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Outsourcing of Warehouse Operations

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Abstract

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This research was conducted within the organization called ST Aviation which operates in the aviation industry. The aim of the study was to determine the impact that outsourcing of warehousing operations has on the company operating in the aviation industry. Another objective was to discover whether, in comparison to the current logistics process, outsourcing of warehousing operations will speed up the delivery of repaired components from suppliers to customers. The objective was achieved by analyzing the advantages and disadvantages of current logistics operations at the case company and comparing it with the advantages and disadvantages of outsourcing warehousing operations to a third-party logistics provider.

The thesis utilized qualitative research as a research method. Primary data was collected through a semi-structured interview and the participant sample consisted of employees from the organization under study. The collected data was analyzed employing a thematic analysis method. The research followed an inductive approach to a thematic analysis.

The results revealed that outsourced distribution centers streamline delivery with faster shipments due to their strategic positioning near both suppliers and customers. In addition, the key advantage of outsourcing is gaining access to logistics expertise and resources. This results in improvements in customer service and customs management. However, outsourcing also leads to a loss of control over warehousing operations. Furthermore, it was discovered that outsourcing causes trust concerns, making it more difficult to enhance logistics and delivery times. This worry could discourage the company from outsourcing, even if it sees its advantages.

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1 Introduction

Nowadays, every organisation strives to keep up with the latest globalisation trends. To remain internationally competitive, businesses strive to respond quickly to demand while providing high-quality service to their customers. Supply chain management and logistics play a significant role in delivering high-quality service to customers. Improvements in logistics have been the key source of new profits and competitive advantage for businesses. One of the emerging trends among organisations around the world is to outsource all or some of their logistics operations to third-party logistics providers in order to reduce bottlenecks in the logistics process and thereby improve the quality of services provided to customers.

This thesis is commissioned by aircraft parts provider called ST Aviation. The company operates in aviation industry. The purpose of this thesis is to find out what impact outsourcing of warehousing activities has on the company under study. Another objective is to determine whether, in comparison to the current logistics process, outsourcing of warehousing operations will speed up the delivery of repaired components from suppliers to customers. This goal will be reached by analysing the current logistics operations at the case company and comparing it with the services and solutions that could be reached by outsourcing warehousing operations to third-party logistics provider. The research also aims to evaluate and compare ST Aviation's existing practices of shipping components through intermediary warehouse in Denmark to a hypothetical scenario in which warehousing activities are outsourced to its logistics partner. This comparison analysis seeks to determine the best solution for ST Aviation, considering time as a critical factor. In this research, the financial aspects of outsourcing warehousing operations are not considered. The outcome of the research provides an in-depth analysis of the company's current logistics operations and a report that serves as a valuable reference for the commissioner, offering insights into potential changes of logistics cycle and assisting in the decision-making process.

The ultimate aim of the thesis is to determine the impact that outsourcing of warehousing operations has on the company operating in aviation industry. To address the research problem, the following set of research questions was formulated:

- What is the current logistics process that company uses to deliver repaired aircraft parts from suppliers to customers?
- What are the advantages and disadvantages associated with current logistics process?

- What advantages and disadvantages are associated with outsourcing warehousing operations to third-party logistics provider?
- What is the impact that outsourcing of current warehousing operations has on the company's logistics process?

Limitations: This study aims to offer comprehensive insights into ST Aviation logistics processes. However, it's important to acknowledge certain limitations. Specifically, this research does not include an analysis of the financial aspects associated with the impact of outsourcing warehousing operations. Therefore, the financial effect of outsourcing is not taken into account in this research.

Thesis is organized into five main sections. Chapter 1 introduces the research topic, research questions, and objectives. In chapter 2, the literature review gathers theoretical knowledge from various sources. It focuses on the theoretical knowledge of the impact of outsourcing warehousing activities on companies and what are the advantages and disadvantages that outsourcing brings. Chapter 3 outlines the research methodology, including the research approach, data collection method and data analysis method. Chapter 4 discusses the implementation of the research methods and describes the application of the research methods chosen. In chapter 5 the main findings are presented and discussed, covering the company's current logistics operations and opinions on outsourcing of warehouses, interpretation of interview results, and comparison with existing literature. This chapter addresses the main research questions based on primary data analysis. Finally, chapter 6 provides conclusions drawn from the study's findings and suggestions for future research in this area.

2 Logistics of aircraft parts and outsourced warehousing

This chapter defines the central concepts and establishes the theoretical foundation for the research. It provides context for the examination, discussion, and suggestion of research findings within the context of this thesis. The theoretical framework serves as the foundation for understanding and interpreting the research topic.

2.1 Supply Chain Management and logistics

A supply chain is a network that includes all stakeholders involved in meeting customer demands. It consists of manufacturers, suppliers, transporters, warehouses, retailers, and customers. These activities are strategically coordinated by supply chain management to achieve efficiency and cost-effectiveness. The goal is to maximise overall value by meeting customer requirements while also making a profit. The supply chain surplus, or the difference between customer value and supply chain cost, is a key indicator. To increase this surplus, effective supply chain management coordinates product, information, and capital flows. Customers are the only source of revenue, so it is crucial to manage assets strategically. Growing the supply chain surplus benefits all participants by resulting in a larger overall success "pie" to be divided across the supply chain. (Chopra & Meindl, 2016, pp. 13–16)

A well-managed supply chain can offer the organisation with a competitive advantage. It can be accomplished by a company's ability to differentiate its supply chain management from the competitors, as well as by operating at a lower cost and thus at a higher profit. The value advantage in the supply chain originates from the awareness that customers seek benefits rather than products. These advantages go beyond tangible features of the product and can be intangible, such as image or outstanding service. The promise of what the product will deliver is what adds value, and this delivered offering may outperform competitors in functional aspects. In basic terms, the value advantage of the supply chain lies in continually providing and improving these benefits, resulting in a competitive advantage that goes beyond the actual product itself. (Christopher, 2011, pp. 4–6)

Logistics refers to the activities that take place inside the supply chain and is related to supply chain management. It is necessary for efficient supply chain connectivity and it connects and synchronizes the entire supply chain as a continuous process. (Bowersox et al., 2002, p. 4)

According to Christopher, within the context of business terminology and theory, the term logistics can be understood as “the process of strategically managing the procurement, movement and storage of materials, parts and finished inventory (and the related information flows) through the organisation and its marketing channels in such a way that current and future profitability are maximised through the cost effective fulfilment of orders”. (Christopher, 2011, p. 2)

The five interdependent activities that compose logistics, according to Frazelle, are customer response, inventory planning and management, supply, transportation, and warehousing. But another authors point out, the two main functions of logistics are transportation and warehousing. In terms of logistics, transportation means the actual physical movement of goods, materials, or people from one location to another. Warehousing or warehouse management include the storage and management of goods within a concrete location or designated facility. It also involves various activities such as receiving, storing, dispatching, and maintaining inventory records. (Frazelle, 2002, p. 12; Hashemi-Pour & Essex, 2023)

Warehouse can be understood any area where the storage of goods lasts for at least 24 hours. For a variety of reasons, the warehouse may also be situated far from the organization's facilities. It might be due to a lack of space on the site or for strategic reasons to be near stakeholders. (Morana, 2018, p. 47)

2.1.1 Transportation and warehousing

Given that transportation costs have a significant impact on overall logistics costs, it is essential that businesses examine and continuously optimize transportation. In his research paper, S.G. Kumar discusses that these expenses make up between 40 and 50 percent of all logistics costs and accounting for 4 to 10 percent of the product selling price for many companies. Thus, they are a significant concern for logistics management. Transportation decisions not only have a direct impact on total logistics costs, but they also have an impact on expenses in other functional areas of the organization. Effective transportation management involves the day-to-day operations of the transportation process and requires a thorough understanding of transportation prices, services, and regulations on a national and international scale. Transportation optimization is critical for enhancing the logistics system and ensuring cost-effectiveness across the whole supply chain. (Kumar, 2014, p. 19)

Transportation is not only about the physical movement of products from one location to another. The planning, execution, and monitoring of the movement of goods depend heavily on the transportation and shipping procedures, which are commonly referred to as Transportation Management Systems (TMS) in the fields of logistics and supply chain management. The TMS covers various tasks like planning when and how shipments will happen, combining shipments for efficiency, notifying parties involved, creating transport documents, and managing carriers. The TMS is important for making the best use of transport resources and managing carriers effectively. It typically involves three main parties: the shipper (the one sending goods), the carrier (responsible for transporting the goods), and the consignee or recipient (the one receiving the goods). This collaboration among these three parties within the TMS framework helps in smoothly coordinating transportation processes, ensuring that operations are well-organized, and resources are used efficiently. (Bowersox et al., 2002, p. 239)

For the products that have high value and are extremely perishable or those having a routine logistics such as repair parts the air transportation is utilized. Due to its advantages in terms of service compared to other shipping methods, air transport is often used for high-value, time-sensitive, or fragile goods. The biggest advantage of air transport is its speed. Because air transportation is reliable and secure, many businesses use it to transfer and deliver their goods. In terms of reliability, many countries treat goods that are shipped by air with priority while clearing customs. Despite high service standards, air transport remains one of the most expensive shipping modes. This results from the allocation of relatively fixed costs, such as warehousing, loading, and unloading as well as landing and take-off fees for aircraft. Additionally, fuel consumption increases with distance. It remains that the premium service provided by air transport makes it a desirable shipping mode for high-value goods, for which logistics-related expenses only represent a small portion of the final delivered price. (Bowersox et al., 2002, pp. 345–346; Liu, 2012, pp. 446–447)

Warehousing is a part of company's logistics system. This activity is used for storing products at and between point of origin and point of consumption and provides information to management on the status, condition, and disposition of items being stored. Warehousing provides storage during all phases of the logistics process. Different types of inventories can be placed into storage. Those are raw materials, components, parts, and finished goods. The term warehousing refers to a flow-through point rather than a holding point. (Lambert et al., 1998, p. 266)

The warehouse's role is to deliver the appropriate products to the right customer on time and in the right quantity. This requires that the warehouse accurately choose and despatch products. In

order to meet the delivery deadline, the goods must be properly labelled and put onto the appropriate vehicle in a timely manner. The warehouse must also ensure that the product leaves the warehouse clean and undamaged. As a result, the warehouse is important for delivering the right order. There are many various types of warehouse operations, and they can serve a variety of functions. Serving as a transshipment and cross-dock centre is a very common warehouse role. (Richards, 2014, pp. 6–10)

Even though, warehousing may appear to be an extra expense in the supply chain, but for most businesses, it is an essential part of the process. Warehouses have a dual purpose. To begin, they improve overall supply chain efficiency by holding products until they are needed, combining shipments to cut transportation costs, and completing value-added activities such as labelling and packaging. Secondly, warehouses improve the overall effectiveness of the supply chain. Strategically situating warehouses near major markets and customers reduces time to deliver orders, and it often enables customers to conveniently pick up orders using their own transporters. (Mentzer et al., 2007, p. 227)

According to the authors, the word distribution centre (DC) is sometimes used to refer to a warehouse, but these two terms are not identical. The key distinction is that warehouses handle most products in four cycles: receive, store, ship, and pick. Furthermore, warehouses provide minimal value-added services and focus on lowering operating costs in order to meet shipment requirements. On the other hand, DCs handle products in two stages: receive and ship. Furthermore, DCs provide a high percentage of value-added services and prioritise maximising the profit impact of meeting customers delivery requirements. (Lambert et al., 1998, p. 266)

Warehouse's primary functions are storage and distribution. The author distinguishes between warehouse and platform. The warehouse is utilized for goods storage; in other words, the products remain on site for more than 24 hours. In contrast, within a platform, products just transit before being shipped to another location. This method of transportation is known as cross-docking. Products on the platform are available for less than 24 hours. Companies should choose a preferable alternative between a warehouse (with storage) and a platform, often called as a distribution centre (without storage). (Morana, 2018, pp. 48–123)

Reducing handling steps can help to streamline the material flow during the receiving process and minimize the amount of work that is required. Implementing cross-docking is one efficient way to reduce the number of handling steps. Figure 1 illustrates cross-docking as the process of receiving goods from several suppliers or origins and then sending them straight to multiple

customers or destinations. The cross-docking is used when products cannot be shipped directly to customers and they don't require long-term storage. (Bowersox et al., 2002, pp. 382–384; Frazelle, 2002, p. 246)

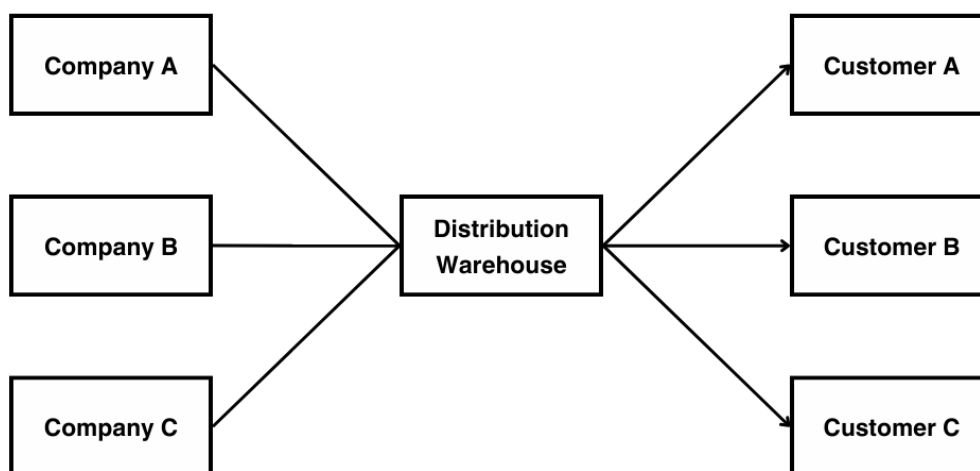


Figure 1. Cross-dock.

Cross docking is best suited for high-value products with short lead times. When using the cross-docking approach, the goods or products do not enter the actual warehouse or are placed in storage. This method is all about shifting products from an inbound carrier to an outbound carrier. Aside from the fact that cross docking can result in large inventory savings since both the costs of holding goods and the expenses of handling the inventory are removed or significantly reduced, it also has a number of other advantages. Cross-docking, when done correctly and monitored, can not only serve as a tool for synchronising the supply chain, but it can also result in major space, labour, and inventory savings. (Kulwiec, 2004, pp. 28–35)

Cross-docking is a replenishment technique that emphasises speed in the supply chain and is intended for quick product movement. In this strategy, inbound products are quickly unloaded at a distribution centre, sorted by destination, and reloaded onto trucks without being stored in a warehouse. The core of cross-docking is directly related to timing; the ability to efficiently receive and ship products with little handling in a short time window is critical. It is also critical to be able to quickly inspect incoming items. Cross-docking is worth considering if the company's typical distribution techniques and order cycles are insufficient to meet customer demands. Also, if the distribution network is outdated and inefficient, resulting in longer cycle times and weaker shelf-life guarantees. Lastly, it is critical if transportation networks are overextended, as this can

make it challenging to deliver items on time, requiring rushed service. (Blanchard, 2010, pp. 91–95)

Additionally, cross-docking should be considered if the company has inventory which destination is known when it arrives, and the customer is ready to receive goods right away. Also, if there are fewer than 200 shipments each day and the inventory is time sensitive. (Lambert et al., 1998, p. 277)

Berg (2007, p. 56) distinguishes between production warehouses and distribution warehouses. The production warehouse is used to stock the raw materials, semi-finished goods or finished products. The finished goods are then distributed to customers or other warehouses and other items are received from or shipped to production plants. The distribution warehouse has different function. This facility only receives products from different suppliers and then ship them to various customers. In addition, the distribution warehouse can be classified by the geography location it serves. There is a central and local warehouse. The central warehouse stores the inventory that serves a large region. On the other hand, the local warehouse serves a limited geographical area, which can be a region or even multiple countries. This warehouse benefits from being closer to customers, allowing it to quickly supply products to them.

The decision where to locate the warehouses, distribution centres or cross-docking facilities can be approached from the macro and micro perspectives. The macro perspective examines the topic of where warehouses should be located geographically within a certain area in order to improve product distribution. There are three categories of location strategy. The first is a market-positioned strategy, that includes locating warehouses closer to the end customer. It increases customer service levels and is mainly influenced by transportation costs, order cycle time, product sensitivity, order size, local transportation availability, and the quality of customer service provided. Another location approach is the production-positioned strategy. According to this approach, warehouses are positioned closer to suppliers. These warehouses do not offer the same level of customer service as market-positioned warehouses, but they do act as collection points or mixing facilities for products obtained from multiple suppliers. Product perishability and transportation consolidation rates are some of the elements that influence production-oriented warehouses. Finally, there is the intermediately positioned strategy, which establishes warehouses midway between the customer and the production or supplier. This method is used by a company when it needs provide excellent customer service and has items supplied from multiple locations. However, this method offers poorer levels of customer service than market-positioned facilities. (Lambert et al., 1998, pp. 290–292)

Having warehouses closer to customers is preferable for several reasons. Overseas, a centralized warehousing strategy encounters challenges due to distinct economic entities in many countries. Managing import/export laws and regulations for each entity adds complexity, and the associated duties can significantly increase overhead costs. Therefore, to streamline operations and minimize complexities, most companies have opted for a more localized approach. Placing at least one warehouse in each country where they sell products proves to be a more sensible strategy, allowing companies to better navigate local regulations and enhance overall efficiency. Furthermore, warehouses play a crucial role in enabling swift responses to changes in demand. This becomes particularly important when transportation systems are unreliable or face delays due to various factors. Having warehouses closer to customers helps reduce lead times and provides more consistent and efficient shipping, ultimately enhancing customer service. (Bartholdi & Hackman, 2019, p. 5; Saxena, 2009, p. 22)

The distribution from a central warehouse has its pros and cons. In the past, it was preferred by many companies because it is cheaper for suppliers to ship products to one location instead of other smaller warehouses spread over a region. However, this strategy is no longer useful because it demands longer delivery times, which are no longer worth the cost savings. (Schram, 2021)

The analyses performed on spares parts warehousing showed that a combination of centralized and local warehousing is the most effective solution. The authors suggest that the slow moving and non-critical spares can be stored at the central location. On the other hand, the fast-moving spares and urgent consumables can be received to and distributed from the local warehouses. The study found that delivery responsiveness from local facilities is very satisfactory. Contradictory, the centralized warehousing would reduce the responsiveness. However, by running both, the centralized and local warehouses would further increase the warehouse operating cost. Therefore, the outsourcing option was brought into consideration, and it outranked other alternatives. The analysis clearly revealed that the best option is to outsource the warehousing activities. Outsourcing has long been seen as one of the most important ways for businesses to improve their competitiveness and effectiveness. For decades, the trend has been to focus on core competencies and outsource the rest to specialised suppliers, particularly in the manufacturing industry. (Mukherjee & Kumar Dey, 2008, pp. 29–31)

2.2 Aircraft maintenance supply chain and logistics

There is a difference between mainstream and maintenance supply chain. The mainstream supply chain is aimed for current markets of typical consumer and manufacturing goods. The maintenance supply chain, on the other hand, is meant to fulfil the changing needs for contingent production supplies. The contingent production supplies are maintenance, repair, and operation (MRO) materials and contingent-sale parts and accessories (P&A). There is a significant connection between these different supply chains because a maintenance supply chain is a necessary companion to a standard or mainstream supply chain. Each firm must manage both, its primary supply chain, and a maintenance supply chain. The maintenance supply chain performs two critical functions: it provides MRO supplies for production maintenance, and it manages P&A for customer service, which is triggered by contingent sales. (Liu, 2012, pp. 333–334)

Currently, the aircraft maintenance industry is characterised by strong global competition among multiple maintenance organisations, with operators prioritising price, time, and quality when selecting services. Maintaining a competitive edge requires maintenance organisations to strike the right balance between speed and precision. Logistics and supply chain management are critical in the aircraft components sector, particularly in eliminating delays caused by technical problems. The "Push and Pull" system, which is used in air transportation, distinguishes between scenarios in which demand at the end of the supply chain pushes the product to market (Pull) and situations in which products are made and assembled based on predicted demand and placed in the supply chain (Push). For aircraft maintenance organizations, the strategic supply of consumable materials and spare parts involves assessing critical components contributing to delays and considering the importance of each component in aircraft operation. The "Just-in-time" system is critical for manufacturing and delivering products at the time of the customer's request. The end consumer, such as air operators, triggers this mechanism, which falls under the "Pull" category. The "Lean" approach, inspired from Japanese automobile industry standards, focuses on eliminating unnecessary elements in the supply chain in order to attain perfection. This approach can be utilised by maintenance organisations by eliminating time-consuming and resource-intensive operations, lowering wait times, and improving efficiency. (Zaharia & Necula, 2015, pp. 510–511)

2.2.1 Role of warehousing in aircraft maintenance industry

The warehouse is crucial in the aircraft maintenance industry since it is necessary to store products on these premises according to the tight requirements established by aviation quality protocols. Aviation items are transported to the warehouse area from suppliers. Warehousing helps to guarantee that parts are well protected during the storage process. Packages delivered to the supplying organization's warehouse must be controlled by an authorised and qualified person. The operational aircraft warehouses should be customised to complete procedures and requirements defined by the manufacturers of aviation parts, as well as by aviation companies and regulations. (Konieczka & Wyderka, 2020, pp. 29–42)

In the aviation industry, the role of a warehouse involves various aspects of inventory management as outlined by the Federal Aviation Administration (FAA). This includes receiving and placing items in storage, storing them in a warehouse facility, ensuring proper care of stored materials, and issuing materials as needed. The warehouse in the aviation industry is responsible for tasks such as preserving, packaging, and packing items. Furthermore, it is critical for determining the suitability and condition of products for distribution, emphasising the importance of maintaining quality and preparation throughout the inventory management process. (Federal Aviation Administration, 2012, p. 7)

An aircraft parts distribution centre is one of the most challenging warehouses to manage because the inventory consists of very expensive parts. The total activity of distribution centre can be statistically predictable, however the demand for the specific part is relatively small and hard to predict. This means that there is a big fluctuation in demand. A service parts warehouse manages two types of orders: stock orders and emergency orders. Stock orders are large and predictable, and dealers use them to refill commonly used parts. Emergency orders, which are requested by equipment owners or repair shops for immediate repairs, are small, urgent, and unpredictable. These orders usually include rarely ordered parts, which makes them costly to handle. Additionally, uncertainty in part selection by customers can lead to a significant number of returns, further complicating warehouse operations. (Bartholdi & Hackman, 2019, p. 8)

2.3 Logistics service providers

Since logistics is one of the keys to a company's success, many businesses owe their achievement of important service, cost, and customer satisfaction targets to logistics service providers. With outsourcing, company can access resources like world-class services, goods, technology, and procedures that aren't always available within their own business without need to make infrastructure investments. The European industry is going through a shift right now, and more companies are thinking about the benefits of outsourcing some or all of their logistics. (Vasiliauskas & Jakubauskas, 2007, pp. 69–72)

Within the context of logistics service providers, the author defines and explains the term freight forwarder as following: “In itself, the freight forwarder does not transport the goods himself, but uses carriers, considered as his subcontractors. In a similar manner, it is he who chooses the mode(s) of transport.” (Morana, 2018, p. 26)

Morana (2018, pp. 23–24) states that there are 6 levels of expertise provided by logistics service providers in terms of logistics service: First Party Logistics Provider (1PL), Second Party Logistics Provider (2PL), Third Party Logistics Provider (3PL), Lead Logistics Provider (LLP), Fourth Party Logistics Provider (4PL) and Fifth Party Logistics Provider (5PL).

- 1PL manages the outsourcing of transport or warehousing.
- 2PL includes the outsourcing of transport and warehousing.
- 3PL manages the different flows such as transport, warehousing, stock management and return management.
- LLP provides service of 3PL and 4PL through its own assets and those of other companies.
- 4PL manages logistics flows only in informational way, meaning that it acts as a link between the company, the market and other service providers.
- 5PL coordinates the activities of various subcontracting companies and designs new logistics IT solutions.

Third-party logistics (3PL) emerged as a concept because of the need for transportation companies to offer their services to customers. In basic terms, 3PL involves outsourcing transport and logistical tasks to outside companies that are neither consignors nor consignees. Typically,

businesses outsource multiple activities, such as storage, warehousing, and transportation to these companies. Planning, IT integration, transportation planning, order tracking, logistics consultancy, application solutions, and financial services are all provided by 3PLs and 4PLs. However, as an extension of 3PLs, 4PLs focus on creating strong client relationships and providing value-added services that improve service efficiency. They also offer consulting services. (Vasiliauskas & Jakubauskas, 2007, p. 69)

In addition to the services provided by 3 PLs mentioned above, another authors mention value-added services provided by these companies. Those include warehousing and operations connected with it such as product marking, labelling, packaging, re-packaging, cross docking, and order returns. Logistics providers also offer administrative functions. For example, document preparation, customs clearance, invoicing, performance evaluation and communication. (Bertalero et al., 2020, p. 463; Zanjirani Farahani et al., 2011, pp. 74–75)

Companies need to understand the different kinds of 3PLs and, as a result, the services they offer. Before entering into a long-term relationship with them, businesses should ensure that the services offered by the chosen logistics company are compatible with those they wish to outsource. In regard to customer adaptation, 3PLs are categorised into 4 types. Standard 3PL providers offer the most basic services such as picking and packing, warehousing, and distribution. Second group are service developers who offer value-added services such as tracking and tracing, cross docking, specific packaging, and providing a unique security system. Customer adapters come next, providing services at the customer's request, and managing the company's logistics activities. They improve logistics services but do not create new services. Customer developers are the last group. These businesses take care of all aspects of logistics while providing the best possible service and integrating themselves with customers. These providers will have a small number of clients, but they will undertake complex and detailed tasks for them. (Zanjirani Farahani et al., 2011, pp. 76–77)

2.4 Outsourcing of logistics and warehousing operations

Richards defines outsourcing as collaborating with a supplier to deliver a function or service that falls outside an organization's core competence. He emphasizes that companies can leverage the expertise and competence of a specialized provider to enhance performance and attain the required service. When opting for outsourcing, companies must ensure seamless integration of

outsourced processes with the overall business, aiming to improve overall performance. The primary motivations for outsourcing logistics and warehousing operations often include gaining expertise, reducing costs, and enhancing service quality. The decision to outsource should be grounded in considerations such as the appropriateness of the outsourced activity, the profile and culture of potential suppliers, the impact of outsourcing on the existing business, and a comprehensive assessment of all associated costs and risks. Third-party contractors can manage both dedicated and shared-user warehousing on behalf of their clients. Dedicated warehouses involve either transferring an existing warehouse operation to a third party or establishing a completely new operation managed by the contractor. Before deciding to outsource services, companies should thoroughly investigate their chosen service provider, assessing factors like experience and understanding of the market sector, resource availability, service range, adherence to timelines, financial stability, geographic coverage, contract renewal success rates, and cultural compatibility. (Richards, 2014, pp. 316–325)

Warehousing aggregation offers great benefits for small suppliers and companies entering new geographic locations. Warehousing aggregation involves a third party consolidating warehousing needs of multiple firms, especially when customers do not have warehousing needs that are large enough to justify a warehouse of their own in each region. (Chopra & Meindl, 2016, p. 449)

Christopher (2011, pp. 223–225) pointed out that the 3PLs and 4PLs also provides value-adding services such as repacking and cross-docking. According to the research paper that studied third-party logistics in USA, more than 80% of companies provide cross-docking and pick/pack subassembly for warehouse services, and in recent years, more businesses have included vendor-controlled inventory and location services. There has been an obvious growth over time in two categories: technology services and special services. Yang's research confirmed his earlier hypothesis that the service offerings differs between global and North America focused 3PLs. With the exception of the technology category, global 3PL organisations offer far higher levels of services; their averages range from 66.93% for special services to 79.63% for logistical services. (Yang, 2015, pp. 26–33)

There are numerous reasons why organisations desire to outsource their logistics operations. Financial benefit, better customer service, the capacity to use Just-in-Time (JIT) delivery methods, global capability and expertise are the most frequently presented reasons. Financial factors exist because new warehousing facilities require a significant investment. Outsourcing also decreases costs for material handling, order picking, transportation equipment, and information technology. The practice of outsourcing can also improve customer service by ensuring accurate

and timely delivery, which enhance customer satisfaction. Aside from that, logistics service companies provide specialised services to specific industries. Another strong argument for outsourcing is the expertise and knowledge of logistics service providers. They use a variety of systems, facilities, transportation, and material-handling techniques. All of these activities are supervised and operated by logistics specialists who are more qualified than their clients and may provide valuable information to the process that many logistics managers lack. Most logistics service providers have a global network of facilities, and outsourcing can be a useful strategy for setting up foreign distribution centres and organising and carrying out international shipments as a company seeks to better serve the various global markets. This trend is accompanied by the introduction of Just-in-Time (JIT) systems, in which logistics companies are sourcing parts from a wide range of suppliers in different geographic areas, transport them to a cross-dock facility for consolidation, and then send them to separate locations. The JIT delivery system plans the arrival of items ahead of their actual need, simplifying the supply chain. (Mentzer et al., 2007, pp. 377–382)

Efficient logistics outsourcing is essential in the spare parts industry. The network of logistics suppliers should be diversified to meet local demands in terms of frequency, speed, and quality. Collaborating with partners helps to secure the essential capacities. While a full-service provider offers coordination benefits, the selection should be carefully balanced against the dangers, especially during disruptions. Analysing transportation options based on local requirements is crucial, and close collaboration with a chosen logistics provider requires a clear understanding of capacities and service agreements. This approach ensures that spare parts delivery is both efficient and resilient. (Deloitte, 2020, p. 20)

Outsourcing warehousing operations is the most suitable solution for effective spare parts management. This choice is consistent with the general trend in business strategies, which emphasises outsourcing as a way to improve competitiveness and effectiveness. By outsourcing warehousing, organizations can focus on their core competencies while relying on specialized suppliers for efficient spare parts management. This approach offers a simplified and cost-effective solution by leveraging external partners' experience to optimise logistics and increase overall operational efficiency. (Mukherjee & Kumar Dey, 2008, pp. 29–32)

Most of the reasons why organisations choose to outsource are related to the benefits of outsourcing. One of the most significant benefits of outsourcing is that workers have extensive logistics experience because logistics management is their primary function. The company that has decided to outsource its warehouse services does not have to worry about recruiting skilled employees or providing individual training. Furthermore, firms do not have to worry about legal

issues like transportation licences and customs regulations. This can lead to improvement in the quality and flexibility of customer service. All of this will save resources such as capital expenditure and time, allowing the organisation to focus on its main business operations. Based on all of that, it can be said that 3PL are saving time of companies that are using their services due to the fact that they don't need to focus on secondary competencies such as warehousing or transportation. Logistics providers do this through their knowledge and resources. Even if the clients have resources available, the providers can accomplish logistics activities more efficiently due to their established position in the supply chain, knowledge, and economies of scale. 3PL businesses can share responsibility for managing worldwide supply chains and delivering perfect orders every time. This is important when re-engineering distribution networks since logistics outsourcing can be an efficient way to satisfy global market demands and achieve an advantage over competitors. (Damme & Amstel, 1996, p. 89; Vasiliauskas & Jakubauskas, 2007, p. 72)

Another advantage of using 3PLs is the access to international logistics network. These companies have a worldwide reach through their local, regional, and international networks, making it easier to reach suppliers and customers. This can result in accurate shipments and faster service. In the aircraft maintenance industry, when there is a time pressure for parts delivery, 3PLs can expedite parts obtained from suppliers on a just-in-time basis. Despite the incredibly short delivery timeframes requested, 3PL provides excellent responsiveness. (Hassan & Annabi, 2019, pp. 17-18) On top of that, other authors discussed that reducing delivery time to regional foreign markets, improving quality and reliability and establishing presence in foreign markets are further benefits of outsourcing. (Kathawala et al., 2005, pp. 191–193)

Nevertheless, there are certain disadvantages as well. For example, long-term agreements with external logistics companies may lead to a loss of control over distribution decisions. The only way to maintain control over delivery, monitor quality, and oversee procedures is to keep everything in-house. Additionally, logistics providers must access sensitive information about the outsourcing company in order to perform logistics operations. If some of that confidential information will leak it is a serious issue for the company. As a result, it is critical to carefully identify the right logistics partner and establish a relationship that is tailored to the company's individual needs. Collaborating with a 3PL provider established in developed countries with well-structured legal frameworks and strong intellectual property protection, including safeguards for trademarks and copyrights, is critical. This strategic decision reduces concerns about the possible leaking and misuse of personal information, giving the organisation greater assurance and peace of mind. (Kathawala et al., 2005, p. 194; Vasiliauskas & Jakubauskas, 2007, pp. 70–72)

Other authors confirm this idea, stating that outsourcing will result in less frequent and direct client contact, which is demonstrated by the company's ability to respond slowly to changing consumer requirements. Keeping logistics operations in-house can sometimes result in faster and more reliable delivery. (Damme & Amstel, 1996, p. 89)

Another issue comes from the increased risks in the supply chain when companies outsource to different locations. Moving away from local or nearby areas makes things more complicated, especially because the distance makes issues related to language and cultural differences more challenging. In addition the geopolitical instability in some countries might have a negative effect on the outsourced operations. (Waters & Chartered Institute of Logistics and Transport in the UK, 2010, pp. 174–176)

Maintaining service levels and quality may provide challenges, such as delayed deliveries and product damage during delivery. Late deliveries, especially during peak demands or disruptions faced by 3PLs, can impact schedules significantly. There is a risk of losing control of logistics while outsourcing, which could affect transparency and accurate scheduling of maintenance work. Dependence on 3PLs for all outsourced tasks raises the risk of supply chain interruptions, reducing overall effectiveness and reliability. (Hassan & Annabi, 2019, p. 19)

To overcome these challenges, Nemoto and Tezuka (2002, pp. 8–9) mention that efforts should be made in two stages. Firstly, companies should pick a 3PL provider carefully, based on their ability to provide better services. While evaluating their capabilities is necessary, this selection process may involve extra costs. Secondly, it's important to set up a system to maintain a strong partnership once the 3PL partner is chosen. Sharing information and risks transparently between the parties is crucial. Smoother information exchange and effective communication improves logistics. So, both parties need to commit to sharing information, and there should be a well-structured plan to ensure these commitments.

3 Research methods

This chapter discusses the methodology to be used in analysing the current logistics operations at company and evaluate the advantages and disadvantages of outsourcing warehousing in order to improve efficiency and timeliness of products delivery in comparison to the current scenario. The chapter presents the research approach, way of data collection and research method used. In addition, it will describe the process and techniques used to conduct the research and the motives for using them.

Qualitative research is a research strategy that typically prioritizes words over numerical data during both data collection and analysis. Interaction and close involvement with people being investigated is crucial because the researcher wants to approach an authentic understanding of the world from their point of view. The point of orientation comes from the participants' perspectives and what they consider important and significant. In qualitative research, the researcher aims to understand behaviour, values, and beliefs in relation to the context in which the research is conducted. (Bell et al., 2019, pp. 376–377)

Also, Yin (2016, p. 9) states that capturing the participants perspectives may be a major purpose of qualitative study. Therefore, the events and ideas derived from qualitative research may portray the interpretations attributed to real-life occurrences by the individuals experiencing them, rather than reflecting the values, biases, or interpretations of the researchers themselves. Qualitative approaches focus mostly on the type of evidence (what people say and do) that will allow the researcher to understand how the current situation looks like and what is happening. The qualitative approach enables exploring situations with limited existing knowledge. Secondly, it enables researchers to gain an in-depth understanding of a group or organization, uncovering informal realities from inside. Finally, qualitative approaches are helpful in examining processes that lead to results, with an emphasis on understanding how certain outcomes were reached rather than simply analysing the significance of the findings themselves. (Gillham, 2005, pp. 10–11; Mack et al., 2005, pp. 1–4)

3.1 Qualitative semi-structured interview method

Interviews are one of the most used methods for data collection. Interviewing can be described as a conversation with a purpose to gather information. The data that are collected through

interviews is in the form of words. There are three different types of interviews: structured, semi-structured, and unstructured. Each type varies in how much flexibility it offers in terms of format, and they differ in how strictly they follow a set structure during the interview process. Semi-structured interview is located somewhere between the completely structured and completely unstructured interviewing forms. The researcher establishes the outline for the topics discussed, but the interviewee's responses determine how the interview unfolds. Therefore, researchers seek to approach the understanding from the participants' perspective. It can be accomplished by using unscheduled probes as part of the interview process. In this type of interview method, conversations may deviate from the planned questions, often leading to more engaging discussions. Semi-structured interview method allow interviewers to prepare questions ahead of time while still allowing participants the freedom to express their views using their own language. This interview method is crucial for understanding and exploring the perspectives of participant sample and participants can support their answers by their experiences and provide examples, that will be very useful for data analysis. (Lune & Berg, 2017, pp. 69–70; Stuckey, 2013, pp. 57–58)

It is crucial to create a comprehensive qualitative semi-structured interview guide because it improves the reliability and credibility of research results. The guide is based on insights from the literature review, which helps identify key themes. During this process, there should be a balance between main themes and follow-up questions, depending on the goal of interview. Typically, main themes guide the conversation, with follow-up questions serving as hints to help participants understand. (Kallio et al., 2016, pp. 2961–2963)

3.2 Thematic analysis

Analysing the gathered responses from interviews often involves employing thematic analysis as a method. Thematic analysis is a qualitative research method that involves identifying, analysing, and reporting patterns (themes) within the data. In other words, it is about analysing the themes within the data set to identify meaning, based on the research aims and questions. A theme is a repeating idea or pattern in data that is relevant to the research question. It captures something essential and meaningful across the dataset, but its value isn't strictly based on how frequently it appears—it's about the insight it brings in answering the research question. Themes arise by grouping codes. A code is a label given to a specific piece of text. Its purpose is to help identify and summarize important ideas found within a set of data. The process of assigning codes is

known as coding. Thematic analysis method is particularly helpful when looking for subjective information, such as a participant's experiences, perspectives, and opinions. As a result, thematic analysis is frequently conducted on data collected from interviews. The process is not linear but involves iterative phases, providing a flexible framework to fit the research questions and data. (Braun & Clarke, 2006, p. 82; Crosley, 2021)

When conducting thematic analysis there are two types of approaches that researcher can choose from. Deductive approach uses predetermined set of codes which are drawn from the study's theoretical framework as well as prior empirical research. On the other hand, in the inductive approach the codes and themes will emerge exclusively from the data. The inductive approach is most appropriate for research that seeks to explore new ideas and topics where there isn't much existing information available. The process of thematic analysis starts with transcription and becoming familiar with the data by reading it several times. The next step is generating initial codes. Coding involves labelling a piece of text to identify and summarise important concepts within an interview transcript. The next stage is to analyse the codes and examine how different codes might be used to build a theme. The codes are then sorted into potential themes. Some initial codes may develop into main themes, while others may become sub-themes, and others may be deleted. Another step involves reviewing all the identified themes and ensuring that the themes accurately represent the data. Some themes might be deleted while other may be split into more themes. The themes are then named based on their content, with the goal of ensuring that they align with the research aims and questions. The final step of thematic analysis is to report on the findings. (Braun & Clarke, 2006, pp. 87–93; Crosley, 2021)

4 Implementation of the research

This research was conducted within the organization called ST Aviation. The company operates in aviation industry. The organization is centrally headquartered in Copenhagen, Denmark, where both the logistics department and the company's warehouse are located. ST Aviation also operates in two additional offices in Morocco, specifically in Casablanca and Tetouan. It is a small company consisting of 20 employees. Since its founding in 2016, the company has steadily expanded, offering crucial services and solutions to airlines across the globe. Components repair management is one of the primary services provided to airlines all over the world. The company outsources the repair of aircraft parts to repair facilities situated across Europe and the United States rather than repairing the components themselves, therefore effective logistics management is essential to company's operations. Nowadays, ST Aviation must constantly work to ensure the efficient and timely delivery of crucial aircraft components to keep up with the rapidly evolving aviation industry.

4.1 Data collection

This thesis utilized qualitative research as a research strategy. Primary data was collected through semi-structured interview method. This data collection method was used because it allowed the researcher to develop interview questions supporting the objectives of the thesis beforehand but also it allowed the participants to express freely their opinions and knowledge of the topics researched. The main objective of the semi-structured interviews was to get a full overview of the present logistics operations for repaired components. This investigation was aimed to explore the advantages and disadvantages of ST Aviation's current logistical procedures and warehouse operations arrangements. Furthermore, the interview was aimed to provide insight into the impact of outsourcing on the company's logistics operations. The discussion included ST Aviation's expectations from a logistics service provider, as well as how the partnership fits into the company's strategy for enhancing logistics efficiency. Another objective was to determine whether it is more beneficial to outsource current warehousing operations compared to current logistics practices at the company.

Before conducting the interviews, an interview guide was prepared (see Appendix 1). This guide included questions relevant to the research goals, ensuring that the researcher stayed focused

and didn't lose sight of what was important to ask. The interview guide consisted of 13 questions. The first set of questions was developed to scan and ask participants about the current logistics process performed at the case company. It was specifically designed to gather information about the advantages and disadvantages of the current logistics situation, as well as the existence of an intermediary warehouse in Copenhagen. The second set of questions intends to gather views from participants about having outsourced warehouses and the advantages and disadvantages that it may have for the company if it decides to outsource warehousing. The goal of last set of questions was to explore the importance of delivery time in the aviation industry, as well as participants' perceptions of the effectiveness of current logistics operations in comparison to what may be achieved by outsourcing warehousing activities. Another goal was to determine whether outsourcing current warehousing operations to a third-party logistics provider would expedite delivery time and improve service quality for customers.

The interview guide included follow-up questions (probes) for most of the topics in case to motivate participants to comment on a topic that was important to the researcher. The prepared probes were used with most of the participants. In some cases, the interviewer asked prompts, particularly when the participant had not yet touched on the topic, and it was necessary to motivate participants to explore an area in greater depth. The prompts were not planned in advance, instead they were the interviewer's spontaneous reactions throughout the discussion. Since the semi-structure interview method was used, the questions from the interview guide weren't asked in a predetermined order. Instead, the process was more flexible and allowed for questions to arise naturally as the conversation unfolded. This approach gave participants the freedom to express their opinions on the topics discussed in their own way. The semi-structured interview method was chosen because it allowed the interviewer to focus on the key topics including the advantages and disadvantages of current transportation and warehousing operations, the potential impact of involving third-party logistics providers, and the advantages and disadvantages of outsourcing warehousing and its effect on service quality and delivery times. This method also made it possible to capture any new insights and important details that emerged during the discussions, which participants felt were relevant and wanted to share.

The research sample for the interviews were employees of the case company called ST Aviation working in operations and logistics department. A total of six interviews were performed, each interview with a different employee. The participant sample included five men and one woman between the ages of twenty and forty. The employees at the case company deal with logistics operations every day, so they have a clear understanding of how things work. Their input was

helpful in studying the research topics because they could provide practical insights and real-life examples based on their experiences. They have the most up-to-date understanding of the company's logistics situation and potential effects of outsourcing warehouses, given their day-to-day tasks. Their opinions were crucial for exploring the study areas, which is why they were selected as a research sample.

All interviews were conducted within one week in February 2024. Two interviews were conducted face-to-face with employees at the Copenhagen office, while the remaining four were conducted online via Zoom platform. This was necessary because the majority of participants are located in the other two offices in Morocco. Two out of six interviews were scheduled outside of regular working hours due to participants' busy schedules. The rest were conducted during working hours, with employees given permission from higher management to take a designated time slot for the interview. On average, each interview lasted 30 minutes.

Each interview was planned in advance. Those participants that were interviewed online received links to join Zoom meeting with the designated time. At the beginning of each interview, all respondents gave their consent to use their responses for research purposes. Participants were informed about the purpose of the research, data storage procedures ensuring anonymity of their responses, and given the option to withdraw consent during the thesis process. This ensures that the ethical guidelines were followed. To ensure understanding, some questions were presented in simple English during discussions. Additionally, explanations were provided for any unfamiliar terms, as the interview was conducted in English and participants had different levels of proficiency in the language, none of them being native English speaker. All interviews were audio-recorded and transcribed, and the data were securely stored on a password-protected device to maintain confidentiality. These transcripts ensure that the interpretations and conclusions drawn are based solely on the collected data, making the conclusions and deductions reliable and transparent. Furthermore, the interview transcripts played a crucial role in the later stages of this study, particularly during thematic analysis, where the transcribed text enabled coding.

4.2 Data analysis

There are many potential qualitative analysis methods that could be used to analyse the qualitative data. For this specific research the thematic analysis method was chosen for several reasons. Firstly, the research questions were centred around the warehousing operations in a particular

company. The subjective experiences, views and opinions of employees were needed in order to answer those research questions. Given that the participants were the ones with most knowledge about the company's operations, bottlenecks and needs, the researcher tried to understand subjective information like what they think and feel when it comes to the option of outsourcing their warehousing activities to a third party. Secondly, since the semi-structured interview method was used, the amount of data collected was larger than in other data collection methods. Thematic analysis was beneficial here because it allowed to break down and organize a lot of data into smaller parts, making it easier to understand. Furthermore, it was useful in identifying significant themes and common patterns in the responses of participants, reflecting their opinions and views. By looking at these themes, it was possible to dig deeper into what people are saying and get a better understanding of their perspectives. In this case, the thematic analysis proved to be a great tool for interpreting qualitative data.

This thesis follows an inductive approach to thematic analysis meaning that there was no predetermined set of codes and themes, but they emerged naturally from the data collected. This approach was chosen because the research problem was very specific and there was limited existing knowledge about outsourcing warehousing in the aircraft maintenance industry.

By reading the interview transcripts, the initial codes were developed based on what was found within the data. The coding was performed manually by using Microsoft Word's comments feature. During this process, codes were created based on the participants' own words, or simultaneously, extracts were summarized using a single word or noun to represent the main idea of each section of data. Only relevant text segments were coded, focusing on content directly connected to research objectives and questions while ignoring irrelevant or unnecessary information that may not contribute to answering research questions. Most often, the relevant information were chosen to be coded when it was matching with theoretical concepts, participants stated that it is important or it was repeated several times. At this stage over 400 initial codes were developed. After that all initial codes were extracted to Microsoft Excel sheet where each code was linked with the coded text and page number of transcript where it can be found. This enabled the researcher to have a better overview of codes and to easily navigate between them and interview answers.

During next stage, all codes were reviewed and sorted out into categories. There were several codes that stood alone and were not related to any category, thus they were either combined to create a new code or removed. Also some codes were divided into two. After deleting irrelevant codes, only relevant codes were combined to form themes. This process was time-consuming

because it required jumping back and forth between codes and interview transcripts to make sure that the codes that remained were useful along with providing new insights.

Furthermore, it was important to find and develop the themes as they didn't emerge by themselves. It was simple to group the codes related to advantages and disadvantages because they clearly described related elements. Also, there were many codes representing the tasks associated to current logistics process so it made sense to group them and create a theme. However, it was difficult to create themes that represented the relationship between outsourcing and delivery time because it was unclear at first which theme should reflect that. However, after analysing them again, the researcher began to understand the various relationships between delivery time and warehouse location. At that moment, 10 themes were developed. After a review, two of them were combined to make a single theme, and three were removed. The main reason for that was that they did not have enough data to validate the theme's relevance due to a lack of evidence. Another reason was that theme did not sufficiently address the research questions and wasn't consistent with the thesis's objectives. For example, the theme that addressed financial implications of outsourcing was removed as it didn't align with the research questions and financial aspects were not taken into account in this research.

After the reviewing stage, 6 themes remained which adequately aligned with objectives of the research and at the same time they brought new information in regards to answering the research questions. The themes were named based on the information they encapsulate. The titles were chosen to ensure that they are defined by what each theme represents. In addition, it was visible that the themes are complex and contains subthemes. Therefore subthemes were established and named to delve deeper into specific aspects or details related to broader themes. Finally, the thematic framework was created which is presented and described in next chapter.

5 Results and discussion

This chapter introduces the thematic framework and provides an in-depth analysis of the research findings. In this chapter, the key results from the thematic analysis are presented and interpreted in relation to the research questions and objectives. It aims to provide insights into the phenomenon under study and contribute to the field's existing knowledge. Additionally, it provides an opportunity to critically evaluate the research methodology and discuss any limitations encountered during the study. Figure 2 shows a table presenting the main themes developed by implementing thematic analysis of the data collected. It also includes sub-themes, which were identified to give a structure to main themes.

Theme	Subtheme
Current logistics process	Cross-docking
	Associated administrative tasks
Advantages of current logistics process	Efficient logistics coordination
	Quality assurance
	Confidentiality compliance
Disadvantages of current logistics process	Waste and lack of resources
	Customs clearance challenges
Advantages of outsourcing	Access to resources
	Cost and time reduction
	Improvement of customer service and customs management
Disadvantages of outsourcing	Trust concerns
	Loss of control
Delivery time reduction through outsourcing	Strategic warehouse proximity for faster deliveries
	Optimization through distribution center outsourcing

Figure 2. Thematic framework.

Six main themes were developed using thematic analysis method to analyse the primary data collected through semi-structured interviews with employees of ST Aviation. First theme describes the logistics process that company employ to deliver repaired aircraft parts from suppliers to customers. Next 4 themes are about advantages and disadvantages of both, the current process and outsourcing. Last theme describes the impact of outsourcing warehouses on the company. Each theme is supported by subthemes which are presented more in detail in next paragraphs.

Current logistics process

Regarding the current logistics process for delivering repaired aircraft parts from suppliers to customer, the interviews revealed that the cross-docking logistics strategy is employed with the distribution centre located in Denmark. Additionally, the current logistics process involves administrative tasks associated with cross-docking. First set of tasks include the communication with suppliers and logistics providers that facilitate the transportation of units. Second set of tasks includes the inspection of parts that arrived at facility. These tasks were concluded by Employee 2: “And then, we can ship it back to a warehouse, inspect the unit, check that everything is correct, that we received the right certificate, the right paperwork, the right part numbers, serial numbers, to be sure that it's the same unit” (see Appendix 2 7/32). It is crucial to repack the units before dispatching them to customers to prevent the leakage of any confidential information.

The whole process is described by Employee 5: “When it comes we have to remove all the original paperwork or original invoices that repair shop is charging us what we pay. Then we put inside our new invoice that we charge our customer. We also remove all the other original tags, other things not related to our business. And then we also remove the tapes and this things that the customer doesn't have to see them. We add our own ST Aviation tape and make it look like our product” (see Appendix 2 22/32). The whole delivery process consists of three parties as Employee 6 states: “There is a customer or end user, there is ST Aviation and there is a shop or the MRO. We're three here” (see Appendix 2 27/32). The repaired aircraft part is transported from suppliers to distribution centre in Denmark where “it stays less than 48 hours” (see Appendix 2 22/32). During this time the unit is inspected and repacked. After that it is shipped to the customer. The whole delivery process is illustrated in Figure 3.

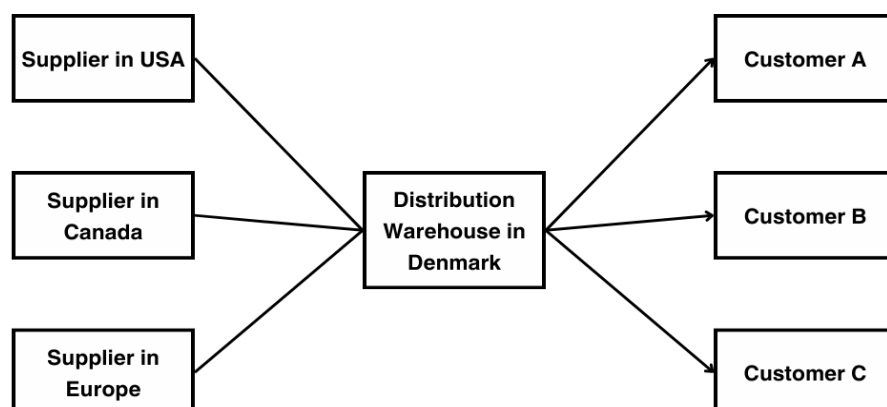


Figure 3. Cross-docking logistics strategy.

The suppliers are located in the USA, Canada, and Europe. The customers are located all around the world but most of them are based in Africa as Employee 5 said “usually our target group is in Africa” (see Appendix 2 22/32). It can be concluded that the current logistics process employs cross-docking and administrative tasks associated with this logistics strategy.

Advantages of current logistics process

Employees believe that having direct influence on management of logistics operations is one of the key advantages of the present logistics process. This includes keeping control over all activities related to the incoming and outgoing shipments. Employee 6 believes that “In case we receive it here again, we check that everything is good. It's more visibility or control” (see Appendix 2 28/32). Another advantage is that current warehouse operations are efficient and driven by strong staff performance levels as one of the employees states “Our Danish team is so good and so fast. They make very good progress and very good delivery.” (see Appendix 2 21/32).

Employees also believe that current process is advantageous because they can ensure that all units are inspected and packed properly. Employee 6 states “Let's say the advantage can be in one way: when items come, you inspect.” (see Appendix 2 28/32). He also explained “it's better to come here and I pack it nicely and then make sure that the box, everything is good from our side.” (see Appendix 2 28/32). It is vital to mention that preventing the leak of confidential information and correct documentation assurance is very beneficial for the company. Employee 4 explained that “there is a big issue like we send the unit to our customer, they found the price that we are using, what we are paying to the shop, they know our cost and they know our benefits. So, it is not good for us.” (see Appendix 2 17/32). There are six main advantages of current process discovered as illustrated in figure 4.

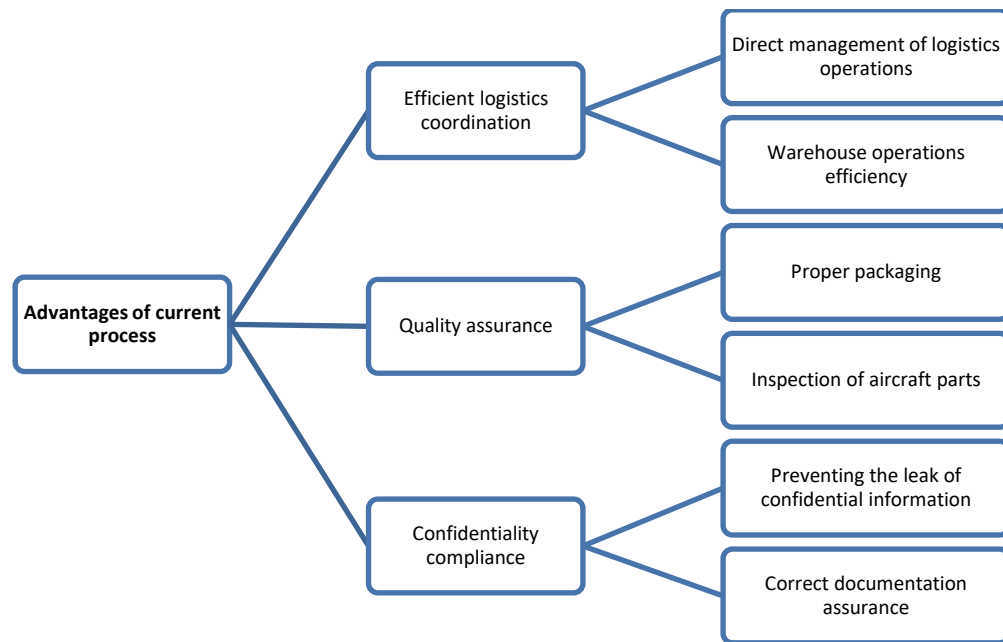


Figure 4. Advantages of current logistics process.

As it was presented above, the second theme discusses the advantages of current process. The theme is divided into three subthemes. Firstly, efficient logistics coordination gathers first two pros that were recognized during analysis. Those are direct management of logistics operations and warehouse operations efficiency. These mean that it is advantageous for the company to have a direct control over its operations as well as the fact that tasks at current warehouse are performed very well. Second subtheme is called quality assurance and it includes two additional advantages that are proper packaging and inspection of aircraft parts. With current process, employees can inspect and ensure that everything is packed properly. The name of last subtheme is confidentiality compliance. This gathers last two advantages recognized. Those are preventing the leak of confidential information and correct documentation assurance. They are quite connected as employees found beneficial to ensure that right documentation is included in the package which means that no paperwork with confidential information will be shipped to customer.

Disadvantages of current logistics process

Most of the disadvantages discovered (see figure 5) were connected either directly or indirectly to long delivery times. The most recurrent disadvantage was that current process is time-consuming and costly. Shipping aircraft parts between continents and then further across to other continents is not sustainable. Employee 1 believes that current delivery process “takes time but also money” (see Appendix 2 5/32). Another disadvantage is not only the lack of technology and equipment but also lack of employees to facilitate faster shipments. Employee 5 said “If there is one employee a day that can only handle, and he has to repack everything, and everything takes

time to do this task” (see Appendix 2 26/32). Another drawback of the current process is the problem with customs clearance, which delays delivery when shipments are put on hold. This is confirmed by Employee 3 who mentions that “sometimes we have a lot of problem with the customs,... because sometimes the units can be on hold with the customs, maybe one week so, it's not good for us to deliver the unit to the customer” (see Appendix 2 14/32). Overall, it can be said that current process is time-consuming and costly due to lack of resources and customs clearance challenges.

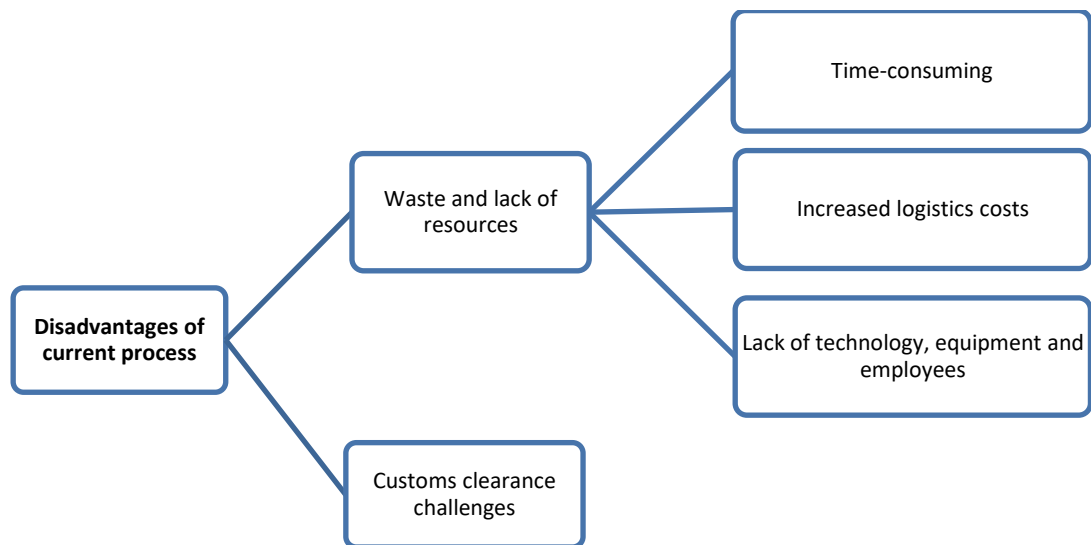


Figure 5. Disadvantages of current logistics process.

Disadvantages of current process can be divided into two subthemes. First subtheme gathers disadvantages connected to waste and lack of resources. The main disadvantages that were recognized here are time-consuming process and increased logistics costs. This can be described as waste of resources. Other disadvantages are the lack of technology, warehouse equipment and employees. Therefore those are the lack of resources. The second subtheme is about customs clearance challenges. It was found that company struggles with customs management and many times it leads to package detention due to lack of documentation or evidence.

Advantages of outsourcing

According to participants, outsourcing might prove to be very helpful for the company. Figure 6 illustrates the discovered advantages of outsourcing. By outsourcing warehousing activities to third party, the company can gain access not only to logistics expertise but also access to technology and better equipment for handling shipments. In regard to make delivery time more efficient by outsourcing, Employee 1 states that “It is going to be good, especially in cases where we

are going to select another freight forwarder or some professional to help us for these shipments.” (see Appendix 2 4/32). In addition Employee 2 believes that “if we were to outsource it to a 3rd party, they might have their resources to be able to fulfil things faster, improve the work process” (see Appendix 2 9/32). Furthermore, it was found that outsourcing can lead to shorter delivery times and cost reduction. Employee 5 believes that “it would save so much time because the transportation to Copenhagen and then sometimes this being transported, it takes, let's say, seven days or even more than seven days to transport something from America” (see Appendix 2 23/32). Employee 4 thinks that outsourcing of warehouses “has a good impact regarding the cost. For example, if we have a unit in a shop in the US and at the same moment, we have a warehouse in the US, so there are no more costs. Then we're going to be cost-oriented” (see Appendix 2 18/32).

In addition to that, it was identified that outsourcing leads to improvement of customer service but also it can help to solve issues with customs clearance. Employee 4 mentions that “when we are using a professional freight forwarder, the service level there is very high, and the customer is satisfied” (see Appendix 2 18/32). Also, Employee 5 thinks that outsourcing “will help a lot with customs because it will be repaired or manufactured in America, and then in America it will wait for the final custom declaration so it can leave from America to Africa” (see Appendix 2 25/32). According to employees, outsourcing brings many advantages for the company and it can be said that access to logistics expertise and resources improves customer service, customs management, and reduces costs and delivery time.

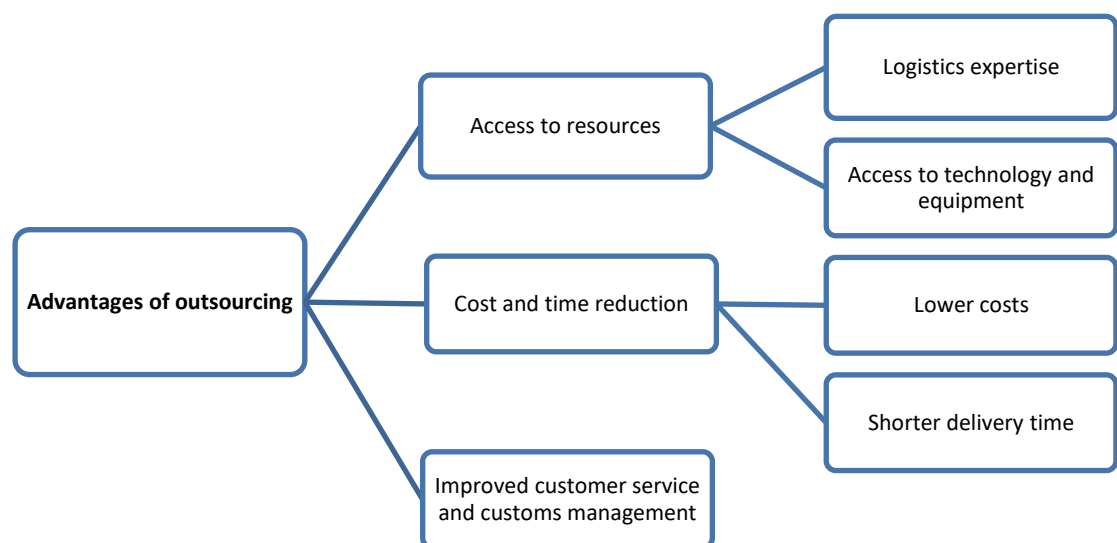


Figure 6. Advantages of outsourcing.

By comparing disadvantages of current process and advantages of outsourcing it can be noticed that they are clearly linked. The pros of outsourcing are supported by three subthemes. First subtheme discusses the access to resources. Concretely, it is access to logistics expertise and access to technology and equipment. Second subtheme is called cost and time reduction. It was found that outsourcing reduces the costs connected with shipping goods through intermediary warehouse in Denmark. In addition, it shortens the delivery time. Last subtheme deals with improvements. It means that outsourcing leads to improved customer service and better customs management.

Disadvantages of outsourcing

The disadvantages identified regarding outsourcing (see figure 7) are significantly fewer in comparison to the advantages. It was found that outsourcing reduces control over warehousing operations. Participants feel that in some situations, they can completely lose control. Employee 5 is concerned that “You don't have an overview. Also, are they going to do it our way as we are doing it?” (see Appendix 2 24/32). The second disadvantage that was observed is that employees are afraid to trust the logistics provider because they had an unpleasant previous experience. Employee 2 said “We had problems before with communications between us and the third-party organizations. Yeah, communication is a big problem for us. It could be a big problem for us, probably the biggest one.” (see Appendix 2 9/32). In addition, Employee 5 said “I don't know how much I can trust them.” (see Appendix 2 24/32). Overall, it was found that outsourcing reduces control over warehousing operations and brings trust concerns.

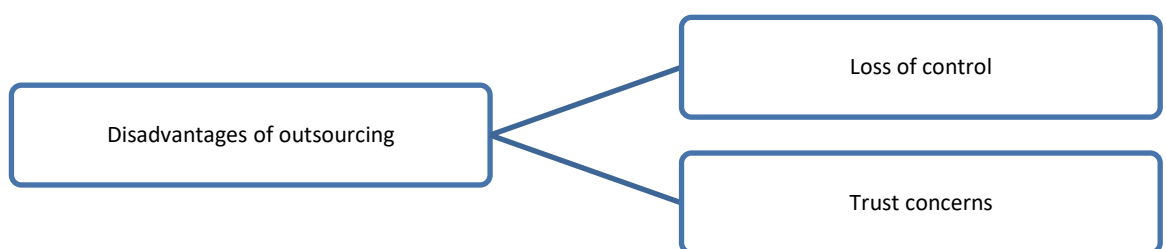


Figure 7. Disadvantages of outsourcing.

There was not many disadvantages recognized. They can be described by two subthemes: loss of control and trust concerns. This means that employees believe that by outsourcing they will lose control over activities done to each aircraft part. In addition, they won't have an overview of information that are disclosed to customer. Trust concerns are another disadvantage. Employees

are concerned about communication issues and are doubtful that the logistics provider would adhere to the tight procedures used in aviation.

Delivery time reduction through outsourcing

All of the participants agree that outsourcing shortens delivery time. The reason for this is the proximity of facilities to stakeholders. Employee 6 clarifies that “if you have manufacturers and you find, in the corner, a warehouse to have your stock there to outsource, it's a good solution” (see Appendix 2 31/32). The respondents were not united in their answers whether the warehouse should be located closer to suppliers or customers. Some of them are of the opinion that it is better to have outsourced warehouses near suppliers for faster deliveries. Employee 5 states that “we have only a few suppliers, so therefore, definitely having it closer to the suppliers would make more sense and would be more time-efficient and save so much time” (see Appendix 2 25/32). Others believe that deliveries will be faster when outsourced warehouses will be located closer to customers. Employee 4 believes that “if we have it, it would be fast, like having a warehouse in Tunisia, and if your customer is in Tunisia, there is no more than maybe 4 hours to get the unit to their facility or to the airport” (see Appendix 2 20/32). In order to reduce the delivery time, the distribution centre should be outsourced. Employee 6 said that “but it's not for storage the warehouse, but it can be for a quick move. It might be a good solution” (see Appendix 2 28/32). Therefore the findings can be concluded that outsourced distribution centres streamline delivery with faster shipments due to their proximity to suppliers and customers.

5.1 Discussion of findings

By considering time as a critical factor it is more advantageous for ST Aviation to outsource warehousing operations to third-party logistics provider. It can be seen that pros of outsourcing outweigh the cons. The findings indicate that outsourced distribution centres play a crucial role in enhancing speed of delivery by significantly reducing shipment times. This improvement is primarily attributed to their strategic positioning in close proximity to both suppliers and customers. Within this arrangement there is no need for repaired components to be shipped through Denmark therefore the transportation time will be saved. Moreover, it is visible that disadvantages of current process and advantages of outsourcing are linked. For instance, current warehouse lacks technology and equipment but company can get access to that by outsourcing warehousing to third party.

The disadvantages of the current process are clearly linked to slow deliveries, while the advantages lack a clear connection to that. The advantages primarily concentrate around operational benefits such as confidentiality and strict adherence to procedures. However, the advantages of outsourcing clearly lead to faster delivery times by outsourcing warehouse activities to external partners. For example, the customs clearance challenges might be solved, therefore the package wouldn't be stopped by customs which will expedite the delivery time. In contrast, the disadvantages of outsourcing do not affect delivery times directly. Moreover, company can decide which logistics activities will be outsourced. For example, the communication with suppliers and customers can be kept in-house. However, it is not possible to have a direct influence on the activities done at the warehouse when it is outsourced.

The research findings support existing literature, which suggests that outsourcing may result in a loss of control over distribution decisions. On the other hand it provides access to the expertise of logistics service providers. Furthermore, outsourcing warehouse operations improves customer service and resolve customs clearance issues. However, there are several gaps in existing literature when it comes to disadvantages of outsourcing. According to the research findings, one of the primary disadvantages of outsourcing is that it creates trust concerns. Employees of the company under study are unsure whether they can trust third-party logistics providers. This could be a major concern for companies looking to outsource warehouse operations in order to improve their logistics and delivery times. They may see the benefits but worry about whether they can trust third-party providers and ensure effective communication.

While existing literature suggests that warehouses closer to customers reduce lead times and improve shipping consistency and efficiency, the research findings don't agree with this assumption. It shows that warehouses closer to suppliers also improve delivery times. Given the company's fewer suppliers compared to customers, it proves more beneficial to have outsourced warehouses in close proximity to supplier locations. This setup enables the collection of repaired parts at these facilities before distribution to customers. As a result, the research indicates that both warehouse location strategies can reduce delivery times.

This research clearly shows that adherence to strict processes and maintaining control over warehousing operations is critical for companies operating in the aviation industry. Furthermore, it is important to ensure that the correct documentation is used, each aircraft part inspected and that there is no leak of confidential information. In aviation industry, there are strict regulations applied to warehouse activities therefore if the third party logistics provider wouldn't comply with them, it might generate huge problems for the company. As the existing literature implies, the

only way to maintain control over delivery, monitor quality, and oversee procedures is to keep everything in-house. As a result, the company must decide whether to prioritise faster delivery or maintaining total control over its operations. Also it is important to carefully consider the benefits and drawbacks of each option to make a well-informed decision.

5.2 Reliability and validity

The degree to which data collection methods or analysis procedures will produce consistent results is referred to as reliability. Validity refers to whether research findings accurately reflect the phenomena they claim to measure or investigate. (Saunders et al., 2007, pp. 149–150)

There are some factors that may influence the reliability of the research. Firstly, most of the interviews were conducted during participants working hours with specific time slots allocated within their workday. This scheduling constraint may have influenced participants to provide shorter answers, potentially affecting the depth of their responses. This aspect could also be considered as a limitation of the study. Conducting interviews outside of working hours could bring different results. Secondly, the qualitative research is not so straightforward as quantitative research, meaning that during thematic analysis, the acquired data may be coded differently, resulting in different themes being created.

The researcher's long-term interaction with data enhances the credibility of the research. During the data analysis, the researcher spent a significant amount of time on transcribing, data coding, and theme development to ensure that the data was correctly understood and interpreted. However, because none of the participants is a native English speaker and they have limited English proficiency, their responses may be interpreted differently than intended. This fact presents another limitation of this research. In addition, the research results might be more trustworthy if triangulation of data collection methods would be used. Since only semi-structured interviews were utilized, there is a possibility that the research did not fully capture the phenomenon under study. Participants might not give honest responses particularly when discussing the disadvantages of their current processes and operations, because they did not want to speak negatively about their workplace.

The research findings may not be applicable to a broader population because they are derived solely from the responses of employees within a single company. Therefore, the findings cannot be generalized to other companies operating in different countries or having suppliers located in

different countries. Nevertheless, the study thoroughly describes the context of what is being investigated, including the setting and participants. This detailed description allows for the potential transferability of the findings to other contexts where they may be applicable. The researcher's objectivity and avoidance of subjective interpretation in analysing the results contribute to the validity of the research.

6 Conclusion

This study aimed to determine the impact that outsourcing of warehousing operations has on the company operating in aviation industry. Furthermore it was intended to find out if the outsourcing of warehousing will expedite the delivery of repaired aircraft components from suppliers to customers. The research objectives were fulfilled by addressing the research problem and providing answers to the research questions.

To begin with, the results reveal that the current logistics process employs cross-docking logistics strategy and includes administrative tasks associated with it. Administrative activities are also strongly related to the benefits of the company's current logistics process, such as inspecting aircraft parts, preventing the leakage of confidential information, and directly managing logistics operations. Secondly, the findings reveal that current process is advantageous for the company when it comes to quality control and ensuring that all warehouse activities are done correctly. However, the results show that current logistics process is time-consuming due to lack of resources and customs clearance challenges.

On the other hand, the outsourcing shows clear benefits when it comes to reducing the delivery time of shipments. One of the key advantages of outsourcing is gaining access to logistics expertise and resources. This results in improvements in customer service and customs management, ultimately resulting in reduced delivery times. However, outsourcing also leads to loss of control over warehousing operations which might create huge problems for the company operating in aviation industry. There are strict regulations applied to warehouse activities therefore if the logistics provider wouldn't comply with them, outsourcing wouldn't be beneficial for the company. Overall, it can be concluded that outsourcing indeed shortens delivery time. The main reason for that is the close location of distribution centres to stakeholders.

The research also brings new findings. First, the close proximity of distributions centres to suppliers streamline the delivery times. The research findings suggest that expedited deliveries are not only influenced by the proximity of warehouses to customers, but also by their proximity to suppliers. Furthermore, it was discovered that outsourcing causes trust concerns, making it more difficult to enhance logistics and delivery times. This worry could discourage company from outsourcing, even if it sees its advantages.

In practice, if the company decides to outsource warehousing, it will expedite the delivery of repaired aircraft parts. On the other hand, the company loses control over warehousing operations that are important. As a result, a trade-off must be made between faster deliveries and ensuring adherence to procedures and accuracy in every task. Also it is important to carefully consider the benefits and drawbacks of each option to make a well-informed decision.

To conclude, this thesis was successful because the results make a meaningful contribution to the field of study. Also, the outcome of this research creates a report that serves as a valuable reference for commissioner, providing insights into the impact of outsourcing warehouse operations on the company. It will contribute to the company's decision-making process. By completing this thesis, the researcher gained insights into the practices within the aviation industry which will help her in the future career. Additionally, the researcher developed her research skills by conducting in-depth analysis and learned how to work with secondary sources in an effective way. Lastly, the researcher had the opportunity to apply theoretical concepts from academic studies to practical scenarios. Some areas of improvement were identified during the thesis process. Creating simpler interview questions would be beneficial, as it wasn't considered that participants may have difficulty understanding the questions asked to them. Furthermore, it would be preferable to focus more on specific numbers in order to find out the concrete difference between various delivery times, as it might contribute to more accurate findings.

The researcher's recommendation for future research is to investigate and evaluate the benefits and drawbacks of prioritizing faster delivery through outsourcing against keeping total control over logistics operations. Additionally, it would be useful to analyse the financial aspects of outsourcing distribution centres in contrast to the expenses associated with operating a single centralized warehouse.

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Interview questions

1. What tasks and actions are associated with the process from receiving aircraft parts from suppliers to shipping them to customers after repair?
 - Why do you think cross-docking is a right strategy for delivering spare parts?
2. What do you believe is the role of warehouse and distribution center in helping your company operate smoothly?
 - Why repaired products can't be shipped directly from suppliers to customers?
3. What are the advantages of having an intermediary warehouse in Denmark?
4. What are the disadvantages of having an intermediary warehouse in Denmark?
5. How do you see the potential impact of outsourcing warehousing activities on the company?
 - How can the involvement of a logistics provider help the company to improve service quality and improve customer satisfaction?
6. How do you think logistics experts from a logistics provider could improve the delivery process compared to internal staff, especially in terms of time efficiency?
 - What are the main criteria that a logistics provider needs to offer or have for the company to consider outsourcing warehousing?
7. What are the main concerns or disadvantages for the company when outsourcing?
8. How important is timely delivery within the aviation industry?
 - What benefits can a company gain from reducing delivery times?
9. What is the usual time gap between receiving notification from the supplier that a part is ready to ship and the customer receiving it?
 - How can outsourcing of warehouses reduce this time?
 - How can outsourcing make the delivery more effective?
10. What are your thoughts on the idea of keeping the current warehouse for inventory stocking while outsourcing the distribution center for delivering repaired parts to customers?
 - Why?
11. Is it more effective to position the distribution center closer suppliers' location or closer to customers' location, in terms of reducing delivery times? Why?

12. How do you see the current possibility for the company to establish its own local warehouses ?
13. What improvements are necessary within the current delivery process for distributing aircraft spare parts?
 - How can outsourcing help to improve those bottlenecks?
 - What are the logistics and warehousing operations that would be the best to out-source and why?

I – Interviewer

R – Respondent

Employee 1:

I: At the beginning, I would like to ask you, how would you describe the role and significance of warehouse and distribution centre in ensuring the smooth functioning of a company's operations?

R: I think about serviceable shipment, concerning our warehouse, I can see it's better. Concerning the search of shipments and maintain following each transaction, yeah, I can see it's good, actually. It helps us much from the beginning, as before it was following these things with Zainab so it takes some time but now it's good. I can see that when it is ready, we can ship it right now, and we can follow the process really.

I: Can you tell me what tasks are associated with the process from receiving the aircraft parts from the suppliers until it's shipped to the customers after repair?

R: First of all, to make sure that all the units are certified because there is a difference between the return as is, so the units are going to be returned, and those that are going to be serviceable. So, there are some differences. We need to make sure that we know these units which condition are and also remove all the pricing, especially it is very important to remove the pricing and put our invoice and make a label to the customer and the certificates. To inspect all of the paperwork and documents that come with this unit.

I: What are the advantages of having warehouse in Denmark for delivering parts from suppliers to customer?

R: Yeah, I can say that to make sure not to give the contact of the shop to the customer because I also have a lot of cases that we gave to the customer the ship-to address so they can get to the contact because we have already given them the contact like e-mail, the phone, so he gets all of the contacts with the shop directly. Basically, he doesn't need to come back to you because we have already given him the source. I can say it's very necessary to keep, so I can say it's very necessary as to take care about the customer; the warehouse is the one that is gonna take care of this unit. And I can say that also it is very important for us for our units, either it's exchange or core unit, it's that come back to us, it is very necessary especially some of the shops in Europe are very close to us. So this is what I can say and also to facilitate the things with the shop as sometimes we need to return the units to us directly from the shop to avoid any problem later on with the customer with packing or any other things.

I: Can you repeat again what are the problems you want to avoid with the customer?

R: Yes, like for the pricing, because especially we are taking care of the repair, so I can say there is also a customs pricing. So we believe that after the shop will repair the unit with less price, and we get to quote the customer with the pricing, it is very necessary to make sure that we are involving the pricing, you know, from the beginning. That's why we need our warehouse in Denmark.

I: What are the disadvantages of having only one warehouse in Denmark for delivering the repaired parts from suppliers to customers?

R: Regarding the time of the unit and the shipment from the shop to the warehouse and then to the customer, I think it is going to take time, yeah, especially when it is very critical, when the unit is in an AOG case. So I can say that it is a little bit harder, but in this case, when we know that this unit will take time, we can offer to the customer that this one can be supported by the replacement unit. Otherwise, we can check with the manager if we can send it directly to the customer, but in this case, we need to make sure that they will put our paper and invoice. There are not a lot of disadvantages to associate that we are the one to take care of this unit, as we said to the customer.

I: Why the products cannot be shipped directly from the suppliers to customers?

R: In case of an AOG, as I said, when the customer really needs this unit, we can ship it directly to the customer, but I need to make sure the shop will respect and put our paper like pro forma invoice documents and remove any pricing. It is very important if we ship it to the customer from the shop. And yes, in this case, we can send it to the customer only in the case of an AOG. But to be honest with you, sometimes it is very difficult to send it to our warehouse, especially with the heavy units when they have a big weight and dimensions. I know that it is going to be costly. I know that it is very difficult to ship the units from the shop to our warehouse, especially when the unit is heavy. So when the unit has weight and dimensions bigger, it is going to be difficult for the customs fee and also the pricing. So I think in the case of the unit has high value, we can ship it to our warehouse, but if the unit is not of that much value or in the case of an AOG, I think it's very important to send the units to the customer, especially in an AOG case. Otherwise, we can offer him a replacement.

I: What might be the impact of outsourcing the warehousing activities on the company?

R: It's going to be great, especially if supporting the shipment and taking care of each, and also what is important is when the units arrive to make sure that it is the correct unit with the correct details. Sometimes the customer makes a mistake and is wrong with mentioning the correct number or some of the details, so it is very important to have a warehouse also concerning the shipment and to make sure that the part number and the details are correct, and also to know if some units are included or are missing. Because before, it was very difficult, especially when you verify it and you did not find the unit that the customer said he already sent. So this is what I can say: it is very important if they will follow the process, it will be better, as each process you need to follow. Otherwise, if you did not follow it, you may miss something. So this is what I can tell you.

I: How can the involvement of third-party logistics provider improve the service delivery and customer satisfaction?

R: The customer satisfaction is dependent on the situation of the shipment, especially as I told you, if they're looking for these units, you know it is very important to them the timing and you need to have not been damaged, you know, to make sure that the unit is alright. And in the cases of return, also to make sure that it is going to be assembled. This can sometimes create problems with the customers, so if you have a freight forwarder that can respect these rules concerning the time and concerning making attention of the unit do not miss it or do a mistake with the units, then it is going to be good for the satisfaction of the customers.

I: How do you think that the logistics experts from the third-party provider company can improve the delivery process compared to internal staff and especially in terms of time efficiency.

R: I can say that there are these bigger companies like OEMs and also other suppliers that we know them, for example, Liebherr and also other OEMs we spoke with them, they already do subcontracting and contracts concerning the shipments to take care of, and they give them the good pricing concerning the shipment. In the case of AOG, we need some freight forwarder that can take care of these units faster. But in the case of something like routine or usual, it can be based on the price of this freight forwarder because the process of the shipment is normally based on the cost of the shipment.

I: How do you think that the logistics experts working in these subcontracting companies can handle the tasks better than the internal staff at ST Aviation at the moment?

R: I cannot say this 100% because we know that some OEMs delay the delivery of some shipments, and I know that it takes sometimes too much time to ship units, especially when it is coming from an OEM. And I can say that in some cases we are better than other companies, but at the same time, we are not the best, so I can say we need to work on it in the future. But if we can divide it, as I told you, because there are two cases of the shipment: the case of an AOG and the case of the routine shipment.

I: What are the main criteria the third-party logistics provider needs to offer or have for the company to consider outsourcing of warehousing. What they should offer?

R: I think if they can offer other warehouses, especially if they are bigger companies, if they can take care of the units in special countries like America, Europe, and other countries. If they have multiple warehouses, that if we are going to give them the instructions to get back this unit, they have some warehouse where they can put the stock until they will get the notification to ship it or to storage. At the same time, they need to have like a free zone.

I: By free zone you mean for the customs clearance?

R: Yes, this is what I can say. So they need to have the facility with the customs warehouse.

I: On the other hand, what are the main concerns or some disadvantages for the company when outsourcing warehouses?

R: I told you that we have a free zone, which is a great idea that we make sure that these units, especially when it is coming as unserviceable unit, so we can control it to make sure that there is the right PN and the details if it is coming from the right customer source. So we make sure that there is nothing missing, even if something additional is coming with this package in the box or something missing. Basically, I can say that the disadvantage is the controlling the package that we have received if it is correct or not. It is easy here because we can go faster to the customer and ask him to modify some documents or some details needed. For example, repair order, we cannot do any action without the approval of the customer concerning instructions and also parts information. So I think it is good for us that we are controlling this package, and from the other side, when the units are coming, it is also important that we can verify, for example, return as is have been assembled or not because it is very necessary in case of return to be assembled. So yeah, it's basically the controlling of the units and documents that it is having.

I: How important is timely delivery within aviation industry?

R: It is very important, I will repeat again, that in the case of AOG, it is very, very important. That's why I said that we need to divide the shipments into two sides: the AOG and the routine. So, I can advise you if we can find a freight forwarder that is going to be faster and the shipper and have a quality to ship the units to make sure that everything is good. And in the case of routine, it is okay, we can take care of it and take our time to realize who is the better freight forwarder. So this is my answer, yes.

I: What are the benefits that the company can have from reducing the delivery times?

R: The benefits are to get satisfaction from customers because when you help the customer, this is very important for him. Because when you show that you are helping and supporting him, especially when the case is very important and very urgent (like aircraft on the ground or something), it is very demanding from him. It is very important to make sure that the delivery is on time and to show us as we are professional, we are serious, and at the same time to get more future business because when you show him that you are good, he will send you again some other stuff.

I: Can you tell me what is the usual or average time gap between receiving the repaired part from the supplier to your warehouse until it is received by the customer?

R: It depends on the condition of the unit because the process of the repair is not something easy. It can take time, but if you already prepared sourcing before we get the order and also the units to you, because there are two cases. Like if the units have been in condition just tested or inspected from the shop, it will not take that much time. I can say that these units can take like 20 days or two weeks around, like 2 weeks, 3 weeks. And in the cases like to be repaired or overhauled, it may take time depending on the time of the spare parts are coming and also depending on time taken from the customer to approve.

I: Sorry to interrupt you but what I mean is only the logistics process from when the part is already repaired at the shop until it is received by the customer.

R: We can do it in one week or two weeks.

I: How can outsourcing of warehousing operations improve the effectiveness of logistics process and reducing delivery time?

R: It is going to be good, especially in cases where we are going to select another freight forwarder or some professional to help us for these shipments. And it is necessary that he has multiple locations around the world, as we have some shops in the US. If we will have another warehouse in the US, it will be much faster because we will send units from the shops to the warehouse we have in the US, then we will notify the customer directly. And in this case, the shipment can take like one day. One day you need coming from the shop to the warehouse. So our outsourcing, if they can have other locations and other warehouses that can help us, it is going to be very important.

I: In terms of reducing delivery time, do you think that it is better to have distribution centre close to supplier location or close to the market location? I mean customers.

R: I think it is better to be closer to the supplier location or the shop location because it's going to allow us to better ensure verification and take actions when things are not clear. The supplier or the shop may make mistakes, for example, they may miss something to do or any action.

When you have a location close to the supplier or shop, you can control faster than when you are with the customer. Also, the distance matters because normally what we do when the unit is ready, when we get notification from the shop that the unit is ready, we take care of the shipment from the shop to our warehouse. So, this normally takes time but also money. If we're going to be closer to the shop, it is going to reduce our cost, time, and money. So, I think it is better in this case to be closer to the supplier.

I: Would you prefer to keep the current warehouse for stocking the inventory and outsourcing the distribution centre for delivering the repaired parts to customers and if yes, what factors influence your decision?

R: If we have a better option like outsourcing, such as a freight forwarder who can support us concerning multiple locations that he has, it will be better. First of all, to minimize the cost of the shipment and also paying the customs fee. Sometimes the customer can make mistakes with the shipment, and in this case, we can get the risk of customs fee. And also, it is very necessary when we have other sourcing in multiple locations, for example, closer to the shops. It is going to be better because in this case, we can give the details to our customer to ship the units to the address of our outsourcing. Then, he's going to ship it easier to the shop with less cost and also less time.

I: So, the best scenario, what you're saying, is to keep also the distribution centre and the current warehouse as it is, and also outsource it, or no outsourcing at all?

R: In the case of the repair, I think that outsourcing is better. But in the case of the exchange, I can say the first scenario to keep our warehouse.

I: Why is it not possible for ST Aviation to establish their own warehouses either close to the suppliers or customers?

R: It is not difficult, to be honest. I think that this is coming because we are growing. Now we have another office in Dubai, which is good. And when I see how we are evolving, the company is getting bigger. It is good; it's like a project that we're working on. So I don't think that this is something difficult for us. Just we need to have confidence to have better service. And also, it is something logical to have other warehouses at different locations, and it is going to be better for us from the side of getting time and last costs of the fees for customs. I think it is going to be good. Yes, it is not that difficult, and it is possible in the future.

I: What improvements are necessary within the current delivery process for distributing repaired parts?

R: I can say that the most important is the controlling and also to keep updating for each delivery because there is a risk of missing the unit. Especially when we're shipping the units from the warehouse to the shop and also from the shop to the warehouse, we are the responsible ones to follow it. We are following all the cases, but this one is the special one because we need to keep evolving about the way these units are going because they may be tracked by the customs clearance. So this is something to be worked out, and also the process to be following. When they have something, it is a process you need to follow it yourself, all this if you have followed all the steps or not because you can't miss if I have steps like 1, 2, 3, 4, 5, I have to follow them like 1, 2, 3, 4, 5. So you have to follow what you have in the process. And also, this coming from the freight forwarder, the things have to be clear with him also to be prepared for all the scenarios with the freight forwarder that you have dealt with. In my opinion, this is what is needed.

I: Why do you think that it can be easier or more difficult when the delivery and also the warehousing will be outsourced to the provider? Do you think that they can catch up better on the processes?

R: I can't say that they are not good for this responsibility, but we are very good, not bad, if we are going to make things better with outsourcing. When we will have units he needs to take care of it, it will be great. He will know the value of this unit. We are not playing; we are working on the aircraft parts, some of them are very expensive, so at some points, we need outsourcing. They need to respect this deal, to follow each transaction, and to make things clear, also faster when it is coming. And there are some problems, like having problems with customs or some units missing, we need to do it as fast as possible.

I: What are the warehousing and logistics operations that should be outsourced and why?

R: In the case of the repair, in the condition that we have already prepared our shop, we have outsourcing to follow up these things. It is going to be faster for the customer, also for the shop, as we have outsourcing address closer to the shop. We're going to give the address of the outsourcing to the customer, so he's going to ship it, and at the same time, he knows when we will get it. When the customer ships the units to our address, he has been informed that it was received. He's thinking that we are getting in the inspection process, so he thinks himself that we are preparing the units and he should be quoted soon. He's thinking that we are in steps of inspection already, so we are going to come back to him directly. But will this coming, it is like nobody knows the unit is still with us, so we're trying to ship it to the shop. So what I want to say, it is good if we are going to do it for repair. I think it is better if we are going to do it in our warehouse to take care of. If this comes as exchange or the core unit, it is better to get the responsibility to do it, basically the exchanges is the controlling of our units. So for exchanges, it is better to keep it for our warehouse. When it has arrived at the warehouse, we can decide either to ship it or to keep it.

I: Why do you believe that cross docking is the best strategy for improving the delivery time of spare parts in logistics process? To explain what cross docking is, it is basically that you are getting the units from different shops to one facility and then from this facility you are shipping it to many other customers. So, all of the parts are going to one location and then being shipped out to many other locations.

R: I can say that it is important when this location is closer to the shops, so it is going to be very advantageous for us and with the customer also to minimize the time and also to speed up the process. In this case, we're going to ship the units faster. So, of course, to have a warehouse in one region and you have a shop from another region, I don't think that this strategy will be working. It is going to be the same process as we are doing with our warehouse when the unit is coming from the customer to Denmark and from Denmark to other shops, so there is no additional advantage. It is going to be more better in the case of outsourcing and having multiple places that he can support us with.

Employee 2:

I: What tasks and actions are associated with the process from receiving aircraft parts from suppliers until it's shipped and received by customers?

R: The process differs based on the services that we are required to do. For example, in our industry, we have things like exchange programs and loan programs. What we do is we don't repair, but we do repair management. So, for example, we can receive a part from the customer, which in our case would be the airlines. From there, we will outsource it to an MRO (maintenance, repair, overhaul) shop for aircraft parts that supports the part number that we need to have repaired or the customers need to. Then, we prefer to receive the unit at our location in Copenhagen. From there, we can inspect and check the unit to ensure it is the correct one, that the description, part number, serial number, everything matches. Then, we can send it off to be repaired with our own repair order, not another one from a customer, but our own to the shop. The shop will then inspect the unit, see what it approximately costs to repair it, and then we receive a call back. We can either accept the quote or if the unit is beyond economical repair, in that case, we will receive the unit back, and it can be used for spare parts, or we can look for another shop that might be able to do it cheaper instead of buying a new one.

I: And what about the reverse process? When it's already repaired, it's going back again to Copenhagen warehouse and what processes or operations are made with the unit, until it's received by the customer?

R: When we have the unit repaired by the shop, we will then ask for the airworthiness certificate. It is basically the certificate that says that it's allowed to be mounted on an aircraft. From there, we upload the documents to the Danish customs (Toll). And then, because it's air worth it, there's some custom ruling in Europe that says that we don't have to pay customs for it. And then, we can ship it back to a warehouse, inspect the unit, check that everything is correct, that we received the right certificate, the right paperwork, the right part numbers, serial numbers, to be sure that it's the same unit. We can then pack it into our own box and put on logos and stuff on it, put on paperwork, and ship it back to the customers. And yeah, in shipping, we also have a couple of different options. We can either use our DHL account number, give it to the customer, they can book the shipment, make labels, everything, or we can use one of our own freight forwarders that we will be in touch with and just have them pick it up from the shop, and they will do the rest.

I: Why do you think that this strategy of receiving repaired parts from different supplier shops to Copenhagen and then shipping it to different customers, why is it the right strategy for ST Aviation?

R: Well, we don't have the means to repair. You know, it requires a lot of physical space, a lot of knowledge, engineers, mechanics, machines, tools. It's a big process to be able to repair them. For us, a small company, it's a much better option to outsource the work instead of doing it ourselves, which is less profitable in the long run. But yeah, for now, it's got to be able to do also if we want to repair spares, we will be limited to a certain amount of part numbers. There are too many part numbers to be able to repair at one shop. Basically, there are specialists for engines, specialists for landing gear, specialists for some of the electrical stuff, all the aero stuff. So yeah, it's a big industry, and we won't be able to cover as much as we do if we want to repair in ours. So outsourcing the repair work for us is a better option to grow in the market.

I: What do you believe is the role of warehouse and distribution centre in helping the company operate smoothly?

R: Basically, the shipping department at ST Aviation helps connect all the departments - operations, sales, repair, exchange departments. So we are basically the connection between them so they don't have to spend the time making labels. And we also able to optimize the work by making savings. We find time to speak with freight forwarders, get better deals, and we have time to work with the customs, making sure that all important export is good. We can track the shipments, so they don't have to worry that the unit arrived at the shop, that the unit arrived to the customer, that the unit arrived to us warehouse. So basically, it helps with optimizing all departments' work.

I: Can you tell me why repaired products can't be shipped directly from suppliers to customers?

R: It can be shipped directly from suppliers to the customers, but we would rather have it shipped to us first. If we let the supplier directly drop ship the units to the customer, we don't know what paperwork was packed. We don't know if everything is okay with the unit. Is that the right unit? Was there any fault on the MRO side? We basically get to double-check that everything is correct. We can put our own paperwork in as they're for customers. By making a drop ship from the shop to the customers themselves, basically, we're putting them in contact with our supplier and making room for the customer to be able to work with a supplier directly, not with us.

I: Can you tell me what are the advantages of having intermediary warehouse in Denmark for delivering parts from suppliers to customers?

R: Yes, basically one of the things is that we get to inspect the unit ourselves. We get to have the units on hand while we wait for shops to respond to us to see if they have the capacity for the part numbers that we want to get repaired. Do they have the tools, the time, basically all this so we don't push the customer to ship items off when we need them off. And then we can basically control the flow of the shipments. And as I said before, it's good to inspect, then see what's going on. We can put the repair orders in, and we are the ones in contact with the shop; they are expecting something from us.

I: And can you think of some disadvantages of having intermediary warehouse in Denmark?

R: It's a cost, it's an expense. We need the warehouse. We need the employees. There's a lot of shipment work. The whole shipping department is there only because we had the warehouse and we drop shipping all the shipments off, even with huge drops of quite a lot of shipments, we are still receiving in the warehouse. And then yeah, this way even though it's much more expensive having to make multiple shipments, so basically, we have to do four shipments instead of two, and then just to get it back and forth, it's all this cost.

I: Can you please clarify what do you mean by drop shipping?

R: So by drop shipping, we don't receive the items. We plan the shipment directly from our customers to the shop, so from customer to supplier without intervening at all on the shipping process. So we don't have anything physical to do with it, only yeah, we are basically shipping it off without actually having seen the product itself.

I: How do you see the potential impact of outsourcing warehousing activities on the company?

R: We have looked at options, but especially in our industry, there's a lot of certificates needed, there's a lot of procedures, quality checks, all of this. If we want to outsource the warehousing work or things, we would have to be very careful about it. But yeah, it's not so practical for us to outsource it and have to get someone from the aircraft association ASA come up to check warehouse it's not ours to make sure that they are following the guidelines to have the quality certificates to be able to have the parts in stock. So, it's much easier to have it in house to know that everything is good.

I: How can the involvement of 3PL (third party logistics provider) help the company to improve service quality and improve customer satisfaction?

R: Well, if you want to outsource it, we might find some company with more experience in this whole area. They probably know what they're doing, but in the end, it's not their product, it's not their business. They are just basically storing and shipping units. They have very little to lose, you can say. By doing it ourselves, we can make sure that we have the service level needed. Then I will not be in contact with the customer, so customer satisfaction would probably be on our shoulders. So, we would be the one to make sure that the customer is satisfied, and from what I know, we would not be involved at all in customer relations that often. But doing it ourselves, we can check that everything is going according to our standards.

I: How do you think logistics experts from 3PL could improve the delivery process compared to internal staff, especially in terms of time efficiency?

R: In the shipping department, we are only three persons right now, mostly 2, working on it. And then if we were to outsource it to a 3rd party, they might have their resources to be able to fulfil things faster, improve the work process. But yeah, we're working on improving it step by step, trying to make sure that we can keep our growth.

I: What are the main criteria that the third-party logistics provider needs to offer or have for the company to consider outsourcing of warehouses?

R: Well, firstly, experience in working in aviation and with aircraft parts is probably the most important for us. If we were to outsource, for example, also when we work with freight forwarders, we tend to choose the ones that know the ins and outs of the aviation business and the industry and how to handle the parts, how to work with parts. And also, we would probably want someone rather local for easy communication. When having someone in the US, even if it might be practical for us since we do a lot of work in America, it would not be practical for us due to things like time difference, cultural differences, work environments, all this kind of stuff varies from country to country, and it would be a disadvantage for us to have someone geographically that far away from us. So yes, being local is key. If we were to outsource, it should be someone, probably a big organization, that would have better resources than we do.

I: What are the main concerns or disadvantages for the company when outsourcing?

R: The first thing is not handling the items. It's not being under our supervision. Not being able to directly influence the handling of the parts. We had problems before with communications between us and the third-party organizations. Yeah, communication is a big problem for us. It could be a big problem for us, probably the biggest one. Not being able to have a direct influence on the handling and inspection of the parts.

I: How important is timely delivery within aviation industry?

R: It can be extremely important. We have a term in the industry, AOG (aircraft on ground), and it means that basically without this, the aircraft is on the ground. It can't go up in the air. It needs to be inspected, something, parts need to change before doing anything, and in that case, it can cost airlines a lot of money. So basically, parts when they are in AOG, they will have a higher price tag, shipments will have a high price tag because they need to be shipped out ASAP. Then we need to get the parts to the airlines as fast as possible so that their engineers can figure out this situation as fast as possible. In those times, it is very essential to be as fast as possible and ship off the items and make sure that everything has to go as fast as possible.

I: Do you think that outsourcing of the warehousing operations can help this AOG units to be delivered faster?

R: It depends. If we're working with someone who is at the warehouse or has access to the warehouse 24/7, they can respond to fast orders, they can respond to fast requests, they're able to send someone out for shipping it, and able to have someone to pick it up. There's a lot of factors involved, but if they can do all this, then yes, it will be advantageous to have it outsourced. But it's difficult to put things like this on the third party.

I: What is the usual time gap between receiving the notification from the supplier that the part is repaired until the customer will receive it?

R: It can depend on a lot of factors. The way of shipping, the urgency of the shipments, the MROs. Do they have the units packed ready to go or is it only just getting off the assembly line? Yes, it depends on a lot of things. Are we booking the shipment, are they booking the shipment? Do we have all the paperwork, or do we need to make sure that they send the right paperwork? And then there are other things like when can the freight forwarder pick it up? Are they able to pick up during the weekend or do we have to wait until Monday? Are they in Denmark, are they in South Africa? It depends on a lot of factors: where from, where to, what are the restrictions, do customs hold it on longer than needed? There could be a lot of factors included so it's hard to say.

I: Can you elaborate on the potential impact of outsourcing warehouses on reducing this time?

R: Yes, if they are able to accommodate for the risks and factors that I just said, they have processes, procedures, ways to make sure that everything is going smoothly, as fast as possible, then yes, we would be able to reduce the time of delivery.

I: What are your thoughts on the idea of keeping current warehouse for inventory stocking while outsourcing the distribution centre for delivering repaired parts to customers?

R: Well, it's an option we have looked at it a bit. For example, to have a just like distribution centre where we would be able to have someone to put our paperwork and tape our boxes, everything remove supplier branding, and just generally inspect items in locations that are more favourable than in our warehouse in Copenhagen. But for now, the amount of shipments and outgoing parts we have, we don't feel like it's necessary for us to try that at this stage. But yeah, in the future, it could be a good opportunity for us to, for example, have the location of distribution centres around Europe, around US, Africa, around our customers, closer to our customers, easy routes, so we don't have to wait on transits and stuff like that.

I: What do you think whether it's more effective to position the distribution centre closer to suppliers' location or closer to customers' location? Or both?

R: It's quite difficult to say. Our customers are probably closer to each other than our suppliers, so it will probably be better to have them closer to the customers. In case of having it closer to suppliers, we would have to get more locations or some location may not be favourable.

I: And in terms of reducing the delivery time?

R: If our supplier is in Miami and the customer is in Africa, I would trust to have a distribution centre rather in US than in Africa. Just the how the customs and all those things are easier in the US, just to get them through that then trying to work things out in Africa. Even though in America it's actually quite the process, but in Africa, I think it's less structured. I think we would have a better overview of this situation if we're having a distribution centre in the US.

I: What improvements are necessary within the current delivery process for distributing the aircraft parts?

R: At the moment, we are trying to build up our customs warehouse, so getting more involved with the customs process. Also trying to get more involved within the import and export process of the parts themselves, so instead of outsourcing that to the freight forwarders, trying to do it as much as we can in house to gain control of the situation, the process, and basically as much of the movement of units as we can. We always try to implement new processes, new features that will give us a better overview of in and outgoing parts. We are a growing company, and we are trying to follow the needs and also future profit.

I: You mentioned that we need to improve the customs and the customs warehousing so can you elaborate if outsourcing to logistics partners can help to improve it?

R: Yes, so we've had options to outsource some of the customs work to maybe even more qualified organisations that have more experience, at least in making customs warehouses, in communicating with the customs department, with making sure that the process is done right, it's done correct, that everything is handled correctly. But yeah, for now, we would like to expand the company and what we do and have control over as much as we can, and if we don't need to get someone else to do it if it doesn't make sense for us to use those resources when we can have it better there. We could outsource that, but for now, it's maybe better to learn and gain experience with some different things and learn by doing it.

Employee 3:

I: My first question is what tasks and actions are associated with the process from receiving aircraft parts from the suppliers until they are shipped to the customers?

R: Yes, for this one so when we send the quotation to the supplier...

I: I am just asking about repaired, so it's already repaired and what is done until it will come to the customer?

R: For the units repaired we ask for the certificate to be sure that the units are certified and also for the invoice. After we ask for the weight and dimension, we're trying to find the freight forwarder for this units and when we find this, we start the process for the shipment. Make a label for this unit and take the AWB and try to follow up with the tracking number. And yes for the customs, if there is a problem with the customs, we try to find a solution for it. Sometimes they need some papers, so we provide him with this paper and that's all, we receive the unit.

I: Okay perfect and then, until it is shipped to the customer, what processes are happening in the warehouse when it's already in Copenhagen?

R: Yes, okay. For the units that we have in our warehouse, we have to first open, take some pictures of the units before sending. Because sometimes they said now we received this unit like that but because sometimes there is some damage in the units in the transport from us, so that's why we have to take these pictures to be sure that the units going from us are in good condition. And also, we ask the customers to provide us with the account number for the DHL or FedEx. So, sort of packaging of the units. That's all so we ask for. We already have the ship-to address so that's all, I think.

I: Okay perfect and also, I want to ask you what is happening with the packaging or the tapes or the documentation?

R: So yes, for the documentation we have to put the invoice on the box with the repair order I think. That's all I know.

I: Thank you and I want to ask you why you think that this strategy - it's called cross docking - meaning that you are receiving many parts from different shops and they're coming to Copenhagen and then, they are being shipped to different customers. So, why do you think that this process is a good fit for the company.

R: Yes, there are many advantages for this one. It's possible to make the shop anonymous. So, the customer cannot know the shop directly. Also, sometimes the shop keeps some paper with the pricing, and it's not good for us that the customer knows the pricing for these units.

I: Why?

R: Sometimes because we add our benefits, you know. And also for the units, sometimes we don't know what has happened to the unit. We send the units from the shop directly to the customer, but the customer says there is a problem with this unit. We didn't receive this part or spare part. So when we ask the supplier or the shop, they said no, we sent the units in good condition, so we don't know where the problem is. So, when we receive the units in Copenhagen, we inspect the units and see what. If it's all good, we send it directly to the shop.

I: What do you believe is the role of warehouse in helping your company operate smoothly? Why do you need warehouse?

R: To be honest, for the shop in Europe, it's good for us. Why? It's near to all customers. Because sometimes when we want to ship units from the US to the customer, for example, in Africa or in Asia, it will be difficult, a long process, especially in customs. But from Europe to the customer in Africa, it's easy. The thing goes smoothly.

I: And what about the shops in America, in US. Is it more difficult than if they are in the Europe?

R: Yes, they ask for lots of papers, and the customs, as I said, it's more difficult than they are in Europe. Yeah, so for me, I prefer to send the unit to the shop in Europe than to the shop in the US. And also, the difference in time, you know, that's why.

I: I want to ask you about disadvantages of having warehouse in Denmark, connected to timing, or timing of the delivery.

R: For disadvantages, I don't think so. Sometimes the customer sends us the core units, so the unit is unserviceable. Sometimes the value of the unit is, for example, 20 K dollars and they send it. And the units are not repaired, it's an unserviceable unit, and this is without notifying us. So, when the customer sends it, we have a problem with the customs because the customer says the value of the units is 20 K they give us. We have to pay the taxes. We have to pay the VAT of this unit, and it's not repaired, so this is, I think, the disadvantage. Just for the payment and for the other things it's good.

I: And what about the advantages of having warehouse in Denmark?

R: I said before that it's near to the customer. It's easy for the process. It's easy to send the units, and also when the customer knows that the shop in Europe accepts. Sometimes we receive purchase orders just because the stock is in Europe, not in the US. This process will not take a long time. Maybe in 1-2 days, we finish the process, but what you asked is a long process, even for the payments when we want to pay the supplier, it takes time. That's why.

I: By long process you mean like long delivery process until it will come back to the customer?

R: Yes exactly.

I: Now I want to ask you about the outsourcing. How do you see the impact of outsourcing warehousing activities on ST Aviation?

R: If you can just give me a synonym for outsourcing. I don't know the meaning of outsourcing.

I: Yes, basically outsourcing means that you wouldn't do it yourself but you will have for example outsourced warehouses which your partners will provide and it will be closer either to shops or to the customers.

R: For us it's good but for example when we have some units in the shop, I can give you an example. We did an exchange with the customer and the customer sent the core unit directly to the shop, so when we repair the unit it is still with the shop. So now it's outsourced and we leave it with the shop and other units we leave it with the shop. When we receive a purchase order and want to send the unit, we send it directly from the shop and we save the money for

the transport. But if we send it to Denmark, there is a transport fee that's why. And also, as you said some outsourcing is near to customer, so if we say to the customer we will deliver this unit today we can do it. But sometimes there is a customer in Asia and customer in Africa, so it's good that we have a unit in France. It's near.

I: So how do you think that if you will have outsourced warehouses in any region, because this partners they are having their warehouses everywhere in the world, so how do you think, it will help the company to improve service quality and customer satisfaction?

R: As I said, sometimes the customer has an AOG, so the airplane is grounded, so he needs the parts in AOG and he says to you that I can pay but just this unit, I want it today. By today. And they say no stock in US, we need the stock in Europe. So, if we have outsourcing we can help the need of the customer that's why. If we have this outsourcing we can help all our customers in the good time.

I: How do you think logistics experts from third party logistics provider could improve the delivery process compared to internal staff?

R: I think they can help for the customs. Because sometimes we have a lot of problem with the customs, so they can be very helpful for this thing. But because sometimes the units can be on hold with the customs, maybe one week so, it's not good for us to deliver the unit to the customer. So, it will be helpful for us on this thing.

I: I want to ask especially in time efficiency so to reduce the time until it will come to customer.

R: Yes, exactly because we don't have a specialization in logistics, so we need the experts.

I: What are the main criteria that third party logistics provider needs to offer or have for ST Aviation?

R: They have to give us a good offer. A good price first of all. And also, they have to be fast for this units that we have. If there is a problem, they have to solve this very fast because it can cost a lot of money for us.

I: And do you see any concerns or disadvantages when outsourcing?

R: No, I don't see. For me no. Just if we talk about the cost of this outsourcing. If we have the money to pay, it's good.

I: How important is timely delivery in aviation industry?

R: Yes, it's very. Sometimes our prices it's high in the market. Regarding the market, our prices sometimes it's so high and the customer says but what is the thing that make the difference, it's the delivery. If we deliver the units with a good time, sometimes we give the word to the customer. Okay he said, I will pay this amount even it's high regarding the market, but I want this unit to receive it today or tomorrow. If we do this thing, it's good for us. Even the price is high. So, for me, the customer when you want to work with the supplier this are the two things he looks for: the price and the delivery. And sometimes delivery is more important than the price.

I: What is the usual time between receiving notification from the supplier that part is ready to ship and customer receiving it.

R: I think it depends if the unit is in US or in Europe.

I: You can tell me both cases.

R: For the units in Europe, sometimes it takes just one day, maximum 2 days. In US it's maybe 3 days.

I: But also, if it's going through Denmark?

R: From US it can take like 5 days.

I: Do you mean to Denmark or to the customer?

R: Yes, from US to Denmark and from Denmark to customer.

I: So, 5 days overall.

R: Yes 5 days overall, I think.

I: And do you think that outsourcing, for example having warehouses closer to customers or suppliers, would reduce this time?

R: Yes absolutely.

I: And why do you think that.

R: For example, if the customer is from Serbia and our stock is in Slovakia or Denmark, maybe it will take just hours to receive it. But if the unit is in Florida or Canada, it will take more.

I: So, let me ask you, what are your thoughts if it will be more effective within delivery time to have warehouses closer to supplier location or to the customer location?

R: Closer to customer.

I: Okay and can you tell me more. Why? Or what are the benefits?

R: Yes, because if we have the units for example if the outsourcing is near to the to the shop, we never change anything because it's the same distance from the shop to the to the customer but if the outsourcing is near to the customer, it's short distance. It's logic.

I: How do you see the current possibility for ST aviation to establish their own local warehouses either close to suppliers or close to customers?

R: Yes, it will be good and we start this strategy with the warehouse in Dubai. It's open, so we look forward to have another warehouse in Africa or maybe in USA one day. It would be very helpful for us to control the time and the lead time for the units. We can say how long this units take to the customer and we make the customer satisfied and he can trust in us.

I: And what improvements are necessary with the current delivery process?

R: Sometimes for dangerous goods, they need a lot of paperwork, and yes, it would be very helpful if we had fast delivery for these specific units, like chemical units. If they can improve this side, this would be good. And also, when we have a unit and the amount of the unit is more

than 2500, so we need a document named as SLI, which stands for shippers' letter of instruction I think. So, what happened with me last week: I tried to make the units ready for the customer in Libya, and the unit is with the supplier in the US. I took the weight and dimension and I linked the freight forwarder with the warehouse and all is okay. But in the midnight of Friday, the supplier said I have units in hand, but I need the SLI, shipper's letter of instruction, so I can release the units from the customs. The problem is when I discuss with the shop, it's too late to provide me with these things. For these documents, we have to make them ready before dealing with the customer, and if the freight forwarder is good enough, he has to send this before taking the units. Solve it before, and we will fill up this information and send this abroad. For me, this is the improvement, or this is the problem that I faced in this shipment.

I: And do you think that these problems could be solved by outsourcing these operations to some partners?

R: Yes, it's easy to find a solution for this.

I: Can you tell me exactly, what logistics and warehousing operations would be the best to outsource to this partner?

R: For example, for the packaging and make the units ready for the logistics. I think a good communication between them and yes well, they have to make the process very fast. For example, if the unit is dangerous good you have to check the decision before you try to make the units ready. Packaging all this stuff. Make the weight and dimension and all invoices. That's all.

I: Great, and within timing, is there something that can also help you to reduce the time? For example, what they will handle instead of you, and it will help in the end.

R: For example, with our supplier the problem that we have is just the payment for the time. Because sometimes when we have a credit with some supplier, all the stuff goes smoothly, so we can deliver the units. I think I don't know to be honest. I don't know.

Employee 4:

I: I am researching the logistics process of repaired parts from the shops to the customers so I want to ask you what tasks and actions are associated with this process?

R: Are you talking about serviceable or non-serviceable units?

I: Serviceable and those that are going through Denmark.

R: Okay, so basically all we do is we have the unit, we ask for a copy of certificates. It's needed in customs in Denmark and a copy of the commercial invoice that we do the customs with. So, we request the weight and dimensions, the collection reference, and the pick-up address. Here you will go with those details to the freight forwarder where you can get the quotes. For example, you use Geodis, Kuehne & Nagel, FedEx, or DHL. Then you get quotes. After that, you have the approval from the high management, then you link the freight forwarder with the warehouse after receiving like that all the details that we request in prior, then you start the process of collecting the units, do the customs in the US or Europe, then ship it to our facility. So that's what we do. When units are coming to our warehouse, we don't use our proforma invoice because we cannot invoice ourselves, but we use the commercial invoice of the shop or the warehouse where it is coming from.

I: are there any processes happening with the package when it's received in your warehouse until it is shipped to the customer?

R: It's all from the warehouse, so the job is done from the warehouse, not from us.

I: Okay but do you have any idea what's done?

R: Honestly, I don't have any idea, but all we do, what I understand, like packing list, commercial invoice, and certificate, like the warehouse manager, do an inspection for the unit. They involve all the details, all the paperwork inside the box. There are three copies of the commercial invoice that's needed for the freight forwarder, and that's all that we do in the warehouse.

I: I want to ask you why do you think that this strategy that you are receiving different units from different shops to Denmark and then shipping it to different customers, why is it efficient for your company?

R: For our company, it is very efficient and very important. For example, there are some warehouses that do not use our paperwork. There is a big issue like we send the unit to our customer, they found the price that we are using, what we are paying to the shop, they know our cost and they know our benefits. So, it is not good for us. The best way is to get the unit to our facility, change the paperwork, include ours only, and then we do our inspection. We know that there is the right serial number, the unit is good and that stuff, and send it to the customer. It's very important, and I prefer the way that we do it from our facility than do it from the shop directly.

I: I want to ask you the advantages and disadvantages of having one warehouse in Denmark in terms of fast delivery.

R: I don't see any disadvantages because using our warehouse is very professional. We have a lot of contacts. For example, we know the freight forwarder who is coming. We know our unit is

going to the right customer. We know that the right part is going to the right customer, and we have fast delivery.

I: How do you see the potential impact of outsourcing warehousing activities on the company? What kind of impact it can have on ST Aviation?

R: What do you mean by outsourcing?

I: Outsourcing, meaning that these things what you are doing in Denmark, it can be done in the location closer to the customers or closer to the suppliers and your partner will take care of that.

R: Like having another warehouse where we can put our units maybe?

I: It will just go there, it wouldn't stay there. It will be just the same processes as you are doing in Denmark with this repaired stuff which is going to customer.

R: Okay. I think this one has a good impact regarding the cost. For example, if we have a unit in a shop in the US and at the same moment, we have a warehouse in the US, so there are no more costs. Then we're going to be cost-oriented. But having a unit, like it's heavy and coming to Denmark, there's a lot of cost involved, and we lose the benefits from our own march because we are paying the cost. The shipping cost is on us. So, it's good to have a warehouse nearby the shops. It's very good.

I: How do you think that the involvement of these logistics providers can help the company to improve service quality or customer satisfaction?

R: When we are using a professional freight forwarder, the service level there is very high, and the customer is satisfied. When we use, for example, a freight forwarder who is not answering our emails or calls, like they are collecting the unit 4 days or a week after we approved the quotation, so there is no satisfaction from our side nor from the customer side.

I: I understand and how do you think that the logistics experts from this 3PL company can improve the delivery process compared to internal staff at ST Aviation.

R: Regarding the freight forwarder in this case?

I: Yes, for example these providers can also facilitate the transport but also the warehousing activities so the unit wouldn't go to Denmark but to their facility and they will take care of everything. They are experts in logistics and they ship it to your customer.

R: You know, all we need nowadays is fast communication and easy communication. And as I said, if there is good communication, like a freight forwarder or agent answering calls, making fast actions, it's easy. Like if we are not answering or if we don't have the paperwork needed, they can search for it. For example, what we are facing now, maybe we are sharing the commercial invoice, and they are not seeing it, they keep asking for it. There is no effort to make a search on this in the emails or that stuff. So, this is what the big issue we have so far. As I said, communication is the most important to facilitate the delivery in the work.

I: What do you think that these service providers should offer? You mentioned the communication. Are there any benefits why you should decide to outsource it to them? What they have to offer?

R: Yes, we can talk here about the cost. If we have a good cost, and as I said, we are paying from our benefits, so this is what we need. Basically, it is a good cost, like the quotation must not be that high price, and then it will be good for our part and their part as well.

I: How do you think they can improve the time of the delivery?

R: Fast action is all we need, you know. We are working in aviation; some moments we have AOG. For example, we are sharing the weight and dimension, and it is ready to go in the afternoon, and till the evening, nobody is going to collect it. So, this is an issue; we have to pay an AOG fee again. And another thing is, we do work extra hours, for example, when we have an AOG and we have to keep following up until the unit is collected. So, this is what we need.

I: Can you think about any concerns or disadvantages for ST Aviation when outsourcing these operations to third party?

R: I don't have any experience with warehousing and that stuff, so that's why I don't have any idea. But we already purchased some units from a supplier that they have a third party, they have a warehouse somewhere in the US, and the issue was late delivery due to time difference. Like the warehouse located in Washington and the supplier located in Dubai, so there is a big time difference. And I still remember we called the supplier at 9:00 pm to help us, so the account manager was already sleeping and the warehouse is open. This is the issue what we have so far.

I: How important is timely delivery in aviation industry?

R: Time is all you have here. If you want to be in the market, you have to be on time because, as I said, you have a flight, you have people booking on this flight, and it is on the ground. The unit must be received on time, the aircraft must be released on time because you have people waiting for you. So, time costs money. All I'm going to say here is that time costs money here.

I: What benefits ST Aviation can gain from reducing delivery time?

R: Reducing delivery time means gaining customers; they will always come to you when they are in an AOG situation. So, as I said, time here costs money, and time will gain customers or lose them.

I: What's the usual or average time between receiving the notification that the part is ready at the shop until the customer will receive it?

R: It depends on the location of the customer. If they are in Africa, you know, most of our customers are located in Africa, and our warehouse is located in the US, so here it depends on the availability of the flights and on the action of the freight forwarder. We cannot decide how fast it's going to be.

I: And do you think that outsourcing these warehousing, so having it in more locations, will reduce this delivery time and why?

R: I think, yes, I would say because warehousing means you have the parts at your own. You are not using someone else's warehouse, and maybe they can make you prioritize. While using the supplier's warehouse or shop's warehouse, there is a queue, and you have to wait for your time or you pay the AOG fee.

I: What are your thoughts on the idea of keeping the current warehouse in Denmark for inventory stocking, and outsourcing the distribution centre for just delivering the repaired parts?

R: I think we are doing it great. I think the units are coming to our facility very fast. When the unit is in our hands, I feel like we don't even use more than 13 minutes to make it ready and make the inspection for the unit, so I think it is a very good idea.

I: Okay so you think that it's a good idea to keep current warehouse and also have some outsourced?

R: I think for Europe we can keep our warehouse but in US maybe, we can have a warehouse in there.

I: What do you think of whether it is more effective to position the warehouse close to suppliers' location or close to customers' location in terms of reducing this delivery time?

R: I would say close to customer.

I: And why?

R: I would say two things: like we cannot have warehouses everywhere because our customers are located in Tunisia, Libya, Morocco, South Africa, or Nigeria, so we cannot have warehouses nearby them. And also, if we have it, it would be fast, like having a warehouse in Tunisia, and if your customer is in Tunisia, there is no more than maybe 4 hours to get the unit to their facility or to the airport. So I think nearby customers much better.

I: How do you see the current possibility for ST Aviation to establish its own local warehouses either near suppliers or close to customers?

R: It would be a great idea.

I: But do you think it is possible at the moment? Or is it better to have it just outsourced to pay some fee and they will take care of it?

R: I would say it depends on the cash flow. Having a warehouse is too expensive, so it's a good idea to our business but we still need time for this.

I: What improvements are necessary within current delivery process for distributing aircraft parts?

R: I would say for the moment, there is no fault from our side. Like we are doing the work very well. We follow the process or what we've done is very well from our side. But we cannot control the others because we are dealing with a lot of parts. We are dealing with the warehouse, and we are dealing with the customer, and we are dealing with a freight forwarder and their agents, so there are a lot of parties involved. We can control ourselves, but we cannot control others, you see.

I: And do you think if, for example, you mentioned that we are delivering some things with, for example, Geodis, yeah, so if they will take care of the delivery and also the warehousing activities and then again delivery to the customer, do you think it will improve your process?

R: I would say we can be faster if the unit is in our facility. As I said, our Danish team is so good and so fast. They make very good progress and very good delivery. When the unit is coming to our facility, we have all the paperwork, we know the certificates, we know everything, we know the package, we have the pictures, we have everything on time, and the delivery also on time. So, I think it's very good.

I: And if you can think about some logistics and warehousing operations that would be the best to outsource and why?

R: Honestly, I have no idea.

Employee 5:

I: At the beginning I want to ask you what tasks and actions are associated with the process from receiving aircraft parts from suppliers to shipping them to customers after repair?

R: Well, when it comes to tasks, so obviously we have to deliver it. We have to transport it from our repair shop, which can be anywhere around the world, to our facility in Copenhagen. And then from Copenhagen, we send it to the customer which usually our target group is in Africa.

I: Can you tell me what's happening with the package or product itself while it is in your warehouse in Copenhagen?

R: When it comes we have to remove all the original paperwork or original invoices that repair shop is charging us what we pay. Then we put inside our new invoice that we charge our customer. We also remove all the other original tags, other things not related to our business. And then we also remove the tapes and this things that the customer doesn't have to see them. We add our own ST Aviation tape and make it look like our product.

I: I want to ask you, why do you think that cross docking is the right strategy for delivering spare parts in your logistics process? Cross-docking means that the products are being shipped or delivered from different suppliers to one facility and then from this facility shipped to number of different customers. And the parts stay at the facility for less than 24 or 48 hours.

R: Yeah, this is exactly how it sometimes work for us. It stays less than 48 hours in our facility. Sometimes they stay a little bit longer because we are waiting for the payment from our customer before we can send it. I think we do it from the reason so we can have a look and we can take all the original paperwork and put our own, so we can avoid sharing the information with our customer of how much we have paid for the repair and only thing that we share with the customer is how much the customer has to pay to us for this service. So, I think that's the only reason why we are doing it like this because there's example. It is coming from America to Denmark, Copenhagen and then from Copenhagen to let's say Algeria.

I: What do you believe is the role of warehouse or distribution centre in helping your company operate smoothly. What's the purpose of warehouse for your company?

R: I would say it is repackaging like relabelling. Taking all this invoice. I think that's the only reason or purpose for this to run smoothly. Of course, sometimes, we do also exchanges so that means that we have one unit that is already repaired. We send it to them and then we receive the broken part that waits for us, until we have to repair it. Or we find a good deal so then we store this unit for longer time.

I: I want to ask you why repaired products can't be shipped directly from suppliers to customers?

R: I don't know why they cannot be. This is how we doing it and this is how it is. This is our procedure, our set up. Basically I think maybe it can be cheaper how we doing it or maybe it's more expensive. But we just haven't invested time or resources into the solution, looking for this and we just do it this way. Of course we are paying for the delivery from the repair shop to our place and then the customer pays only for the final step of this transportation. I don't know why we don't have it but I think it would be very good. I think it would also save lots of things. Lots of time. And also for resources and especially this transportation from let's say USA to

Copenhagen that they have to pay, it's like lost money. If there is opportunity that we can send it directly from America to Africa and the customer is paying for this and it's included, why not? I think that's a good thing, would be amazing.

I: What are the advantages of having an intermediary warehouse in Denmark for delivering parts from suppliers to customers?

R: What I can think of is only this advantage or this pro that we can make 100% sure that our own invoice is there and no other invoice. So, we don't share this. It's like a leak of information that we don't want to our customer. I think that's the only and only advantage of this. I think there would be more disadvantages.

I: Okay and can you tell me the disadvantages?

R: Of course. Obviously, the price that we have to pay for this transportation to us. Then we have to have a bigger storage place over here in Denmark and Copenhagen, because we have to store all the units that doesn't have to be stored. But they are at our place just waiting for the payment and to be shipped to the customer. I think those are the two main disadvantages.

I: How do you see the potential impact of outsourcing warehousing activities on the company?

R: I think the impact would be very nice and it would be very beneficial. And I think if the costs obviously are less than what we are spending now for this cross docking you said, this word like that something is being delivered to Denmark and then immediately within 48 hours to the customer. We just like waste and also it's not sustainable at all so, I think if there is a solution to outsource it, of course, we cannot outsource everything, everywhere, in every single country or every single repair shops but I think it would have a great impact.

I: How do you think the involvement of third-party logistics provider can help the company to improve service quality and customer satisfaction?

R: Definitely, it would save so much time because the transportation to Copenhagen and then sometimes this being transported, it takes, let's say, seven days or even more than seven days to transport something from America. And sometimes, already during this process, during this transportation, the component or the part is already being paid by a customer. So immediately when it arrives in the morning, we send it out, literally within one hour. So, I think that would be very beneficial. It would help a lot like this, I mean outsourcing with the 3PLs.

I: How do you think logistics experts from this logistics provider company could improve the delivery process compared to internal staff, especially in terms of time efficiency?

R: Well, that would definitely make it time-efficient, everything much faster, and also more, maybe, reliable. Because I know that sometimes we have issues with picking up and this reference number for pick up. But once it's like a real expert or logistic experts handling this one, we know that we can count on them, that there will be no mistakes. And they also have their own software for inventory that, for instance, we don't have; we are using post-it notes, so you know mistakes can happen. But in these big companies that have their own verified tools that they also pay for, they have their licenses that we don't have, we can count on them, that it will be much smoother.

I: What are the main criteria that this third-party logistics provider needs to offer or have for the company to consider outsourcing?

R: They have to offer warehousing facility like this: they can handle that, they can repack it, they can put our label, and they can put our own invoice, not leave the repair shop invoice inside. Obviously, they have to offer a good price, meaning that if we send it to Denmark, then the transportation costs money and the time. But the time, we're not talking now; we're talking only about the transportation costs. So, if they offered it that it will be cheaper to store it and send it directly from there, that would be amazing. Also, I know that sometimes we have big issues with customs, which is a big challenge because it's like repaired something coming to our bonded warehouse, and then lots of paperwork related to this. It's also putting many obstacles in our processes because there are some mistakes either from our side of the company or from our customer's side, which is more happening. And then we have to put some parts on hold, and we cannot operate with them until the paperwork is solved. That's a very big pain for us because we're losing money; we have to store it and the time, of course, it's crucial.

I: What are the main concerns or disadvantages for the company when outsourcing?

R: You don't have an overview. Also, are they going to do it our way as we are doing it? But I think those are just maybe threats, not the weaknesses of having this one, like a disadvantage. Just like me in logistics, maybe I would be worried. I don't know how much I can trust them. But I believe that once we know they set their bar or their standard and present it to us, we know that we can count on them, and it will never go below this standard. But besides these disadvantages, I don't see many.

I: How important is timely delivery within the aviation industry?

R: Always very crucial, it's very crucial. If you can imagine something happens with the airplane and it has to stand and be parked on the airport, every single minute actually costs thousands and thousands. And if we're talking about days, that's... yeah, this is the business where time is the most crucial, I would say. And I think that any solution that would make the delivery process of repair parts to the customers faster and more time-efficient would be a great innovation.

I: Can you tell me what is the usual time gap between receiving notification from the supplier that part is ready to ship and customer actually receiving it?

R: It depends, so sometimes we just get a notification, but then we don't have all the paperwork yet ready; we have to wait for it. So on average, I would say maybe three weeks if we think that now the repair shop or the maintenance, they repair it now it takes three or four days. Now, this time between Denmark and USA is different time zones, of course, obviously, and we have our office hours, so we don't deal with this one during the night, so we cannot live call together. So this also adds up; that's a huge barrier when it comes to America. But then let's add up five more days, then transportation 7 to 9 days, that's already two weeks. Then it's at our place, but then we have to wait for the wire transaction of the money, I would say minimum like 3 weeks around that, minimum 2-3-4 weeks before. And of course, yeah, that's like this 2 and half weeks until it's at our place and we are ready to ship it. And then it is being shipped from Copenhagen to the customer, which adds more again, one week. So approximately, yeah, one month, let's say.

I: Could you elaborate on the potential impact of outsourcing warehouses on reducing this time?

R: It would drastically reduce it. It will help a lot with customs because it will be repaired or manufactured in America, and then in America it will wait for the final custom declaration so it can leave from America to Africa. It will totally skip Europe; it would save time like this. Then also, if it goes directly from USA to Africa as I was saying, it was like 2 weeks maybe; it would save, yes, plus also all the other potential threats and challenges that can occur here in Copenhagen with transportation. We don't have great access to our storage; we have to climb a few stairs with it or go around the building on the streets when it's raining. Yeah, basically, it can also be a factor into this, so outsourcing it would like maximize the standards that we would like the dream of for providing to our customer.

I: What are your thoughts on the idea of keeping the current warehouse for inventory stocking while outsourcing the distribution centre for delivering repaired parts to customers?

R: That's brilliant. This is how it should be, and I'm waiting if there will be something that will help our company to grow and something that will change it and innovate our company because our company is a little bit stuck and doesn't grow that much. But I think also it would save so much time and help a lot.

I: What are your thoughts on whether it's more effective to position the distribution centre closer to suppliers location or closer to customers location, in terms of reducing delivery time?

R: In this case, I think it's better to have it closer to the supplier than our customer. And that's for the reason because our customers are everywhere around the whole world, like you know, there's not just one specific country or one specific airline, and we have so many customers. But we have only a few suppliers, so therefore, definitely having it closer to the suppliers would make more sense and would be more time-efficient and save so much time.

I: How do you see the current possibility for the company to establish its own local warehouses either near to suppliers or customers?

R: I mean, yes, that's also a possibility, but I think it will be very expensive for us to go and open a new branch, basically like a new ST Aviation company in the USA. We have to hire people, and also, there is this thing that sometimes there is nothing coming for five days, but it's only waiting for a signal that something can be shipped out. So basically, we will have to pay some people in America just to wait, and that's only in America. We also have repair shops in many states in America, but also in other countries as well. So I don't think that would be the smartest move, like this opening a new branch of ST Aviation having our own. I think the only logical way is to outsource it using our already verified freight forwarders and experts that we can count on.

I: What are the other locations where supplier shops are located?

R: Then we have Canada, which is almost the same as the USA. This is very close and special terms for transportation between these two countries, so that still counts as the United States for me. But then we have the United Kingdom, Spain, France, Germany, so Europe. Yeah, so if I should divide it or separate it as United States plus Canada, and Europe.

I: What improvements are necessary within the current delivery process for distributing aircraft parts?

R: Make it faster. Save time. Save money.

I: Are there any bottlenecks?

R: Yeah, bottlenecks, definitely. I would say at our facility, we are not ready for shipping many things a day. If there is one employee a day that can only handle, and he has to repack everything, and everything takes time to do this task because it's our work. But sometimes, he has to wait for somebody that will come and help. But sometimes, we also have heavy units, and they are, you know, impossible in our warehouse because we don't have any lift or anything like heavy machinery that's going to help us operate it and do this work. What I was saying before, like our own labels and doing this labelling of ST Aviation on the box. And then also, we are relying on a few companies that will come to our place and pick it up. And we also don't have a dedicated time that every day DHL will come to our place like this as they have in other big warehouses or other facilities. So I think that's also like a bottleneck. We book our shipments, and then we have to wait until the moment our freight forwarder finds a partner or courier that will come and pick it up.

I: Can you tell me if outsourcing to logistics partners can help to improve those bottlenecks?

R: Definitely. Well, how I imagined outsourcing warehousing, I am thinking about a big, huge warehouse which is divided and distributed to other companies as well. So, therefore, I can only assume that there is an everyday daily pickup from DHL, daily pickup from other freight forwarders, so basically everything will be shipped, and there will be no stress for the time, and especially heavy units, they will have such great machinery or expert machinery for handling these things which, for instance, we don't have. And I don't know if we will have them anytime soon because it's also very costly, it's very expensive. That's what I want to say.

I: What are the logistics and warehousing operations that would be the best to outsource and why?

R: The best would be to outsource the distribution of heavy units, but it's just like handling these heavy units and keeping them waiting for the signal to ship them, and then also loading them on the trucks; that would be the best because we are not capable at this moment for this. Also, other activities would be the help with the customs; that would be a great help because I know sometimes, we don't notice, us who books the shipment from the transportation with the freight forwarder from our supplier, and our supplier makes a mistake and doesn't put this documentation there. And then our freight forwarder asks for this extra terms or HS codes (harmonized codes) in these things because he knows exactly. They are the transportation experts so they know that they cannot transfer something without this. And we assume, for instance, for example, the supplier is providing all the necessary documentations, but in fact, they don't. And we sometimes are very grateful for Geodis, for instance, that they have an eye on this.

Employee 6:

I: What tasks and actions are associated with the process from receiving aircraft parts from suppliers to shipping them to customers after repair?

R: Well, actually today what we do is you know you've been involved in this kind of transactions well basically today and for us the solution that we're looking to avoid before we meet and actually doing drop shipments we ask our customers to ship a unit directly to the shop then from there we can do drop shipment from the shop to the customers but this is the risk there sometimes when the shop receives components it might be that there is a lack of information or it's from us ST Aviation. There's a lot of risk involved so let's say we are losing a little bit of control. It's a perfect solution it's lean it's fast because it goes direct it's avoiding all the taxes in Denmark that is not always fair with SKAT because they're very firm and are not flexible and when things go wrong you can be again a high cost only on the transportation but also on the toll basically on the fee that you have to pay and you cannot go back basically it can be very costly.

I: I just want to ask, you mention that drop shipping. Basically, is it that you're collecting products from suppliers to one facility and then shipping it to...

R: Drop-shipment is the opposite you go direct it is lean you don't do triangle when I said drop shipments basically and these things there are three let's talk about this. There is a customer or end user, there is ST Aviation and there is a shop or the MRO. We're three here. When you drop something basically you jump step basically we send it from the end user which is our customer to our MROs our shops. This is drop shipments. And this is the most lean and the most efficient but it just comes with the risk of the control. what's going on it might lose items we don't know it might be that they get it and they don't know where it is from. maybe the unit is coming damaged and we don't know or something we cannot report whatever a lot of things we don't see the unit we don't see it physically it goes there directly and then we try to see maybe ask them how is the unit and then there is solution what we are doing today and because we have been losing this control we get the unit here basically this is not drop shipments it's coming from customer to ST Aviation in Denmark which you were involved in this and then you ship it to the MRO. Basically it can come from South Africa it comes to Denmark and then you send it to Canada and drop shipment is from South Africa to Canada.

I: Yes, I understand. And what about the reverse process? So, from the shop when it is repaired?

R: Yes, it's the same if it's not drop shipment there. Then from Canada to South Africa, what we do today, we do it from Canada to Denmark, from Denmark to South Africa. And as I said, there is a risk, as you know sometimes, we pay taxes for something they should not ask, and this is what we're trying to improve: the way with the customs, how to be more efficient. And not only more efficient, sometimes the customs, as you know, the shipper here, they are not declaring the things as they should, and then they put our name. And then basically that I'm giving you an issue to deal with, and this is how it is. And then in the end, you just find a line on the tax that you have to pay because your name has been declined; we didn't approve it, but you have to pay it. In the end, it's just like this: using your name, you have to pay, and if you don't pay, they will come to you and they will tell you you are outside of the law because you're not paying this, and even if you try to explain, you cannot explain. Then you have to pay and then explain but it's too late, and then this is how it is.

I: Regarding this one, what you are talking about, I have a question. What are the disadvantages of having a warehouse in Denmark?

R: As I said, disadvantage, like there is one thing: A warehouse is a cost. Cost of the facility, cost of labels, that mean the colleagues that take care of all the reception or shipments, you know, maintaining this order, management of the warehouse, plus all these things with the taxes that we have to improve the way how we can declare the customs that we are not paying extra, which we should. Yeah, this is all the challenges that we are facing today.

I: What do you think about timing delivery about the efficiency of the time? Do you think that it can be improved if it wouldn't go through Denmark but maybe you will have warehouses closer to suppliers?.

R: You will never improve because it's just like you are taking a flight. What do you like: direct flight or would you like to fly with transit? Direct flight. These are the same things. Time will never improve.

I: And can you tell me now the advantages of having warehouse in Denmark?

R: The advantage is that you control. You control the items. Let's say the advantage can be in one way: when items come, you inspect. It's the right things. If any damage, you control. When you send it to the shop, you know what it is, that things are going right as it should. In case we receive it here again, we check that everything is good. It's more visibility or control. Basically, you are in more control of the job.

I: Can you please tell me more why some shipments of some repaired products cannot be shipped directly from the shop to customer?

R: We do. I mean, we do sometimes. But as I said, if we are selling directly, if we're doing repair management and things like that, we would like it to come here. You do your own tape; you do your own things. It looks like it's coming from us. It's just like giving you a gift. If I give you a gift directly and I want to put my wherever, you know, it's better to come here and I pack it nicely and then make sure that the box, everything is good from our side.

I: How do you see the potential impact of outsourcing warehousing activities on the company?

R: It can be a solution, of course, but also it's something to study. It can be also some challenges. It's something we have to study and see from our experience. By drop shipment and coming here and making sure that the paperwork, because the shipment is not only the way but also paperwork, have to be right. Very important that between, it looks like normal when it's inside the same country, there are same rules or maybe EU. It's the things with the papers are good. But when we start the shipment to be outside of EU, and you know, different country customs are more difficult, and you have to make sure that all papers are right. Even like today, you are going to buy units and you put it in the warehouse in the US, and then to ship it here, you need the seller. Is the warehouse able to make you proforma invoice to ship it here? I don't think so. You still need the seller. You still need the proforma invoice. Yes, it will be easy if ST Aviation has a facility in the US; then we can put our proforma invoice to come here. But sometimes, who is going to make you this, you know? Or you have to go back from who you bought from the US to be on the warehouse. All these challenges, basically paperwork, you have to make sure; otherwise, you will start paying the cost more. But anyway, this solution to be studied and should be seen, and but it's not for storage the warehouse, but it can be for a quick move. It might be a good solution. Maybe it can be this guy; you give him your packing things, and they do it on your behalf.

I: So basically, the part stays at this facility for less than 24 hours.

R: Yes, if they are fast. But basically, you just have to do the job. It comes there, they do some of the job what we do here, basically. And then this has to be studied between the transport to be here and the facility is going to be there, you know? How much it is going to cost us if we ship it here, and how much it is going to cost us if it is going to be there in the USA. But again, you have to have a team there that we are sure that at least the standard is given into what we do here.

I: How do you think that logistics experts from the logistics provider could improve the delivery process compared to internal staff, especially in time efficiency?

R: I really don't know how they can do it. In the end of the day, they are subcontractors and they have to answer us.

I: Do you think it can be faster?

R: They have to see what is in the agreement they are going to do. I don't know if it's going to be faster or not. The only thing they can do is just the same standard as you. If we have good workers, this is a question about who is our staff and how much we love our products and how to do the good job.

I: What are the main criteria that this logistics provider needs to offer or have for the company to consider outsourcing warehousing? What they need to offer to you?

R: Well, basically, it's the service. To be honest with you, today we're not studying these things, and this is why you are taking these things. It's basically to compare, and we will see what we have to know, what we can do, and the rest we will see what they can give us based on agreement tied with some penalty to make sure that things are right. And then we see the budget and cost side, what we can have from them, and then we will decide. But today, I cannot say. The only thing is we have to know ourselves what we have to win.

I: I am just asking what are the things that would convince you to outsource the warehousing? What they need to offer?

R: We are looking for options; it might be yes, it might be not. It's not that we are going to choose. It is an option. We have to think about it. We have this solution, we are happy with it. We can control, okay, let's see, maybe we will find another mode that we can market, and we will find perhaps a good partner that we can have a good system to have a warehouse everywhere and expand worldwide. That today we can do in the US, we can do in Canada. Because we are going to have our own warehouse which they are going to treat on our behalf, and then ST Aviation is going to have a connection everywhere, you know. But the things now again we have to find out that the things are right because it's about control. We don't want to go to somewhere, yeah, we have a warehouse. As I told you, we put it in the US, and then you want to ship it here; you cannot; you need the paperwork and all of these things, basically, you have to be not looking on the warehouse, but you have to be looking to complete solution that at least if we have an AOG, we have a customer grounded, we're able to ship our goods.

I: What are the main concerns or disadvantages for ST Aviation when outsourcing?

R: I already answered this one.

I: How important is timely delivery within aviation industry?

R: There are a lot of conditions here. Between AOG, if it is really urgent, and also if it is normal routine. Inside these things, you have to know also from where you are shipping, part you know, if we're inside Denmark, if we are inside EU, if we are inside Asia. On Monday, I'm going to Singapore. The flight is 20 hours, and best things, even AOG, still take 20 hours. Me, I can go, I can still pass the gate, but again customs, they can take more. It depends on which country. In Europe, the customs are fast; some countries, the customs can take even 10 days. But normally, if it's a good location, it can be from one day, the same day, to 3 days in terms of AOG. Then, if it is something planned like tires, very heavy, and this is going to be by the boat, as any delivery can take a month. Only to transport, basically, it's quite a wide range of lead time of deliveries.

I: What are the benefits for ST Aviation that can gain from reducing delivery times?

R: For us to reduce delivery time, it's by drop shipments, as I said, direct flights. The rest, it's a lot of factors from the team when they receive. We can speak about the solution what we have today, which we try to have the items come here again to come back positive things of having a warehouse. We control it also. It's a good thing, quickly job, it's also positive things. This is also one thing that benefits of this, it is basically control creation job is good, you know, it's nice. But again, we have to look to the cost side, basically. I think I answered your questions.

I: What is the usual time gap between receiving the notification from the shop that the unit is ready until the customer will receive it, but I'm talking about the case now to going through Denmark?

R: Depends. This is how the team is going to find out and how quickly they are going to find out because in this, we have taken care of the control of the shipments. How much time they're going to find the shipper and how much they are going to act with the shipper. This is our part that we control; we need to have a proactive team to do this kind of thing and how quick it is to make the unit ready for pick-up. It must be the same day; normally if it is more than the same day, we are not doing what we should. Again, we control everything, even with the shop; we have to push them if they are not ready because we pay them. We have to make sure that they make the unit ready. But again, this is the control to push that the things are done. But sometimes it's not urgent; we try to do things as it should. But this is again the qualification, the expertise of our team, how much they are willing to put the right energy to get these things right.

I: You also mentioned that there are some issues with the customs and that it can take time. Do you think that outsourcing to the relevant experts out there will improve this system?

R: It's going to be the same thing, because we are going to have a transporter. Of course, definitely, we are going to win the time. The time of transportation, this definitely is going to be faster to get it here, but this is going to be faster if the warehousing and act at the same time or less than us when we get the unit here to be shipped, definitely.

I: Okay so you mean that the time will be faster when outsourcing?

R: Of course, because let's see, you have a warehouse in the US and the unit is in the US. It's going to be only a local flight, whatever, or maybe even just around the corner, and then from there, they are going to do all the packaging and everything. They are going to make it ready; they ask the supplier or the customer to take the unit, and that's it because it is how it is.

Basically, you win on the time; it is going to be faster, of course. But again, it is going to be faster if they act, or maybe you will come to the solution; you will get your unit, and they will tell you are in the queue, we have so many, we cannot. Is it going to be done in the same day? Yeah, definitely, it's going to be fast, but some of their actions can take more than the units coming to Denmark and so on. But this, again, I don't have a number; it's going to be the agreements to put with them to tell you we are going to do it in the same day when it's received to be ready from receiving to be ready for pick up. It would give us time, and this is what we should do to make sure it is going to be a better solution.

I: What factors can influence this one, to have a better communication and relationship with the partner you are outsourcing to? Maybe to write some good agreement or what should be done to avoid this?

R: Of course, it's going to be an agreement. We have to pay them if they give us this service.

I: What are your thoughts on the idea of keeping the current warehouse here in Denmark for inventory stocking and outsourcing the distribution centre for delivering the repaired parts to customers?

R: As I said, today we have to study these things and we have to see if it's good or not. Of course, if we have heavy stuff or today you win an agreement of distributing tires. When we talk about tires, we talk about factors like weight, dimension, and price, you know, transport is high; it can be even higher than the price of the goods of the tires, just the shipments of tires. Or maybe even it can be very close, even if it's yours and you want to put it in our warehouse, it is costly. But of course, if you have manufacturers and you find, in the corner, a warehouse to have your stock there to outsource, it's a good solution. All of this has to be studied and to be checked, and it's numbers. We know how much it costs us to have our warehouse here.

I: I want to ask you, what are your thoughts whether it's more effective to position the warehouse closer to suppliers' location or closer to customers' location?

R: Well, today our suppliers are not fixed, and our customers are not fixed, you know? We are not having one-zone customers; we have customers everywhere, and we have suppliers everywhere. And today, you might be asking for X1, which is the supplier, and then you get another one somewhere, and then it can be fit. Still, you need to have the right distribution because it's not standard.

I: And what are your thoughts about having a logistics partner who has warehouses in different regions so to have it in customers' locations and also in suppliers' locations?

R: So yeah, of course, we want to work with a partner, and this is what I said. If we set up something that has a warehouse everywhere, and for us, it's mostly the quick things. It's not like really storage; it is mostly a solution that can be quick things. Basically, we fight on time to make it ready and also on the transport solution to make it ready for our customers.

I: What are the warehousing activities you would like to outsource? For example, the package is coming to this facility and what the logistics provider have to do with this package in the aviation industry.

R: Packaging. Change packaging and make sure that the right paperwork, that's it. And taking some pictures, checking. Basically what we do here. We get the unit, inspect it, we see that

everything is good, we pack it, we do our tape, we take some papers if it is coming from a second party, we don't want to share it, we keep it, we put our own paper, we scan the things, and then we ship it. Basically, all the action we have here should be there, that's it.

I: What improvements are necessary within the current delivery process for distributing aircraft parts?

R: Today, we have a team, to be honest with you, that we are trying on the customs to tell us what we should do, and I try to take myself as much as I can. I give it to the colleagues to take care and find a solution themselves and not to be involved in these things. I let them take the project and get the options and give the room for creativity to come back with a good solution.

I: And do you have something concrete in your mind what you would like to improve?

R: No, I don't want to be involved in. I would like to see the team that, basically, today we're in the growth and we have to give responsibility of the team to come back and to listen to them and not to try, but based on our comment, mostly in finance side. If it is working or if it's not working and the budget.

I: What are your thoughts on the current possibility for ST Aviation to establish its own local warehouses, either in your suppliers or close to customers locations?

R: Of course, as I said, control is very important. Again, control of the warehouse to have it, it is still your goods, you trust yourself, it's still your money, especially in aviation. We talk about thousands of dollars, we talk about millions maybe, and of course, having this asset in your hands is always good to control it. You don't know what is going to happen.

I: I just want to ask you at the moment is it possible to establish your own warehouses or what are the things right now? Would you like to outsource it rather than making your own warehouses?

R: We still have our warehouse. The question today is, do we want to expand our warehouse? Because as I said, we are growing. Do we want to expand, or do we want to have other options? I am telling you, we have tires coming from Canada again and going to South Africa. This tire costs maybe \$2000, transport is \$3000. Is it smart to get it here and then send it, or do we say, "Wait a second, why am I going to look for transport? I'm going to ask my service provider to do this service for me. I'm going to send you my taping, and let's say this is going to cost you maybe \$100, or if you want to get it for you here, it might cost you \$1000, then you choose the option which one you want." This is what we want. It can be easy as the first option like this, but it's not about the whole thing, so it's about options. You have options to be smart enough sometimes to do it different ways, not only one way. But this is again, it's our team; it has to be possible. I find the transport, even like 500 kroner, just saying. Normally when it's outside, as you know, it's mostly over 2000 kroner, which is \$300.00. He might do this for you for \$50.00 to do this service for you. You win \$250, and when you win \$250, it's like you just sold something very good for \$250.