Risk Management in Air Freight Handling Processes
A Case Study at Jönköping Airport

Paper within Master Thesis in Business Administration
Authors: Matthew Hailey
Martin Jonasson

Supervisor: Leif-Magnus Jensen
Jönköping 2013-05-20
Acknowledgments

We would like to use this opportunity to thank our supervisor Leif-Magnus Jensen who has provided us with valuable input, guidance and support during the undertaking of this thesis.

We would also like to thank Jönköping Airport and its cooperating partners in the air freight handling process, who have been extremely helpful and supportive with providing us the valuable information and contacts in order to conduct this research. The time and patience given by the airport and its partners has made this thesis possible for which we are very grateful.

Last but not least we would like to thank our student colleagues in our opposition group who have provided us with useful and valuable feedback on our thesis, throughout its development.

Jönköping, May 2013

____________________                               ____________________
Matthew Hailey                               Martin Jonasson
Master Thesis in Business Administration

Title: Risk Management in Air Freight Handling Processes - A Case Study at Jönköping Airport

Authors: Matthew Hailey
          Martin Jonasson

Supervisor: Leif-Magnus Jensen

Date: 2013-05-20

Key words: Air freight, air freight handling, risk management, airports, freight forwarders

Abstract

Demands from consumers and industry for faster transports of goods have fuelled the rapid growth in air freight transportation during the previous decades. It has been shown to be an important means in the movement of goods in support of supply chains on a global scale. The authors of this thesis discovered that there was little research previously conducted when it concerns risk within the industry, specifically concerned with air freight handling processes.

Subsequently, the purpose of this thesis is to identify and explore risk factors within the air freight handling processes. Furthermore, the research questions seek to critically examine who the actors are within the process and what roles they have. The thesis then identifies the key elements of risk within the process, and how the actors concerned manage, control, and address them. Furthermore, ways in which this could be improved were explored.

To address the research problem, the authors approached this using a single embedded case study based on the air freight handling processes located at Jönköping airport. Data was collected using observations and interviews with four key participants of the specific air freight handling process. The empirical data was then analysed using four key themes’ derived from theory. Furthermore, propositions were presented from the results that emerged from the data which could be used a basis for further research.

The findings that address the thesis’ research purpose and questions indicate that the major elements of risk exist are that of physical and financial. In addressing these risks, the actors involved in air freight handling processes were flexible and pro-active their activities. Furthermore, the analysis indicated that reducing dependency could be a way to further improve how these risks are managed.
# Table of Contents

1 Introduction ................................................................................................................. 1
   1.1 Background ........................................................................................................ 1
   1.2 Problem Discussion ......................................................................................... 2
   1.3 Research Purpose ............................................................................................ 3
   1.4 Research Questions .......................................................................................... 3
   1.5 Delimitations ................................................................................................... 3

2 Theoretical Framework ............................................................................................... 5
   2.1 Risk Management .............................................................................................. 5
      2.1.1 What is Risk? ............................................................................................ 5
      2.1.2 Risk and Uncertainty .............................................................................. 5
      2.1.3 Approaches to Risk Management ............................................................... 6
      2.1.4 Risk and Supply Chain Management ......................................................... 8
   2.2 Air Freight ......................................................................................................... 10
      2.2.1 The Actors ................................................................................................ 12
      2.2.2 Unit Load Devices (ULD) .......................................................................... 12
      2.2.3 Air Cargo Handling Equipment ................................................................. 13
      2.2.4 Intermodal Transportation ....................................................................... 13
      2.2.5 Hub-and-spoke Networks ........................................................................ 14
      2.2.6 Air Hub-and-spoke Networks .................................................................. 15
   2.3 Risk in Air Freight .............................................................................................. 15
      2.3.1 Operational ............................................................................................... 15
      2.3.2 Accidents ................................................................................................... 15
      2.3.3 Investments .............................................................................................. 16
      2.3.4 Air Screening ............................................................................................ 16
      2.3.5 Cargo Theft .............................................................................................. 16
      2.3.6 Air Freight Costs ...................................................................................... 17
      2.3.7 Planning .................................................................................................... 17

3 Methodology ............................................................................................................... 19
   3.1 Research Strategy .............................................................................................. 19
   3.2 Research Approach ............................................................................................ 19
      3.2.1 Exploratory Study ..................................................................................... 20
      3.2.2 Qualitative Data ....................................................................................... 20
      3.2.3 Cross-sectional Time Horizon .................................................................... 20
      3.2.4 Case Study ............................................................................................... 21
   3.3 Data Collection Methods ................................................................................... 22
      3.3.1 Literature Study ......................................................................................... 22
      3.3.2 Observation ................................................................................................ 22
      3.3.3 Interview Approach .................................................................................. 23
      3.3.4 Conducting Interviews ............................................................................. 25
   3.4 Data Analysis ..................................................................................................... 26
   3.5 Research Limitations ......................................................................................... 26
   3.6 Validity ............................................................................................................... 26
   3.7 Reliability .......................................................................................................... 27
1 Introduction

This chapter begins by presenting the background to the main subject area, followed by the problem discussion that lead to the purpose of the thesis. The chapter then continues by clarifying the research questions followed by detailing the limitations of the study.

1.1 Background

International air trade and its development has brought about the rise demand for air freight transport networks. The air transportation industry is relatively younger when compared with land and sea transports. It has very specific requirements and operates in a nature which is unique to the world of logistics. The advantages of air transportation are plain to see, in the fact that it is a safe and fast method to transport goods over long distances. It can offer suppliers and customers more flexibility, and allow for expedited shipments within time-constrained environments (Enarsson, 2006). The speed and the high frequency of scheduled flights covering the majority of cities in the world has reduced transit time from as many as 50 days to 1 or 2 days. Of the factors currently driving changes in the business world (e.g. shorter product lead time and life cycle; increased product variety; instant customisation; empowered customers; and advanced information technology), globalisation is the most important driving force that is changing business landscapes (Coyle, Bardi & Langley, 2003). This has given industry the ability to reduce their inventories, allow seasonal goods to be available all year round, and the ability to provide rapid emergency support to industry and populations, where critical components or humanitarian resources are required swiftly and efficiently (Rushton, Croucher & Baker, 2010).

The major competitive disadvantage of air freight transportation in general is costs, especially when the macroeconomic environment is unstable. Furthermore, companies tend to focus more and more on reducing costs, especially concerning transportation selection, which often results in switching to cheaper land-based transports (Enarsson, 2006).

The air freight sector as an industry worldwide reached a value of almost 125 billion US dollars in 2012, and is forecast to rise to almost 160 billion by 2016. The European segment of this industry accounts for almost 33 billion or 26.9 per cent (MarketLine Industry Profile, 2012). The growth of air freight in freight-ton kilometres has been outpacing that of passenger with increases of 7.9 per cent, compared with 1-2 per cent annually during the past decade (Reynolds-Feighan, 2001). Furthermore, just-in-time pressures and the vertical integration of the logistics industry have led to growth in the international express market of 24 per cent since 1992 (Zhang, Hui, & Leung, 2004).

This growth in the sector has made many traditional airlines changes their focus from being dedicated passenger carriers to combined passenger-cargo carriers. In terms of weight, air freight accounts for less than 1 per cent of the loads that are transported on passenger flights, but in terms of revenue is about 39 per cent. When it comes to combined passenger/cargo aircraft, the main priority has been the passenger baggage and then later enplane the cargo in the remaining belly space, which means that there is no guarantee that the cargo will be shipped on a specific flight. Zhang et al. (2004) state that passenger revenue is still significantly higher than that of cargo, with passengers
accounting for 70 per cent or more for most airlines. This has increased the importance of dedicated air cargo transports for prioritised goods (Wong, 2008).

The growth in air cargo has also generated additional revenue for airports, as well as for the surrounding community, through providing better utilisation of airport facilities. The majority of these services are operational during off-peak hours (midnight to 6 o’clock in the morning) (Golicic, McCarthy & Mentzer, 2003). Furthermore, Golicic et al. (2003) found that many of the largest airports in the U.S. are facing major bottleneck issues with air and ground operations. While the amount of freight shipped via air is growing, the flight capacity for handling air cargo at domestic airports is not.

For the airports, performing air cargo handling operations could be capital-intensive, and therefore a potential risk could be with how to plan for further development and invest in the right resources (Golicic et al., 2003). Further risks of accidents in the physical operation, both during flights and handling of goods. Changes in safety regulations could intensively increase the time and money spent on preparation with and handling the cargo to and from the aircraft (Dutton, 2010). Cargo theft is also a growing problem, especially during the recent years following the aftermath of the economic crisis. During recent years, concerns regarding environmental effects of air transportation activities, which include both from aircraft and the air terminal operations, have been highlighted (Rondinelli & Berry, 2000). This is an area where future regulations and increased costs could have implications for air freight.

Changed demands from the customers to deliver products faster has also increased the risk with more handling taking place during the weekends, and at often unsecured locations in between the hubs (Tarnef, 2008). The cost itself of handling air cargo could significantly change due to major changes in the world market of air cargo. Major changes like increased cost of air fuel, higher demand of traffic capacity, new regulations and an overall global risk in the aftermath of for example, a safety incident abroad will affect the whole industry (Moore, 2012). The operational planning is often performed in advanced, which means there is always a degree of uncertainty during the actual day-to-day operations, due to the risk of over- or under-booking (Wong, 2008).

1.2 Problem Discussion

It was not until the 1950’s and 1960’s that risk and risk management became a major issue in the wider business community. Major developments in technology, increasing size of companies and also a larger degree of internationalisation within them helped to bring risk into the spotlight (Grose, 1992; Snider, 1991).

This ongoing globalisation process of the market has increased the actors performing within the overall world economy and made the supply chain longer and more complex (Hendricks & Singhal, 2005). That and the increasing demand from the customers for faster and cheaper deliveries has amplified the risk involved in the air cargo operations (Tarnef, 2008). Types of goods predominantly transported by air include perishable goods, such as specialist foods and flowers. Express carriers that provide door-to-door services have been utilised by firms to transport time critical parts and components, in support of just-in-time manufacturing logistics and supply chain management (Park, Choi, & Zhang, 2009). Air cargo operations are also generally capital intensive to perform, with higher revenues compare to other transportation methods (Golicic et al., 2003). The air transportation market is also young compared to sea and land transports,
which could increase the amount of uncertainty and therefore risk within this transportation segment (Enarsson, 2006).

Therefore it can be suggested that this specific field of risk management within the air freight networks is a relatively unexplored area. The recent growth in air freight volumes, especially within the international express market make this a relevant and interesting topic area. The authors of this thesis hope that by focusing on a specific air freight handling process, and the actors involved, this study can help to explore and explain what elements of risks exist, how they are managed, and how they could be managed better.

1.3 Research Purpose

The purpose of this thesis is to identify and explore risk factors involved in air freight handling processes. The thesis critically examines how the actors involved in these networks and processes are able to manage these risks. The authors then approach the research purpose using a single embedded case study based on a focal air freight terminal, and the handling processes which are in operation. The aim of the study is to identify who these actors are, and what roles they play within the focal air freight handling process. By mapping out and describing these activities, will enable better understanding and comprehension of the flows within the process, providing a basis for the analysis. Finally, the thesis seeks to identify what risks are present with regards to handling risk factors in the process of air freight handling. The thesis attempts to explore how these firms manage these risk factors and how this situation could be improved.

1.4 Research Questions

In order to address the purpose of the thesis which has been presented, the authors have formulated three research questions. The first aim is to identify risks involved in air freight handling processes, within a specific airport environment. Secondly, the authors seek to show how the actors involved in these processes, manage, control, and address these risks. Finally, through a third research question, ideas are presented which could suggest ways to improve how these risks are managed, controlled and addressed.

The research questions adopted for this thesis are:

- What are the key elements of risk involved in air freight handling processes?
- How do the actors involved in the specific air freight handling process manage, control and address these risks?
- How could the managing of these specific risks be improved?

1.5 Delimitations

As with any research project, there are delimitations that should be addressed. The first is that the research is limited to a single case study. This was focused on a single airport (Jönköping) and a connecting actor (international freight forwarder) within Sweden, who are involved in dedicated air freight transports (as opposed to freight carried by passenger aircraft). Therefore, it is important to note this case may not be representative
of airports in general, or in fact other similar air freight networks within Sweden. However, air freight handling processes all over the world have to follow certain international regulations, which could result in similar working practices being used in most airports. Furthermore, airports around the globe also work in a standardised way because of the how practical implementation in the air industry works, both for passenger and freight.
2 Theoretical Framework

In this chapter the authors introduce the theoretical framework. Relevant literature in the field of risk management, air freight, and the relationship between these is discussed. Theories have been selected with specific relevance to the research questions in order to provide the reader with theoretical discussions regarding the background to the thesis topic.

2.1 Risk Management

There are many interpretations regarding the meaning of risk and how to manage it. The following section defines and explores the different aspects of risk, and approaches to risk management.

2.1.1 What is Risk?

The origin of the word risk is risicare, which is an early Italian word for dare (Bernstein, 1996). In the seventeenth century the study of risk began and was in the initial stage linked to trying to apply mathematics to gambling (Frosdick, 1997). These early studies led to the development of probability theory, which is a key factor in the concept of risk (Bernstein, 1996). Associated with gambling for many years, during the early nineteenth century, the term risk was adopted by the insurance industry in England (Moore, 1983).

According to Moore (1983) there are two basic components of risk: (1) risk as a future outcome and (2) the probability that a particular outcome may occur. Risk has both a positive and negative side to it, both the possibility of loss and the hope of gain (Moore, 1983). However, previous studies have shown that organisations seem to focus more on the negative aspects concerning their day-to-day (Hood & Young, 2005; March & Shapira, 1987).

When talking about risk there is often a misunderstanding about what defines the word risk from uncertainty. The next part explores this and tries to separate the terms.

2.1.2 Risk and Uncertainty

Knight (1921) contrasts risk with uncertainty, in that risk is something that you can measure and label with a different estimation. However, the probabilities of uncertainty are not known. Yates and Stone (1992) have a slightly different view of this and argue that in the conception of risk, there must be an uncertain implication of the possible outcomes, and if there is no uncertainty about these outcomes, there are no risks. Slack and Lewis (2001) describe uncertainty as a key driver of risk, but through development of different strategies and prevention, managers are not able to completely eliminate uncertainty, but reduce the risk which might arise from uncertainty.

Waters (2011) defines four different levels of uncertainty for events as:

- **Ignorance** - have no knowledge about future events
- **Uncertainty** - can list the possible events that might happen, but cannot give them probabilities
- **Risk** - can list the possible events that might happen and can give them each a probability
• **Certainty** - know exactly what will happen in the future

Sicotte and Bourgault (2008) relate the word *risk* to an identifiable event with negative consequences and the word *uncertainty* relates to the source of the risk. Chapman and Ward (2003) encourage the use of the word *uncertainty* over *risk* mainly due to the fact that the later one is focused more on the negative perceptions of risk, which could have the side effect of preventing the opportunities being identified.

Hetland (2003) defines the difference between the terms, in that uncertainty means that a list can be made of events that might happen in the future, but no more information about which events that will happen or the likelihood of them to happen. However, risk means that a list can be made of future possible events and a probability factor for each event can also be included.

In this thesis the term *risk* will be used in connection with the known part of which events that could happen, and the probability that it could. The positive side of risk will be kept in mind during the study to get a wider perspective of the term.

When handling risk there must be some degree of risk management involved from the participating actors affected. The next part will try to investigate how to approach this and how to use it.

### 2.1.3 Approaches to Risk Management

Risk management is considered a general management function that seeks to assess and address risk in the organisation as a whole (Fone & Young, 2000).

Concerning the financial implications of risk, there are three basic costs to take into consideration: (1) risk management administration, (2) risk control and (3) loss financing. Administrative costs are the overall costs for conducting risk management, risk control, which includes prevention and reduction projects, and loss financing which includes insurance (Kallman, 2008). The purpose of risk funding is to structure financial resources, in order to enhance the ability to react to loss situations, as they occur (Kloman, 1980).

Kallman (2008) has also suggested that prevention is a powerful tool concerning risk management, and there are five methods to achieve this:

- Government mandates (regulations)
- Education (safety is not a matter of common sense, it is a learned skill)
- Information management (things to help people understand hazardous situations)
- Contractual transfer (the likelihood that a third party will consider legal actions)
- Operations management (proper maintenance is highly correlated with fewer losses)

Furthermore, according to Cadbury (1992), directors of companies should create and establish a system for:

- Identifying significant risks
- Considering the likelihood that the risks will materialise
- Assessing consequences if the risks do materialise
The most important thing for a risk manager is to be proactive, both in the long- and short-term perspectives. A good start is to create a risk management policy for the organisation which is used by the senior management. The policy should give directions to all levels of management within the organisation regarding risk (Gibson, 1991). However, the key point is that the managers should not wait to see what negative events occur and react to them. They should be proactive and already have plans in place to deal them (Waters, 2011).

According to Cox and Townsend (1998), the process of risk management begins by evaluating two factors: (1) the likelihood of specific events occurring and (2) the consequences, if it actually occurs. Smallman (1996) argues that effective risk management should be based on good common sense, rather than highly formalised and structured processes.

Despite all the different risk management systems, White (1995) argues that they all tend to follow a generic process that consists of three critical stages: (1) Risk Identification, (2) Risk Estimation, and (3) Risk Evaluation (Figure 2-1):

![Figure 2-1 Risk Management (Adapted from White, 1995)](image)

Simon, Hillson and Newland (1997) suggest that techniques undertaking these three stages can be separated into three general groups, even if there is a wide variety to choose from:

1. Qualitative techniques (identify, describe, analyse and understand risks)
2. Quantitative techniques (model risk in order to quantify its effect)
3. Control techniques (respond to identified risk in order to minimise risk exposure)

In this thesis, the authors will be focusing on qualitative techniques when trying to identify, describe, analyse and understand risks within the air freight handling process, and with a specific focus on how these risks are managed. The generic classification of the different steps in risk management, classified by White (1995), influenced the analysis structure within this study.

Now that a background to the context of what risk and risk management has been presented, an exploration of the ways risks can be identified will follow.
Risk and risk management is something that every organisation and working process is influenced by. The next part of this thesis will specify more how the term is used within supply chain management, in connection to the main topic of this thesis.

2.1.4 Risk and Supply Chain Management

Risk in supply chain management is defined as when unexpected events might disrupt the flow of the supply chain (from raw material to the final customers). There are basically two kinds of risk that can affect a supply chain: internal and external risk (Waters, 2011):

- Internal risk happens in normal operations and, like the name indicates, within the supply chain. These are often based on human error such as inaccurate forecasting, late deliveries and information systems failure.
- External risks, are factors that the company cannot control, such as natural disasters, terrorist attacks or other chaotic macro factors, that the company still has to be prepared to deal with.

In order to classify projects, Turner and Cochrane (1993) suggest two ways of doing this: (1) how well defined are the project goals and (2) how well defined are the methods used to accomplish the project. Risk Management is therefore generally considered as a way of reducing the uncertainty in a project and its consequences, to improve the chance of success.

The importance of risk for supply chain management

There is evidence that the overall development of globalisation of the world economy over the past decade has increased the risk of supply chain disruptions as supply chains are getting longer, more complex, and are involving more partners (Hendricks & Singhal, 2005). Also, increasing expectations in terms of better products, lower prices and quicker response times from the end-customers increases this risk factor in the supply chain (Hallikas, Virolainen & Tuominen, 2002; Handfield & Nichols, 1999). However, Knight and Petty (2001) state that risk management should not only be about trying to eliminate or minimise risk, but instead trying to search for opportunities offered by this uncertainty. Waters (2011) supports this view regarding harms and benefits of risk (Figure 2-2).
Approaches to managing supply chain risk

There are different ways to manage risk within a supply chain. Most of these approaches appear to fall within two different broad categories which also overlap each other: (1) relationship management (Puto, Patton & King, 1985) or (2) strategic/proactive purchasing (Smeltzer & Siferd, 1998). Another strategy of handling risk within a supply chain is supplier relationship development (Puto et al., 1985) and a general approach to sharing the risk/benefits between different partners within a supply chain (Zsidisin, Panelli & Upton, 2000; Zsidisin, 2003; Eisenhardt, 1989). Mitchell (1995) also adds that loyalty to existing suppliers is in itself a risk-reducing strategy within a supply chain.

Single sourcing and long-term partnerships

Two major ways of managing partnership risk are single sourcing and building long-term partnerships. There are some arguments that single sourcing makes the communication more efficient by reducing the number of suppliers a company has to deal with and therefore exposes the company to less risk (Treleven & Schweikhart, 1988). On the contrary, Zsidisin et al. (2000) and Kraljic (1983) instead argue that single sourcing can lead to over-dependence on one source of supply, which could be a risk in itself if the supplier exploit their position. There is also a conflict about the result of building long-term relationships. Zsidisin (2003), Eisenhardt (1989) and Ellram (1991) all argue that long-term relationship is a way of coping with it. However, other authors suggest that long-term alliances instead can create a higher risk factors by creating a situation of over-dependence from the company to one supplier (Smeltzer & Siferd (1998); Pilling & Zhang (1992); Lonsdale (1999).

Wong (2008) states that what is essential with a good partnership is that the right decisions are being made, and that the right group, with the right values and level of integration are established within the partnership.
External integration

The most important factor in order to succeed with external integration between organisations is transparency. This is achieved through sharing information between each other and having a mutual understanding, and clear view of activities throughout the supply chain. This should help to reduce the uncertainty in the supply chain and lower the risks (Waters, 2011).

External integration is likely to reduce some risks, such as to better understand the potential actions by the collaboration partners, but increase other risks. One of the these concerns the sharing of information and how best to implement it. Distributing information more widely creates a higher security risk of passing on the information to unauthorised parties. This fact could in itself make cause some members to avoid sharing valuable information others in their own self-interest, which could create uncertainty within the information flows itself. These effects are especially valid in an unbalanced supply chain where one organisation sees itself as owning most of the knowledge within the chain (Waters, 2011).

This thesis has a specific focus on partnership, how sharing of information works between actors within the supply chain of air freight, and especially how this could affect the overall risk factor within the chain. The next part of this thesis will try to discuss more from a practical way how different kinds of risk are identified.

2.1.5 Classification of Risk

Waters (2011) argues that in practice, internal and external risks are not necessary distinct. For example, when an organisation fails to pay a bill which starts off as an external risk, it soon becomes an internal risk due to the impact it could have with the recipient firm’s cash flow. Furthermore, the author states that there is no clear border between internal and external risks, and that it can be argued that all internal risks are actually triggered by an external event. For example, increasing production costs are caused by varying customer demand, and shortage of stock is caused by late deliveries from suppliers. Therefore, this indicates that risk can travel among actors within networks, up and down the supply chain.

Manuj and Mentzer (2008) present a generic framework in order to categorise risk in global supply chains. These include; supply risks, operational risks, demand risks, security risks, macro risks, policy risks, competitive risks, and resource risks. These categories highlight that there are generic business aspects of risk sources which can be described as vulnerable.

Supply chain disruptions may have long-term, negative effects on an organisation’s financial performance. Tang (2006) suggests that risks can come in different varieties. On one hand they may occur regularly but provide only a minor disturbance, however multiple occurrences at one time can cause critical effects. However, the author suggests that they can be of a more disruptive nature and can affect the operations of a supply chain at any particular time. Knemeyer, Zinn and Eroglu (2009) support this view and describes these events as low probability-high consequence (LP-HC) events.

Literature shows that there are many suggestions as to definition and selection of risk categories. Blackhurst, Scheibe and Johnson (2008) suggest that applicability depends on the supply chain in question, and the most important aspect is how these categories
can be defined, in terms of their relative weight and how they can be compared and quantified. Mason-Jones and Towill (1998) suggest that supply chain risks can be defined as internal risks which arise more directly from management decisions, risks that reside within the supply chain, or risks in the external environment.

These types of risks highlight the exposure to vulnerability of a particular supply chain and the subsequent disruption which is brought about with regards to the risks within each organisation, between actors in a supply chain, and from the external environment.

Waters (2011) suggests another view is to consider the risks in terms of the three recognised flows within a supply chain; (1) physical, (2) financial, (3) information, with an additional term concerning organisational (4), which is closely connected to the previous three (Table 2-1):

<table>
<thead>
<tr>
<th>Risk Type</th>
<th>Affected Areas</th>
<th>Apparent Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Physical</td>
<td>Transport, delivery, storage, material movements, inventory systems, etc.</td>
<td>Late deliveries, interrupted transport, goods damage, stock shortages, missing products, accidents, etc.</td>
</tr>
<tr>
<td>2. Financial risks</td>
<td>Payment risks, cash flow problems, debt issues, investments, account systems, etc.</td>
<td>Poor returns on investment, excessive costs, unpaid bills, shortage of cash, missing accounts, etc.</td>
</tr>
<tr>
<td>3. Information</td>
<td>Data capture and transfer, integrity, information processing, marketing intelligence, system failure, etc.</td>
<td>Missing data and errors, breaches of data security, systems failure, transaction errors, etc.</td>
</tr>
<tr>
<td>4. Organisational</td>
<td>Relationships between suppliers and customers, alliances, shared benefits, etc.</td>
<td>Bad communications, lost customers, supply problems, contract disagreements, legal disputes, etc.</td>
</tr>
</tbody>
</table>

Table 2-1 Classifications of Risk (Waters, 2011)

Other authors have suggested alternative categories of risk which include supplier, regulatory and supply strategy risks (Minahan, 2005), and environmental, demand and supply, process and control risks (Mason-Jones & Towill, 1998).

The classifications and four presented flows of risk (Physical, Financial, Information, and Organisational) by Waters (2011) will be used in this thesis to develop the empirical study and as a structure for the analysis. These flows of risk present a good generic base to use in the study, without being too specifically defined.

A definition of risk has been presented within a supply chain environment context. The next part will explore risk in an air freight context by firstly providing a brief presentation of the industry and its actors involved in the industry, followed by theory relating to risks specific to the industry.
2.2 Air Freight

The regulated air freight transportation market was established in 1929, when customers and carriers began to see its potential. In the beginning, freight was predominantly carried in the belly of passenger planes. As demand grew, carriers soon began to introduce dedicated aircraft and equipment in order to facilitate freight movements and meet the needs of freight shippers and their customers (Rushton et al., 2010).

Air transportation enables fast transit times which has had an effect on global distribution. The speed of air transportation combined with the frequency of scheduled flights has reduced some global transit times from a month to only 1-2 days (Langley, Coyle, Gibson, Novack & Bardi, 2009). This method of transportation is suggested to be more suited to high value, perishable, or urgently needed commodities that can bear the higher cost of air freight. Furthermore, express carriers that provide door-to-door services are utilised by firms to transport time critical parts and components, in support of just-in-time manufacturing logistics and supply chain management (Park et al., 2009).

Langley et al. (2009) argue that air transportation also enables a packaging advantage due to less stringent requirements when compared to sea shipping. This is due to the lower risks of rough handling both in the handling processes and during the shipment itself. Air freight has developed specialised containers, which can reduce handling costs and provide additional protection. However they can also make intermodal transportation more difficult as their odd shape requires goods to be repacked before and after the air segment of the journey. New innovations have helped to alleviate this with the possibilities to load 20-foot (approximately 6 metres) containers onto larger freight aircraft.

2.2.1 The Actors

According to Rushton et al. (2010), there are four major actors involved with air freight transportation:

**International Air Transport Association (IATA)**

This is the international trade association which covers many of the standards of operation with the entire air industry. These can include safety, security, training unit load devices (ULD) and many other standards. The IATA was also instrumental in the setting up of Cargo Accounts Settlement Systems (CASS) which facilitates payments between airlines, freight forwarders, cargo agents, etc. Nearly all airlines involved in the air freight industry are part of the IATA.

**Airlines**

These consist of the companies that operate aircraft which carry freight and passengers. Airlines still owned in some way by national governments are known as flag carriers. Some concentrate on certain segments of the market, such as no-frill passengers, whilst others concentrate solely on air cargo. Often passenger airlines also carry cargo within the belly of the aircraft.

**Cargo agents**

These actors are the freight forwarders, which are licensed by the IATA to handle freight shipments who require cargo to be sent by air on behalf of their own customers. The IATA’s role is to set standards of operation, ensure that agents are insured, and allow them to issue
their own air way bills which are also known as house air way bills (HAWB).

Airport authorities These are the organisations which own or lease the actual airport infrastructure.

2.2.2 Unit Load Devices (ULD)

Unit load devices (ULD) are specialised containers used in air freight transportation. They can come in many different forms but are used in a similar fashion to any other transport container. They allow cargo to be stowed efficiently and safely, in a way that enables rapid and smooth loading and unloading of aircraft. There may also be different shaped ULDs, which slot into specific slots of the aircraft to allow for maximum utilisation of space within the aircraft to be achieved (Rushton et al. 2010).

2.2.3 Air Cargo Handling Equipment

The physical restrictions of the aircraft have led to sophisticated handling system being developed. This is to facilitate the fast and safe loading, unloading and moving of ULDs. Tracks fitted with rollers, often powered, have been adopted so that the ULDs can be moved around the aircraft. Lifting devices are also used in order for the cargo to be loaded through various doors of the aircraft, which are often several metres off the ground (Rushton et al. 2010).

There is an inherent limitation in air freight industry that the planes are restricted to certain airports to land to. Therefore, a combination of transport services, when using air freight, is used in order to bridge gaps in shipments. The next part will present how this relates to intermodal transportation.

2.2.4 Intermodal Transportation

Intermodal transport services involve goods being transported using two or more types of carrier modes in a seamless flow (Slack, 1990). The basic reason for their use is for the varying service characteristics and costs among the modes of transport. Some modes of transport, such as air, rail, or sea, may be inaccessible for a part of the journey which means that freight must use another method. By utilising various modes, goods can be transported in the most time and cost effective manner.

Langley et al. (2009, p.294), state that ‘intermodal services maximise the primary advantages inherent in the combined modes and minimise their disadvantages’. There are various types of intermodal services which exist today. The most used forms tend to be truck-rail, truck-water, and truck-air.

The use of trucks in most intermodal transports can be attributed to the high accessibility factor, which this type of transport facilitates. Over very large distances where the use of trucks would not be possible, or for shipments of items that are time sensitive, the use of trucks is not advantageous. However, as part of an intermodal transport, a truck allows better accessibility with regard to the origin and final destination of the shipment, where ports, airports, railways may not ultimately be reached.
With any intermodal transportation method, the advantages and disadvantages of each method are experienced. It does however require coordination between different actors and can add costs because of the additional handling when transferring the freight from one transportation method to another (Rushton et al., 2010). For example the use of ULDs in the air freight industry means that re-shipment from these containers to the trucks must be performed to fit into the trucks and continue the transportation.

Specific transportation solutions which utilise intermodal transports, including air freight, are often used in connection with hub-and-spoke networks. The next part will provide a background to this topic.

2.2.5 Hub-and-spoke Networks

Correia, Nickel and Saldanha-da-Gama (2010) state that a hub-and-spoke is a solution to effectively managing flows (e.g. goods, people, data) between sets of nodes (physical locations, computer terminals). Bryan and O’Kelly (1999) argue that a simple possibility is that flows could occur directly between each node, as in the illustrated 9-node network (Figure 2-3). However, this would simply not be cost effective or practical. Therefore, a more rational solution involves selecting some nodes which can be used to consolidate, process and redistribute the flows, illustrated as a hub-and-spoke network (Figure 2-4).

These nodes can be defined as hubs. In a pure hub-and-spoke network, all connections must start or end at a hub (Bryan & Kelly, 1999).

Bryan and Kelly (1999) argue that there are two basic types of hub-and-spoke networks. The first called single assignment model involves each node to be connected to a single, centrally located hub meaning that sorting only takes place at one place. The second type is multiple assignment which involves several hubs, where sorting takes place at any place which is connected to more than one hub. This latter model increases the overall number of links in the network but at the same time decreases transit times.

Over time, hub-based networks have become important to move intermodal shipments. Slack (1990) argues that the development of hub-based intermodal networks indicates that economies of scale are the main force behind their use. Bookbinder and Fox (1998)
propose that as a result of intermodal networks being combinations of their respective modal networks, it is only natural that the hub network emerged as the most suitable structure for intermodal transports.

2.2.6 Air Hub-and-spoke Networks

Within the air cargo industry, these hubs-and-spokes tend to be strategically located around the world in geographical positions with proximity to markets for air cargo (Rushton et al. 2010).

These air hubs are utilised by airlines, freight forwarding companies and air cargo customers in order to achieve the best efficiencies from the use of carrying cargo over long distances. Operators consolidate freight when the cargo is transported between these hubs and then deconsolidate for onward transportation by another feeder aircraft or by an alternative mode of transport to the final destination. This does not necessarily mean that the cargo will be carried by the shortest route, rather by which the lowest cost for operator can be achieved (Rushton et al. 2010).

Ishfaq and Sox (2011) argue that the optimal arrangement of a hub-and-spoke network is a constant trade-off between the need to sort and the need to ship in economic bundles. These conflicts tend to be between sort times, volumes, and time sensitivity.

The next and final part of this chapter will seek to put the factor of risk into the air freight context.

2.3 Risk in Air Freight

Companies operating in the air freight industry are facing a lot of risks concerning their specific operations. These risks, which concern the air freight industry, were used to assist the purpose of formulating the interview guide and its questions, which is presented later in the thesis.

2.3.1 Operational

Accessibility to air transport is limited to airports. Therefore, most carriers rely on land carriers in order to facilitate transportation to and from these airports. More actors involved in the transportation can add a degree of complexity and risk to the operation (Rushton et al., 2010).

Weather conditions can also interrupt operations resulting in increased transit times and higher costs for carriers. The costs of re-positioning aircraft out of place and compensating customers is a particular risk to air freight carriers (Rushton et al., 2010).

2.3.2 Accidents

According to the study ‘Safety Aspects of Air Cargo Operations’ published in 1999, air cargo operations around the globe, especially smaller ones engaged in ad hoc-flights, face a much greater safety risk than passenger airlines. Ad-hoc-flights refers to unscheduled flights which are planned with little or no notice because of operational demands. In the study, data between 1980 and 1996 from the CAA Fatal Accident Database and International Civil Aviation show that non-scheduled cargo operations have a higher accident rate (five times) than scheduled ones. Reasons for this fact with ad-hoc operations was concluded to unfamiliarity with routes, airfields with poor
infrastructure, high percentage of night flights and inexperienced crews. This problem is though often related to the developing countries, due to the fact that regulations in a majority of the developed countries have decreased the use of ad-hoc operations (Biederman, 1999).

2.3.3 Investments
Performing air freight operations can be capital-intensive, and a risk is therefore to plan for further development without having a clear picture about the current situation, and the possibilities of what further investment can bring. As a result of this, it is important to know prior to making large investments that the airport has the necessary capability to further succeed in the market and for a specific airport is highly important to show their partners the importance of their facilities (Golicic et al., 2003).

2.3.4 Air Screening
A safety regulation in the U.S. proposed following the aftermath of the terrorist attacks on 11th September 2001, which was subsequently fully implemented in 2010, states that all air freight which is carried on passenger planes must be screened. This is in order to avoid loading dangerous goods that may cause harm during the flight. Air screening concerns the x-raying and scanning cargo goods before it is loaded onto an aircraft. This regulation has not affected the rest of the world or dedicated air cargo transportation yet. However, increasing safety regulations can be costly for air freight operators in terms of both additional procedures and investment that has to be made to fulfil any possible changes in regulations. Furthermore, the case in the U.S. shows that the changing situation can create confusion between actors regarding who has the main responsibility for making sure these safety screenings are conducted (Dutton, 2010).

2.3.5 Cargo Theft
The recent economic crisis has increased unemployment and on a global scale, which also has increased the risk of cargo theft (Palmer, 2010). Different goods have different risks and the increased demands from customers to deliver goods faster, every day of the week, has changed the working schedule of the air freight operating companies. As a result of this, most air cargo thefts takes place during the weekends and at largely unsecured locations in between the hubs. Tarnef (2008) suggest some theft-prevention tips like: (1) thoroughly screen prospective employees, (2) carefully select transportation partners and intermediaries, (3) establish a security culture within your company, (4) factor in security when determining shipment routing, (5) incorporate counter surveillance into the duties of your security guards, (6) take advantage of technology, and (7) conduct periodic security audits.

Another suggestion in order to avoid air cargo theft is for the manufacturer to reconsider the use of their corporate logo on trailers, packaging, shipping documentation and so on, because displaying their corporate name could provide undesired attention from criminals. Furthermore, storage facilities and cargo terminals should consider investing more in traditional security like trained guards, to complement the more technical solutions to this problem (Tarnef, 2008).
2.3.6 Air Freight Costs

Major changes in the air freight market can have significant effects on supply chains and their actors with regards ensuring timely and efficient operations. According to Moore (2012), the four most pressing issues regarding cost that air shippers have to consider is:

1. **Fuel** – higher prices of fuel on the world market can cause increased cost and insecurity for the companies concerned.
2. **Capacity** – changed requirements of loading and handling capacity for air shipments can cause increased cost regarding changes in air cargo containers and handling facilities.
3. **Regulation** – changed regulations regarding safety and environment (for example carbon taxes) can cause increased administration cost companies.
4. **Global Risk** – a global business environment has impacts on the air cargo industry. For example, an accident in another part of the world (with for instance trying to put explosives on board a plane) will affect the process of actors involved in the air cargo industry.

2.3.7 Planning

Another risk that can emerge in the supply chain concerns planning, due to the fact it is often done in advance and inherently has a degree of uncertainty within the process. (Figure 2-5).

![Resource Planning Timeline](Adapted from Wong, 2008)

This uncertainty creates a possible risk of over- or under-booking. If the shipping requirements do not get fulfilled, the involved companies have to outsource some parts of the transportation. The cost of outsourcing is high, but the level of reliability is reduced.

Wong (2008) suggest that air freight forwarders deliver shipments on behalf of their customers (shippers), and their planning of bookings consist of four processes:

1. Forecasting shipment demands
2. Booking resources
3. Managing resources and planning shipments assignments
4. Monitoring shipment plan executions
When it comes to the booking part there are three major strategies to use. Either the forwarder books; (1) the exact forecasted demands, (2) with a backup of buffer resource included, or (3) a fraction of the demands. Regarding all cargo handling and planning, a concern must always be taken into consideration about the three-dimensional capacity, irregular demand and flexible routing issues (Kasilingam, 1997; Billings, Diener & Yuen, 2003). However, the main part of planning, as in supply chain management, should always be to try and maximise the effectiveness each part of the progress. This includes cooperation with other companies within the supply chain (Wong, 2008).

This thesis applies these mentioned elements of risk concerning air freight in consideration when conducting the empirical study. The main focus is to concentrate on the specific air freight handling process and the findings which emerge from the performed study.
3 Methodology

In this chapter of the thesis, the authors present the outline of the methodology concerning how the empirical data was collected. A discussion of the research strategies, approach, and data collection methods are also presented. Finally, the research limitations and validity are discussed in the latter part of the chapter.

3.1 Research Strategy

The purpose of this thesis is to describe and examine how firms concerned with air freight handling processes, manage risk in these processes. To be able to achieve this, it is vital to adopt a suitably structured research method which focuses on the researchers’ purpose. An understanding of the various approaches available in collecting and analysing empirical data needs to be understood. This enabled us to strategise and adopt a plan which maximises the quality and relevance of the research. A research framework was developed in order to illustrate this (Figure 3-1).

![Figure 3-1 Research Framework](image)

3.2 Research Approach

There are two major approaches with regards to conducting research and each can have implications for testing and adding to theory. Colberg, Nestor and Trattner (1985, p.682), define an inductive approach as ‘a type of argument in which the conclusion follows from the premises only with a degree of probability’ and a deductive approach
as ‘the conclusions follow necessarily from the premises’. Saunders, Lewis and Thornill (2012) state that a deductive approach concerns research that starts with theory, from which the research is designed in a way that this theory can then be tested. Alternatively, where research begins with collecting data to explore a phenomenon, and theory is generated, this indicates an inductive approach. Hair, Celsi, Money Samouel and Page (2011) supports this that an inductive approach is a way of discovering how the reality is and create probably theories based on it. However, a deductive approach sets up a hypothesis from the outset, which is then tested (Hair et al., 2011).

The approach of this thesis that has been adopted by its authors, uses a mix of research strategies. This is because begins with presenting a literature review to help ground the research topic, which tends to be a characteristic of deductive research. The thesis then tends to be inductive in its method, seeking to answer research questions which aim to create propositions by identifying patterns in the empirical data to reach conclusions and build theories.

3.2.1 Exploratory Study

There are three types of studies which can be undertaken depending on the nature of the study, known as exploratory, descriptive, and explanatory (Saunders et al., 2012).

*Exploratory* studies investigate areas which are relatively unexplored. These studies tend to deal with research questions that ask what. *Descriptive* studies deal with problems which are are already understood. These tend to deal with the question of when, where, and who. Finally, *explanatory* studies seek explanations concerning different variables, dealing with the questions of how and why (Brannick, 1997).

In this thesis there tends to be an exploratory approach. This is because the area which is explored is relatively unknown and the overarching objective is to identify what risks are present in air handling processes. This is critical in allowing the study to progress in meeting the overall research purpose and questions. However, the thesis also has elements of explanatory approach as it seeks to ask how the identified risks are managed.

3.2.2 Qualitative Data

Saunders et al. (2012, p.162), state that ‘qualitative research studies participants’ meanings and the relationships between them, using a variety of data collection techniques and analytical procedures, to develop a conceptual framework’. Raign (1987) has also suggested that qualitative approaches tend to look at cases as a whole, which means comparison of whole cases with each other. This thesis tends to use qualitative approaches which are affected by the overall nature of the study, and the fact that it focuses on a single activity (handling) within the air freight transportation industry. A qualitative approach can help by allowing a wider and better understanding about this particular situation and assist in meeting the objectives of the research purpose and answering the research questions.

3.2.3 Cross-sectional Time Horizon

When conducting any type of research, considerations with regards to time must be evaluated. There are two clear ways of approaching this. Longitudinal, involves collecting data over a period of time and a continuous analysis of the data and its
changes. Alternatively, data can be collected at one specific point in time, which can be more practical for most types of research (Saunders et al. 2012).

Types of studies that examine substantial and external themed concepts that are of a complex nature in terms of factors and scales are better suited to the cross-sectional data collection approach (Rindfleisch, Malter, Ganesan & Moorman 2007). This indicates that this is most appropriate when the long-term factor of the problem is defined or where there are likely other explanations and therefore unsuited to be examined with a cross-sectional approach (Rindfleisch et al., 2007).

In this thesis, the authors have chosen a cross-sectional time horizon due to the specific time limitations of conducting a master thesis, and also that it is ideal for the research purpose. Saunders et al. (2012) supports this view, as cross-sectional studies may also use qualitative data and that case studies tend to be based on interviews conducted over a short time period.

3.2.4 Case Study

As a method of fulfilling the thesis’ purpose, a case study has been used within the context of the specific area the authors intend to explore. A case study research method can be defined as ‘an empirical inquiry that investigates a contemporary phenomenon within its real-life context, when the boundaries between phenomenon and context are not clear evident, and in which multiple sources of evidence are used’ (Yin, 1984, p.23). This thesis focuses on a focal network of actors involved with the process of air freight handling.

According to Eisenhardt and Graebner (2007), a case study strategy is relevant for when you wish to gain a rich understanding of the context of the research and processes enacted. This supports the position that the use of a case study fits the exploratory nature of the study as it provides the ability to generate answers to the why?, what? and how? (Saunders et al., 2012).

A sample used in a case study, independent of its case size, can never transform multiple cases into a macroscopic study (Hamel, Dufour & Fortin, 1993). This indicates that the purpose of a case study should be to establish the parameters of the study and then apply it throughout the whole study. This thesis uses a case study, collecting data of a qualitative nature, which means that generalisations are not intended. Hamel et. al. (1993) state however that a single case could be acceptable if it can fulfil the established objectives of the study.

Yin (2009) argues that there are four case study strategies based on two dimensions. The first dimension is defined as either a single case versus multiple cases. This is simply a choice between concentrating on one case study as opposed to multiple case studies. Yin (2009) states that the rationale for using multiple cases focuses on if findings can be replicated across the cases. Within this thesis, a single case study was used due to the time constraints of the study, and the suitability in terms of the nature of our research purpose and objectives.

The second dimension concerns if the case study is holistic or embedded. A holistic approach tends to be when a study focuses on an organisation as a whole or one particular unit (Yin, 2009). This thesis tends to use an embedded approach, as although
it concerns one activity within air freight, it encompasses several units, across several organisations which are a part of this process.

### 3.3 Data Collection Methods

According to Saunders et al. (2012), there are two main types of methods. *Mono method* concerns a single data collection technique and analysis procedure, and *multiple method* which consists of multiple data collection techniques and analysis procedures. There are two kinds of *multiple method*, firstly *multimethod*, which uses several data collection techniques but is confined to either a qualitative or quantitative research design. Secondly, *mixed method* concerns the use of both quantitative and qualitative research techniques and analyse procedures.

This thesis is conducted using a qualitative case study, therefore, *multimethod* is used, as different data collection techniques and analysis procedures are utilised. The specific methods used involved literature study, observations, and interviews.

#### 3.3.1 Literature Study

In order to present the reader with an understanding of the overall topic and specific themes investigated in this study, a review of relevant literature was conducted and presented, fitting with purpose and objectives of this study.

In this study, the authors utilised and presented a variety of primary and secondary literature sources. These included primary sources which include those published at source, such as industry and organisational reports. Furthermore, secondary sources which included books and journals were also utilised. These tend to be of a tertiary nature, which are easily obtained through databases and various other sources (Saunders et al., 2012).

The main sources where this literature was located were predominantly through governmental and industry organisation websites for the primary literature sources. Most secondary literature was available at tertiary sources included the databases of Pro-Quest (ABI/Inform Global), Emerald, Business Source Premier and Google Scholar. Other secondary sources included Google Books and the library at Jönköping University.

#### 3.3.2 Observation

Observations at the airport were performed during the study to get a better understanding of the focused air freight handling process, and to get inspiration for the interviews. Our observation was performed on 6th of March, 2013 at the airport and took place between 23:00 to 02:00 in the night to follow the air handling process from start to finish. The observation was of a *participant observation* nature, which is more of a qualitative manner, with emphasis on discovering the meanings behind the observed actions. This gives us the opportunity to get a better and wider understanding of the work performed within the focused air freight handling process with our own senses, and not only rely on the collected data from the interviews (Saunders et al., 2012). The observations also gives us a better opportunity to understand and ask more precise follow-up questions in the performed interviews (S. Schensul, J. Schensul, & LeCompte, 1999). During the observation at the airport our identity as researchers was clearly revealed to make the people working in the handling process understand why the
observations were being made, in order to create to trust and collect more reliable data during the interaction.

The main focus of the observation was to observe the activity of the air freight handling process, without taking part of it ourselves. Notes were being made throughout the whole observation and the authors also interacted with employees to help clarify and understand, when a particular activity or part of the process was undertaken. This type of observation and the role of the researchers with revealing identify and observing the activities is called observer-as-participant (Saunders et al., 2012). The advantage to performing the observation in this manner is that it gives us as researchers, the opportunity to really be able to focus on our role as researchers, and be able to discuss it between each other as it happens in front of our eyes. There is a risk as well with revealing our identity, that the loss of emotional involvement could occur, for example to what is feels like to act as an end user to the observant business process (Saunders et al., 2012). However, due to the fact that our focused air freight handling process does not include the end-customer, the authors as an observant researchers did not see this as a cause for concern regarding this study.

3.3.3 Interview Approach

Interviews were performed in order to collect data from the focal network of actors involved in the handling processes of freight. There are two approaches to conducting interviews, standardised and non-standardised (Figure 3-3). Standardised tends to more fixed where the interviewer prepares a list of closed questions which provides the interviewee a limited choice in answers (Saunders et al., 2012). Non-standardised interviews however, tend to be more dynamic and are more flexible in their approach. They often use more open questions which allow the interviewee the ability to provide more answers and allow for follow-up questions to be asked, depending on the responses (Saunders et al., 2012). Kuada (2012) supports the view that semi-structured and unstructured interviews are recommended when an exploratory, or a study that includes an exploratory element is conducted.

![Interviewing Methods](image)

In this thesis, face-to-face semi-structure interviews, which is in between standardised and non-standardised and allows the interviewer to create a framework of themes to be
explored, with open questions that can be expanded further (Schensul et al. 1999). These were conducted with four actors involved in one particular air freight handling process. This enables us to be more flexible with the nature of the questioning and the ability for the interviewee to respond. This allows the use of follow-up questions to gain more depth in answers and ensure the interview runs smoothly. An interview guide was formulated prior to conducting the interviews (Appendix 1).

In this thesis, the authors conducted an initial meeting at the focal airport with the CEO in order to discuss the purpose of the thesis and to identify possible respondents in which interviews could be undertaken. The authors used this information to select four actors who were, experienced, had an important role with regards to the specific handling process, and would be able to provide rich and deep insights with regards to addressing the thesis’ purpose and research questions. These respondents are listed below (Table 3-1) detailing their position and background information, followed by, date and length of the interview. However, the respondents are not be named in this thesis for anonymity reasons.

<table>
<thead>
<tr>
<th>Position</th>
<th>Background information</th>
<th>Interview date</th>
<th>Interview duration (approximately)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport Chief Executive Officer</td>
<td>Began working at the airport in 2011. Responsible for the strategic and tactical planning of the airport.</td>
<td>11/04/2013</td>
<td>50 minutes</td>
</tr>
<tr>
<td>Freight Terminal Manager</td>
<td>Started in 2008. Takes care of the operational planning and day-to-day operations of the terminal.</td>
<td>11/04/2013</td>
<td>70 minutes</td>
</tr>
<tr>
<td>Airport General Manager</td>
<td>Worked at the airport since 1990. Is responsible for the overall day-to-day operations of the airport, both passenger and cargo.</td>
<td>17/04/2013</td>
<td>45 minutes</td>
</tr>
<tr>
<td>Freight Forwarder Planner</td>
<td>Employed since 2008. Is responsible for handling the handling procedures and planning on behalf of the freight forwarder.</td>
<td>11/04/2013</td>
<td>70 minutes</td>
</tr>
</tbody>
</table>

Table 3-1 Interview Respondents in the Air Freight Handling Process
3.3.4 Conducting Interviews

When interviews are undertaken, it is important that the objectives and goals are clearly identified to enable relevant, high quality, useful data to be collected. As interviewers, it is important to plan the interview in advance and formulate ideas as to how the interview can provide the data required meeting the purpose and objectives of the thesis.

Seven basic principles when planning an interview have been suggested by Rao and Perry (2003) which were used when planning the interview in order for high quality results be obtained (Table 3-2).

<table>
<thead>
<tr>
<th>Principle</th>
<th>Description</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Contact respondent</td>
<td>Contact the respondent and present yourself and the purpose of the interview.</td>
<td>Initial contact with actors within the focal air freight handling process by email and telephone.</td>
</tr>
<tr>
<td>2 Time and setting</td>
<td>Decide when and where the interview should take place.</td>
<td>Interviews to be conducted on 11th and 17th April 2013.</td>
</tr>
<tr>
<td>3 Establishing rapport and neutrality</td>
<td>Making it clear to the respondent what the research is about, the purpose and avoid giving any preconceived ideas.</td>
<td>Interview questions sent to concerned actors within the air freight handling process 1 week before.</td>
</tr>
<tr>
<td>4 Opening questions</td>
<td>The first question should be a general one regarding the topic in order to initiate the discussion.</td>
<td>Interview began with questions regarding length of employment and responsibilities.</td>
</tr>
<tr>
<td>5 Probing questions</td>
<td>Probe questions should be asked relevant to what the answers are given.</td>
<td>Further questions were frequently asked in order to gain a deeper understanding of the interviewees responses.</td>
</tr>
<tr>
<td>6 Inviting a summary</td>
<td>Invite the respondent to summarise their opinions and answers.</td>
<td>After receiving length answers, the respondents were asked to summarise which the main points.</td>
</tr>
<tr>
<td>7 Concluding the interview</td>
<td>Conclude the interview once all relevant information has been collected.</td>
<td>Closing questions relating to potential future changes within the industry were asked.</td>
</tr>
</tbody>
</table>

Table 3-2 Seven Basic Interview Principles (Adapted from Rao & Perry, 2003)

The interviews were conducted on site at the airport in closed offices and were audio recorded. The interviews were conducted in English, however the respondents were given the option to explain in Swedish if they found it more comfortable. This was made possible as one of the authors of this thesis was a native speaker of Swedish, with the other being a native English speaker. These recordings were subsequently written up...
as transcript summaries in order to report the empirical findings and conduct the analysis.

3.4 Data Analysis

There are several approaches available to researchers when carrying out analysis of qualitative data. These include grounded theory, template analysis, analytic induction to name just a few. Since the approach untaken in this thesis is not standardised, a generic approach provides more suitability for the thesis dimensions which tend to be less structured, relies on interpretation, and is of inductive nature (Saunders et. al. 2012).

Once the interview summaries were transcribed from the audio recordings of the interviews, the authors then proceeded with categorising of the data. Strauss and Corbin (1998) suggest there are three main sources from which you can derive codes of labels for the categories. They can be described as two branches. First is that of concept driven which are derived from existing theory and literature (1). The second branch tends to be more data driven, with categories derived from data (2), or actual terms and in vivo codes (3) (Strauss & Corbin, 1998). In this thesis, the data categories used in the analysis were concept driven, derived from existing theory and literature.

During the final stage of the analysis the authors identified key themes and patterns in the data in order to identify any findings and to develop propositions are presented in the analysis, which can be tested in further research.

3.5 Research Limitations

The authors consider that the limitations of the study are interlinked with the delimitations of the study in general. The main limitation of the study is that it focuses on one network of actors involved in a specific air freight handling process. The geographical location, local infrastructure and volumes of air freight involved in the process could also have an effect on the results obtained. This could have implications to how representative the case could be in terms of achieving the purpose and objectives of the study.

Due to time constraints, the study is undertaken using a cross-sectional approach which obtain data in a snapshot manner, as opposed to longitudinal which involves an ongoing process of data collection. This could therefore be argued as a limitation of the study, as this approach does not allow for repeated sampling and observations of the phenomenon over a longer period time.

3.6 Validity

When conducting research, it is important to consider the various forms of validity which have been identified to ensure quality research. Bryman and Bell (2007, p.165) consider validity ‘the issue of whether or not an indicator (or set of indicators) that is devised to gauge a concept really measures that concept’. It is important that validity is considered, in order to ensure that the results can be accurately applied and interpreted.

The respondents identified for interview are employees within different actors involved in the air freight handling processes. This could provide the study with varying perspectives and help to collect more diverse data, as opposed to gain the perspective of one individual or organisation involved in the process.
Saunders et al. (2012) state that there are two aspects to validity, *internal* and *external*. The idea of *internal* validity concerns the idea of a relationship between two variables, such as in the case of selecting theories in connection to the purpose and whether they are sufficient. *External* validity concerns the appropriateness of the studied phenomena and whether the results can be applied to other cases.

In this thesis, validity is also concerned with the methods applied with collection of the data. As interviews that have been undertaken, it is important to consider the impact of, for example, respondent not fully understanding the questions being asked, or the interviewees interpreting responses in a different way to what was intended. Data was also collected through observation. This can assist with the validity as all the data from both observation and interviews can be cross-checked in order to discover consistent findings.

### 3.7 Reliability

It is important that the data collection techniques and analytic procedures employed in the thesis can produce consistent findings if they were to be replicated. Saunders et al. (2012) suggests that there are several threats to reliability that should be addressed:

- **Participant error** – outside factors which affect a participant’s ability to perform. For example, asking a respondent at the end of their shift may affect the way in which they respond.
- **Participant bias** – these concern factors which may produce a false response. For example, if an interview is conducted in an open area where their responses can be heard by others, may influence the way in which the respondent answers.
- **Researcher error** – these factors in relation to the interviewer. If the interviewer is tired or insufficiently prepared, responses could be misunderstood or not probed further.
- **Researcher bias** – factors concern the researchers’ recording of responses. For example, an interviewer may allow their own subjective view or disposition affect the way responses are recorded and interpreted in a fair fashion (Saunders et al., 2012).

In order to reduce to impact of this threat within this thesis, two of the interviews were conducted early in the evening, not long after the individuals in question had started their shift. The third was also conducted in the afternoon, after their lunch break. One of the interviews was suggested to be conducted in the evening when their usual pattern of work was during the day, this could impact participant error, however it was felt this was minimal as the respondent did not appear to be tired or eager to complete the interview.

Each of the four interviews were conducted in closed offices away from open areas. The respondents were also informed they would not be personally named in the thesis which could help with providing more accurate, in-depth answers. As interviewers, the authors ensured that a thorough interview guide was prepared and that were adequately rested in order to carry out productive and successful interviews. The interview guide was crafted to ask open questions which were not biased in any way. Leading questions were avoided, and further probing questions were asked in a manner which were not too narrow or suggestive.
As previously mentioned (3.3.4), a further risk to reliability is the fact that the interviews were conducted in English which was not a native language for the respondents. However, to address this the interviewees were able to explain in Swedish in order to make a certain point clear. This was possible because one of the interviewers is a native Swedish speaker.
4 Empirical Study

This section of the thesis presents the empirical study and its findings based upon the observations and interviews conducted within the focal handling process. The authors first introduce a background to the airport where the process is located followed by descriptions of the four key actors which were interviewed. This is followed by the a summary of the process and specific responses obtained from the interviews.

4.1 Introduction to Jönköping Airport

Since 1992, the Swedish government has opened up and liberalised regulation for the air industry. This has included the privatisation of airports, which has resulted in increased market competition (Regeringskansliet, 2005). In Sweden there are currently 40 operational airports which support main passenger and freight flows, located all over the country and in different sizes (Transportstyrelsen, 2013). Only eleven of them are currently state-owned, operating by an organisation called Swedavia established in 2010 (Swedavia, 2013). The others are privately owned, though some were purchased by regional councils in order to ensure their survival. These airports which are not owned by the state at a national level are part of an independent organisation called Svenska regionala flygplatser (Svenska Regionala Flygplatser, 2013). Within the Swedish context, the bigger the airport is, the more likely they are partly owned by the state (Transportstyrelsen, 2013).

Jönköping Airport was government-owned until 2010, when the Jönköping municipality took over the ownership of the airport (Svenska Regionala Flygplatser, 2013). This change of ownership was a result of the streamlining process from the government over which airports they should own after the deregulation. This created both many risk factors and opportunities for the airport to stay competitive in the new settings.

Located in the Southern part of Sweden, the most populated part of the country, Jönköping has an advantageous location due to its situation in between the three biggest cities in Sweden (Stockholm, Gothenburg and Malmö). Therefore, from a strategic point of view, Jönköping has the potential to become a major logistics hub. Jönköping currently has good transportation connections linking to the three big cities, both through road and rail. In terms of further afield, it also has good access to three other Nordic capitals, including Helsinki, Oslo and Copenhagen. Therefore, Jönköping also has a great strategic location from a Nordic point of view.

4.1.1 Different Actors within the Air Freight Handling Process

Within the air freight handling at Jönköping Airport there are a lot of actors involved in the process. Based on the information from the observations and interviews, four major actors were identified as taking the most responsibility within the process.

1. Airport Chief Executive Officer
2. Air Freight Terminal Manager
3. Airport General Manager
4. Freight Forwarder Planner

For the airport itself there were three identified levels of responsibility. Firstly the Airport Chief Executive Officer which take responsibility over the strategic and tactical planning of the air freight handling process and make sure to attract and maintain
customers for the process. Secondly there is the Airport General Manager, who is responsible for the entire day-to-day operations of the airport, both passenger and cargo. Thirdly, the Air Freight Terminal Manager, takes care of the operational planning and makes sure that the people working within the process at the airport fulfil their day-to-day goals. The fourth major part with responsibilities in the air freight handling process is the representative from the air freight forwarding company at location (Freight Forwarder), the airport’s customer for the whole process. The forwarder firm can be described as an integrator, utilising air transportation along with land methods in order to offer an express service, to predominantly business customers. The majority of goods carried were parts and components for manufacturing firms, and consumer goods. The planner on location at Jönköping Airport is the one who is responsible for coordinating between the air freight forwarder and the airport. This involves processing the incoming goods from other airports and truck terminals, monitoring the handling process at the airport, and finally, the planning of outgoing transports from the terminal, by air and road.

Linked to the air freight handling process there are carriers, both in and out and in different forms. From the air side of the process, there are planes dropping off and collecting cargo, that is sorted into containers for onward transportation. From the land side, trucks arrive with goods that should go further through the air freight handling process. At the end of the process at Jönköping Airport, the trucks also carry further goods that are not be carried by air. These actors do not have any major responsibilities for the air freight handling process itself at the airport. Instead their responsibility is mainly linked to the air freight forwarders business.

4.1.2 Swedish Transport Agency

During the interviews performed in this study, Transportstyrelsen (Swedish Transport Agency) was mentioned by all of the participants and referred back to in connection to the air freight handling process. To clarify for the reader in the upcoming text, a short description about what Transportstyrelsen actually will be presented.

Transportstyrelsen (Transport Agency) is a Swedish governmental organisation, established in 2009 after a major restructuring in the public sector (Regeringen, 2008). Their main goal is to achieve good rail, air, sea and road transport within Sweden. The organisation’s responsibilities also concern regulation within this sector and to ensure that they are adhered to.

The organisation is divided into five bigger departments that all have specific responsibilities: (1) Civil Aviation and Maritime Department, (2) Driving License Department, (3) Road and Rail Department, (4) Tax and Fee Department, and (5) Transport Registry Department. An airport like Jönköping Airport will therefore have most contact with the Civil Aviation and Maritime Department (Transportstyrelsen, 2010).

4.1.3 Description of the Air Freight Handling Process

The observations and interviews provided an overview about how the air freight handling process at the airport works. The main activities are being conducted during the night, to avoid conflict with the passenger operations and to make sure that the products reach the destination early the next day for the customers. A short description of the working process at the airport are as follows:
• 21:30 - Staff preparing the air cargo container for the night shift (from previous shift and from incoming trucks)
• 23:00 - Incoming planes to the airport (In general three planes coming from and going to different locations within Europe)
• Staff handling the cargo from the planes, sorting them out and loading directly on to another plane or taking them into the handling facility for delivery further by truck.
• 01:00 - Planes departure
• The staff finish the shift off by taking care of the last outgoing trucks
• 02:00 – Shift ends

A more detailed description of the working process is included in the appendix of this thesis (Appendix 2). The illustration shows the previously mentioned working process in a more pedagogical way in the form of a graphical flow chart, showing the order in which the activities are performed and the level of coordination necessary between them during a working shift.

The main focus of the whole air freight handling process is to make sure that this relatively short period of time, when the flow of goods of the air freight handling process are being performed, is working without interruptions. The planning and coordination performed outside of this specific time frame should all be focused and linked back to the practical work to make it work smoother and faster. Delays in this short period of time would cost everyone involved in the process unnecessary time and money. That is the reason why this more practical flow of goods, within the air freight handling processes, should be understood by all involving partners.

4.2 Interviews

4.2.1 Airport Chief Executive Officer

The first interview conducted at the airport was with the CEO. This individual has worked at the airport for two years and is responsible for strategic and operational processes at the whole airport.

The most important and emphasised point with regards to risk was that of financial. ‘Financial risk is the main concern as we cannot prevent it’ (Airport CEO, personal communication, 11-04-2012).

Concerning the customers at the airport the respondent mentioned ‘we have two customers and are highly dependent on them’ (Airport CEO, personal communication, 11-04-2012).

The contracts are agreed annually, however revenues are linked directly to flows of freight, which is paid per kilogram in the case of one firm, and per night in the other. In the event of a customer going bankrupt or switching location the airport would be severely affected. ‘It’s very hard to plan or predict as customers could stop tomorrow’ (Airport CEO, personal communication, 11-04-2012).

Other issues however, such as quiet periods, as is the case in July, could be planned and budgeted in advance.
The respondent reported that the air freight providers must be proactive in gaining additional customers and revenue as the airport can only offer limited help.

Another risk concerning the financial risk aspects mentioned by the respondent was that of in the case of accidents, in particular damage to an aircraft. In the event that activities, conducted by the airport, cause damage to one of the air freight forwarders’ aircraft, this will be extremely expensive. The airport is insured, however, there is still a high excess in the event of a claim, which would harm the airport financially.

A physical risk suggested by the respondent, was the fact that the airport’s runway is only 2.2km which could be a drawback in terms of not being accessible to the largest aircraft. However, the airport’s slogan (translated to English) is ‘Simple, Fast, Close’ (Airport CEO, personal communication, 11-04-2012), which refers to the airports ability to process cargo and have fast aircraft turnarounds. Therefore, it was stated that having bigger aircraft which take longer to load/unload could affect this title.

The main employees at the airport that are responsible for identifying general risks include the flight safety manager, security manager and the CEO. The respondent said that firms that cooperate with the airport, such as air freight forwarders must also identify any risks.

It was stated that the airport must cooperate and comply with regulations set by institutions such as Transportstyrelsen.

With regards to employees within the air freight terminal, it was mentioned by the respondent that they are mainly agency workers, in contrast to the other airport functions, such as ramp and refuelling, which consist of directly employed staff. This allows the airport a level of flexibility due to the short-term planning and perspective (in relation to previously mentioned contract agreements with air freight forwarders). Although employing agency staff allows the freight terminal to increase or decrease its workforce constantly, it also means there are higher costs. However, it was said that these costs are justified.

Another aspect of risk, in connection to staff, is that the employment agency are required to have a minimum number of employees who are authorised to work at the airport. This is because individuals are required to be background checked and are issued with a clearance badge, which is renewed every three years. It was said by the respondent that even individuals who have passed all the checks and are authorised could still, in practice, commit some type of inappropriate or illegal offence.

The CEO discussed the potential for growth and expansion, along with the risks attached to this. The two air freight forwarders who currently use the airport’s onsite freight handling facility are using it near to its full capacity. Therefore, it was suggested that there is the possibility to expand the warehouse in order to increase efficiency and increase volumes. However, it was said that there is also the associated risk that, after having made the investment, the expected increase in volumes does not materialise, or in fact there is a decrease or the customers stop using the airport entirely. The airport could also purchase new equipment such as x-ray machines. The CEO states that it is the airport's decision whether to expand or not as it is the one burdened with the financial risk of doing so. ‘It’s best to invest when there is a real step up in volumes’ (Airport CEO, personal communication, 11-04-2012).
With regards to operational risks, the CEO mentioned that it is the airport’s responsibility for cargo once it is unloaded from either aircraft or truck, until it has been re-loaded onto onward transportation. This means that when there are breakages or damages to cargo, for any reason, the airport can be held liable for damages.

In order to reduce accidents and comply with safety regulations, the airport must clearly mark lanes for aircraft to follow and assist with arrival and departure processes. The vehicles used by the ramp handling team are also limited to a speed of 20km/h for safety reasons. ‘If it’s not planned then we must report it to Transportstyrelsen’ (Airport CEO, personal communication, 11-04-2012).

In terms of some organisational issues, there is cooperation between the airport and its customers (air freight forwarders). For example, it was described by the CEO that there is dialogue in order to make continuous improvements. This has resulted in some of the issues with regards to ergonomic problems with cargo handlings operating inside aircraft being addressed.

Several issues with regards to safety were also raised by the respondent. The weather can pose a risk, especially when there are wintry conditions such as snow and ice. There can be slippages which can result in both damage to goods but also injuries for employees. There are also issues relating to ergonomics in terms of employees loading and unloading goods in small aircraft in a very small and awkward environment. There is a maximum individual pallet size of 480kg, which can cause problems when it has to be loaded and moved into position inside the aircraft by hand. It was mentioned that in the past there have been staff members who have suffered back injuries from working inside aircraft, whilst manoeuvring heavy cargo into place.

The CEO suggested several issues regarding security. Cargo that is received from a consignor, that has been approved by the Transportstyrelsen, are often not x-ray checked as there are assurances that the cargo does not contain any dangerous or prohibited goods. Firms that are not authorised must have their cargo x-rayed inside the terminal. ‘Some customers would simply prefer to be x-rayed, however the airport handling process would be severely impacted’ (Airport CEO, personal communication, 11-04-2012).

The airport also handles post freight and a very tiny amount of belly freight which are both screened and processed separately through the passenger terminal. It was noted that there are no rewards for taking risks with regards to security and that you must keep them to a minimum. ‘Rewards to take risk, no, on the contrary. Security and safety first. We have three words we are working with at the airport, Säker (Safe), Smidig (Smooth), Personlig (Personal). First of all Safe and Secure. We have to solve that first, then we can be Smooth and Personal’ (Airport CEO, personal communication, 11-04-2012).

The CEO mentioned that through regulation, risks within the industry have been greatly reduced over the decades. However, there are of course new regulations that will be implemented. The Transportstyrelsen required from April 2013, that only cargo from authorised suppliers can be processed without full security screening. Some customers of the air freight forwarder would rather the cargo was screened instead of participating with the authorisation process, however this would affect the airport’s operations as it is currently unfeasible to screen all goods.
Regulations that the airport is required to implement tend to be introduced over a period of several years. ‘Regulations may be difficult to implement in the beginning but you always find ways to cope. The risk is minimal as there is advanced warning, information and a lot of time before they become compulsory. Regulations might increase costs but we can always deal with it’ (Airport CEO, personal communication, 11-04-2012).

Some regulations may increase costs but these can be sustained. With regards to the environment, it was argued that when there is a need for air freight, it is always a question of cost. However, environmental regulations themselves such as carbon taxes can add to these costs.

4.2.2 Air Freight Terminal Manager

The next interview conducted at the airport was with the Air Freight Terminal Manager. This individual has worked at the airport for five years and is responsible for managing and planning the activities of the air freight terminal.

The main areas which were of importance for this individual related to operational risks. The air freight terminal generally operates the same procedures every day, however, there are factors that can affect the operation.

The first part of the cargo handling process involves receiving goods which arrive from various destinations by truck. As it is vital that this cargo is processed in the terminal before aircraft arrive, there can be problems if trucks arrive late. It is also not easy to plan in advance the volumes that will be received, as this information is not always received before the trucks actually arrive on site.

Within the following stage of the process, the cargo is processed and packed into specially designed air cargo containers. ‘When filling the aircraft there is a margin to minimise the risk of delays due to repacking and other problems’ (Terminal Manager, personal communication, 11-04-2012).

With regards to operational issues, it was stated by the respondent that there is always small margin of unfilled space to minimise delays due to the risk of repacking or reloading. It was also highlighted that ten per cent of the volume tends to create ninety per cent of the actual work due to awkward weight, size and dimension.

When the terminal is operating at full capacity, there is a real pressure for everything to work right. ‘Our main focus for the warehouse is time and flexibility’ (Terminal Manager, personal communication, 11-04-2012). The terminal and ramp staff have to be flexible. The two air freight forwarders who operate at the airport collaborate between each other, however, there are still two representatives from each working on site because of different systems and customer base.

With regards to staffing, it was mentioned that there are predominantly agency staff who work in the air freight terminal, however, other areas such as ramp and refuelling, are directly employed by the airport. This allowed a degree of flexibility through ensuring efficient staffing levels. If there was a shortage of staff, because of sickness for example, replacements can be arranged if it is necessary before a shift, but generally not if somebody leaves during operating hours. When the operation has one or two staff members missing it can cope, however, there will almost certainly be delays.
It was said that all staff have received basic safety and security training in accordance with national regulations. Staff are also trained with correct lifting and cargo handling procedures in order to reduce the risk of injury. Staff members who worked within the ramp team receive more specialised training.

The manager stated that there are safety risks relating to overall operations. The sources of these mentioned are through use of machinery and trucks, heavy and awkward cargo, and weather conditions. It was said that staff must wear appropriate footwear and visibility clothing to minimise these risks.

Security issues were also discussed in the interview. Most cargo is not screened within the terminal because the air freight forwarders deal mostly with authorised customers. This cargo is treated as trusted as it must be checked and sealed at the consignor’s premises. The landside truck operations are operated by the freight forwarder who ensures that the chain is secure. High valuable goods are not usually stored for long periods, the terminal is however secure and alarmed. ‘Not often we have parcels staying in the warehouse overnight, mostly going by truck’ (Terminal Manager, personal communication, 11-04-2012).

The airport has the responsibility of the cargo once it enters the terminal on the land side, and from the air side as soon as it is unloaded/loaded from the aircraft.

It was also stated by the respondent that the terminal is audited in order to ensure security checking, fuelling and aircraft de-icing practices are in order. There is also cooperation with other airports in these audits and the airport is given advanced warning when they will take place.

There are regulations that effect all matters of operation, security, safety etc. These can be from International, EU and Swedish level. It was said that the mentality within the airport in general is more focused on development and moving forward. This is in comparison to before the Swedish airports were de-regulated and the airport moved from state to municipality ownership.

### 4.2.3 Freight Forwarder Planner

The next interview conducted at the airport was with the Freight Forwarder Planner who is responsible for planning and coordination of the operation. This individual has worked at the airport for 5 years and is responsible for the handling procedures and planning on behalf of the freight forwarder.

As there is only one representative for the forwarder on site, there can be issues with regards to carrying out the specific tasks they are required to do, when they cannot be onsite for whatever reason. The forwarder representative and terminal manager have cooperated in teaching one another’s responsibilities and tasks. This means in the event of one being absent, their individual tasks can still be completed. It was also suggested by the respondent that they intend to share this knowledge with others involved in the process in order to create more contingency. There is a contact list for the forwarder company, so that in the event of any problem which requires specific assistance, there is always help on hand. It was stated that when both the terminal manager and forwarder representative are absent, this can cause more of a problem. However they do have plans to get more members of staff involved in providing contingency when necessary.
The operations of the freight forwarder are directly linked to the air freight handling processes which are controlled by the airport. When there are late departures of aircraft, for whatever reason, the handling staff must work extra hours until it is finished. This means the forwarder must pay more charges to the airport.

It was mentioned by the respondent that the operation currently runs near to full capacity and occasionally there is the need to send less urgent cargo via another hub by road. ‘When we have overflow, some parcels have priority, so will go on aircraft, some go by road, others wait until following night’ (Freight Forwarder, personal communication, 11-04-2012). This overflow needs to be recognised so that the alternative transportation can be arranged.

The Road Network Management system and other contacts within the industry are used for arranging extra alternative transport during these situations. ‘The Road Network Management is available when we need some extra trucks. Sometimes they can arrange extra trucks, sometimes they can’t’ (Freight Forwarder, personal communication, 11-04-2012). If the goods are destined for countries outside the EU, such as Norway, extra time is required to gain the necessary paperwork.

Depending on the type of service paid by the customer, some goods occasionally are kept in the terminal and sent the following day. In order to address some of these problems, it has been suggested that bigger aircraft could be utilised by the firm. ‘Have to find customers before 737, cost too much at the moment. Need a lot more customers to fill 737 so it is best to have an overflow then unfilled aircraft’ (Freight Forwarder, personal communication, 11-04-2012).

During the operations, information is received regarding number of containers, weight and destination about the cargo on board incoming aircraft, approximately thirty minutes after they depart from their origin. This is because of the Express service nature of the services offered by the freight forwarder means that the information is not known until the aircraft is loaded at origin. This shows that many of the tasks must be completed in a short space of time, approximately within one hour. It was suggested that this part of the operation can be stressful and highly demanding. These tasks include managing which cargo will be transported, which containers they should be loaded onto, and also how they will be loaded onto the aircraft. It was said that the weight must be evenly balanced across the aircraft and information is passed to the pilots in order to calibrate the trim of the aircraft.

Further operational risks were raised by the respondent concerned with the way aircraft are prioritised. The incoming flight from Brussels which continues to Helsinki is handled with the highest priority. There are containers that will remain on the aircraft and some that must be unloaded and resorted. In order to maximise space on the aircraft, there may be a container on board which has mixed cargo to more than one destination. This needs to be taken into the terminal for sorting. Containers that are destined to one of the other flight destinations (Billund and Oslo) can be loaded straight onto other aircraft without resorting.

It was stated by the respondent that there are responsibilities to ensure the operation runs effectively and smoothly. A high level of coordination with the other freight forwarder, terminal manager, handling staff, ramp staff, pilots, and drivers is required. It was noted that it is very important that they work as part of a team. ‘When there is a
good flow, everything is working ok, however, some problem in the chain will affect everything’ (Freight Forwarder, personal communication, 11-04-2012).

One potential bottleneck in the operation occurs inside the terminal at the land side end. There are trucks that drop-off and collected from up to ten different destinations within Sweden. There are currently three bays at the terminal which limits the number of trucks that can be unloaded and loaded at the same time. There is a risk here that if many trucks arrive at the same time, late in the operation, a high degree of coordination is required to ensure goods are unloaded and loaded as quickly as possible.

With regards to technical risks, it was suggested that there could be problems when there are issues with computer systems, or in the event of communications failure. This has happed on two occasions in the last five years, however the information required can be submitted through other means such as fax or over the telephone. It was said that during these circumstances things may be more difficult than usual, but they are able to cope.

It was mentioned by the respondent that if goods arrive damaged in any way, it must be reported, along with photos to the destination terminal. It is rare that goods may be so damaged that they do not continue on their journey. This tends to be when there are leakages and therefore should not be loaded onto the aircraft. With regards to breakages inside the terminal, and whilst loading and unloading the aircraft, the airport is technically responsible for goods as they handle this part of the operation. If there are accidents air side which causes damage to the aircraft, this can be extremely expensive.

With regards to security it was stated that there were increased safety regulations after 11th September, 2001. Whenever there is an accident or incident of some kind there is a review of all regulations and procedures. There is also a risk for more regulations at a national level. ‘Regulation has however eased up during the recent years, a more local approach and responsibility to fulfil the demands now’ (Freight Forwarder, personal communication, 11-04-2012).

The freight forwarder company began to require that all freight be x-rayed, however this would be unfeasible due to the extra work associated. The operation at Jönköping airport managed to secure an exception to this, and uses a known consignor list, whereby all freight that comes from an authorised customer does not need freight to be fully screened.

It was highlighted by the respondent that there are regular audits performed by the forwarder at its hubs. These are to make sure correct procedures are followed, both with the way cargo is handled, but also the other airport services such as de-icing and refuelling.

### 4.2.4 Airport General Manager

The next interview conducted at the airport was with the General Airport Manager who is responsible for planning and management and operation of the airport’s day-to-day functions. This individual has worked at the airport for since 1990 and is responsible for the overall day-to-day operations of the entire airport.
It is in the airport’s interest to identify the individual processes to ensure that there is a good flow between the inputs and outputs. ‘You have to improve the process from the end and backwards’ (Airport General Manager, personal communication, 17-04-2012).

There are two freight operators who although cooperate, have different views and opinions when working with the airport. ‘This could create tension and differences in opinions on how the work at the airport should be performed in both from a short- and a long-term perspective’ (Airport General Manager, personal communication, 17-04-2012). Therefore it is clear that processes need to be identified so that people really understand how things should work.

It was stated that there are four different teams who work in connection to the handling process. There are currently few processes written down which can cause problems when members of staff are away or leave their job. This can make training new staff difficult.

‘Today the ramp/warehouse manager takes responsible for too many people throughout the process chain’ (Airport General Manager, personal communication, 17-04-2012). This could be problematic.

‘The main focus of the process is; People, Process, and Results. Different people within the airport focus on different parts of this. The main idea is to find a good mix between the three’ (Airport General Manager, personal communication, 17-04-2012).
5 Analysis

This chapter of the thesis presents an analysis of the empirical findings. A comparison between the findings of the theoretical frameworks and empirical study is conducted by critically reviewing and reflecting on interpretations. Following this, propositions are presented for further research. The structure of this chapter is based on the purpose and research questions of the thesis.

5.1 Physical Risks

The first classification of risk in the analysis is that of the physical flow and for the purpose of the analysis these have been divided into seven different subcategories.

Aircraft

Presented in the interviews was the risk of damaging the air freight forwarders’ aircraft and how costly that would be for the airport to repair (Airport CEO, personal communication, 11-04-2012). This links back to the presented theory about the capital-intensive industry of air freight operations (Golicic et al., 2003) and how important it is to know about these risks in advance. The nature of this particular risk is low frequency, but high impact. If it anyhow would actually happen, it will have heavy impact on the airport financial situation as a whole, even though there is insurance to cover such events, the excess payment and other costs relating to operations disruption and customer dissatisfaction could be high. The risk of it to happen is low, because the airport provides staff training and follows safety procedures to minimise the chance of it happening.

Capacity

Another physical risk concerns the length of the airport’s runway (2.2km), and how that could affect both the total capacity and the speed of the air freight handling process (Airport CEO, personal communication, 11-04-2012). This could be linked to the capacity cost of the air cargo handling process (Moore, 2012), and the challenge of finding a good balance between the current capacity situation, whilst at the same time, is flexible enough for further development regarding it. Furthermore, the slogan of the airport (Simple, Fast and Close) could be affected in a negative way with bigger and more time-consuming load/unloading procedures, and therefore also affect the airport’s financial situation as well.

Currently when the air freight terminal is operating at full capacity, the employees are under pressure to fulfil the required tasks (Terminal Manager, personal communication, 11-04-2012). In the event of possible overflow in capacity, it must be recognised in order for alternative transportation via road to be arranged. Sometimes this change of transportation mode works smoothly and sometime it causes some extra problems, for example with extra paper work for countries outside of EU (Freight Forwarder, personal communication, 11-04-2012). This links back to the discussed theory about costs with handling air cargo, especially the concern about capacity (Moore, 2012). The massive cost of investing in new aircraft or new handling equipment to increase the total capacity could in the end cost more than any gains in increased volumes or new customers to the air freight handling process. The interviews indicated that it is best to have an overflow of freight than to have unfilled aircraft (Freight Forwarder, personal
Due to the limited space inside the aircraft and the cost of having another one in the process, there is no smooth transition to increase new customer slowly into the process one at the time. To address this, the airport and its partners must know in advance that the new capacity will be filled with new customers, before investments are being made, to ensure the financial viability of the whole process.

**Responsibility**

The main concern regarding the responsibility for the incoming freight for the airport starts from when they unload it, either from the land- or –air side, and ends when the goods has left been loaded onto onward transportation (Terminal Manager, personal communication, 11-04-2012). This limited gap of time is the main concern for the airport, that it works smoothly and everything should be prepared to make this process be as short as possible, but always having safety in mind. If there are breakages or damages to the cargo during the handling process, the airport would have to pay for it (Airport CEO, personal communication, 11-04-2012). A lot of actors are involved to make the process work smoothly and they must all work as a team (Freight Forwarder, personal communication, 11-04-2012). High value goods will also often not be stored overnight for security reasons (Terminal Manager, personal communication, 11-04-2012). This could also be linked to the problem with cargo theft (Tarnef, 2008), but the responsibility for the airport ends when the goods leave the airport and at the airport the process are protected and secured with different safety procedures. If the flow in the handling process works according to plan there is not a major problem today to fulfil the working schedule. However, as soon one or more problem occurs in the flow that could have an impact on the whole air freight handling process.

**Safety**

Regarding safety procedures linked to physical risks, the airport must have clear defined routines to comply with safety regulations and if something is happening that is not planned, then the airport must report it to Transportstyrelsen (Airport CEO, personal communication, 11-04-2012). Every possible risk must be taken into consideration before performing any work.

Then there are some external risks that the airport must cope with, but cannot avoid in total (Waters, 2011). Weather for example that could drastically change during the seasons of a year and because of the necessity of working outside, in connection to the aircraft, as a result this could affect the workers in their day-to-day work. The airport must therefore be prepared for the weather changes and adapt their working process accordingly, understanding what risks that could occur with different weather conditions. Furthermore, an injured worker during the working shift could have a negative impact on the whole process, and in the end cause costly delays. This is also linked to the various aids used by the workers when they are performing handling tasks of the air freight goods. Poorly angled lifts in small aircrafts could cause ergonomic problems and injures that cause injuries to workers, meaning they are unable to work (Airport CEO, personal communication, 11-04-2012). To deal with this, the airport provides special safety clothing for special weather conditions and all employees must have at least basic safety training (Terminal Manager, personal communication, 11-04-2012). Both the airport and its customer must understand the value the workers add to the total value of the process chain and make sure that the flow works smoothly.
Security

Regarding security of incoming goods, there are different opinions on how and who that will solve them. Air screening that is presented in the theory (Dutton, 2010) will affect the airport’s handling process if it has to been implemented in the working routine. There are also different types of security audits performed at the airport, linked to the air freight handling process, throughout the year from different organisations. Currently, there is not time according to their current working process to fit in these extra safety procedures. The whole air freight handling process must then be re-configured and to do that it is good to first have mapped out the current working process. Today the airport solves this problem, and being approved by the Transportstyrelsen, by mainly received goods from approved consignors (Airport CEO, personal communication, 11-04-2012). But if regulations will be changed and the airport must perform air screening (x-raying) on incoming goods, this will heavily affect the flow of the air freight handling process during that limited space of time that it is performed (Freight Forwarder, personal communication, 11-04-2012).

Regarding the ideas of positive or negative aspect of taking risks in risk management theory (Knight & Petty, 2001), it was clear that this type of evaluation does not take place in air freight handling processes (Airport CEO, personal communication, 11-04-2012). Security and safety is the airport’s main priority and they must always know what risks that could occur when changing processes and work out how to solve with it. So the uncertainty in the work process must be kept to a minimum to secure the safety level for everyone involved and to be certain that they follow the current regulations to be permitted to perform the air freight handling process in the first place.

Information

Information is key regarding physical risks of the air freight handling process, in order for the air freight handling process to be performed effectively. Discussed in the theory is the potential risk of over- and under-booking in the air freight handling process due to the fact of planning in advance (Wong, 2008). The interviews in this study showed that this was not the problem, but instead the express nature of the shipped goods, the information of what kind of goods, and volumes was received approximately an hour before incoming aircrafts arrive at the airport (Terminal Manager, personal communication, 11-04-2012). This short period of time from the information received to the arrival of incoming aircraft is work intensive as a lot of things concerning the air freight handling process must also be performed in a short period of time. For example the coordination within this short window of time must always be made with time priorities in mind, in particular with regard to the order in which aircraft arrive and must depart (Freight Forwarder, personal communication, 11-04-2012). Another problem is the arriving trucks that could be late, arrive all at the same time which creates a bottleneck in the process, caused by limited amount of physical docking bays and therefore has impacts on the whole process. Due to this fact that the airport cannot plan more in advance about the incoming goods, the airport must really be flexible and have a well-thought out plan with different options to choose from, once again to secure the safety and security of the whole air freight handling process.
Flexibility

The overall need for flexibility of the air freight handling process creates some specific extra cost for the airport that they must be able to handle to fulfil their objectives. Regarding the staff employed in the air freight handling process, the information gathered in the interviews said that a majority of the workers in the freight terminal were hired from an external working agency (Terminal Manager, personal communication, 11-04-2012). This could create a feeling of the workers to not feel really part of the airport, feel unsecure about when they should work and therefore lose some of the extra working capacity that a more secure employment could create. It could also create some even extra costs if unexpected delays in the process make the workers have to work longer time in total to fulfil the tasks of the working shift (Terminal Manager, personal communication, 11-04-2012). This extra cost could the airport charge the air freight forwarder for, but it could also affect their partnership in a negative way. When cooperating with external firms, transparency is of essence (Waters, 2011).

Propositions

The key themes of interest identified by the authors relate to the importance of flexibility between actors in the network, and in the area of effective health and safety practices in relation to risks of accidents and injury. The following two propositions have been formulated which can be further tested for any generalisability or significance:

P1: *Flexibility between actors in air freight handling processes is particularly important to ensure effective implementation.*

P2: *Effective health and safety practices and procedures can reduce the risk of accidents and injury within air freight handling processes.*

5.2 Financial Risks

The most important risks raised from the interviews are that of financial, due to the fact that the airport cannot prevent it (Airport CEO, personal communication, 11-04-2012). The financial risks can affect the air freight handling process and is strongly connected to its very existence. This could be linked back to some of the presented theory in the thesis, for example concerning the risk of investment in the air freight handling industry (Golicic et al., 2003), general air cargo costs (Moore, 2012) and the planning part (Wong, 2008). For the airport it is important to constantly search for new customers to ensure the air freight handling process grows, but at the same time and most importantly to keep and maintain the current customers. Which could be linked back to the presented theory about strategic/proactive purchasing (Smeltzer & Siferd, 1998).

Regarding growth and expansion the interviews suggested that the new customers must first sign contracts before any investments by the airport will be made. This is to help reduce the risk of making investments without some kind of commitment from customers (Airport CEO, personal communication, 11-04-2012). With this in mind it is of major concern for the airport to keep the current partnership and customers going strong, then to focus more on finding new customers and create a risk of affecting the current ones in a negative way.
Regulations

Changed regulations in the industry that the airport must follow and adapt to be allowed to perform the air freight handling process could be costly for the airport. Even if changed regulations are announced well in advance (Airport CEO, personal communication, 11-04-2012), the airport must still fulfil the new requirements. This could be linked back to the general air cargo cost, and especially the one regarding cost of regulation, presented in the theory (Moore, 2012). These are costs that the airport must accept and take into consideration to even be allowed to performed their activities in the first place.

Customers

Even if the handling activities are being performed at the airport’s facility, they are heavily dependent on the fact that their customers will continue to work with them. Contracts are agreed annually, but are linked directly to flows of freight (paid per kilogram or per night) (Airport CEO, personal communication, 11-04-2012). This will affect the planning part from the airport’s point of view, presented in the theory (Wong, 2008) and make it hard for them to plan from a more long term perspective. Therefore flexibility must always be of main concern throughout the air freight handling process, one way of dealing with this is to know how exactly how the operation is now by mapping out the processes.

Security

Regarding security it costs to maintain the right level to even be legally certified to perform the air freight handling process and therefore it is a cost that the airport must take. But accidents concerning the safety of the process could happen and in the event of that happening this will be extremely expensive for the airport (Airport CEO, personal communication, 11-04-2012). This links back to the accidents presented in the theory (Biederman, 1999), that accidents could have major impact on the whole process. Due to current regulations and the huge impact accidents can have on the process, the airport and its partners must always be proactive and take into consideration all the risks of accidents that could occur before it happens. Security comes at a cost, but to avoid it would cost a lot more.

Another aspect of risk, in connection to security, is concerning the members of staff involved in the air freight handling process. As all individuals, whether directly employed or agency staff must be background checked and authorised to work at the airport, this may still not completely eliminate incidents involving thefts or deliberate damages caused by staff (Airport CEO, personal communication, 11-04-2012). In the event that staff rosters are regularly changing, with a high turnover of individuals coming and leaving, this could perhaps increase risks with regards to security in the operation, even with all the relevant checks being made.

Flexibility

Due to the requirement for the airport to be flexible, a majority of the workers employed in the freight terminal at the airport are acquired through an external employment agency. The costs per hour are greater than to employ them directly, but it was mentioned in the interviews that these costs are justified (Airport CEO, personal communication, 11-04-2012). All this is to maintain the important overall flexibility of
being able to react to demand during the air freight handling process, without the commitment and cost risks associated with full employment contracts. This flexibility is required due to the short-term perspective of the nature of the air freight industry as suggested under the paragraph Customers. This could also be linked to the risk of planning presented in the theory (Wong, 2008).

**Propositions**

In this part, the key themes of interest identified by the authors relate to the importance of the financial risks of the dependency of a low number of customers, and the risks with expansion investments in connection to short-term perspectives of the concerned actors. A further area concerns the balance between flexibility and financial cost in relation to the use of agency workers. The following propositions have been formulated which can be further tested for any generalisability or significance:

P3: *Dependency on a low number of customers creates a financial risk for airports involved in air freight handling processes.*

P4: *Expansion investments are a higher risk due to the short-term perspectives of actors involved in air freight handling processes.*

P5: *The benefits of flexibility outweigh the financial costs of employing external agency workers in air freight handling processes.*

### 5.3 Information Risks

Within the freight handling process, information is received by the Freight Forwarder Representative from the firm’s control centre concerning the containers loaded on aircraft destined for the focal airport (Freight Forwarder, personal communication, 11-04-2012). Due to the freight forwarder offering Express services, information is usually received thirty minutes after the aircraft has departed its origin. It was highlighted that during this time, the Freight Forwarder Representative must complete several planning tasks based on the information received regarding on-board freight. This includes configuring the outbound loading plan and weight distribution calculations to assist the pilots with flight configuration settings. The risk is shown that a high amount of information needs to be effectively and precisely processed in a short window of time. When mistakes are made, time will be wasted re-loading and configuring the aircraft once the error is realised. During this work intensive window, the freight forwarder planner does not have any other responsibilities and can focus on completing these time critical tasks without any interruptions.

As with nearly every organisation today, Information Technology (IT) is utilised in order to plan, coordinate and control operations, this is no exception concerning the air freight handling process. Thus, this could be linked back to the presented theory about risk with planning in the air freight industry (Wong, 2008). This type of risk appears to cause disruption for part of the process and does not stop the handling process all together. In the event of any IT failure, this information must be received by alternative methods, such as fax or telephone. Although this was reported to only have occurred twice in the past five years, it still causes difficulties and increased pressure. This type of risk appears cause disruption for part of the process and does not stop the handling process all together.
Concerning the airport, information regarding expected volumes of cargo is not easy to predict (Airport CEO, personal communication, 11-04-2012). Since the contracts with the freight forwarder are short-term in practice, the airport does not know what future freight volumes, if indeed there are any that its customers will process through the terminal. The only time that the airport knows when there is a seasonal drop in volumes is during July, which it plans and budgets for accordingly. Other events, or even a customer ceasing to use the airport cannot be predicted.

Within the early part of the operation, when freight is received landside via trucks, the terminal does not know the size or volumes of the cargo to be dropped off, until it physically reaches the terminal (Terminal Manager, personal communication, 11-04-2012). This lack of information is not so much a risk when the operation is running according to plan. However, when the trucks are behind schedule, this lack of information does not help the terminal to catch up or quickly resolve the situation.

**Proposition**

The key theme of interest identified by the authors relates to the negative effects last minute information flows can have on the air freight handling processes. The following proposition has been formulated which can be further tested for any generalisability or significance:

P6: Last minute information flows can impact air freight handling process implementation.

### 5.4 Organisational Risks

The final classification is that of organisational. As shown in the theoretical framework, these risks arise from links between members of the chain (Waters, 2011). For the purpose of analysis, these are considered to be both internally and externally.

**The Airport**

At an internal organisational level, the empirical data indicates that the primary employees at the airport who are responsible for identifying risk are the safety manager, security manager and the (Airport CEO, personal communication, 11-04-2012).

Within the handling process, there is cooperation and coordination between different areas of the airport. Although the freight terminal is the main actor, it must work with ramp staff who deals with aircraft movements and servicing (Freight Forwarder, personal communication, 11-04-2012). The ramp staff also cooperate with the refuelling team. There is a risk that any break down in relationship or misunderstandings could be detrimental to the efficiency of the handling processes. To address this, there is a strong relationship, good communication and flexibility between the teams in order for the handling processes to be enacted smoothly.

It was stated in the interviews that it is in the airport’s interest to identify the individual processes to ensure that there is a good flow between the inputs and outputs (Airport General Manager, personal communication, 17-04-2012). This indicates a high level of coordination is required by the airport in effectively managing each of the actors involved in the handling process.
An internal risk highlighted was that in terms of the lack of all processes within the airport being fully documented (Airport General Manager, personal communication, 17-04-2012). This can cause problems in the fact that employees do not fully understand the reasons why procedures are conducted in a certain way and how they might affect other areas. Furthermore, when staff members leave, some of the knowledge may also be lost and not passed to new employees. It can be acknowledged that the airport is currently undertaking a project of recording and mapping all the processes that operate within every department of the airport, which could help to control this risk. A further related risk identified concerns the fact that some managers may be responsible for too many people in the process chain (Airport General Manager, personal communication, 17-04-2012). This could add further problems for when these particular staff members are absent for any period of time. A sharing or delegating of responsibilities to other staff members could help to address this risk.

**Employment agency**

Another organisation the airport cooperates with and could be a source of risk, as mentioned previously, is the employment agency that is used for the staff within the air freight terminal. Although the benefits of having a flexible workforce have been suggested (Airport CEO, personal communication, 11-04-2012), there are risks in a workforce that could be constantly changing due to changes in labour requirements. Furthermore, the fact a third party handles them, which could be risk as the airport is dependent on them to deliver what they are required to do. This could be linked back to presented theory about the risk with external integration (Waters, 2011).

The agency must be able to provide staff when there are shortages, such as when there is sickness. If the agency fails to deliver enough adequately skilled staff, there could be a breakdown or strain in the relationship with the airport. To address this, the agencies themselves have a appropriate number of staff in their pool that are cleared to work at the airport.

**Customers**

Externally, the firms that cooperate with the airport such as the freight forwarders, are also responsible for identifying risks within the processes they are involved.

The first organisational risks concern the relationship between the airport and its customers (freight forwarders). Currently there are only two customers, which present a risk of being highly dependent on them (Airport CEO, personal communication, 11-04-2012). This is mainly a financial risk but is also organisational due to the significance of losing them as customers. Furthermore, due to contractual arrangements, the airport is only paid per kilogram of freight with one customer, and per night of activity for the other (Airport CEO, personal communication, 11-04-2012). There is a risk of losing these customers suddenly, without any transition period, which could bear severe financial consequences for their airport. This can be linked to the presented theory about being too dependent towards other partners linked to a more single-sourcing approach (Zsidisin et al., 2000; Kraljic, 1983). In order to address this, the airport is pro-active in seeking new customers.

One risk identified in connection with business generating concerns the activities of the airport’s customers (freight forwarders). Much of the success of the airport’s air freight handling operation depends upon the success of the customers’ ability to attract and
retain customers. It was noted in the interviews that the airport can only go so far in offering help with regards to gaining customers (Airport CEO, personal communication, 11-04-2012). This could be related to the presented factor of loyalty in reducing risk between actors in a supply chain (Mitchell, 1995) and the factor of sharing risk as a good way of coping with the partnership (Zsidisin et al., 2000; Zsidisin, 2003; Eisenhardt, 1989).

Another area of organisational risk, which can be observed, is that of possibilities for expansion. As a financial risk it was stated that further expansion of the freight handling facilities depends on the growth of volumes in freight, which is generated by the freight forwarders (Airport CEO, personal communication, 11-04-2012). This risk has similarities with the part in the theory about risk with high investments in the air freight industry (Golicic et al., 2003). The airport itself would finance this type of expansion. In the event of anticipated volumes not being realised, there could be strained or break down in relationship between the airport and the freight forwarders.

Within the relationship between the airport and the freight forwarders, it was said that there is constant dialogue in order to make continuous improvements. There is a risk concerning communication and trust with regards to making changes which affect the other parties. If one party changes something without fully informing the other, there could be misunderstandings or even disagreements, which could strain the relationship. Transparency between actors in a professional relationship is of essence to build a long-lasting trust (Waters, 2011) and also a positive relationship management (Puto et al., 2001). The forwarder representative and terminal manager have also cooperated in teaching one another’s responsibilities and tasks, and have planned to get more individuals involved in this sharing of knowledge. This can help reduce risks associated with absent staff but also help the actors understand the processes undertaken by other actors.

When there are issues which cause the handling processes to run later than required, such as if aircraft arrived late, there is an issue of who will cover extra costs incurred. It was noted that the handling terminal is flexible in ensuring staff work as needed until the tasks are completed. Currently this means that the forwarder will pay any extra charges to the airport. This could cause friction in the relationship with regards to the conditions and amounts to be paid in these circumstances.

Another actor, which forms part of the operations contingency that was mentioned, is that of the Road Management Network. This is a service utilised by the freight forwarder in situations where extra alternative transports are needed when there is not the aircraft capacity to meet the demand. There is an organisational risk in that if these firms are not able to offer a reliable service, the goods could be received late and cause dissatisfaction to the customers of the freight forwarders.

There appears to be an organisational risk concerning the physical risk of handling goods. When goods are received by the terminal which are damaged in any way, it must be reported to the destination terminal to make them aware (Freight Forwarder, personal communication, 11-04-2012). The airport is also then responsible for the goods until they are loaded onto the aircraft (Terminal Manager, personal communication, 11-04-2012). This area of ensuring accountability for goods could be a cause for tension between parties, especially in the case of high value damages. If procedures are not correctly followed or damages are not reported, this could create misunderstandings and
disagreements between the parties. In the case of damages to aircraft for example, not only would the airport face expensive repair bills, but also disrupted operations and a weakening of trust could also damage the relationship. In order to address this risk, the terminal staff are provided with adequate training and support to ensure their routines are of a high standard.

There are two freight operators who although cooperate, they have different views and opinions when working with the airport (Airport General Manager, personal communication, 17-04-2012). Therefore it is clear that processes need to be identified so that people really understand how things should work. There could also be differences in perspective with the airport being more interested in the long-term, whereas its customers, the freight forwarders, have a more dynamic short-term perspective. This could be a cause for disagreement or friction between the parties, and making one actor more dependent with the other in a long-term partnership (Smeltzer & Siferd, 1998; Pilling & Zhang, 1992; Lonsdale, 1999). To address this, there is constant dialogue between the different organisations involved with the process to ensure good relations and continuous improvement.

**Regulatory bodies**

The empirical findings highlighted an organisational risk with regards to regulations that affect all matters of operation, security, safety etc. This could be linked back to the argued theory earlier in this thesis about the general costs in the air freight industry and about changed regulations in practically (Moore, 2012). These can be from International, EU and Swedish level. Concerning the operation of the airport, it was ones directed by *Transportstyrelsen* which were predominantly raised in the interviews.

With regards to security it was stated that there were increased safety regulations after 11th September, 2001 (Freight Forwarder, personal communication, 11-04-2012). Whenever there is an accident or incident of some kind there is a review of all regulations and procedures. This means indicates that the actors involved in the handling process must be willing to cooperate with governing bodies such as *Transportstyrelsen* in implementing any necessary changes.

With regards to screening of cargo, it was said that new rules imposed by the *Transportstyrelsen* mean that consignors must be on an approved list, otherwise full screening must take place. This was also brought up as a risk in the theory (Dutton, 2010). The head office of the freight forwarder company initially wanted to go further and implement screening of all freight as a matter of practice. Furthermore, it was indicated that some customers of the freight forwarder would simply prefer their goods to be screen as opposed to going through the authorisation process. In the end a specific approach to the airport, using approved consignors, was adopted based on the new *Transportstyrelsen* rules. This is a particular risk for the air freight handling process as it will create a bottleneck, and require the airport to make further investments in equipment and increased labour. If there were a sudden requirement to screen all cargo, it would be unfeasible and negatively affect the current handling processes.

New regulations can always present some kind of risk to the handling process, this was highlighted with the need for extra safeguards with regards to screening and authorised customer lists. The interviews indicated that the impact of these risks is limited by the fact that new regulations tend to be implemented gradually. Concerned parties have a
long time period to implement these and find ways to cope with them, even if they may add some degree of cost (Airport CEO, personal communication, 11-04-2012).

The air freight handling process is subject to audits in the areas of security, screening, refuelling and aircraft de-icing practices are carried out properly. There is a risk that if procedures are not followed correctly, the airport could face penalties or suspension of its operation.

**Proposition**

In this section, the key theme of interest identified by the authors relates to the information risk of the need to sustain active dialogue between actors in order for effective work flows and long-term relations. The following proposition has been formulated which can be further tested for any generalisability or significance:

**P7:** *Active dialogue between actors involved in air freight handling processes is key to effective work flows and long-term relationships.*
6 Conclusion

In this chapter the authors summarise the findings that have resulted from the analysis in accordance with the research questions of the thesis.

What are the key elements of risk involved in air freight handling processes?

This study has indicated that the key elements of risk exist in the Physical and Financial categories, which the authors used. Within physical these were highlighted as that fact that operations in the handling process are conducted during a small time window. The fact that several actors are involved in the process requires significant coordination. Furthermore, disruptions to any part of the flows can create bottlenecks and delays to the whole process. Other factors such as the size of the freight terminal and aircraft used by the forwarders indicates that contingency plans need to be enacted when there is overflow in the process. The fact that a significant number of employees within the air freight terminal are temporary agency workers can provide risks with regards to effectiveness and competencies required to undertake the specific tasks.

The key financial risks relate to the fact the airport is dependent on two main customers. The nature of the contracts means that these firms could potentially cease their operations at the airport with very little notice. This presents risks with regards to financial stability of the airport and with forecasting and planning. This degree of unpredictability can affect the degree of investments made in the process as it was highlighted that it is up to the airport if it decides to invest in bigger facilities or new equipment.

How do the actors involved in the specific air freight handling process manage, control and address these risks?

The two main themes that emerged from the analysis in terms of answering the second research question relate to flexibility and awareness. The fact that the airport uses agency workers within the terminal can be seen as one way to address the risk that its customers could stop operating with little notice. Though the operation can be time intensive there is a degree of contingency with regards to the activities within the process and flexibility of staff to assist in other areas or work longer hours when required.

In terms of awareness, the airport itself is pro-active in seeking out new customers for the airport, in order to reduce the financial risks of only have two customers. Another aspect of awareness is that the airport is currently in the process of mapping out all processes in order to fully understand the various tasks and responsibilities and reduce risks in the organisation.

How could the managing of these risks be improved?

The risks highlighted in the specific handling process show that the actors are actively involved with managing and improving the way they handle these risks. The main suggestions, which could be proposed, relate to the ones discussed in answering the previous research questions. With regards to financial risks, the airport and freight forwarder could be more pro-active in making firms aware of the services available. Utilising more than one agency, or employing more staff directly could also reduce the risks raised concerning the use of employment agencies for staff as mentioned in the
analysis. This could help create a greater level of contingency and retain certain staff and their associated skills and knowledge.
7 Discussion

In this chapter the authors present the implications that have resulted from this thesis and recommendations for further studies within this topic area.

This thesis has provided useful findings in relation to the main research problem and questions. The authors feel that many implications of the research could be developed in further studies.

The performed study provided an insight into the specific purpose of the study and with consideration of the three research questions, provided answers in relation to them. This study focused on one specific air freight handling process within the industry, but a majority of the presented findings concerning risks are general air freight industry related rather than to one specific handling process. The study identified both areas where findings could be connected to the presented theory, but also areas that were different due to the specific process that was focused on.

With regards to further studies, the clear areas we recommend to focus on, concern the seven propositions which emerged during the undertaking of analysis in this thesis. The propositions show indications of how the situation is regarding the four areas of risk acknowledged throughout this thesis. Some of these may be assumed to be the case, however, in order for any generalisations to be made, further studies which explore these themes need to be conducted. The predominant categories where propositions were shown to be physical (2) and financial (3) risks, with one each from the respective information and organisation categories.

Further studies within this field, which use this thesis as a foundation, but focus on other air freight handling processes, could be performed to test the generalisability of the findings. This study was also performed in the context of a medium sized airport in Sweden. Further research could study if there are any major differences between different countries, or if the operating environment with regards to risk are similar within all air freight handling processes.

With the aim of this study, the findings of it are heavily influenced by the concerned industry in mind, namely the air freight industry. That does not mean that the findings cannot be used for others industries. For example, the findings in this study could be used in a further study when combining both air freight and air passenger flights. The base of the different studies would be similar, but because of different current regulations in the different segments of the air industry, the findings could differ. The specific air freight handling process focused was generally operated by the airport itself. This could have provided a perspective to risk within the process from a specific actor, which may prove unique to this specific case. Therefore, further studies whereby the handling processes are controlled more by the freight forwarder themselves could provide different insights.
Reference List


Appendix 1 - Interview Guide

**Interview Guide**

How long have you worked at the airport and what are your responsibilities?

Establish and map out the processes involved in the cargo handling activity at the airport. (Will include every stage and the relevant actors, which are involved).

Identify the risks involved with these air cargo handling processes at the airport.

- Financial?
- Operational?
- Strategic?
- Safety?
- Security?
- Regulations?
- Long-term or short-term perspective?

How do you deal with these risks?

- Identifying?
- Solving?
- Coping?
- Who is responsible for identify and addressing these risks?
- How do you cooperate with other actors involved in the cargo handling process at the airport in order to manage these risks?

Do you consider some risks more critical than others? Why?

- High frequency vs. low frequency
- High impacts vs. low impacts
- Do you use risk to your advantage?
- Rewards? Are there rewards as a result of taking some risks?

**Future**

- Potential regulatory requirements? Risk of increased costs? Changes to industry?
Appendix 2 - Jönköping Airport Freight Handling Process Map