Baltics.

The remaining twelve companies that did not make the final round, were separately listed so that Actiw knows, which companies were not selected or considered. Therefore, they can later be double checked if needed. On the other hand, the companies that were contacted, but did not answer were also listed for Actiw. These companies were from the final round. On the other hand, companies that answered, but informed that they could not offer their services at the required level were also listed. The reasons received from these service providers included: not having the capacity to handle additional business, too small shipment flows for their interests, they do not do business to business; only business to consumer, they do not provide long time storage, and they cannot handle non-standard pallets and container shipments.

8.4 Questionnaire and interviews

The questionnaire consisted of the questions to help determine the service level offered by them, and an information package for the service providers. The information package contained a chart

with approximated amounts of main project related products sold annually, with respective loading meters and volumes taken up by the shipments, per shipment annually. This was done because the exact numbers were too hard and time consuming to be dug up from company systems. The spare parts shipment amounts were separated, marked and added with the project-based shipments in the end to see the total amount of shipments per year. Additional information was added related to how long on average these project-based products are stationary in the warehouse, and what types and sized products are shipped. The information also included when the possible outsourcing process would possibly be starting at Actiw. This time period information was collected during internal company conversations and noted as important information into the package. This full chart can be found as appendix 1. (secret)

The questions in the questionnaire were divided into different categories to enhance the readability and understandability of the questions. These categories were divided as follows:

- Handling which included questions related to their standard procedures and more specific questions for example, the need of being able to handle container sized shipments occasionally. Additionally, the in- and outbound pallets are not always standard sized, they can be wider, longer, or higher than normal.
- Information flow category included questions related to the way in which information can be shared, to be able to operate with the service provider. For example, were there an ability for the service provider to share their WMS-systems in a way that sharing of information would be as easy as possible. Additionally, pre-asked what kind of opportunities they would possibly have to connect their system with Actiw´s system.
- Pricing category was added to find out how they price their services, and what kind of pricing they use for their services.
- Lastly there was a section left for other related questions, that included questions related to the extra services Actiw was looking for. For example, the assembly of different components into one larger assembly. Additionally, there was an open question left for the service providers, if they had something special or extra to offer.

It was determined that these were the key information that was desired to be gathered at this point, to be able to then continue the conversations at a later date. For example, additional questions could be asked after the answers from the initial round. The questions could be based on the original questions, depending on their response, and also if the service provider was able to provide the services asked in the original questionnaire. The full questionnaire in English can be found as an appendix 2.

The service provider interviews were mainly conducted with the Finnish companies and were all based on the same questionnaire explained above. Additionally, other companies for example from Latvia were interested to have a meeting, which was arranged via Google meet on their behalf. The interviews got initiated by a phone call to company sales or other responsible managers. Depending on who answered the call, it might have been transferred onward to a person who knew, if the original answerer to the call did not know. In most cases they listed what was said and asked, and a time was reserved for a Teams or Google meet. The information package was sent via email to them for reference before the scheduled meetings. This way they had the time to get ready and get more familiar with Actiw from their website linked in the information package and most importantly their logistics flows.

The meetings were conducted in an open manner. In the beginning the service providers introduced their company and gave some background about their company operations. The meetings usually continued by either the questions being asked, or they answered them one by one, based on the questionnaire and information package. Extra questions were asked accordingly both ways and answered to the extent that was possible by both participants. Notes were made during these meetings, so that there is something available to refer later. These meetings were extremely productive and made the process straight forward, when gathering information for Actiw. This definitely helped with the offer making process in case of the possible service provider. After these calls and meeting interviews a few were interested to come visit Actiw´s warehouse facilities and continue with the conversations. These meetings were arranged with at their headquarter at Naarajärvi. The service provider companies made their offers a few days after these meetings.

8.5 Collection and description of data gathered

The collected data and information were both qualitative and quantitative. The most essential quantitative data for this thesis was collected via Actiw´s management systems and from their transportation operators they use. This shipment flow information was requested from the transportation companies. Otherwise, the retrieval of the outbound shipment flows would have been hard to find for their systems.

On the other hand, the most important qualitative information was collected via the questionnaire, to make the determination of the service levels for the providers. This information was collected mainly from emails, which contained answers to the questionnaire. Further questions were asked, if the provided answers did not get the needed picture of their services. Additionally, qualitative information was gathered from conferences held at Actiw´s Naarajärvi headquarters, with possible service providers representatives. Other service provider related information and data came from emails, that were possible price lists or straight offers from contacted companies. Finally, the received offers were in the form of price lists for their company´s services.

9 Information and data handling

All the information received from the service providers were gathered, analyzed, and then filled into the Excel sheet produced for this thesis work. This would make it easy for later referencing for Actiw. The excel sheet contained a chart with the different areas, the scaling for these used to determine the service level of the service providers, and then a weight percentage for all the areas. The combination of these produced a total service level for the companies that were evaluated.

9.1 Scaling

The scaling was done with 0 to 4, zero mostly meaning that they do not provide the service at all, and 1 to 4 being that they do to some level. These areas, and more specific scaling for these areas were determined and defined as follows:

- *Capacity*, this includes physical warehousing space available for spare parts storage, and the floor space needed to store palletized goods related to the projects. Also, the overall willingness to take on project-based warehousing.
  The scaling was determined as follows: 0, if they cannot handle non-standard pallets or do not have the space, 1 if they have space for spare parts but not able to handle the non-standard pallets, 2 if they have ability to handle non-standard pallets but not spare parts, 3 if they are able to handle both to a certain extent, lastly 4 that means that they are able to take care of both spare parts and non-standard pallets in the warehouse.
- *3PL*, the service provider is providing third-party logistics services.
  The scaling works here in a way that 0 if they don´t mainly provide or 4 they mainly provide 3PL services.
- *4PL*, the service provider is providing fourth-party logistics services.
  The scaling works here in a way that 0 if they don´t mainly provide or 4 they mainly provide 4PL services.

- *Handling*, this includes picking, packing and shipping of products. For example, are they able to handle project-based shipments, and global shipments and the related documentation and packaging needed for air cargo etc.
  The scaling here works as follows: 0 if there is no ability to handle project based shipments or do not know the requirements for global shipping, 1 if they know how to handle global shipments but cannot handle project based shipments, 2 if they are able to handle project based shipments but need help with global shipments, 3 if they can handle both to some extent, and lastly 4 if they can handle global shipments without any problems.
- *Container*, this includes the need for container handling, because project-based shipments, and larger spare parts orders are large enough that container shipping are necessary.
  The scaling here works as follows: 0 if they cannot handle container shipments at all, 1 if they can load and unload but can´t handle nor ship them. They need someone else like Actiw to handle the container related transport to them and from them. 2 they can handle, load and unload, they are able to ship. They need a separate shipping/transportation company to do that. 3 they can handle container shipments, but might need intervention from others, and then lastly 4 they can independently handle the shipping process of containers.
- Communication, this means that, does the service provider for example, have a WMS that can be either shared or to an extent integrated between other systems. For example, Actiw current system, Netvisor.
  Here the scaling was decided to have three levels: 0 they don´t offer WMS and communication would have to be done via email, 2 they offer a WMS-portal to use and share with possible other members like suppliers, 4 they can offer a full integration option.
- *Pricing,* comparing pricings of the service providers based on simplicity, logicality, and other comparable factors like pricing for floor space for off gauge pallets. Simplicity was based on the understandability of the offers pricing. For example, if the pricing was based on ABC-costing method, how easy was it to be able to determine what costs out of the many different activities would be directed towards Actiw. Logicality means that the offer makes sense for Actiw. 0 if no offer was made by the company. 1 if the pricing is not logical, nor simple, and non-standard pallets storage were relatively expensive compared to others. 2 if the pricing is simple, but not logical and has relatively expensive non-standard pallets storing compared to others. 3 if the pricing is logical, but not simple and still relatively expensive non-standard pallets storing compared to others. 4 if the offer is logical, relatively simple and is comparably the best offer for all the factors.
- *Pricing 2*, the comparison was done between the companies that made offers. The pricing of offers for the service was compared. 0 would be no offer available. 1 if the pricing was expensive compared to others. 2 if the pricing was relatively expensive when compared to others. 3 if the pricing was on an average level when compared to others. 4 if the offer was comparably the best from the offers. Splitting of pricing into two was done to make sure that there is less likely to be errors, due to too many factors needing to be evaluated under one heading.
- *Stock keeping*, taking inventory amounts. This is since not all offered inventory taking as a basic service and was an hourly paid process.
  The scaling works here by the premise of whether they are including it as basic service or not. 0 would be that they do not offer stock keeping or it was not specified. Then it was decided to make the scaling simple 1 or 4. 1 is where the service is hourly rated and must be requested, and 4 if the service is included.
- *Assembly*, the possibility to make small assembly of components into larger components before sending them out.
  The scaling here is seen as at which level they are willing to assemble components. It was decided that the scaling would be 0, 2 or 4. 0 if they are not willing to offer assembly, 2 if they are willing to work with the idea, and 4 if they are willing to offer assembly services.
- *Quality Control.*, the possibility to conduct quality control for in- and outbound shipments. Also, the possibility to do quality control on actual products.
  It was also decided for quality control that the scaling is 0, 1, 2 or 4. 0 if no quality control was able to be provided, 1 would be that they do not do more than look that the arriving shipments seem to

look okay. 2 if they are willing to work with the idea of more strict quality control. 4 if they are willing to do extra quality control on products, if they get training for it.
- *Other*, other was added here for possible future criteria that will be evaluated by the company. The scaling would be separately then made out for this factor.

- *Total service level*, total service calculated from the factors above that have been weighed according to their importance for the company. The closer it is to four the better.
- *Offer*, here will come the possible offer form the service providers. That will be calculated on an annual basis for all possible costs provided.
- *Standardized offer,* offers being somewhat different it was seen necessary to calculate the offer additionally in a way that all similar costs that can be found from all, were summed up in a way that shows the different price level of the service provider compared to one another. These costs were then split into annual and monthly costs.

	Services								Extras							
Importance weights	10 %	5 %	0 %	15 %	5 %	20 %	5 %	15 %	5 %	10 %	10 %		100 %	Annualy	Annualy	Monthly
Service providers	Capacity	3PL	4PL	Handling	Container	Communication	Pricing	Pricing 2	Stock keeping	Assembly	Quality C.	Other	Total service level	Offer	Standardiz	Standardi

Table 2. Service provider chart areas and weighted index of services.

The Excel sheet was made in a way that it is as easy as possible to understand. The listing for the service providers were marked as a reject and coloured in grey, the information that could be evaluated based on their answer were still filled into the chart. Then possible service providers that eventually made offers were marked as option and coloured in green. The 4PL service provider was marked a yellow to make a clear difference from the 3PL service providers. Additionally, the 4PL service was moved to the very bottom of the chart for clarity of the Excel sheet. On the other hand, the scaling for the 4Pl service provider in the chart was based on their objective, which is to find the best possible service provider that is in line with the client company´s requirements. This made it extremely difficult to evaluate. Therefore, it was chosen to mainly evaluate them as maximum four, because this is what would be expected from their services. An exception was made for the price, which was evaluated since they gave a reference price list from a service provider. Additional space was left in the chart to for example, to be able to add new service providers easily.

The description of the scaling was additionally added as an info tab in the Excel sheet, which was seen as a must since they are crucial to be understood to be able to evaluate the areas. The explanations for the areas were made as accurate as possible to what Actiw was looking for in a service provider. These areas were discussed and decided with Actiw´s representative. Also, to make the scaling match these areas. The whole template is as an appendix 3. (secret)

9.2 Weighted index

The weighted index was set out in a way in Excel chart that the maximum service level would be four or in other terms one hundred percent. The index can be found on top of the different factors for easy reference, on which of the factors the weight is affecting. The weights were then weighed in percentages, that when summed all up the total of these would then reach one hundred percent. The weighted index was based on the importance of each factor in relation with Actiw´s outsourcing requirements for the different areas scoring. These weights were discussed and decided with the company´s representative during meetings. Each of the weights were based in the following factors:

- Capacity, the weight was set as 10 %, since the space needed to handle the project-based pallets was seen important.
- 3PL, the weight was set as 5 %, since the current status is towards 3PL.
- 4PL, the weight was left as zero, since it was not seen as a criterion that should be weighted because there was only one 4PL company taken. Additionally, it was not the main point of analysis.
- Handling, was weighed at 15 %, since the amount of projected-based shipments are more relevant for the business therefore, the weight was set fairly high.
- Container, was weighed at 5 %, even though the container shipments are relevant it was decided to not give great weight since there are relatively little of them that they will be managed in most cases.
- Communication, was weighted 20 %, this was seen as one of the most important factors, since their own systems are not that well equipped for handling warehousing. Also they would want to have more real time data and history for the shipments, and inventory.
- Pricing, was weighted at 5 %, the weight was set based on the fact that is the pricing simple, logical and accurate for Actiw´s needs, which was the project-based warehousing.
- Pricing 2, was weighted at 15%, this was because the objective is to get the best possible use for their capital. Therefore, the relatively high weights were given by them.
- Stock keeping, was weighted 5 %, even though it was decided to be weighed lightly, it needs to be done at an annual level, however the costs are relatively small. Even if the stock keeping is not included in the service price.
- Assembly, was weighed 10 %, this was based on their requirements that the service provider should be able to do in some extent. Therefore, it was given some additional weight.
- Quality control, was also weighed at 10 %, due to some possible errors they would want the service provider be able to conduct quality control at a certain level.
- Other, was intentionally left blank, so that it can be determined and added later without larger editing and remaking of the formulas.

9.3 Analysis of the collected data and information

The data and information were analysed with the help of the Excel sheet model, SWOT-analysis and risk assessment matrix, to determine several factors that are involved in the warehouse outsourcing process. Firstly, the motives and goals that were set out for Actiw´s outsourcing process to have on their operations. Then secondly SWOT-analysis and the risks assessment, with a risk assessment matrix for the main risks found from the SWOT-analysis for the outsourcing process, which also helped bring out some of the advantages that Actiw was looking for. Lastly, analysis of the results received from the questionaries.

9.4 Motives and goals for outsourcing

Actiw´s motives and goals set out for the outsourcing process were based on their current status. Their growing traction in the market space has pushed their warehouse to the limits. Therefore, they have been considering the option to outsource warehouse processes. This would enable them to grow without having the warehouse holding them back. The service providers will most likely have the opportunity to provide the capacity needed for them to expand their operations. This capacity could be relatively quickly in use after the deal is accepted.

Additionally, their current Netvisor system is not well suited for handling warehouse operations and is starting to hinder their ability to handle the warehouse processes efficiently. The outsourcing of the warehouse would, therefore help them ease the pressure on their current system and let them focus on other core aspects on the business.

The overall efficiency that could come from the outsourcing of the warehouse, could lead to better service levels for their customers. This is because their own expertise does not lie in warehousing even though the company offers solutions to make logistics flows more streamlined. The 3PL service providers are experts in their field and can offer more efficient process that can decrease lead times for sending. Therefore, increasing the overall efficiency of the warehousing.

They are seeking value creation opportunities from the outsourcing process. Since, they are looking for possible services that can offer value adding services like the assembly of smaller parts into

larger components. Moreover, the repacking and possibly re-labelling the package for the larger component, to specify that it is a certain assembly.

Lastly, possible cost savings can arise from, the rent paid for the warehouse space. They could save costs from the fact that they will not need all the current space. Also, they could get rid of extra equipment that is not needed after the warehouse has been transferred. Additionally, the service providers usually have larger transportation flows and therefore have good contracts with their transportation service providers, for transportation costs. This can enable Actiw to possibly gain savings from transportation costs of their products. This is purely because their shipment flows are too small that they would be able to get better deals from transportation companies.

9.5 Analyzing possible types of logistics outsourcing options for Actiw Oy

During meeting discussions with Actiw, few different outsourcing options were seen as possibly. Additionally, the option not to outsource was brought up here. All these possibilities where SWOT-analyzed separately for each option. This was done to be able to easily reference the strengths, weaknesses, opportunities, and threats for each type. The SWOT-analysis was kept intentionally simple to not over complicate it and show the main differences between the options. Additionally, it was determined that the described partial outsourcing in chapter 3.4, would not be a viable option for Actiw at this current time. Even though possible, the size of their current warehouse does not give room for expansion and would not bring enough to the table. Therefore, it was decided that the option of partial outsourcing would be dropped out at this point. The SWOT analysis was conducted for the reminding three options. The SWOT-analysis charts can be found from appendix 4.

9.5.1 Fully outsourcing the warehouse

Fully outsourcing the warehouse, for Strengths were recognized to be less tied up capital, less workers needed, shared responsibility and expertise. Less capital tied up, meaning that there could be extra equipment that could possibly be sold, therefore freeing up capital used. Also, depending on how their warehouse space rent is, the freeing up of space that is not needed can lead to be less capital needed to use for example paying rent. The current warehouse takes about fifty percent of the current space used. Therefore, it could be assumed that half less needs to be paid

for the space. Less workers, since the warehouse will be basically non-existent, there is no need to have workers handling their warehouse anymore. Shared responsibility between service provider and Actiw. The responsibility of having products in the service providers warehouse falls on the client Actiw and the responsibility of warehousing, receiving, and sending on the service provider. Lastly, the service provider can offer their expertise in the field of warehousing to Actiw.

Weaknesses is the next with, the loss of some control, need to manage, harder to manage and loss of use of assets. Loss of some control means that Actiw loses control of the handling of the warehouse and shipping process of products. The service provider is left with this responsibility. Instead Actiw, has to take a managerial role, which leads to the next weakness. The need to manage the service provider, their performance needs to be followed and the need to communicate with them on a regular basis, related to in- and outbound shipments. This leads to the next point, which is managing the service provider relationship can become hard, since it is new thing for Actiw. Even though they have some knowledge from the manufacturing side. It is again a whole new area of the business that has been inhouse for a long time. Also, depending of how they can communicate is crucial, can they use a common shared platform or does this communication involve a lots of emails between the service provider. Lastly for weaknesses is the loss of use of assets simply means that, if equipment is sold or the warehouse is rented out, in the outsourcing process or after the outsourcing process, these spaces or equipment cannot be then used by the company anymore.

Opportunities include more time for core-competences, more fluent logistics, ability store more products and flexibility for capacity changes. Actiw can focus more on their core-competences, which is on the automation side of their business, since they would not need to manage the warehouse by them self anymore. The logistics have the opportunity to be more fluent and streamlined, since the service provider is able to handle the flows more efficiently. Actiw´s customers, and manufacturing facilities can receive their products in a more timely fashion. Next, the ability to store more products, since the current warehouse does not leave room to increase inventoried units to an extent that a service provider can offer. Lastly, flexibility for capacity changes, the client company does not need to increase their own investments to be able to increase capacity. Also, the time needed for capacity adjustment is fast compared to if investments are needed for example, for additional warehouse space. They can simply inform the service provider that they

need more capacity. Most service providers are delighted to do this because it means more business for them.

Lastly for threats there are choosing the correct service provider, information flow and mistakes made. Finding the capable service provider is never an easy process or decision to be made. The trust that is needed between client and service provider to be able to make decisions can be a tough endeavor. Also, the ability to make sure that the service provider can offer the services at a level that satisfies Actiw´s needs. Closely related to this, depending on the service providers contract terms, which might tie them for even a year or more, before the contract is finalized in case of a termination. Therefore, if the partnership is not working, they might be stuck with the service provider for a relatively long time. Information flow is crucial in outsourcing situations, without it there can be serious problems like late dispatches or misunderstandings. This then leads to the last point about mistakes. Mistakes can occur because of communication problems or worker mistakes, either intentional or unintentional. Both can create large problems for Actiw´s logistics and company reputation amongst customers.

S	W
Less tied up capital	Loss of some control
Less workers needed	Need to manage
Shared resposibilty	Loss of use of assets
Expertise	Harder to manage
O	**T**
More time for core-competences	Correct service provider
More fluent logistics	Information flow
Ability to store more products	Mistakes made
Flexibility for capacity changes	

Table 3. SWOT-analysis, fully outsourcing.

9.5.2 The hybrid outsourcing

The hybrid outsourcing option, strengths included less control loss, less workers needed and shared responsibility. Firstly, less control is lost in this option, since only part of the warehouse would be outsourced. In Actiw´s case either the project-based or the spare parts part of the ware-

house would be outsourced. The other one would be left inhouse, and therefore part of the control of the warehouse is maintained. Even if all is not outsourced, the need for less workers applies, since the warehouse does not have as much activities as before. Therefore, the workload of the warehouse is decreased for Actiw. The same as for the fully outsourced warehouse, Actiw shares the responsibility of the warehouse operations, however not to the same extent.

Next weaknesses include more tied up capital, need to manage even more and possible loss of use of assets. Continuing with the example from the opportunities. The capital at least to some point has to stay locked in and might need to be increased depending on, if the amount of spare parts is increased in storage. All the space cannot be released, because there needs to be space for the spare parts. This can lead to the situation that Actiw needs to take care of two logistics chains, their own spare parts and the outsourced project-based operations done by the service providers. Therefore, increasing the work flows for certain aspects in the company. Some loss of use of assets can happen during the project-based side of the warehousing process being transferred over. The selling of extra assets might happen therefore, they cannot be used anymore. All cannot be sold because part of the operations will continue inhouse. This also depends on the need for possible new shelving or other equipment to handle the possible larger flows of spare parts. The assets might need to be increased and therefore increasing capital expenditures.

Opportunities include more time for core-competences, more fluent logistics, ability to store more products and flexibility for capacity changes. However, not nearly to the same extent as the fully outsourced warehouse option. The need for handling warehouse process inhouse stays, the time and workforce used for these should decrease. Therefore, leaving room for focus on core-competences and have more fluent logistics flows. For example, if the project-based products are not being handled anymore, the ability to focus on only the spare parts leads to simplified workloads. In this case the freed space from the project-based parts can be taken up by additional spare parts or other value adding functions instead. Lastly, the flexibility for capacity changes, the client company does not need to increase their own investments to be able to increase capacity. This is because the project-based are not taking up space anymore. Additionally, like in the fully outsourced model they can simply inform the service provider that they need more capacity. Most service providers will offer more capacity because it means more business for them.

Lastly threats for the hybrid model include choosing the correct service provider, information flow and mistakes made can increase. Same as for the fully outsourced warehouse option, the choosing of the correct service provider is important. For the hybrid model and continuing with the example, it is even more crucial that the service provider knows how to handle project-based warehousing, to avoid possible issues with shipping. Information flow stays equality important here, no changes happen here. There can be an increased chance of having more mistakes, due to the supply chain gaining an extra outside member, in this case the outsourcing service provider. Additionally, mistakes can be made if communication between the two warehouses is not accurate. Shipments can be sent to the wrong warehouse or vice versa sent from the wrong warehouse.

S	W
Less control lost	More tied up capital
Less workers needed	Need to manage even more
Shared resposibilty	Possible loss of use of assets
O	**T**
More time for core-competences	Correct service provider
More fluent logistics	Information flow
Ability to store more products	Mistakes made can increase
Flexibility for capacity changes	

Table 4. SWOT-analysis, hybrid outsourcing.

9.5.3 Not outsourcing

Not outsourcing the warehouse processes. Strengths include no loss of control, no loss of use of assets and no need to manage other outside parties. No loss on control, since the warehouse stays inhouse and there are no other parties that can have an effect on the warehousing. No assets are lost, no need to get rid of extra equipment that is not used, since these will most likely still be used. Lastly, since there are no outside parties there is no need to manage them separately by the company.

Weaknesses include more workers needed, less time for core-competences, investments needed and no loss of assets. The current status would call for more workforce or more input from existing workers to contribute to the handling of the warehouse processes. On the other hand, this would take away from the ability for the other workers to focus on the core-competences of the

company. The current growing situation of the company will most likely lead to more investments needed to be made to get more space or other space needs to be sacrificed from the current warehouse to better utilize the space for the warehousing actions. Lastly, no loss of assets can be seen as a weakness since they will still be stuck with all their current assets and are unable to sell the because of needing them to continue operations in the warehouse.

Opportunities include future independence, growing the business and less possible errors. The investments made into own capital or rented extra warehouse space can increase Actiw´s independence. Therefore, the company does not need to rely on or be dependent of others. Moreover, they can possibly grow the company in this way, without needing to give a way that much control over company process. This is however dependent on the possible payback period for the investment. There is no need for extra communication or extra steps involved in the warehousing process added by and service provider, therefore there is a smaller amount of possible errors to happen.

Lastly the threats of keeping warehousing processes inhouse. These include costs, harder to switch and possible loss of competitive advantage. The need for investing capital especially if the capital is not available can lead to very high costs. These costs can cause numerous problems for example, financial issues for the company. Weaken the company´s ability to handle accounts payables. The more that is invested in the warehousing the harder it could be to later switch to alternative options. The loss of capital would be greater and if they are heavily invested, they would not have much to fall back to. All the focus on essential but not Actiw´s core-competences could lead to them losing some competitive advantages in their market. Heavy investments could lead to the increase in overall price levels and or operating costs, that they have to make back up from somewhere. Time the investment takes to take effect, can be seen as a major threat for growing operations since it might take a long time to scale up operations and find or build new space to operate in.

S	W
No loss of control	More workers needed
No loss of use of assets	Less time for core-competences
No need to manage other parties	Investments needed
	No loss of assets

O	T
Future of self reliance	Costs
Growing the business	Harder to switch
Less possible errors	Possible loss of copetitive advantage
	Time for investments to effect

Table 5. SWOT-analysis, not outsourcing.

9.6 SWOT-analysis charts comparison

The charts were compiled into the following chapter to make it easier to compare the SWOT´s, with each other. The fully- and hybrid outsourcing model have similar strengths, weaknesses, opportunities, and threats. While the option not to outsource have opposite ones and few differing factors. These are mainly related to the fact that everything is kept inhouse instead of transferring them to 3PL service provider.

Fully outsourcing

S	W
Less tide up capital	Loss of some control
Less workers needed	Need to manage
Shared resposibilty	Loss of use of assets
Expertise	Harder to manage

O	T
More time for core-competences	Correct service provider
More fluent logistics	Information flow
Ability to store more products	Mistakes made
Flexibility for capacity changes	

Figure 6. Fully outsourcing.

Hybrid outsourcing	
S	**W**
Less control lost	More tide up capital
Less workers needed	Need to manage even more
Shared resposibilty	Possible loss of use of assets
O	**T**
More time for core-competences	Correct service provider
More fluent logistics	Information flow
Ability to store more products	Mistakes made can increase
Flexibility for capacity changes	

Figure 7. Hybrid outsourcing.

Not outsourcing	
S	**W**
No loss of control	More workers needed
No loss of use of assets	Less time for core-competences
No need to manage other parties	Investments needed
	No loss of assets
O	**T**
Future of self reliance	Costs
Growing the business	Harder to switch
Less possible errors	Possible loss of copetitive advantage
	Time for investments to effect

Figure 8. Not outsourcing.

9.7 Risks assessment Actiw Oy

Risk assessment is an important part of the outsourcing process that should not be overlooked in any case. Companies need to know and plan how possible risks in outsourcing can be mitigated or managed, before they have really happened. The following risk assessments were made to determine the risks involved in the process of outsourcing their warehouse operations to a 3PL service provider and what they should be looking out for.

Risks of outsourcing are closely related to the increased dependencies in the service provider. The risk can also be performance related, since the service provider takes over such a crucial part of the clients supply chain. Without the warehousing and shipping process the client company could possibly lose their ability to competitive. In a way the ability to go back after the process is passed through will be extremely difficult or the threshold to do so is high. This why making sure that the service provider can provide the services is vital.

Communicational risk on the other hand is related to the handling of service provider relations. The overall communication between the service provider and in this case Actiw the client should be managed on a regular level. Good practice would be to have a specialized person in the company handling these relations. In this way they can make sure that information flow is on point and cannot be misdirected by other inhouse employees. Therefore, the service provider will get less conflicting communications with the client company. Additionally, it is important to make sure to get notified about any possible problems related to the warehousing or shipping process. The farther away the outsourced service provider is located the more possible challenges there are for example, time zone related communication problems. Therefore, opting for a relatively nearby service provider might be a good idea.

Financial risks are related to making sure that value is created for their products through the outsourcing process. Moreover, making sure that the outsourced service keeps them competitive in the market. Meaning that cost do not drastically increase, weakening profits received from sales. This is especially important when asking pricing for the final tendering process. It is important to secure, that the prices do not increase after the contract has been signed. Financial risks can somewhat be mitigated with the contract terms, both parties need to come to terms about possible penalties, if service levels or other factors are not met.

9.7.1 Further analysis of risks

Five factors were chosen from the risks found from the SWOT-analysis and theory that could have real life implications in Actiw´s case. These were information flow problems (1), management problems (2), service provider mistakes (3), service level (4), and loss of control (5). Locations of these factors in the matrix were placed accordingly to their effects of operations and how likely they are to occur.

The risk of having information or communication problems in the start of the partnership are relatively high, however the actual likelihood is relatively low, and the impacts are also low. This is dependent of course on the issue at hand. As for the communication, the management of the partnership may have more problems in the beginning. Otherwise, the likelihood is low however the effects can be more prominent if real problems arise.

Mistakes made by service providers are seen to be likely to occur and the effects of these mistakes can be large. Especially, if the two previous factors are part in the mistake's correction process. These mistakes lead to the next factor that is the problem with the service providers service level. The risks of this are relatively low, since the service providers are usually experts in their area. However, the impacts can be higher if the service level decreases drastically.

Lastly, the loss of control is low, since the service provider´s aim is to operate with the client and not by themselves. However, the impacts can be critical if service providers start making their own decisions without permission. Therefore, the management of the partnership with the service provider must be maintained at all times, to prevent any possible loss of control happening. The constant management of this partnership should also be a general rule, that should be followed.

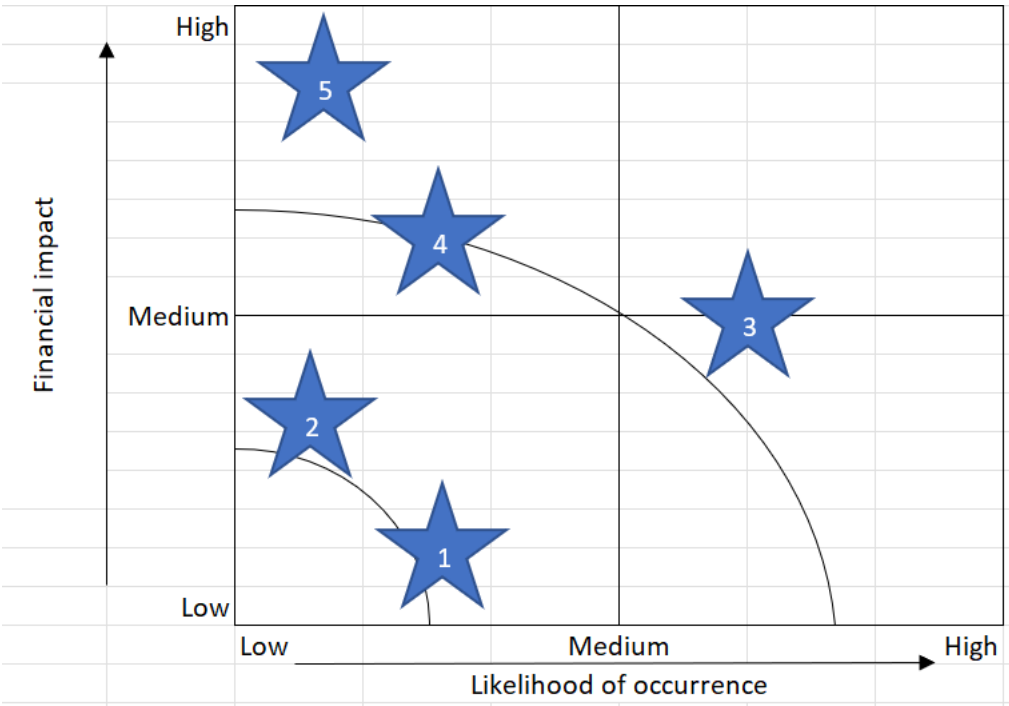

Figure 9. Risk assessment matrix.

Based on this risk assessment matrix, Actiw should make sure that the communication with the service provider is managed well, especially in the beginning, that small problems do not lead to larger ones. Additionally, Actiw should track performance of the service provider with different KPI´s that for example, the service level for their customers can be determined. Other KPI´s that should be looked into are perfect orders, invoiced correctly, time taken for deliveries and in term of costs total costs per shipment. Additionally, the overall planning in case of possible risks happening is a good practise to be able to act fast when it is needed. The risk assessment matrix can be found from appendix 5.

9.8 Analysis of received answers for questionnaires

The received answers from the service providers were somewhat mixed. Most of the answers they were mainly asking additional questions, which were either not in the questionnaire or they were wanting more details about, what was meant by some of the questions. On the other hand, it was clear from some of the answers received, that some questions were ignored or not read or understood probably or simply not answered. Therefore, in some cases questions needed to be re-asked either in the same way or then articulated differently, in the hope of getting an answer for the question. The main question that needed more detailed explaining was the assembly service-related question.

Moreover, some discussions did not continue after the first contact, they knew straight away that they did not offer these kinds of services. However, others continued for a long time without results. These were because of some internal discussion that they had to go through, which took time. On the other hand, some saw that they believed that ignoring would automatically mean that they cannot offer these services. Therefore, several follow up questions had to be asked to gain this denial information. Nevertheless, all companies were respected with the same manner if they answered or not. Those again who were truly interested in doing business gave good answers to the questions and were relatively easy therefore to evaluate according to the criterion made.

10 Results

The answers received from possible service providers were less than expected, out of twenty-four contacted twelve answered. Unfortunately, out of these twelve only six gave a concrete offer that

was received. Additionally, some of these offers were particularly hard to calculate since the pallet sizes are not always standard and the service providers had large deviation in their different prices for them, when compared to the standard pallet place prices. Additionally, even if asked to give prices in a certain way, discarded them and gave the pricings most likely in their usual way. On the other hand, some companies gave good details in what they price and what not. Additionally, they included some of their extra services and priced what they offer. Most of their pricing were mainly based on ABC-costings method, with some of them having variable costing and fixed plus variable costing. Nevertheless, valuable information has been gathered for Actiw.

10.1 Collected results

The following results that were collected from company data was sent in the data package to the service providers. This can be seen in the table below. The shipment amounts per year have been changed due to confidentiality reasons. Also, the total loading meters and total volumes have been changed to not show correct amounts. These are however in the ballpark of the true values.

The stars marked after the products column were extra information related to the products and were noted under the chart. The one and two stars consisted of the time that each of the products needed to be inventoried before shipping. These times were left out due to confidentiality. However, the three stars in spare parts for products; small, included the following information: boxes or pallet sized shipments, that can be sent many times a week. Then the four stars included extra information about container sized shipments, which are mainly 40 and 45 foot, but can be 20 foot as well. This was seen as a good illustration method for the extra information so that the chart would have not been overcrowded. Additionally, colouring the most important information to be received. This example chart with the changed values can be seen below.

Products	Shipments per year	Loading meters per shipment	Volumes (m^3), per shipment
Loadmatic*	1	20	65
Loadplate**	1	7	25
Total project based	2	-	-
Spare parts for products, small***	1	Variable	Variable
Spare parts for products, big****	max. 1	min. 6 - max. 14	min. 30 - max. 90
Total volume with spare parts	3 + 1 small spare parts	250 + 50 small spare parts	750 + 30 small spare parts

Table 6. Collected data for information package. (edited amounts)

10.2 Results from questionnaires

On the other hand, the results of the information collected from the questionnaires were evaluated by the criterion set out and then filled into the Excel chart. Corresponding with the company that gave the information needed. For example, company A was evaluated by capacity as 3, 3PL as 4, 4PL as 0, handling as 3, container as 3, communication as 0, pricing as 1, pricing 2 as 3, stock keeping as 2, assembly as 1, and quality control as 1. This was done for all the companies that made an offer for their services for Actiw.

Additionally, the weighing that was discussed was added into the chart. These can be seen on top of the factors. In company A´s case the service level totalled to 1,5 out of the possible 4. All the evaluation numbers are true values that were evaluated and discussed, with Actiw. The company names were left out with the offers, due to confidentiality reasons from both sides. This censored version of the Excel chart can be seen below.

Option																	
Rejects		Services								Extras							
4PL service provider	Importance weights	10 %	5 %	0 %	15 %	5 %	20 %	5 %	15 %	5 %	10 %	10 %		100 %	Annualy	Annualy	Monthly
*Offer through FIN	Service providers	Capacity	3PL	4PL	Handling	Container	Communication	Pricing	Pricing 2	Stock keeping	Assembly	Quality C.	Other	Total service level	Offer	Standardiz	Standardi
Finland	Company A	3	4	0	3	3	0	1	2	1	1	1		1,5	########	########	########
	Company B	4	4	0	4	4	2	2	3	1	1	2		2,5	########	########	########
	Company C	4	4	0	3	3	4	4	4	1	4	4		3,5	########	########	########
	Company D	3	4	0	3	3	0	0	0	0	0	0		0,9			
	Company E	0	4	0	1	0	0	0	0	0	0	0		0,2			
														0,0			
														0,0			
														0,0			
														0,0			
														0,0			
Estonia	Company F	3	4	0	4	4	2	3	2	1	1	2		2,3	########	########	########
	Company G	1	4	0	1	0	0	0	0	0	0	0		0,3			
	Company H	0	4	0	1	0	0	0	0	0	0	0		0,2			
														0,0			
														0,0			
														0,0			
Latvia	Company I	3	4	0	3	1	4	2	2	4	1	2		2,5	########	########	########
														0,0			
														0,0			
														0,0			
														0,0			
														0,0			
														0,0			
4PL	Company J*	4	0	4	4	4	4	3	3	4	4	4		3,6	########	########	########

Table 7. Filled evaluation and offer Excel chart.

Adding to the results received from the service providers, that the WMS and ERP-systems integration would cost Actiw an excess of a few thousand to over ten thousand euros, to be able to connect their Netvisor system with the service providers systems. However, most of the systems had portals that could be used with a monthly fee that was low compared to the integrations costs.

Moreover, since the offers were in the form of price lists. The offers needed to be calculated with Actiw´s logistics flows gathered in the beginning. The first column in the Excel offer, were calculated with all the provided costs that could be seen happening during the warehousing process for Actiw´s products. However, even though the results give a more realistic result. They cannot be then compared to each other since they have different costing factors. This was due to not all having identical pricing models and or pricing activities. Therefore, the standardized offer was calculated with pricings that each company had in common in their pricing.

Results from calculating from the data received the possible financial savings are related to the giving up of the current rented warehouse. It was calculated to bring approximately 40,84 percent savings annually already in the case for the most expensive offer and 55,93 percent savings from the best offer received. These were calculated by dividing the annual costs of the service providers services by the annual current warehouses renting cost and timing it by one hundred percent,

gave the possible percentage savings. These were calculated from the standardized offers, therefore they could be compared between the offered service providers.

For comparison, from the service provider that made the relatively best non-standard offer that included almost all possible costs related to Actiw´s warehouse operations. The savings came up to still 39,56 percent annually. There are additional costs that come from the outsourcing process like the use of the service providers web portal for easier information transfer. Additionally, the daily costs to store the goods in their warehouse. These still don´t come near the costs for renting the current facilities.

11 Conclusion

The following conclusion is based on the research conducted.

Answering to the first research question, what kind of financial effects outsourcing can have on a company?

The results of the research conclude that Actiw can gain positive effects from outsourcing of their warehouse process to a third-party service provider. Foremost they can focus on their core-competences and stop dragging the warehouse process on the side as a hindrance. Additionally, since their systems are not able to efficiently handle warehouse processes, letting the service provider take care of these actions with their purpose-built WMS or ERP-systems, would greatly improve the process and relieve Actiw of this task. Inefficiencies always lead to time wasted that could be used on something more important. Time is money, and it should not be forgotten.

As it can be seen from the results there is a potential of about 40 percent savings on an annual level, through the outsourcing of warehousing processes. These savings come from the fact that the monthly running fees are relatively lower, since costs are mostly based on the number of stored products or units. When compared to the current warehouse that is based on space used.

Answering to the second research question, what kind of effects does warehouse outsourcing have on day-to-day operations?

The outsourcing of the warehouse processes would free up the current tied-up labor, that could then be transferred to more meaningful operations or processes inside the company. Helping with their ability to focus on their company´s core-competences. Additionally, the possible option to move their warehouse closer to their manufacturing facilities in the Baltics or at least to places with more logistics flows than Naarajärvi. This is because their warehouse is relatively far away from any large transportation hub. There could therefore be value creation opportunities, getting their warehouse closer to transportation hubs or the manufacturing facilities to cut down on transportation costs and the time taken to transport the products between facilities if needed. The following up process of these operations could also be possibly made easier, since while visiting the manufacturing facilities, the warehouse could be visited in the same trip. Therefore, cutting down on additional travelling costs. This might need to be done in a regular basis especially in the beginning. As an example, company C´s facilities are located in central Finland, near Jyväskylä. It would be easier for workers in Actiw´s Jyväskylä office to go visit the service provider's warehouse. Therefore, less time needs to be used for traveling to and back from the current Naarajärvi warehouse. Additionally, the threshold to make the trip to the new service warehouse would decrease and can be arranged more spontaneously. When compared to company C´s warehouse location on average the traveled kilometers would decrease from approximately 82 kilometers to a maximum of twenty kilometers. Therefore, there is a saving of 62 kilometers and an additional forty-minute time savings depending on traffic and other factors. At the current petrol price and depending on the vehicle used, these savings could be up to thirty euros per trip. Additionally, this would mean that the warehouse would be closer to transportation hubs located in central Finland.

The most visible effects of the outsourcing process would be seen in the current warehouse as diminished shipment flows to the warehouse and slowly decreasing stock amounts during the transitions period to the service provider's warehouse. The tied-up workers can start focusing on other more important company endeavors. For example, managing the new partnership formed with the outsourcing service provider.

Answering to the third research question, how should information flows be managed in a warehouse outsourcing situation?

Actiw should consider the service providers ability to possibly integrate their systems so that the flow of information can be more seamless. At a minimum the service provider should be able to share some kind of portal to aid in the communication between the two companies. Suggestions made by some service providers to using emails and Excel sheets to share information would seem to be a waste of resources.

The overall importance of the information flows between Actiw and the possible service provider need to be weighed heavily and addressed from the very beginning of the outsourcing process, from planning to implementation. Surprisingly even during this research process companies struggled to communicate even basic aspects of their company. This was not what was expected, it was seen as highly worrying. Therefore, emphasis should be put on communication process working fluently.

This conducted research process is one of the most important parts in the outsourcing selection process. The emphasis should be put on planning of the selection process. Planning will be the easiest way to mitigate risks involved in the whole outsourcing process. For example, the correct description of the required services from service providers needs to be clear. When this is done in a proper way the company can make sure that service provider is able to provide the services. There is a small chance that something can go wrong. Service providers know what they can offer therefore, they can inform if the required services can be met by them. All in all, the time used for the planning process will not be wasted, if the correct service provider can be found. Rather than going with something hastily and hoping it will work out.

Additionally, with the provided KPI options in chapter 9.5.1, they can follow and make sure that the performance is at the required level and also gain information about consistency of work done by the service provider.

11.1 Suggestions

Considering the results received and the conclusion, the recommendations for Actiw Oy are to use the fully outsourcing model for their warehouse operations. This recommendation is based on the fact that the company desire is to grow and continue to maintain their competitive advantage in their field now and in the future. Results and data from the questionnaires, interviews, and the overall results from the Excel table, showed that company C seems to offer the best corresponding services for Actiw´s current requirements. They also seemed to be interest in working with Actiw to find the best possible solution to satisfy the requirements. However, it is good to keep in mind that company J as a 4PL service provider can possibly offer the same services than company C. They can also possibly find better fit services with better locations for the clients, which is important factor to be assessed.

company C operates in different parts of Finland and therefore the warehouse would likely stay in Actiw´s home country. This means that the warehouse will be relatively close for possible visit or in case of some issues, which was one of their factors to consider. Additionally, the warehouse would then be located in a more central location were more logistics flows are occurring. Partially due to company C other operations, however this might help to bring transportation costs down at the same time.

12 Discussion

12.1 Reliability and ethicality

The thesis was conducted and seen through with a professional and confidential matter with the possible service providers for Actiw. Also, the anonymity of the people involved in the interviews and questionnaires were kept between the companies as wished.

The sources used for the theoretical background were specifically chosen and checked in the case of free online sources, to the best of my knowledge to be reputable. Also, the objective was to find the newest possible sources to get the most up to date information. The online sources were mainly supported by knowledge from published authors works. Therefore, this was one way of making sure that the sources were at least reliable in the areas used.

The RFI´s and RFQ´s should have maybe sent out separately even though of time pressure, since this could have led to unnecessary time use for companies, that were not able to offer the wanted services for Actiw. Therefore, their time would have been wasted for nothing. On the other hand, the service provider companies´ were really well conscious of their abilities on what kind of services they can offer based on the questionnaire. Many companies directly informed, that they do not for example offer services for the logistics flow rates, that Actiw has. This meant that the flows were too low, to interest them.

12.2 Limitations

The largest limitation was found to be the unresponsive service providers that seemed to fall mainly into Latvia in this case. Additionally, the most rejects or they could not offer the services needed out of the three countries fell into Estonia. On the other hand, I believe that the comparable small amount of transactions could have had some effect on the service providers, to lose interest in Actiw as a possible client.

The accuracy of the tenders received from the possible service provider companies were somewhat hindered by the un-even logistics flows of the consignor company Actiw, which led the offers to be superficial or not as accurate as they could have been.

Actiw´s growing visibility and traction in the market has led to significant increases in logistics flows inside the company. This has stretched their logistics processes to its limits, which has led to information being highly scattered. This dispersed information could have been connected to the poor accuracy of some offers. Even though some service providers had fixed prices for their services. It therefore then limited the ability to calculate the approximate monthly fees that they would receive.

4PL service providers were only willing to show a reference company, which their service had searched and suggested for them. This reference company had similar logistics shipment flows. Therefore, the given costs example for the basic operations could be compared with the other offers received. It is understandable that they do not make an actual enquiry so to say, since it costs money to do their search process. In other words, this work is what their clients pay for.

Then when forming the Excel sheets evaluation criteria, the limitations came from the humanly elements such as perception, subjectivity, and the ability to form the evaluation criteria to represent reality. This process involved the evaluation of the qualitative data and transforming them into quantitative data for the Excel chart, which is not by any means easy not always successful in showing the true results. For example, choosing the factors for the different areas that were then evaluated from 0 to 4 and also weighing the areas accordingly.

This kind of evaluation is difficult and challenging to make and could have been somewhat affected by human factors like personal opinions or perception of reality. For example, the weighing process is mostly based on their current feelings and visions, related to the outsourcing process, since there is no real way to define the different percentage levels for the weighing process. Additionally, the same applies to the 0 to 4 scaling and the main factors chosen, however these levels could be somewhat defined out, that the evaluator can read the ratings and give a best estimate which fits the area best for that specific company. Therefore, the evaluation process should be looked objectively avoiding turning to one side or another for example, to give more points to the companies that visited Actiw´s headquarter.

It should also be mentioned that the growing demand for Actiw´s products, may have affected their representatives in a way that the workload effected their ability to focus fully on the making of the evaluations. Therefore, some aspects might have been more heavily or lightly weighed, depending on the situation at work. All these can limit the accuracy of the results received for this research.

12.3 Main results in view of the theoretical framework of the first section

The main results when viewed form the theoretical frameworks showed that, Actiw can in fact gain positive effects from outsourcing their warehouse operations to a 3PL service provider. The theoretical framework in the first section pointed out what were the possible cost savings that could come from outsourcing process. These were later reflected in the main results, as possibly lower warehouse operating costs for Actiw. Therefore, the theoretical framework supported the main results of this thesis.

12.4 Concluding the thesis and possible development proposal for further research

The decision was made to only have a relatively small amount of larger players involved in the service provider search. This was because of Actiw´s relatively small shipping flows, which might not have interested the bigger companies. It could have been a good idea to include more bigger service providers, since they have usually better opportunities to offer their services due to larger capacities. Smaller companies seem to be backed up at the moment still, due to Covid-19 caused shockwave in the global markets and logistics. Clients are stocking up more than before and this has quickly led to them getting full.

The thesis could be continued or further researched in the future to achieve updated or more accurate results. Moreover, the attainment of more accurate data, with the addition of more service providers into the research could increase the yield of future studies. Additionally, giving a bit more of time for the companies to give their possible offers. Although, it should be considered that all companies were given a total of six weeks. The field of logistics has gained efficiency and turn over times have drastically decreased over the years. The field itself is still continuing to grow and evolve over time and time again. Therefore, I see that these kinds of studies are a way of continuing the evolution of logistics for the future and are the corner stones of finding new solutions in our field. As an ending note, I believe that Actiw will continue to grow and overcome the difficulties related to their warehousing processes. Adding to this I also believe that my research has opened their eyes to new options for these processes.

The information gathered in this research from the questionnaires and interviews, could be sorted and filtered in away, that the most interesting and important points could then be later compiled by Actiw, into an actual fully detailed RFQ for service providers. Through this process they have gained valuable information related to the planning process for outsourcing. Additional valuable information could be collected by asking for an existing reference from the service provider company and then interviewing them. This way they can get more knowledge about how the service provider have succeeded with other clients of theirs.

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Appendices

Appendix 1. Information packet (English) for service providers (secret)

Information packet (English) for service providers.doxc

Appendix 2. Questionnaire

Handling:
-How do you handle the picking, packing and delivery of products?
-What kind of shipments can be loaded and unload?
-What kind of handling times do you have for shipments? Are next day deliveries possible if necessary?
-How do you operate in batch type order situations, if different product need to gathered up and sent at the same time for a certain project?
-How are international shipments processed?
-What are your abilities to handle containers shipments?

Information flows:
-What kind of ERP-system do you have in use? What kind of connectivity does your ERP-system have with other systems?
-Do we have to both have the same system in use to operate?
-Can the service include the sharing of the ERP-system with customers, so that faster communication can established?
-How do you take care of information flow related to inbound or outbound deliveries and information flow in general?

Pricing:
-How are your services priced?
-Per pallet, per shipment?

Others:
-Is it possible to take periodic inventories as needed and who would do this?
-Is it possible to take care of quality control for in- and outbound deliveries and how would they be done?

-Any extra services that you could provide, that could interest us?
-Like a possibility for small assembly of the products into components? For example, joining washers, bolts, plates, and nuts into one component before shipping. **If possible, can this be prices separately?**

Appendix 3. Service provider thesis charts (secret)

Service provider thesis charts.xlsx

Appendix 4. The SWOT-analysis charts

Fully outsourcing

S	W
Less tied up capital	Loss of some control
Less workers needed	Need to manage
Shared resposibilty	Loss of use of assets
Expertise	Harder to manage

O	T
More time for core-competences	Correct service provider
More fluent logistics	Information flow
Ability to store more products	Mistakes made
Flexibility for capacity changes	

Hybrid outsourcing

S	W
Less control lost	More tied up capital
Less workers needed	Need to manage even more
Shared resposibilty	Possible loss of use of assets

O	T
More time for core-competences	Correct service provider
More fluent logistics	Information flow
Ability to store more products	Mistakes made can increase
Flexibility for capacity changes	

Not outsourcing

S	W
No loss of control	More workers needed
No loss of use of assets	Less time for core-competences
No need to manage other parties	Investments needed
	No loss of assets

O	T
Future of self reliance	Costs
Growing the business	Harder to switch
Less possible errors	Possible loss of copetitive advantage
	Time for investments to effect

Appendix 5. The risk assessment matrix

Information flow problems	1
Management problems	2
Service provider mistakes	3
Service level	4
Loss of control	5