

## ABSTRAK

Perubahan dari perkapalan konvensional ke kontena laju melibatkan perubahan dalam banyak aspek pengurusan. Belajar dan membangunkan pengurusan rantaian pembekalan berdasarkan risiko membantu memahami faktor kritikal yang mempunyai pengaruh secara langsung terhadap kejayaan idea perkapalan kontena laju. Kajian ini mewujudkan hubungan antara elemen di dalam proses pengurusan rantaian pembekalan kepada risiko. Empat elemen yang dikaji ialah pembungkusan, dokumentasi, pengangkutan darat dan pemindahan dari jeti ke kapal. Soalan kaji selidik diedarkan dan data yang dikumpul, dianalisa menggunakan Pakej Statistik untuk Sains Sosial (SPSS) dan MINITAB. Keputusan menunjukkan bahawa kesemua empat elemen yang dikaji adalah berisiko. Pengangkutan darat merupakan proses yang paling berisiko (nilai Pearson  $r^2$  0.437 dan nilai-p 0.104) di dalam pengurusan rantaian pembekalan untuk perkapalan kontena laju. Ianya diikuti oleh pembungkusan (nilai Pearson  $r^2$  0.409 dan nilai-p 0.073), pemindahan dari jeti ke kapal (nilai Pearson  $r^2$  0.407 dan nilai-p 0.075), dan akhir sekali dokumentasi (nilai Pearson  $r^2$  0.328 dan nilai-p 0.158). Kajian berjaya mewujudkan diagram perhubungan antara risiko dan keempat-empat elemen yang dikaji.

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# CHAPTER 1

## INTRODUCTION

### 1.1 Research Background

Why risk management is important because Supply Chain Management (SCM) alone is not enough for providing managers a tool in making decent decisions. Each process of the Supply Chain (SC) has its own risk which is called *risk factor* (RF). By identifying those factors, the level of risk would also be notified. Equipped with the proper analysis, it is viable to see the effects of those risks towards the whole system including sub-processes.

In this research, the review and synthesis were executed in Malaysian context which leads to the development of integrated risk assessment-based management approaches enabling the prevention and/or reduction of the negative impacts caused by human errors or activities on that supply chain management system.

The related measurable and verifiable risk-based deliverables are:

- i) An overarching concept, generic approach and guiding principles to integrate risk-based management of fast container shipping.
- ii) Recommendations towards evolution and implementation of risk-based management in national and companies' policies and towards implementation in management.
- iii) A proposal for the national research agenda related to risk-based management.

This research was conducted all the way through research methodology via step by step approach, i.e.:

- a. Identification of transportation chain process, application of supply chain management to fast container shipping process
- b. Development of Preliminary Model for RBSCM
  - i. Identification of Components of transportation chain
  - ii. Identification of Links between each components of the chain
  - iii. Identification of the management issue of all the sub-processes
- c. Data Collection by Questionnaire / Interview Methods
- d. Development of Final Model for RBSCM
  - i. Identification of risk factors for all the management issues
- e. Model Validation by experts, i.e.: main industry players.

### **1.1.1 Purpose of Study**

Container shipping is currently undergoing an era of transition towards fast container shipping primarily due to efforts on more efficient cost effective container transportation, viable technology in ship design of faster ships, and possible winning competition against inter-continental air transportation of high volume high value cargo.

This research is to identify the risk factors for supply chain management for transportation involving fast container shipping. The three elements for this research are the scenario of container shipping towards fast container shipping, supply chain management in container shipping, and the need to consider risk in supply chain management for fast container shipping

### **1.1.2 The Role of Supply Chain Management in Container Shipping**

The idea of containerization was to move trailer-size loads of goods seamlessly among trucks, trains and ships without breaking the bulk. Along the way, even the most foresighted people could make mistakes and lose millions.

Assessing the potential demand for container ports and related multimodal transportation is critical for several purposes, including financial feasibility analysis and the evaluation of net economic benefits and their distribution.

When developed in conjunction with the idea towards fast container shipping to match the transportation efficiency via air for fast maturing immediate implementation, a logistic information system, port-related demand analysis also provides needed input for assessment of selected risk-based issues, such as truck traffic on local roads and related potential external costs.

However, the risk factors for the supply chain management model for container shipping analysis is very difficult due to the complexities of international trade in containerized goods, inter-port competition, and potential strategic behaviour by several parties.

This paper summarizes the development and application of risk factors for the supply chain management model for container shipping. The underlying supply chain management models for FCS assumes shippers minimize the total general cost of moving containers from sources to markets whereby risk management issues on FCS need to be addressed as well. The model is validated and in the future it is possible to use it to estimate (1) annual container transportation service demand for major container ports, (2) the market areas served by selected ports, and (3) the impact on

port demand and interport competition due to hypothetical changes in port use fees at selected ports.

Basically, this paper first describes the framework of the present supply chain management for conventional container shipping (CCS), and modifying the present CCS to suit the scenario of future fast container shipping (FCS).

The ultimate intention is to develop the risk factors for the supply chain management model for FCS in which describes the model and the underlying economic reasoning, followed by the assumptions. Then, the element data, sequences of elements, transportation networks, and relationship between processes variables are described.

### **1.1.3 Supply Chain Management**

If one company makes a product or provides a service, from one place to another, then surely there is a Supply Chain. Some supply chains are simple, while others are rather complicated. The complexity of the supply chain will vary with the size of the business and the intricacy and numbers of items or elements that involve in the Supply Chain Management system.

The advantages of supply chain management are:

- i) It is a coordination and integration of all supply chain activities into seamless process;
- ii) To enable organization to plan and collaborate across supply chain;
- iii) To deliver the right product to the right place at the right time in order to maximize profit.

SCM is managing flow of information through supply chain in order to attain the level of synchronization that will make it more responsive to customer needs while lowering costs. Keys to effective SCM are information, communication, cooperation and trust.

#### **1.1.4 Container Shipping**

##### **1.1.4.1 Containerization**

Containerization is a system of intermodal freight transport using standard ISO containers. It is known as shipping containers, ITUs (Intermodal Transport Units) or isotainers that can be loaded and sealed intact onto container ships, railroad cars, planes, and trucks.

The fundamental challenge of intermodal transportation is to use the inherent advantages of each modal partner, the universality of the highway/truck network and the low-cost “line-haul” attribute of the rail network. Without any efficient transfer between the two of them, it dissipates the advantage and containerization is a fundamental aspect of that.

The fact that containers are uniform in size and transfer equipment (i.e.: cranes) exists to deal with containers, moving them readily from one mode to the other; this is fundamental to the idea of intermodal transportation.

#### **1.1.4.2 Sea Shipping**

Some people may refer container shipping as “*sea shipping*”. One of its main business activities of "Multimodal Transport in Sea Shipping" is granting the full complex of services in the organization of cargo transportations by sea and river modes of transport. Owing to the existing stable and safe relations both with owners of navigable lines and with the largest world ship-owners by offering clients alongside with optimal cost of cargoes/containers transportation; including perishable or demanding observance of the certain temperature modes of storage, by water transport also favourable conditions of cargo/containers storage in ports, its timely qualitative and safe overload to other modes of transport in accordance with customers' desire wherein the transportation of cargo/containers be organized in such a way to any direction "from port to port" and/or "from door to door". A common Qualitative service provided by the shipping organization includes sea freight, cargo consolidation, confirming paper work in port, safety, reloading, and control of motion.

#### **1.1.5 Fast Container Shipping**

Consequently, many new ideas were introduced, which were then developed into new concepts and systems with purpose to improve the efficiency of the existing system of container shipping transportation. The improved container shipping system is known as fast container shipping or high speed container shipping transport system which requires efficient and reliable door-to-door services offered by transport/logistics service providers, who may be Multimodal Transport Operator (MTO).

In order to achieve this idea of high speed container shipping operated by fast and efficient total system, new concepts are introduced to fulfil every requirement. These new concepts provide new systems controlled by tools that are highly advanced in technology. Modern technologies ensure that the container shipping system could be speed up into high speed container shipping system (Azlin, 2008).

### **1.1.6 Risk-Based Management**

Risk management is a structured approach to managing uncertainty related to a threat, a sequence of human activities including: risk assessment, strategies development to manage it, and mitigation of risk using managerial resources. The strategies include transferring the risk to another party, avoiding the risk, reducing the negative effect of the risk, and accepting some or all of the consequences of a particular risk. Some traditional risk managements are focused on risks stemming from physical or legal causes, e.g. natural disasters or fires, accidents, ergonomics, death and lawsuits.

The objective of risk management is to reduce different risks related to a preselected domain to the level accepted by society. It may refer to numerous types of threats caused by environment, technology, humans, organizations and politics. On the other hand it involves all means available for humans, or in particular, for a risk management entity (person, staff, and organization). Risk is the net negative impact of the exercise of vulnerability, considering both the probability and the impact of occurrence, and therefore Risk Management is the process of identifying risk, assessing risk, and taking steps to reduce risk to an acceptable level (Stoneburner, 2002).

### **1.1.7 Missing Component**

The traditional supply chain strategy is assembling consumer products in the significantly low-cost region of the world, and nowadays, shipping these cargoes or containers fully configured and packaged to other regions of the world is increasingly being challenged.

The one thing that is missing is the development of risk-based management model for container shipping. This paper, in particular, studies and identifies risk factors for the supply chain management through understanding critical factors that would influence to implementation of the idea of fast container shipping. To synchronize all elements of the risk-based supply chain, intelligent tools and operating technique are required to better manage the balance between the supply side of the equation with the demand side.

## **1.2 Research Objective**

The research objective is to identify risk factors for the supply chain management for sea transportation involving fast container shipping. The consequence of performing risk management is to enable the organization to accomplish its missions:

- i) By enabling management to make well-informed risk management decisions to justify the expenditures that are part of an operation budget;
- ii) By assisting management in authorizing (or accrediting) the supply chain systems on the basis of the supporting documentation resulting from the performance of risk management.

### **1.3 Research Statement**

The move from conventional to fast container shipping requires shift in many aspects of its management. Studying and identifying its risk factors for the supply chain management will better understand critical factors that would have direct influence to the successful implementation of the idea of fast container shipping.

### **1.4 Research Questions**

The main aspect of this research involves:

- i) The transportation chain for fast container shipping by transforming a Conceptual Model for Transportation System of High Speed Container Shipping System (Azlin, 2008) into transportation chain via showing processes for fast container shipping.
- ii) The understanding of supply chain management or the management of the processes when it is applied to fast container shipping.
- iii) The development of linkage between elements of SCM when transporting goods using fast container shipping with a possible risk factor that exists in the process.
- iv) The effects of this risk factor to the supply chain management process and the influence of the factor directly towards the implementation of the risk-based idea on fast container shipping.

These questions are discussed further detail in Chapter 5 later in this paper. It comes together with the enhancement of the new findings as based on the data gathered through interviews and questionnaires carried out with operation personnel of several shipping, international trading companies and cargo owners.

## 1.5 Scope of Research

The scope of this research be mainly connected with three entities; the focus on the research interest area, the method on how the research to be conducted and the applicability of result; i.e.:

- i) The variables studied are packaging, documentation, inland transporting and shore-to-ship transfer.
- ii) The analytical method used is statistical.
- iii) Indicator of correlation between variable and risk used are Pearson  $r^2$  value together with p-value.

## 1.6 Organisation of Thesis

This thesis consists of six chapters. It will cover Introduction, Literature Review, Methodology, Results, Discussions, Conclusion and Recommendation.

Chapter 1 covers the general overview of the research. The aim is to introduce the thesis' background, problem statements, objectives, purpose and scope of this paper.

Chapter 2 explains an overview of risk management. The next thing is to see how it fits into the study of Fast Container Shipping Supply Chain System, and the roles of individuals who support and use this process.

Chapter 3 covers Risk Management research methodology. The primary steps in conducting a risk assessment of SCM of FCS system. The preliminary findings and the development of a conceptual idea for risk-based model is the main focus.

Chapter 4 shows results of the statistics analysis carried out using SPSS software which the input data is based on the findings and information gained from the feedback of the questionnaire conducted with the shipping and trading companies.

Chapter 5 discusses in detail the good practices and needs for an ongoing risk assessment. The evaluation and the risk factors leads to identify risk factors for the supply chain management for fast container shipping.

The final finding is to verify relationship of the risk factors for supply chain management for fast container shipping. This finding is carried out against the daily real-life system applied by shipping companies. Chapter 6 concludes the thesis. Recommendations are also included in this chapter.

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