



**ANALYSIS AND EVALUATION OF AIR CARGO LOGISTICS
SYSTEMS: A CASE STUDY OF SUVARNABHUMI AIRPORT**

By

Ms. Kulchalee Hongdalud

**A Final Report of the Six Credit Course
SCM 2202 Graduate Project**

**Submitted in Partial Fulfillment
of the Requirements for the Degree of Master of Science
In Supply Chain Management
Assumption University**

March 2007

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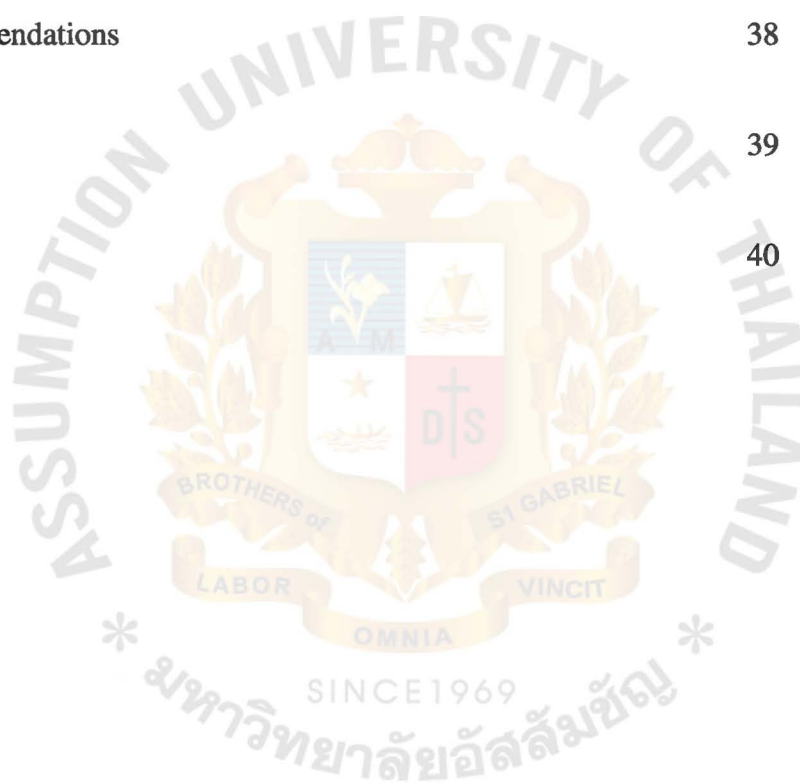
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TABLE OF CONTENTS

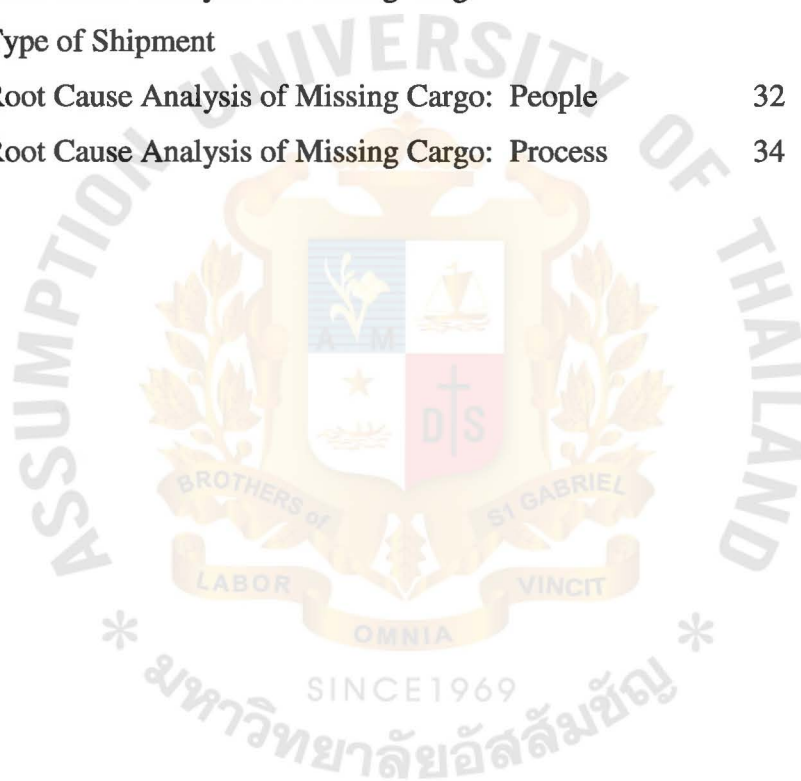
	Page No.
Title Page	i
Table of Contents	ii
List of Figures	iv
List of Tables	v
Abstract	vi
 Chapter I Introduction	 1
1.1 Introduction	1
1.2 Statement of Problem	4
1.3 Objectives of the Study	5
1.4 Scope of the Study	5
1.5 Limitation of the Study	5
1.6 Significance of the Study	6
1.7 Definition of Term	7
 Chapter II Literature Review	 10
2.1 Overview of Airlines Industry	10
2.2 Overview of Air Cargo Industry	11
2.3 Performance and Service Quality	14
2.4 Customer Satisfaction and Loyalty	17
2.5 Information Technology in Air Cargo Industry	19
 Chapter III Methodology	 22
3.1 Project Design	22
3.2 Study Framework	22
3.3 Sources of Data	25
3.4 Data Collection Method	25

Chapter IV Results and Discussions	27
4.1 Loading Area	28
4.2 Characteristics of Shipment	31
4.3 People	32
4.4 Internal Practice Process of Airlines	33
 Chapter V Conclusion	 36
5.1 Summary of Findings	36
5.2 Conclusions	37
5.2 Limitations	38
5.3 Recommendations	38
 Appendix	 39
 Bibliography	 40



LIST OF FIGURES

		Page No.
Figure 3.1	Project Design	22
Figure 3.2	Root Cause Analysis of Missing Cargo	23
Figure 3.3	Conceptual Model of Customer Satisfaction and Loyalty	23
Figure 4.1	Airfreight Export Process	27
Figure 4.2	Root Cause Analysis of Missing Cargo: Loading Area	29
Figure 4.3	Root Cause Analysis of Missing Cargo: Type of Shipment	31
Figure 4.4	Root Cause Analysis of Missing Cargo: People	32
Figure 4.5	Root Cause Analysis of Missing Cargo: Process	34



ABSTRACT

Air shipment has become a growing solution for international shipments. It is traditionally being used for high-value merchandises such as electronics parts, orchids, tropical fruits, etc. There are many factors that influence a customer's decision to ship the cargo by air. These factors include high value, urgency of need or use, product sensitivity, being lightweight but important in the production process (i.e. spare parts), etc.

However, due to lack of visibility, sometimes cargo can disappear or get damaged before reaching the destination. Problems in the cargo logistics system range from damaged cargo, miss-routing, missing cargo, or even missing documents. Performance measurements are required to analyze the effectiveness and efficiency the cargo logistics system. Performance measures can be distinguished by many aspects, such as Relational Performance, Operational Performance and Cost Performance (Stank *et al.*, 2003). In the case of the new Suvarnabhumi Airport, the operational performance of air cargo is difficult to control by the air cargo service providers. This is because the operations at the cargo terminal are centrally operated by Thai Airways International (Thai Cargo Terminal) and Bangkok Flight Service (BFS Terminal).

The purpose of this study is to identify and analyze the hidden factors and elements that affect the performance of air cargo service providers. This study reviews the flow of cargo from booking and receiving to the end. It also examines the operation process starting from the Cargo Terminal, to customs formality and inspection, unloading, to being put on standby before exporting. The flow of cargo and operation process will be described and examined after being investigated and analyzed at the International Cargo Terminal. A Root Cause Analysis (RCA) will be applied to identify the hidden factors and elements which affect the performance of the operation process.

The result of this analysis shows the sensitive points in the cargo system. This analysis and resulting suggestion will increase the air cargo service providers' ability to manage their performance. This study will serve as a basis for the improvement of performance of airport cargo logistics systems.

CHAPTER I

INTRODUCTION

1.1 Introduction of the Study

Nowadays, manufacturers and exporters are continually upgrading to international standards and are evolving into multinational corporations with global networks, an important factor in international business.

The increasing importance of efficiency and a focus on core competencies opens up many business opportunities for manufacturers and companies to sell or offer the products not only to their domestic customers, but also to distribute their products to customers in other countries. These products can be materials, electronic items, equipments, spare parts, machinery, fresh foods & daily foods, flowers, animals, services, etc.

To sell these products to other countries, there are three basic components that have been considered for International business. They are seller, buyer, and logistics. Transportation becomes an extremely important factor for its logistics part, as it is a movement service. Transportation is the creation of place and time utility. When goods are moved to places where they have higher value than they had at the places from where they originated, they have place utility. Time utility means that this service occurs when it is needed. Time and place utility are provided to cargoes when they are moved from where they are produced to places where they are needed at the demanded time. Sellers are largely providing the same product to their end customers as they always have. The big difference is there is growing demand for **"build to order"** products, driven mainly from their clients' need to keep fewer inventories on the shelf. This shift in requirements is straining the supply chain. Sellers are no longer "pushing" products, end customers are now "pulling" products through the supply chain.

From the above shift in requirements, customers increasingly expect shorter cycle times through the Just-in-Time technique, a Japanese concept. The speed, delivery time or transit time between manufacturer's and customer's warehouse at destination countries,

and more accurate services, are factors that are being focused on for the transportation part.

Today, the concept of Just-in-Time (JIT) is increasingly considered and applied in many industries. It is important to the seller to adjust its business strategies and operation practices to respond to the changing requirements of its customers and to maintain its competitiveness. By applying the concept of just-in-time, buyers will place their orders more frequently while the lot size is smaller. Under the JIT concept, sellers might suffer when they want to satisfy customers, and so one choice is to keep more stocks to have product availability to meet demand.

However, there are many companies who also adapt their business strategies, responding to the concept of just-in-time by producing smaller lot size, keeping stock as low as possible. As a result of these changes, there is product unavailability when there is demand, and thus customers are lost. To operate the business with the concept of just-in-time, total cycle time has been expected to reduce, therefore good logistics management in planning, organizing, scheduling, information, and cooperation between seller and buyer is required in both upstream and downstream. Besides production lead time, delivery time and transit time should also be considered and be more strict so that there is less inventory within the chain.

However, there are many factors that influence companies to consider how to distribute or transport their products to customers in different places around the world. Transportation modes can be distinguished based on characteristics of product types and some limiting conditions of the consignment. Transportation modes can be airfreight, ocean freight, railway, and trucking. The consignment can be shipped through a single mode or inter-modal transports such as Air-Sea, or Railway-Sea transport.

Generally, if the product that is being shipped is urgently required, with a hurry to use, a fixed schedule, no inventory availability etc., then Airfreight transportation can be one of the best options to ship the required product to their destination in order to meet the demand and satisfy the customer's needs on time.

Air transportation cost seems to be the most expensive when compared with other transportation modes but it provides the shortest transit time, which enables a response to the concept of Just-in-Time. Most companies are therefore expecting a reliable carrier, a reliable service, within restricted time, mistake-free, and visibility, while cargoes are being transported from their origin to final destination.

This study will mainly focus on a single mode: airfreight transportation. There are several factors why companies choose the airfreight mode to transport their products to customers at various destinations, such as, valuable cargo, urgent requirement, light weight consignment, temperature control, fast transit time is required, sensitive cargo, flexibility and frequency of the services, etc.

There is a prediction of TIACA (The International Air Cargo Association), that the volume of global airfreight shipment will grow 6.5% annually, and especially Intra-Asia where it will grow by 9%.

Reliability, accessibility, times restriction and mistake-free are highly expected by customers when they accept to pay such high transportation costs. It is therefore easy for an air carrier to disappoint its customers who find that their consignments are lost or missing at the destination terminal. Poor accessibility is one disadvantage of air carriers. Generally, it is unpredictable when the missing cargo will be found. It might be at some other places instead of the consigned destination, or it might be lost or disappear from the loop due to poor operation either at the loading port or the destination port. Times of tracking is unpredictable, as this varies from days, weeks or even months. Making a claim on an air carrier for the full cargo's value is difficult and time wasting.

The Airport Authority of Thailand moved their operations from Bangkok International Airport to Suvarnabhumi Airport in October 2006. The records base of Thai Airways International during October 2006 to January 2007 shows that the total import shipments from worldwide is 624,174 shipments, while there is a total of 2,206 shipments or 0.35% which were missing when compared with the total import shipments.

This paper will therefore study the operating processes at a loading terminal by using the new Thailand International Airport, Suvarnabhumi Airport as a case study, to gain a better understanding, visibility and accessibility of the process. The possible

causes that lead to poor operational practices will be analyzed by investigating the current practices at International Cargo Terminals, Suvarnabhumi Airport.

1.2 Statement of the Problem

High transportation cost there is high expectations of reliable service in term of fast transit time and smooth flow of the consignment from origin to consigned destination. It would be a very serious case if a customer found that one of its ordered items is missing and there is no stock availability. In this case, it will be a matter of luck if the customer or factory can wait it for more few days to order and ship replacement stock. In the worst case, if a customer cannot wait, what will happen to the company and its customer or its factory? Some factories have to stop their production line for a few days to wait for the replacement items or raw materials. For example, one trading company in Bangkok imported many items in one lot, one of them being one unit of lubricant, which is packed in a small box. They discovered later that this item is very important and urgently need by its customer who would otherwise have to stop the production line and would face paying a penalty charge to this trading company of THB 50,000 per day; and the replacement item must be the responsibility of the trading company which costs more than THB 54000 excluding transportation charge, customs clearance, import duty & tax, and delivery charge. To place a new order for a replacement, the customer expectation and time are much more restricted than the first time. In its claim against the carrier for compensation for the lost item, this trading company received THB 69,000 after a delay of 3 months

Due to to the production line having been stopped for a few days to wait for the lubricant; it therefore affected other parties in the chain since there is no product available from first factory to the second factory, with a continuing affect until the end customer. Based on this story, the main research problem and the sub-problems can be summarized as follows:

Main problem: -

- What are the major factors that are the cause of missing cargo, miss-routing, or damage occurrence?

- What would be the variables that are driving the factors to be the cause of the problem which occur?

1.3 Objective of the Study

In order to address the research questions, the following objectives were identified:

- To identify the current operating process of air cargo transport service providers at the loading terminal, International Cargo Terminal, Suvarnabhumi Airport.
- To identify and evaluate the potential variables that could create the risk of problems at the loading terminal.
- To prevent the potential causes those lead to missing cargo, miss-routing, and damage cargo at the loading terminal.

1.4 Scope of the Study

The scope of the study will mainly focus on the major risk factors that lead to the problem of missing cargo, miss routing, and damage. These factors could be environment, human, loading process, etc. These factors will be identified by a deep study of loading operations by ground service handling companies at the loading point, International Cargo Terminal at Suvarnabhumi Airport.

The loading process has been observed at International Cargo Terminals, Suvarnabhumi Airport, plus interviews with air cargo carriers and ground service handling companies. There are two companies which provide and operate at Suvarnabhumi Airport: Thai Airways International, and Bangkok Flight Services.

1.5 Limitation of the Study

There is related information available, but there are only a few particular studies on the operating processes and operational performance measurements of air cargo carriers. It is difficult for outsiders to know and understand.

For the interview process, interviews were conducted with the International air cargo carriers and Ground Service Handling companies who provide the ground service

handling at Airports in Thailand and operate their offices at the Cargo Terminal. The contacts for interviews were successful only for some airlines due to the high confidentiality and sensitivity of the information such information may effect the companies' reputations. As the operating processes inside the terminals have been standardized and the procedures for all carriers are similar, the results from the investigation are reliable.

For the survey process, observation is a method for this paper by investigating the loading processes at 2 separate international cargo terminals, which are handled by 2 Ground Handling Services companies, Thai Airways International (Thai Cargo Terminal) and Bangkok Flight Services Cargo Handling (BFS Terminal). The entire international cargo terminal is located in the Customs Free Zone area. For security reason, only authorized personnel involved in daily operation are allowed into the International Cargo Terminal. This places a limitation on visiting and observing the area. However, this restriction was postponed and began to apply tonly in January 2007 – after the researcher had observed the area in November 2006.

1.6 Significance of the Study

Today, transportation is one of the most important components to a company when it does business with companies overseas. Transportation cost is considered as a big percentage when compared with total company spending. It is therefore important to exporters and importers to know the operation process and understand the operating limits in each area. The trend is for the transportation and logistics industry to continue to grow, and thus the number of logistics service providers, which includes transportation service providers for air, ocean, railway, and trucking.

Due to high global competition, companies are finding ways to save on total cost; and to cut their spending on transportation is one of their targets. Besides cutting transportation spending, companies are also seeking for good performance from carrier regarding timeliness, accuracy, delivery performance, safety, etc. This study is based on the following:

- Presenting the concept and introduction of transportation and Logistics Services.

- Providing an overview of the operating process of loading cargo through air transportation.
- Identifying the potential factors, which may cause risk to the operational performance of Air Cargo Carriers.

1.7 Definition of Terms (Source: Thai Airways International)

Air Carrier: An Airline, which carries or undertakes to carry cargo under the air waybill or to perform any other services related to such air carriage including the airline issuing the Air Waybill.

Air Waybill: The document made out by or on behalf of the shipper, which evidences the contract between the shipper and carrier(s) for carriage of goods over routes of the carrier(s).

Agent: A person or organization authorized to act on behalf of a carrier.

Booking: A request for cargo space on an aircraft.

Bulk Cargo: Loose cargo not loaded onto a pallet or into a container.

Cargo: Any property carried or to be carried in an aircraft other than mail or other property carried under the terms of an international postal convention, baggage or property of the carrier; provided that baggage moving under an Air Waybill is cargo.

Cargo Ground Handling Agent: An authorized agent acting on behalf of a carrier in manipulating freight.

Cargo Terminal Services: Cargo services facilitating the movement, loading, unloading, storage, delivery, packaging, export and import of goods, which will operate within a 24-hour free zone

Claims: A request for refunds or compensation (by shippers or their agents) for loss or damage to cargo due to reasons within the control of the carrier.

Commercial Invoice: A Written record of transaction between seller and buyer, listing agreed prices and other charges; outlining goods sold, weights, terms of sale, shipping marks, etc.

Commodity: Cargo contents, e.g. leathers etc.

Customs Free Zone: Free Zone arranged by AOT is a new system of handling cargos at the Suvarnabhumi Airport, "Customs Free Zone". This new system is aimed at enhancing the efficiency of cargo management at Suvarnabhumi Airport.

Consignee: The person or firm whose name appears on the Air Waybill as the party to whom the goods are to be delivered by the carrier.

Consignment / Shipment: One or more pieces of goods accepted by the carrier from one shipper at one time and at one address, receipted for in one lot and moving on one air waybill to one consignee at one destination address.

Consolidation: Different consignments grouped together and covered by one Air Waybill (Master Air Waybill) with a separate House Air Waybill issued by the forwarder for each individual consignment.

Container: A certified container that interfaces directly with an aircraft restraint system and meets all restraint requirements without the use of supplementary equipment.

Customs Broker: An agent designated to perform inbound customs clearance for the consignee.

Customs Clearance: Customs formalities to be completed at origin, in transit and at destination.

Damage: Harm done to goods during transportation that impairs their value or usefulness.

Destination: The ultimate stopping place of the goods according to the contract of carriage.

Freight Forwarders: Referred to as international trade specialists, offering a variety of services to facilitate the movement of international shipments (Murphy et al., 1992; Murphy and Daley, 2001)

Logistics: is a collection of functional activities (transportation, inventory control, etc.), which are repeated many times throughout the channel through which raw materials are converted into finished products and consumer value is added.

Logistics Management: A part of the supply chain process that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customer's requirements (Ruther and Langley, 2000).

Reverse Logistics: All efforts to move goods from their typical place of disposal in order to recapture value. It also refers to the need for activities such as handling return loads, disposal of packaging materials, obsolete products and materials, as well as the return (or recycling) of appliances, components and equipment (Rogers and Tibben Lemcke, 1998).

Shipping Documents: Documents other than transportation receipts or transportation contracts, required to enable shipment to be forwarded or received.

Short-shipped: Cargo included in a flight manifest but not loaded onto the aircraft.

Shortage: A loss or reduction, i.e. a loss in weight compared with the weight originally stated on the air waybill or loss of part of a consignment upon delivery at destination.

Terminal: Either end of a carrier line, e.g. airports are often referred to as terminals.

Unit Load Device (ULD): A pallet or container Fleet/ULD

CHAPTER II

LITERATURE REVIEW

This chapter presents a review of the literatures and researches related to the study. It provides the concept of performance, service quality and visibility of the airlines industry as well as the performance of logistics service providers or air cargo carriers. These factors will finally affect customer satisfaction and customer loyalty.

There are many authors presented the linkage and effect of one variable with another variable such as how operational performance has an effect on a company's service quality level, and how service quality affects customer satisfaction and loyalty. This chapter will present an overview of the air cargo industry, performance and service quality, customer satisfaction and loyalty, and implementation of information technology to improve the trace and track system, provide more accuracy, and increase visibility of the consignment when it ships from origin to destination.

The literature examines a variety of measures of the general or specific performance of logistics service providers regarding transport activities, timeliness and accuracy (Bromley, 2001; Johnson, 2001); delivery performance (Stewart, 1995); and personnel scheduling and safety measures (Crum and Morrow, 2002; Mejza *et al.*, 2003). Logistics service providers can also be distinguished based on the characteristics of their customer relationships (Knemeyer *et al.*, 2003), customer satisfaction and loyalty (Stank *et al.*, 2003). The findings of Lai *et al.* (2004) suggest that perceptions of shippers and consignees differ from one another.

An Overview – The Airlines Industry

(Leo-Paul Dana and Daniella Vignali, 1999). The airline industry has undergone significant restructuring in recent years. Each airline tries to expand its business. There are several methods to expand in the airline industry. Expansion in the traditional way is to add flights to its schedule, using its own equipment and crew, although such expansion requires time as well as significant capital expenditures. The next approach to expansion is through mergers and/or acquisitions. Mergers were popular for some time. More recently, mergers or acquisition have been shifted toward co-operation. More co-

operative marketing, airlines have been connecting with one another, such as to form networks, working together among carriers or airlines rather than competing with one another. Forms of co-operation include sub-contracting, code-sharing, franchising and the formation of global marketing networks. Such alliances allow firms to focus on their respective core competencies, while drawing the benefits of scale economies. In essence, co-operation among competitors has led to increased competitiveness. This has accelerated the trend of joint marketing, and the airlines have become characterized by the desire to belong to a global network. In addition to using networks as a means to expand, alliances are also being used to maintain market-presence during downsizing. It would be more profitable to the airlines to co-operate than compete with each other.

Firms enter alliances for competitive reasons. Alliances allow firms to gain economies of scale in production and marketing; they can also overcome regulatory barriers and facilitate access into new markets. There are generally 2 types of alliances relationships; they are vertical and horizontal relationships. Vertical relationships entail firms co-operating in complementary activities. To co-operate within the same activity is a type of horizontal relationship.

The changing industry structure, from the traditional way to one of alliance, is reflecting a new operating environment and giving rise to opportunities for joint-marketing alliances, more competitiveness, and cost reductions in term of less restrictive rules and more specialized aircraft.

The Air Cargo Industry

According to Burnson (1999), the improved technology and intensified competition have enabled and forced companies to expand their markets worldwide. As one of the sequences of this trend, global sourcing has rapidly arisen as a prerequisite for companies competing in today's market. Monczka and Trent (1991) defined that global sourcing is the integration and coordination of procurement requirements across worldwide business units, looking at common items, processes, technologies, and suppliers. This procurement strategy has extended organizations' supply chains to a global scale.

Logistics processes form the critical loops of supply chains and oversee the flows of materials, information and cash, which are the essential elements of fulfilling customer's orders. As greater distances, currencies and cultures separate markets, suppliers and manufacturers, logistics plays a more critical role in the success of the supply chains. As a result, total logistics cost has become one of the most important economic indicators of supply chain efficiency. This concept has been supported by Gilmore (2002): there is a growing recognition of the role that transportation and logistics excellence plays in achieving a world-class supply chain and that transportation costs represent a substantial component of overall supply chain and corporate spend for many companies.

Lambert et al. (1998) and Saccomano (1999) mention that the costs associated with logistics activities normally consist of the following components: transportation, warehousing, order processing/customer service, administration, and inventory holding. Not surprisingly, total logistics costs often represent a large portion of total supply chain costs, especially when the supply chain is extended to the global market.

There is a large body of literature pertinent to the strategic role logistics plays in creating value and its relationship to a company's financial performance. As reported by Richardson (1995) and later stressed by Gilmore (2002), logistics controls a significant amount of assets and has direct impact on cash flow and the bottom line, adds value through continuous productivity and service improvements, and possesses a strong relationship with a firm's customer service level and revenues.

Since there is uncertainty about how much of a product will be sold, manufactured and shipped, even with improved forecasting methods it is not possible know precisely how much demand there will be for a firm's products in the future. This means that it is difficult to know how much logistics capacity the firm will require, or the timing and location of the needed capacity. Because forecasting does not provide exact results as to the amount of product to be sold, logistics flexibility is necessary (Ronald *et al.*, 2006).

David F. Pierce, Chairman of the Research and Development Committee for The International Air Cargo Association (TIACA), predicts that the world airfreight industry is expected to more than triple in the next 20 years, growing at an average of 6.7 percent

per year and significantly outpacing passenger growth in all major markets. Airfreight shipping is increasing primarily because:

- Fluctuating currency has increased the demand for goods from overseas.
- Labor costs and interest rates remain low, as fuel prices tend to vary.
- Businesses worldwide have seen the need for express cargo shipping.
- Shorter lifecycle of products
- General trend towards global markets, which has been spurred on by the Internet.

From this prediction, the greatest growth will occur in the intra-Asian freight markets, followed by North America-Asia, Europe-Asia and Australia-Asia, and North America-Europe. Intra-Asia growth will be 9 percent while the world average is expected to be 6.7 percent per year.

In changing markets (Ingrid Lobo and Mohamed Zairi, 1999) the airfreight customers have seen dramatic changes in the recent past. The life cycles of their products have become shorter and shorter, (e.g. in the case of cellular phones, it takes just two months before any given model is succeeded by a new one). At the same time the buyers' market has become more global and – thanks to Internet – more transparent, which has led to tougher competition. Airlines/freight forwarder partnerships have not been able to keep up and the integrators have been profiting a great deal more from this environment.

Wilhelm Althen, Chairman of Lufthansa Cargo pointed out: "Today customers want to know at all times where their consignment is – because things are always going wrong" (Competitive benchmarking in the air cargo industry : part 1, 1999, p.165). He also mentioned, we must ensure that the transportation time must be in the range promised to customer and must be continually improved to be faster. Visibility of the consignment is another factor that we should consider and provide to customers.

Therefore, Air Cargo Carriers prepare and increase their capacity to support this growth with different strategies. Some carriers plan to increase their capacity to carry more volume of air cargo by leasing freighters to support the higher demand and cargo volumes in order to save their capital investment, while some carriers plan to buy new freighters.

According to Zairi (1999, p.165), “Globalization of sourcing, production and sales has revolutionized the requirements for transport providers. Customers are reducing batch sizes and demanding ever-shorter transport times. Global logistics systems with low and reliable transport times are needed for accelerated product cycles and for competition in global markets”.

Due to the above factors, the airfreight mode has become the focus of more firms due to fastest transit time, most reliable, safety, and response to the concept of JIT and reduction of total cycle time. There are many aspects to measure the performance and service quality of carriers in order to satisfy the customers’ requirements.

Performance and Service Quality

To keep current customers and develop relationships with new ones is a key business strategy (Piercy, 1995). According to Zemke and Bell (1989) nothing is as common as organizations committed more to lip service than customer service, more interested in advertising than action. Zeithaml (2000) highlights three major problems in measuring relationships:

1. The time-lag between measuring customer satisfaction and measuring profit improvements;
2. The number of other variables influencing company profits such as price, distribution;
3. That other variables (such as behavioral issues) should be included in the relationship as they explain causality between satisfaction and results.

However, a number of studies have demonstrated a clearly positive relationship between organization performance and customer satisfaction/service excellence. Wirtz and Johnston (2003) highlight the positive correlation between the profits and service excellence of airlines. There is also the statement that perceived quality is related to organizational performance indicators in the same year and/or in the next year (Van der Wiele *et al.*, 2002). Service failure and the subsequent complaints from customers are a likely occurrence over a product/service lifetime, and the rapid, effective handling of these has proven to be vital in maintaining customer satisfaction and loyalty.

The research by the Office of Fair Trading (OFT, 1990) illustrated that when people make a complaint about goods and services and the complaint is satisfactorily resolved, three quarters of them will buy the same brand again. Where the complaint is not resolved, less than half will buy the same brand again. Clearly there is a profit to be made by retaining the customer loyalty of those whose complaints the company resolves (Citizen's Charter Complaints Task Force, 1995). The ability to deal effectively with customer problems is closely related to employee satisfaction and loyalty. Additionally, Guenzi and Pelloni (2004) provide further support for the evidence that customer satisfaction is a fundamental driver of customer loyalty in service markets.

According to Gronroos (1987) the dimensions of service quality are diverse and relate to both the basic service package and augmented service offerings. Two important contributions in developing models for measuring service quality are from Johnson *et al.* (1995) and Silvestro *et al.* (1990), cited in Dale (1999), who assessed service quality in the UK. They identified 15 aspects of service quality, and categorized them into three factors:

1. **Hygiene factors:** those expected by the customer.
2. **Enhancing factors:** those that lead to customer satisfaction, although failure to deliver is not likely to cause dissatisfaction.
3. **Dual threshold factors:** those whose failure to deliver will cause dissatisfaction while delivery above a specific level will cause satisfaction.

While the above model gives a clear view of what criteria a customer may use to judge service quality, it is not as widely reported as the one proposed by Parasuraman *et al.* (1985) who condensed ten original factors into five categories: tangibles, responsiveness, reliability, assurance and empathy. A sixth factor was later, called recovery (Gronroos, 1988a, b).

1. **Tangibles:** includes the company's or service provider's physical facilities, equipments, dress of their employees and communications material.
2. **Reliability:** refers to the ability of the service provider to perform the service accurately and dependably as promised.
3. **Responsiveness:** refers to the willingness of the firm's staff to help customers and to provide the requested service promptly.

4. **Assurance:** refers to the knowledge and courtesy of the company's employees and their ability to inspire trust and confidence in the customer towards the service company.
5. **Empathy:** refers to the ability of the service provider to provide a caring and personalized attention to each customer.

Parasuraman *et al.* (1985) also suggested that quality consists of the gap between what the customer expects and receives, and that this gap is affected by four gaps on the provider side: these are customer expectations, management perceptions of consumer expectations, service quality specifications and actual service delivery. Unfortunately when customers are asked for feedback the methodologies used sometimes lack empirical rigor and are often a response to a specific crisis in the organization (Berman, 1996). This loss of data at the organizational level means that operational changes are not tied to customer priorities in a routine manner.

Dale (2003) summarizes three major changes in the service sector due to the present emphasis on the service encounter, in particular the contribution made by service providers in enhancing and maintaining service quality. These arise from environmental trends relating to:

- Consumers' awareness and expectations;
- Technological developments and sophistication; and
- Competitive elements.

In term of customers' awareness and expectations, as society gets wealthier and the marginal utility derived from additional increments of goods declines, people turn to service expenditures. The growth in final demand from consumers may be attributed to consumer expectations of quality, which are believed and accepted to be increasing (Fitzsimmons and Fitzsimmons, 1998).

With regards to technological developments and sophistication, computerization and technological innovations are radically altering the way in which many organizations do business with their customers. They can make a major contribution in the delivery of quality service. One view is that technological advances offer an opportunity to increase

service in a variety of ways to improve the competitive stance (Schlesinger and Heskett, 1991).

For the last element, the competitive element, since entering the new millennium, it has become clear that most organizations, in their quest for progress and advancement, are increasingly interested in how they can achieve differentiation and competitive advantage (Verma, 2000). Globalization and value driven business imperatives therefore mean that mistakes will not be tolerated.

Customer Satisfaction and Loyalty

Heskett *et al* (1994) identifies a number of factors that are considered important for employee satisfaction. These include: satisfaction with the job itself; training; pay; advancement fairness; treatment with respect and dignity; teamwork; the company's interest in employees' well-being; and the service worker's perceptions of their abilities to meet customer needs. There is a study which mentions that the greatest barrier to effective service recovery and organizational learning is that only 5-10 percent of dissatisfied customers choose to complain following a service failure (Tax and Brown, 1998, p. 77; Dube and Maute, 1996). Instead, some dissatisfied customers choose to silently switch providers or attempt to get even by making negative comments to others (Singh, 1990).

Dube and Maute (1996) and Singh (1990) studied and explained four reasons why customers do not complain when they are dissatisfied the goods and services. These are:

1. Customers believe that the organization will not be responsive;
2. They do not wish to confront the individual responsible for the failure;
3. They are uncertain about their rights and the firm's obligations; and
4. They are concerned about the high cost in time and effort of complaining.

The suggestions by Hart *et al.* (1990), Mason (1993), and Bowen and Lawler (1995) are that there are specific practices that improve service-recovery effectiveness: hiring, training and empowerment; establishing service-recovery guidelines and standards; providing easy access and effective responses through call centers and maintaining customer and product databases.

Furthermore, as service quality is influenced by customer satisfaction (Bitner, Hubbert, 1994) much more convergence evolves upon satisfaction representation. Satisfaction is defined as an emotional post-consumption response that may occur as the result of comparing expected and actual performance (disconfirmation), or it can be an outcome that occurs without comparing expectations (Oliver, 1996). Moreover, base on Nicholls, Gilbert and Roslow (1998) satisfaction is based on the extent to which customers perceive the service episode to have met, fallen short, or exceeded their expectations. When performance is less than expected, the organization experiences detrimental effects. When customers are satisfied, the organization may be performing well. When customers are delighted, they come back, and frequently become an organization's best advertising/marketing tool.

People whose perception of service quality is poor have poor satisfaction level, and those who have ranked the service quality as high are highly satisfied with the services of the organization (Sureshchandar, Rajendran and Anantharaman, 2002). Although there is a strong correlation between service quality and customer satisfaction, the two constructs are indeed different which means that is becomes imperative for the service providers to view the two constructs separately (Sureshchandar, Rajendran and Anantharaman, 2002).

There are many previous researchers who talk about customer satisfaction. Bennett and Rundle-Thiele (2004) demonstrated in their research that satisfaction and loyalty are not the same, and in some cases satisfaction does not predict loyalty (consider banks where customers are highly dissatisfied yet remain loyal). This suggests that marketing managers need to test both customer satisfaction and loyalty levels because high levels of satisfaction do not always translate into high levels of attitudinal loyalty.

Moreover, Eggert and Ulaga (2002) showed that customer perceived value and customer satisfaction could be conceptualized and measured as two distinct yet complementary constructs. Strong interactions between the two concepts do exist. Both theoretical reasoning and empirical research provide evidence, however, that value and satisfaction tap different dimensions. Critical customer information includes on the one hand data about how satisfied customers are with the company's products and services. On the other hand, the assessment of how value is perceived by customers in market

offerings complements the information needed for marketing decision-making. Besides, Levesque and McDougall (2000) indicated that the very strong relationship between loyalty and satisfaction, will raise the importance of perceived value to loyalty and, in turn, lead to profitability. Perceived value was a significant determinant of customer satisfaction. Its consistent effect on satisfaction, which dominated the contribution of relational quality intentions, highlights the improvement in understanding customer satisfaction and future intentions. The three factors, core service quality, relational service quality and perceived value, impacted on customer satisfaction, which, in turn, impacted on loyalty (Levesque and McDougall, 2000).

Furthermore, Lee, Lee and Yoo (2000) investigated the causal order of the satisfaction service quality relationship and indicated it may not be the case that satisfaction is an antecedent of service quality, and provides empirical support for the notion that perceived service quality in fact leads to satisfaction. Lee, Lee and Yoo (2000) suggest that service quality is an antecedent of customer satisfaction and that customer satisfaction exerts a stronger influence on purchase intention than does service quality. Perhaps customers do not necessarily buy the highest quality services. Rather, they may buy services that provide more satisfaction. Some factors such as convenience, price or availability may influence satisfaction and then purchase intention, while not actually affecting customers' perceptions of service quality (Cronin and Taylor, 1992). Consequently, service managers should try not only to improve service quality but also to find and manage factors, which may not be related to service quality but related to satisfaction.

Information Technology in the Air Cargo Industry

Information management, which is needed in order to control and track products, can be significantly improved in accuracy, detail and sheer speed of availability.

EDI. Partnership has become a major theme of freight forwarding, underpinned with very fast, reliable methods of information technology to enable business partners to function more effectively. The advantages of EDI are recognized globally, and more and more cargo professionals are switching to EDI.

In theory, EDI means that any piece of cargo can now be sent from its site of origin to its destination, using as many modes of transport as required – with a single set of EDI messages to control, document and monitor its progress to any part of the world (Ingrid Lobo and Mohamed Zairi, 1999). There is also “Barcoding”. Airlines, such as Lufthansa Cargo, have already introducing barcoding as a standard system since 1997. The bar code label describes a worldwide standard in air cargo and serves as the basis for an integrated logistics chain.

Zairi (1999) also mentions that the improvement in service quality to carrier/forwarder includes:

- Fewer mistakes;
- Better space utilization;
- Improved reliability;
- Greater control over shipments;
- Improved inventory control;
- Much improved management information; and
- Revolutionized communications in the air cargo handling community.

There are also mentioned the following four criteria to examine the air cargo carrier performance (source: URL: <http://www.aircargoworld.com>):

- **Customer Service:** Claims handled expeditiously, problems solved in a prompt and courteous manner, professional and knowledgeable sales force.
- **Performance:** Fulfills promises and contractual agreements, dependable, accomplishes scheduled transit times.
- **Value:** Competitive rates commensurate with service levels, value-added programs.
- **Information Technology:** Tracking and tracing, Internet/electronic commerce capabilities.

Air France Airlines have been measuring their performance regularly. Their main criteria are as follows:

- ✱ **Flown as Booked (tons):** this indicator represents the ratio between the AWBs with firm reservations, which have been loaded onto the booked flight and the total number of AWBs with reservations.
- ✱ **On-Time Performance of Freighters:** this indicator measures the on time departure of freighters.
- ✱ **Missing Documents / Missing Cargoes:** this indicator measures the rate of missing documents or missing cargoes on arrival in all stations on the network.
- ✱ **Handling Calls – Reservations Paris:** this indicator measures the percentage of calls handled by the Paris Sales team. This figure covers all calls, as well as the average of waiting time before someone answers
- ✱ **Handling Calls – Import Paris:** this indicators measures the percentage of calls handled by the Paris Imports Department, and the average of waiting time before someone answers.



CHAPTER III

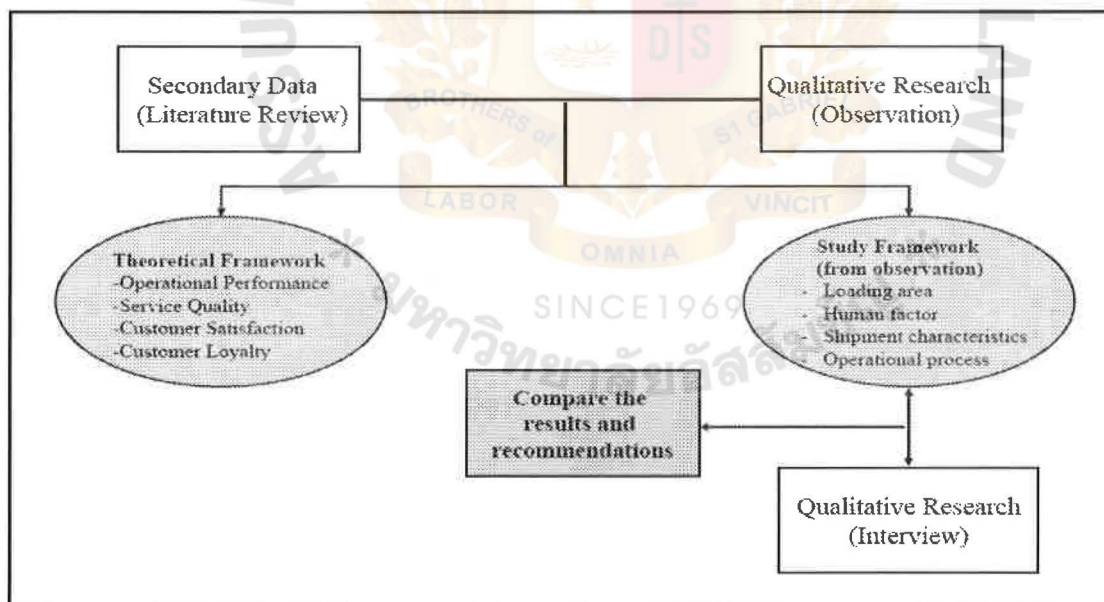
METHODOLOGY

The aim of this chapter is to present a framework or conceptual model which draws on previous studied about the influence of operational performance and service quality on customer satisfaction and customer loyalty. This study also creates the study framework, Root-Cause Analysis. The purpose of this study is to find all possible factors at the loading point, which cause missing cargo at a destination point. This study focuses on the air cargo industry.

3.1 Project Design

According to Yin (2003), the research design is a logical plan for getting from here to there, where in “here” and “there” may be found a number of major steps, including the collection and analysis of relevant data.

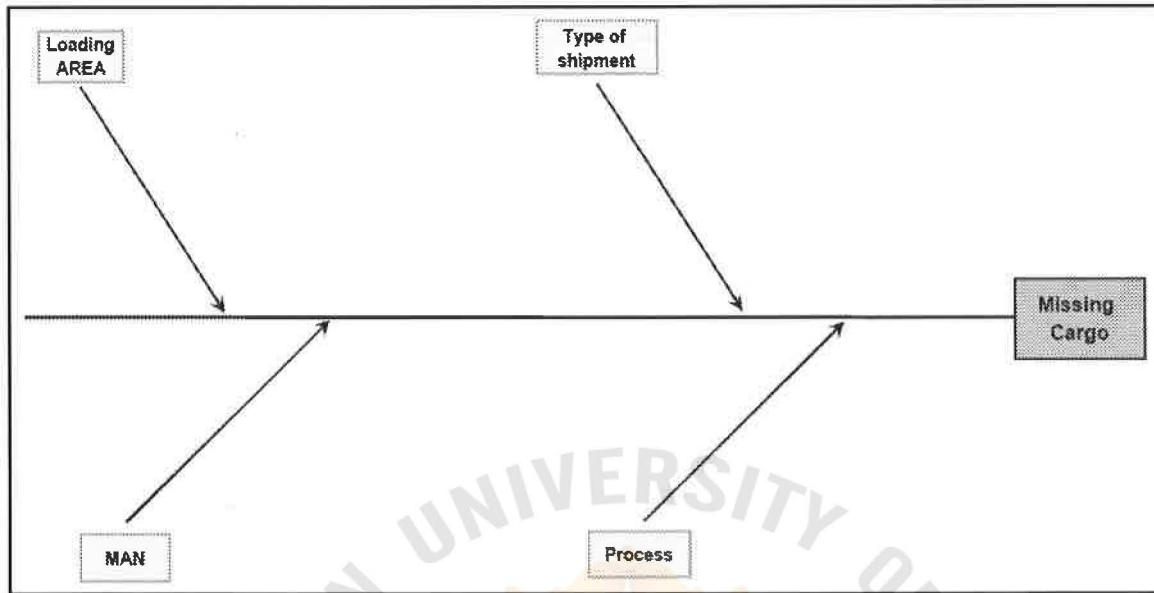
Figure 3.1 Process of the Study



3.2 Study Framework

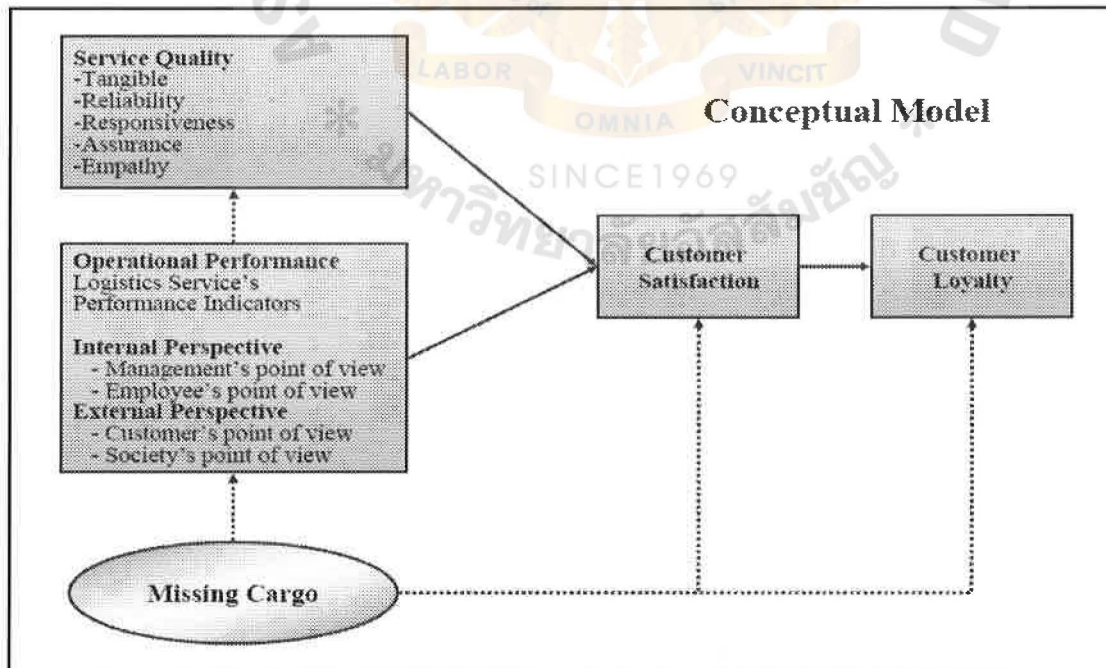
The observation at International Cargo Terminal, Suvarnabhumi Airport, resulted in many factors that could lead to problems of missing cargo. All possible variables will be listed under 4 factors, which are mentioned in Figure 3.2 below.

Figure 3.2 Root Cause Analysis of Missing Cargo



Moreover, this chapter will also present a model of partially lost (missing cargo), and its effects to the framework of operational performance and service quality, which influence customers in their satisfaction and loyalty.

Figure 3.3 the Conceptual Model of Customer Satisfaction and Loyalty



However, this research will be based on the concept of service quality measurement which is proposed by Parasuraman *et al.* (1985) who condensed ten original factors into five categories: tangibles, responsiveness, reliability, assurance and empathy. Missing cargo has been listed under 'reliability' service of the air carrier.

Base on URL: www.worldaircargo.com , there are four criteria to examine air cargo carrier performance. These are: *customer service*, *performance*, *value* and *information technology*.

In the framework, the literature has also mentioned that service quality and operation performance affect customer satisfaction and loyalty. There is a strong relationship between loyalty and satisfaction (Levesque and McDougall, 2000). Additionally, Guenzi and Pelloni (2004) provide further support to the evidence that customer satisfaction is a fundamental driver of customer loyalty in service markets. However, Rundle-Thiele (2004) demonstrated that high levels of satisfaction do not always translate into high levels of attitudinal loyalty.

As mentioned in chapter 1, customers increasingly expect shorter cycle times to in response to the Just-in-Time concept. The speed, delivery time or transit time between the manufacturing and customer's warehouse in destination countries, and more accurate services, are the factors that are being focused on for the transportation part.

For the air cargo industry, visibility and accessibility of the consignment are important and need to be provided to the customer. Partial loss or unavailability of a consignment when its flight arrives at the destination point will create serious problems and might be perceived as poor service quality due to the carrier's poor performance. Based on literature, these factors may lead to customer dissatisfaction and switching to other carrier easily or less loyalty to the company. Therefore, this project will study the possible factors that could lead to partial loss and make recommendations based on the operational process in order to reduce the chance of problem occurrence.

3.3 Sources of Data

The research paper use as its main sources of data, observation at the International Cargo Terminal and interviews with air cargo carriers. The findings of observation and interviews will be presented in chapter 4, Results and Discussion. The results will be grouped under four areas: loading area, type of shipment, manpower, and operation process. The results data will be considered as possible factors which may cause missing cargo at a destination point.

3.4 Data Collection Method

There are two qualitative methods of data collection that will be employed throughout this study: observation and interview.

- **Observation** – the operation process of exporting and loading cargo is the same for all airfreight shipments, and there is only one loading area at airport. This study therefore observes the operation process at International Cargo Terminal, Suvarnabhumi Airport.
- **Interview** – the target population will be International Airlines and we will interview, share and discuss with either the Air Cargo Manager or the Claims Department about possible factors that may occur during operating at the loading terminal, resulting in missing cargo, and the effects on the company. Interviews will also be conducted with ground service handling companies.

In selecting airlines to interview, the researcher will select bases on the following criteria:

- **Area of Operation** – passenger–cargo or freighter carrier only.
- **Network and Size** – worldwide destination services, major hub are in Europe and Asia.
- **Market Reputation** – has been awarded and well known in the European-Asia market.

- ***Evidence of Quality Systems*** – top ten carriers ranking by World Air Transport Statistics (WATS), ISO 9001 standard and Cargo 2000 membership.
- ***Competitive Edge*** – competitive advantage in various areas. Benchmarking will be applied.

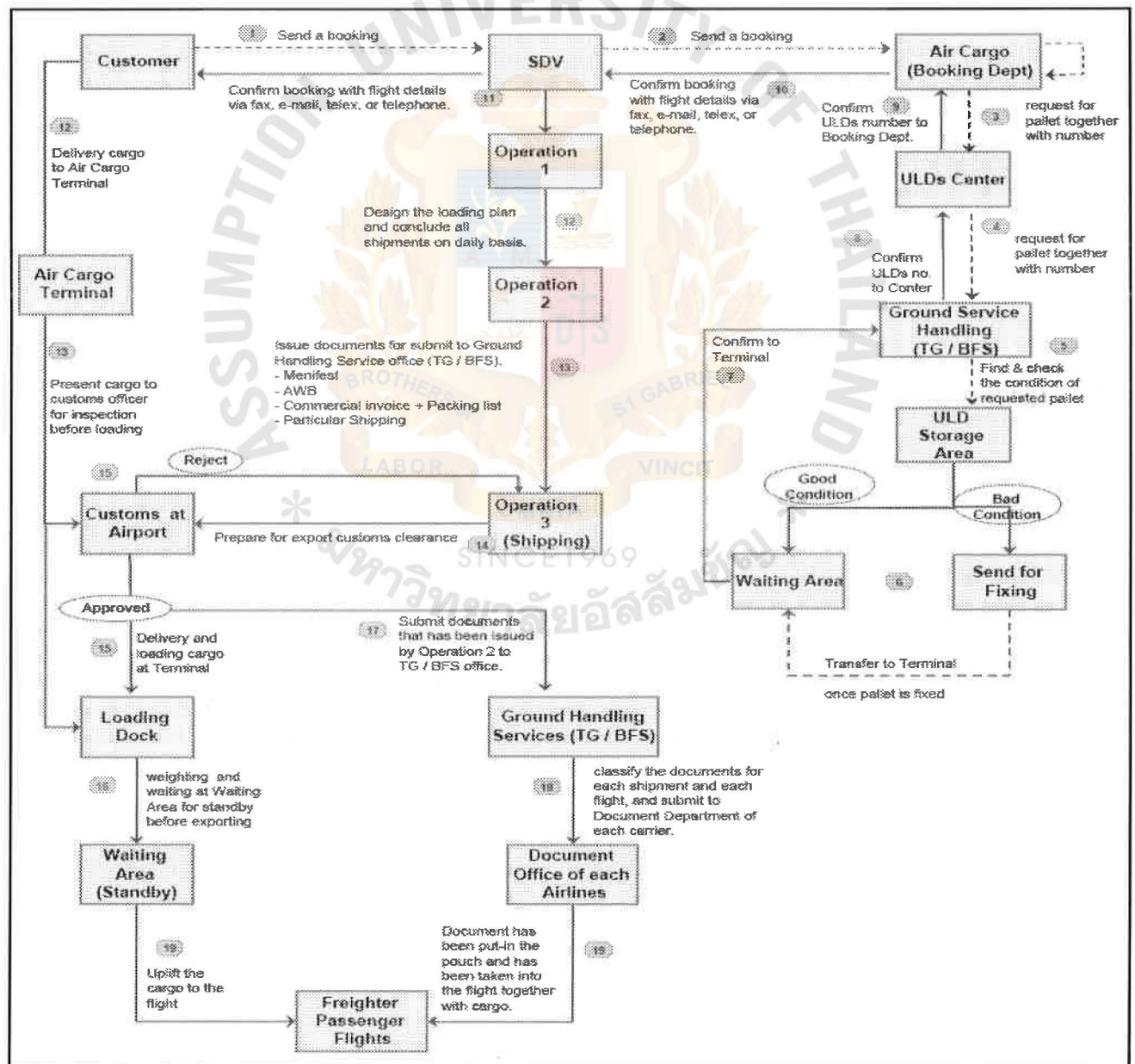


CHAPTER IV

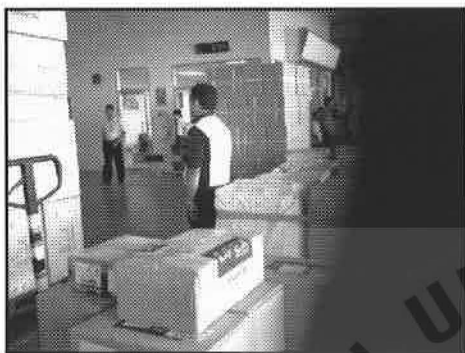
RESULTS AND DISCUSSIONS

In this chapter, we will discuss the results from the observations at the international cargo terminal and interviews with the air carriers and Ground Service Handling Company. In addition to variables that were discovered which could lead to the problem, this study also provides a summary of the Airfreight Export Process as shown in Figure 4.1. The details of each process can be found in the appendix.

Figure 4.1 Airfreight Export Process



This study has found many variables in the current export process, which are causing the problem of missing cargo. All variables have been listed and grouped into four factors. As mentioned earlier in chapter 3, they are: loading area (Figure 4.2), characteristics of shipment (Figure 4.3), people or labor (Figure 4.4), and the internal practice process of carriers (Figure 4.5).

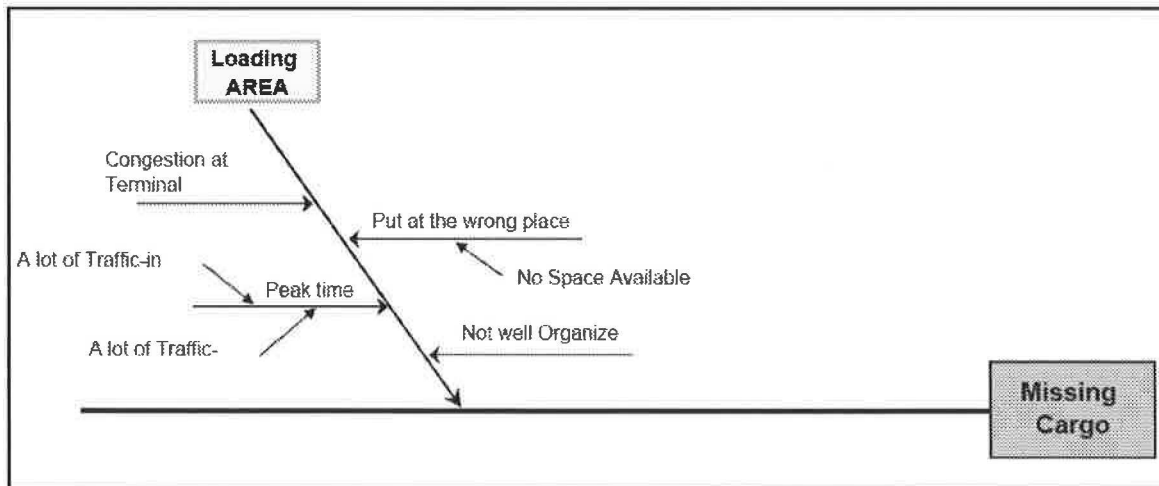


Loading Area

After the loading area has been observed, the possible variables have been listed under the factor of Loading Area, Figure 4.2. The main variables are as follow: -

1. **Congestion** – when there are a lot of shipments that need to be exported from Thailand, they continue arriving at the cargo terminal and unloading at the same time, although there are limited weighing machines and gates at the cargo terminals. Based on the export process, a shipment needs to complete all the processes of customs clearance and documentation before being weighed at the terminal. A shipment will then go inside the terminal gate to be loaded on a pallet, and stand by for uplift into the targeted flight. Most of the time, there are not only export shipments; but also a lot of import shipments waiting for shipping companies to be investigated for the completion of shipments. If the shipment is completed with no damage (package condition), nothing missing, no short-ship, then the shipment needs to be taken out of the terminal gate to wait for trucking at the loading/unloading area. A truck can get inside the terminal to pick up the cargo only when the shipping company completes all import customs clearance. It could not be denied that the waiting time for both types of shipments, export and import, can generate congestion at the loading/unloading area at the terminal.

Figure 4.2 the Root Cause Analysis of Missing Cargo – Loading Area



2. **Peak Time** – during the day, there are a lot of flights coming in and going out of Thailand, both passenger flights and freighters. Every flight contains a lot of shipments. Therefore the area for both storage and loading/unloading are shared among import and export shipments. Because of lack of space to support this number of shipments, a shipment might be mixed up if it is loosely packed.
3. **Put at the wrong place** – due to not enough space or no available space to support all shipments during peak times. It is sometimes the staff of a Ground Service Handling Company who put the cargo at the wrong place or close to the area of other carriers.
4. **Not well organized** – due to the area being limited while there are a lot of carriers and shipments. Each carrier has quotas in the area for loading and unloading the pallets inside the terminal. When there is congestion of traffic and peak time, the quota area cannot be well organized.

From the interview with an officer at terminal, we learned that the international cargo terminal was built to support a Free Zone system, not a Bonded Warehouse system. A Free Zone system has been planned and designed to eliminate the problem of congestion, peak time, and inefficient area usage. All these problems happened during the operation of Bangkok International Airport. However, the Free Zone system did not succeed due to some factors such as the system and process of customs clearance, and the

software program, which did not support the Free Zone system and needs more time to develop and needs more investment.

The differences between a Free Zone system and a Bonded Warehouse system is that in a Free Zone, all import shipments move freely from cargo terminals to freight forwarders' warehouses without having to complete the import customs clearance. Warehouses have been built in the Free Zone area and are for rental by freight forwarders or logistics service providers. When shipments arrive and are unloaded from a flight, all ULDs (pallets and containers) will be pushed out of the terminal, and freight forwarders or logistics service providers have to go to pick up their own pallets and containers to send to their warehouses, break the console, prepare for customs clearance and distribute cargo to customers.

For a Bonded Warehouse system, the consoled shipments will 'break' inside the terminal and wait for logistics service providers to contact terminal officers, and the customs process must be completed before picking up the cargo from the terminal. Under the Bonded system, after pallets are broken up, shipments will be stored at the terminal's warehouse. The limited usage area inside the terminal has to be shared among incoming shipments and outgoing shipments.

The interviews gave some indication of how to solve this kind of problem: more time is needed to study the details, and more cooperation from all government departments to invest, develop, and adapt the procedures of import and export shipments and create a software program that can be used to support the concept of a Free Zone system. These are the major problem for the International Cargo Terminals.



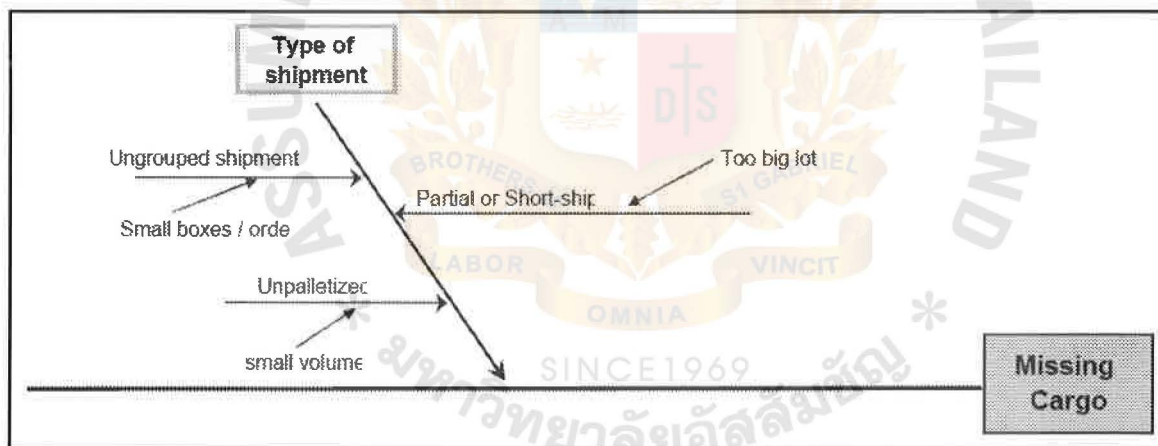
Characteristics of Shipment

In a lot of

missing cargoes it is sometimes found that characteristics of shipment are also important and lead to the problem. Figure 4.3 shows the characteristics of shipment that could lead to missing cargo.

1. **Ungrouped shipment** – sometimes the shipment is not packed or wrapped as a big unit or put together in the same area or put in the cart while they are waiting for weighting or loading onto a pallet. It is easily mixed up with other loose shipments.

Figure 4.3 the Root Cause Analysis of Missing Cargo – Type of Shipment



2. **Unpalletized** – sometimes the quantity or volume of shipments are not great, and some customers have only a few boxes while some customers have greater volumes and pack or wrap these as a big unit before loading onto the pallet. It is easy for staffs to recognize the shipment and not be confused as to whether a carton belongs to which pallet or to which customer. A loose shipment is easily mixed up with other shipments during loading or unloading and this may occur both inside and outside the terminal.

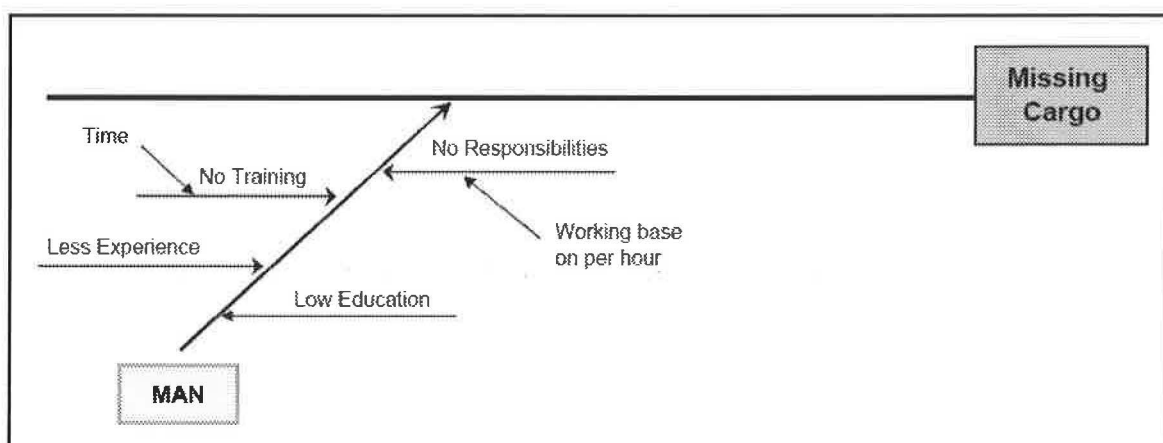
3. **Partial or Short-shipment** – sometimes too big a shipment also creates the missing problem for the company. In some cases, a shipment is too big or high volume, but the carrier has limited capacity to carry the whole shipment. Therefore the carrier will break or split the shipment and ship them to the destination as partial shipments. Sometimes a carrier will co-ordinate by requesting to share space with their alliance airlines. The whole shipment might be moved and shipped by an alliance carrier or only part of the shipment.

The main variable of shipment characteristics is loose shipment, where a shipment is not packed onto a pallet or is not wrapped as a group or unit for each customer. Due to this problem, the cartons might be dispersed from one group to another group. This problem might be solved by wrapping or packing the cartons or boxes onto pallets or making it a big unit which easy to recognize and move. Besides the shipping mark, there should be a clear mark on cartons and pallets for each shipment, for each customer. This will be recognized by ground staffs who are loading cargoes onto the flight. It would be a benefit also when a shipment needs to be transited at some places to connect with another flight before it arrives at the destination.

PEOPLE (Staffs of Ground Service Handling Company and Shipping Company).

The loading/unloading area, and inside the terminal, are mostly operated by humans, and humans generate the most errors. Figure 4.4 shows the variables that cause missing cargo generated by staffs at the terminal.

Figure 4.4 the Root Cause Analysis of Missing Cargo – Man



1. **No training** – as time is limited in companies, there is no training provided to staff before they start their job. Its affect is that sometimes staff do not know for certainty what should to do or have to do to solve the problem.
2. **Less experience** – sometimes the staff of a Ground Service Handling Company are new or have less experience of the operating process.
3. **Low education**
4. **No Responsibilities** – some staffs at a terminal or staffs from shipping companies have been hired on a daily wage basis. Staffs may not be responsive to the job that they were assigned and this variable could lead to the problem of missing cargo due to lack of responsibility.

As humans generate the most errors, staffs from freight forwarders and ground service handling companies should be well trained for the process and the importance of each process, its effects and what to do when mistakes occur. When staffs have realized the effects of mistakes, they may become more careful and more responsible during their working in order to avoid mistakes.

Internal Practice Process of air carriers

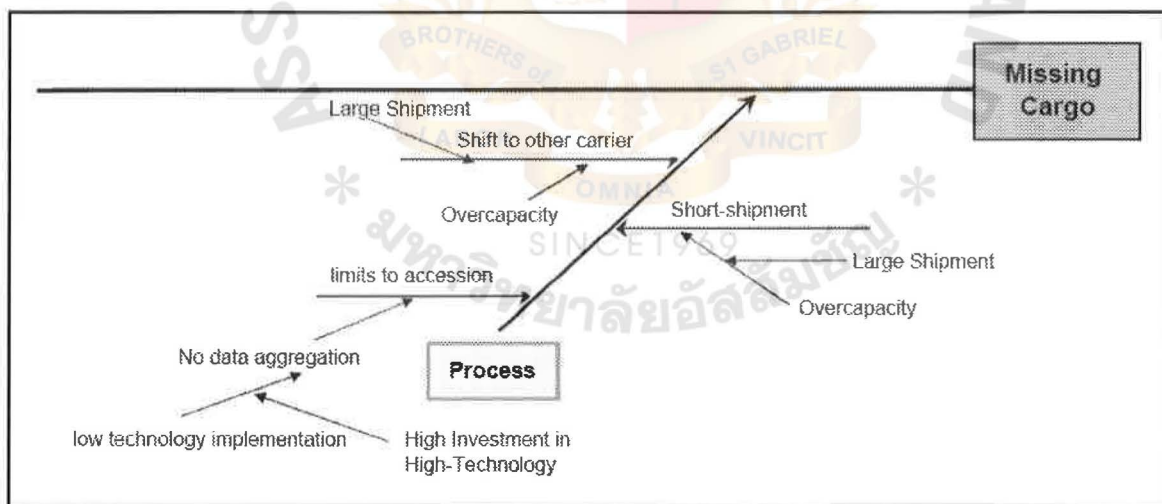
The problem of missing cargo also occurs due to the internal procedure of each air cargo carrier as mentioned in Figure 4.5: the root cause analysis of missing cargo – process.

1. **Short shipment** – as mentioned earlier in characteristics of shipment, if the shipment is too big, it is possible that an air cargo carrier will decide to split or break the shipment and ship it as partial. To ship as partial, all might be shipped with the same carrier while some may be shipped with alliance carrier. To ship as partial or change the carrier, sometimes the number on the air waybill is changed but the carrier does not inform the customer about the split shipment and new air

waybill number, so misunderstandings might occur between origin and destination stations.

2. **Shift to other carrier** – as mentioned in the previous variables, when a shipment is too large and cannot carry it from origin to destination on one flight, the shipment will be moved and shipped by the alliance carriers who have space available and have a similar time schedule, and if not, the first available flight and schedule will be used. With this practice, an air carrier sometimes does not inform the destination office or the customer.
3. **Limits to accession** – as the airfreight mode provides customer with the fastest transit time. It normally takes only a few days to get through to the destination. So the proper shipment information or shipment status is sometimes not key-in on time. Moreover, it is a very high cost for airlines to invest and implement new information technology to support faster and more correct information to customers.

Figure 4.5 the Root Cause Analysis of Missing Cargo – Process



Another factor that limits accession is data aggregation. The information technology that is used between carriers, terminals, and ground service handling are different and there is a need to communicate with various parties for each shipment. It is possible that one of those parties did not update the shipment information or status into the system, such as shifting a big shipment from one carrier to another carrier. It is an

unplanned action and the decision has to be made at loading time. Sometimes, it is recorded and communicated only between origin offices and the origin terminal but not to the destination. When the shipment arrives at its destination, nobody is aware the shipment is due as the number of the air waybill has changed. The customer will always try to trace the shipment with the old reference number.

The main factor in the internal process of the carrier is communication. From interviews with air cargo carriers it was learned that any change for a shipment is sometimes not well communicated between the parties of origin as well as between the origin office and the destination office. To track and trace the shipment it will take time to make contact between the destination and origin offices due to time differences from country to country. The current system used to communicate between each party, both of origin and destination, is telex. To solve this problem, they should develop an IT system which can link the data to all concerned parties. However, RFID is already implemented for some airlines, but only a few because of the high investment cost.

CHAPTER V

CONCLUSION

This chapter presents the summary, conclusion and recommendation based on the results of the study, and is divided into four sections. The first section summarizes the findings of the research questions of the study. The second section concludes and discusses the importance of this study. The third section is about the limitations of the study. The last section offers recommendations that are based on the results of the study. Finally, suggestions are made for further study.

5.1 Summary of Findings

When conducting this study, it was found that there are many kinds of discrepancy shipments. They are: cargo damage, missing cargo, misrouting, and missing documents. From the results from interviews with targeted groups, the effects of missing cargo are the most serious for the customers. It also affect the company's reputation, performance and service quality, customer satisfaction, and customer loyalty. It takes a lot of time to investigate the case and find out what happened to the shipment. Moreover, the air cargo carrier has to lose money to when there is a claim from a customers who is an importer or exporter. From interview results, the average cargo value for general cargo varies from THB 50,000 up to THB 80,000 per shipment. Therefore, the total cargo value for missing shipments will be THB 231,900,000 up to THB 371,040,000 if there is a total of 4,638 missing shipments annually. In fact, customers will not only claim for their cargoes' value, but they will claim also for their expense on other processes for the shipment such as international freight charge, local charge at origin, and sometimes the penalty due to the delay in delivery in a specific period, which is mostly charged on a daily basis.

Therefore, this study attempts to find the factors that cause the problem of missing cargo by identifying elements that may lead to the missing problem during the loading process. It is important for all concerned parties to find a way to solve and avoid the problem. This study has also extended our understanding of the international air cargo process at international cargo terminals, Suvarnabhumi Airport.

After investigating the operation process at International Air Cargo Terminal and interviewing air cargo carriers and ground service handling companies, there are many elements and factors which the shipments go through in the operation processes that drive shipments to face many kinds of discrepancy problems. Those elements can be identified under 4 main factors: 4 main elements in the loading area, 4 main elements in the people factor, 3 main elements under shipment characteristics, and 3 main elements in the internal process of the carrier itself.

5.2 Conclusions

The importance of knowing the causes that may lead to the problems in shipments is that it could help all concerned parties, including air cargo carriers, ground service handling staffs, freight forwarders, and exporters and importers, to be aware, understand and find ways to avoid problems that may be incurred with their shipments. This study will assist new exporters and importers or those who have never faced the problem to be aware and to know how the airlines work and their processes inside the terminals.

After observation and interviews, it seems that the main problem of the Air Cargo Terminal at Suvarnabhumi airport is the problem of total area usage, which has been designed to support the Free Zone System, not the Bonded Warehouse System. Moreover, the process of customs clearance regulations and processes are not supported.

5.2.1 Important of Study to Ground Service Handling Staffs

This study would help staffs who are working at terminals to have more realize and be careful on their customer's shipments. To aware about effects and problems in advance for what they are deciding to do will help them to have more responsibility. To provide good service for

5.2.2 Importance of this Study to Air Cargo Carriers

This study could help air cargo carriers to realize the importance of communication systems, and develop and implement new technology to support customers' requirements. The new developing technology will help customers to have faster tracking and tracing with the correct data and real time for their shipments.

5.2.3 Importance of this Study to Freight Forwarders

This study could help freight forwarders to be aware, and provide suggestions to their customers who are importers and exporters for the operation process, information, and how to arrange shipments with proper packing.

5.2.4 Importance of this Study to Exporters and Importers

This study could help exporters and importers to have more knowledge and understanding of the loading and operation processes at terminals. Based on this study, they can know in advance what kind of problems that may occur when a shipment is at the terminal. They can find ways to protect their shipments from the problems.

5.3 Limitations

We attempted to minimize limitation of this study, but there still exist several limitations.

First, as the Airport of Thailand had just moved from Bangkok International Airport to operating at Suvarnabhumi Airport, data, which has been shown in this study, is based on the records of Thai Airways International and recorded only from October 2006. There is therefore no previous data to compare, for trends of discrepancy shipments. However, this study used the data which had been recorded during operations at Bangkok International Airport to study the trends of discrepancy.

Second, observation was done at the loading/unloading dock, but we were not allowed to get inside. However, the process inside was explained when conducting the interviews.

5.4 Recommendations

The finding of this study focused on variables which can be classified into four factors that could lead to the problem of missing cargo, misrouting, and damage. This study was conducted in one service industry and replication is needed in other industries such as the Sea freight Industry. Moreover, all missing cargo, misrouting, and damage also affect the company's operational performance and service quality. Therefore, further study should be conducted on the effects on customers' perceptions.

Appendix



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