SUPPLY CHAIN OPTIMIZATION OF RISK MODEL WITH AHP

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ABSTRACT

Competition increasingly competitive business has prompted the company to provide the best service for its customers. If you look at the customer as the highest goal, the company will be able to grow if the company is able to provide goods and services to customers in a timely, cost-effective and qualified for the customer is able to enjoy the benefits of the goods or services. Since the 1990s a number of studies have focused pad supply chain management as an integrated measurement system in rangak maximize the value and purpose of the company. This research study focuses on the scope of forwarder agents as a single business entity that will support the success of the company in order to export their products. The main motivation of this study is to examine the number of supply chain risk factors to be able to understand it and this assessment is useful to help the furniture industry in an effort to survive and win the competition of their business. So to achieve the objectives of the study, the research steps that need to be addressed: (1) review the literature on supply chain risks in the furniture industry; (2) make a list of risk factors and make the structure of a hierarchical classification of risk factors; (3) using AHP (Analytical Hierarchy Processing). Results of the study was the identification of priority regulatory risk as a major risk that triggered the failure of furniture exports.

Keywords: Supply Chain Management; AHP Methods; Supply Chain Risk; Optimization of Risk; Forwarder Agent

INTRODUCTION

In today's globalized world, have an impact on the company's ability to respond to a number of requirements needs of consumers, especially consumers in foreign markets. Companies need to build a strong supply chain to gain an advantage over their competitors by offering the best value for their customers. Supply chain management (SCM) has become very important for managing risk, dynamism and complexity of global sourcing (Christoper and Lee, 2004). A supply chain is completely integrated needed for the company to get the maximum benefit. The aim of the supply chain and performance measurement needs to be understood in order to build

the most effective supply chain (Tang, 2006). Provide performance measurement approach to identifying successes and potential supply management strategies (Tang, 2005). One of the main aspects of the SCM is to select the appropriate source of supply in the global business environment that can support the company's strategy. Contrary to a conventional perspective, SCM effective in the new competition suggest seeking a close relationship in the long term with numbers partners.

Given the conditions of overseas markets rapidly changing and customers who always need to look for the best value, long-term relationship exporter company established cooperative relationships with several parties such third party that helps the process of shipping or logistics of their products. Failure phenomenon export information often can be traced to the forwarder logistics or services, the data branch Asmindo solo mentions 33 container furniture manufacturer Asmindo members have failed to export due to multiple risk factors. The main risk is the incompleteness of the document PEB (Notice export of goods) are not equipped DKP document (Document commitment of suppliers) are not complete and many SMEs furniture yet certified timber legality verification as the primary document that should be included in the PEB. Some SVLK (Timber Legality Verification Certification) also is no longer valid due to an extension extend the certification cost is very expensive. The purpose of this paper is to emphasize the importance of identifying problems and perform a number of criteria and sub-criteria perangkingan supply chain risks that often appear in the scope forwarder so the impact on export failures furniture manufacturing company. Methods for analysis using Analytical Hierarichal Processing (AHP), to create a supply chain management strategies that are reliable for furniture manufacturers. Failure triggers a number of risk information obtained from the export forwarder agents are expected as feedback for manufacturers to improve supply chain performance measurement system company.

LITERATURE REVIEW
Supply Chain Management
A supply chain is characterized by the flow of goods, services, money, and information both within and between enterprises including suppliers, producers / manufacturers and customers (Chase et all, 20001). It also includes all kinds of third-party organizations that are engaged in transportation, warehousing, information processing and export / import documents and materials handling. The functions of supply chain management include raw material procurement, production scheduling, order processing, inventory management, warehousing, shipping the product until the customer service functions. The main purpose of SCM is to meet customer demands more efficiently by providing the right product, in the right quantity, at the right location, at the right time and in the right conditions (Christoper, 2003)

Supply Chain Risk Management
Risk management is an important component in the process of development and execution of strategy, and is believed to be key to the success of the company (Finch, 2004). A survey has been carried out and resulted in finding some 74.2% of respondents believe that Supply Chain Risk Management or SCRM is a continuation of the process of building a partnership with the customer relationship management (Cophra and Sondhi, 2004). Although there have been an increasing number of studies that examines the SCRM, there is no consensus on the definition or scope of SCRM itself (Cophra and Sondhi , 2004). Let's say Kleindorfer and Saad, 2005 mentioned there are three steps in the supply chain risk management needs to be done: (1) determine the sources of risk and Supply Chain Vulnerability; (2) assessment and (3) mitigation.

While Juttner et al, 2003 introduces four steps while Manuj and Mentzer 2008 tune into five steps in the supply chain risk management: (1) identification of risks; (2) evaluation and risk assessment; (3) Selection of alternative ways of managing risk; (4) the implementation of strategies to manage supply chain risk and (5) Mitigation risiko.Meskipun standard elements in general SCRM yet it is concluded that there is no consensus on the definition of standard components and SCRM process.

Although there is no agreement to classify the supply chain risk in this study need to develop a number of risk criteria as an agent or a source of risk and sub-criteria as the number of risk events that can be triggered from a particular agent or a source of risk. Essentially a risk agents can trigger a number of risk events and a risk event can also be triggered by more than one source of risk (Zsidisin, 2003). Several studies have identified a number of criteria specific risks such as labor disputes, distorted information, errors in the fulfillment of customer orders, supplier bankruptcies, exchange rate risk, government regulations, a single supply source, the delay in ports (Manuj and Mentezer, 2008; Zsidisin and Ellram, 2003). The thing to remember is the incidence of risk is highly dependent on the type of industry studied, the phenomenon of diversity of risk requires supply chain risk management process differently, because of supply chain risk management process is a process of environmental scanning (Zsidisin and Ellram, 2003). Risk mitigation efforts in supply chain risk management is a process of evaluation and confidence because of the risk could arise as a result of dyadic relationships in the supply chain process (Carter and Cavinato, 2004).

RESEARCH METHODS
Data Collection Technique
Data collection using in-depth interview technique. Dillman, 1978 describes the technique of data collection using in-depth interviews need to be done carefully, a few steps that can be taken to conduct in-depth interviews. First, the researchers will use the list of members of the Branch ASMINDO in Yogyakarta through research partner who happens also as one of the members and the board ASMINDO at the local level. Second, researchers will conduct initial contact to the companies in the list and further members as a resource willingness response will be sent a questionnaire via email. Third, researchers will select a few key informants virgin enterprise data that can be contacted, in order to develop a questionnaire that will be used by researchers to select speakers who occupied positions at management level or several employees in the logistics department, sales, procurement, marketing and IT. Of the key informants representing the manufacturers, researchers will search where suppliers and logistics agents.

Data Analysis Technique
In this study, presents the AHP analysis model to assess the risk. AHP model is able to support managers in optimizing the supply chain objectives, identifying indicators of risk criteria and sub-criteria, putting all the risk with impact severity scale to identify optimal solutions risk. So there are three formulation of the problem is the first review of the literature related to supply chain risk industries studied, both make classification structure of risk factors based on field interviews and the third using AHP model to identify the consistency of existing risk assessment in order to produce an optimal solution in dealing with risks in the supply chain furniture industry.

The purpose of using the AHP model in this study is to evaluate the risk associated with supply chain management in manufacturing companies. The use of weighting criteria using the weighting criteria developed by Saaty (2000;2001), although in the weighting process of subjective role is very high but the weighting subjectively rated logical because it attempt a

comparison criteria in AHP is an attempt appraisal criteria generally condition is often fickle and intangible. Pairwise comparisons intended to produce all the alternatives ranking criteria so that priority criteria can be identified. Here are five steps that need to be done with the AHP model: (1). Decomposition of problems with classification problems hierarchically structured; (2). Gather data by conducting interviews (especially interviews with a team of experts); (3).Perform pairwise comparisons of each factor / criterion; (4) Calculate the consistency index to rank the importance of each risk (Gaudenzi and Borghesi, 2006).

Results and Discussion

At the early stage researchers need to formulate a hierarchical model consisting of objectives, risk factors and sub risk. The purpose of the problems of this study is the optimization of supply chain risk management, where risk factors of identification there are five risk factors: environmental risk, risk systems and administration services; market risk, technical risk and regulatory risk. The fifth factor is assumed as an agent or a source of risk that can trigger a number of items of other risky events or referred to as sub factor. The sub factors of risk that triggered the events of each sources of risk are:

Table 1. Assessment of risk factors in the sphere of literature forwarder agent

Number	Risk Factors (Risk Sources)	Sub Risk Factors (Referred to as a number of risk events that trigger by sources of risk)
1	Environmental Risk	- Strike action in the port - Bad weather or storm disaster - The road to the port a lot of damage and crowded - Genesis accidents during the delivery process of export products
2	System and Administration Service Risk	- Services system disorders customs administration in the port - Delays in receiving FCR or forwarding cargo receipt - Supplier invoice document incomplete - Delays in the payment of export duties and other export taxes at customs regularly
3	Market Risk	- Unraveling the cost of exports has not detailed - Currency risk
4	Technical Risk	- Damage to the ship's engine - There ommit or the movement of goods using other boats and sail to the initial destination. - Technical Disorders forwarder agent communication with the supplier or manufacturer as exportir - Delay in receipt of invoice from the supplier, the SGLT and shipping line - There was a delay in custom clearance
5	Regulation risk	- Rejection of the transfer process of preparation of export of goods (PEB) - Card DFT or department of foreign trade is not valid

After building the model AHP next step is to measure and collect data, should involve a team of experts and subsequent tasks perform pairwise comparisons for a range of risk factors that have been identified by using weighting and weighting scale of 1 to 5, which was developed by Saaty, 2000; 2001. The questionnaire was prepared comprised of all the factors and sub-factors, and the team of experts will give a score for each risk to be compared with other risk weights range from 1 to 5 as shown in Table 2 as follows.

Table 2. Scale for Rating

Intensity of importance	Definition	Explanation
1	Equal importance	Two factors contribute equally to the objective.
2	Somewhat more important	Experience and judgment slightly favor one over
3	Much more important	Experience and judgment strongly favor one over the other.
4	Very much more important	Experience and judgment very strongly favor one over the other. Its importance is demonstrated in practice.
5	Absolutely more important	The evidence favoring one over the other is of the highest possible validity.
	Reciprocal	While comparing reversely one risk to other, value would be 1/original comparison.

Supply chain risk mapping in scope forwarder company there are 5 sources of risk as the risk factors or criteria consisting of: regulatory factors; factor and administrative systems; market factors; Technical factors and environmental factors. Here will be described a discussion of risk factors based on the priority of AHP and risk events as sub-criteria are urged to think about risk prevention action.

Table 3 presents the priority sub-criteria are detail risk or incidence of risk arising from the risk of each agent. Risk events that frequently arise and have a high severity level that is triggered by environmental factors is the weather, while the incidence of risk triggered by the sources of risk and the administrative system is a supplier invoice document; and so can be read in table 3.

Table 3. Priority risk events and the trigger source based on the critical ratio

Risk Agent	Sub Risk Factors	CR Value
Environment	Weather	0,628
	Strike	0,221
	Inadequate road infrastruture	0,091
	Traffic jam	0,06
System and Administration Service	Supplier Invoice documents	0,593
	The system disorders custom office	0,225

|	Delays duty	0,112
	Bill Payment delays by suppliers	0,069
Economic	Fuel Price Fluctuations	0,651
	Market uncertainty risk	0,203
	Foreign exchange risk	0,146
Technical	Delays Shipping Line	0,554
	Custom clearance delays	0,219
	Occurs ommit	0,108
	The emergence of technical problems	0,071
	Damage to the ships's engine or flight schedule	0,048
Regulation	Rejection of the transfer process PEB	0,742
	Regulatory changes are not sure	0,162
	DFT card is not valid	0,096
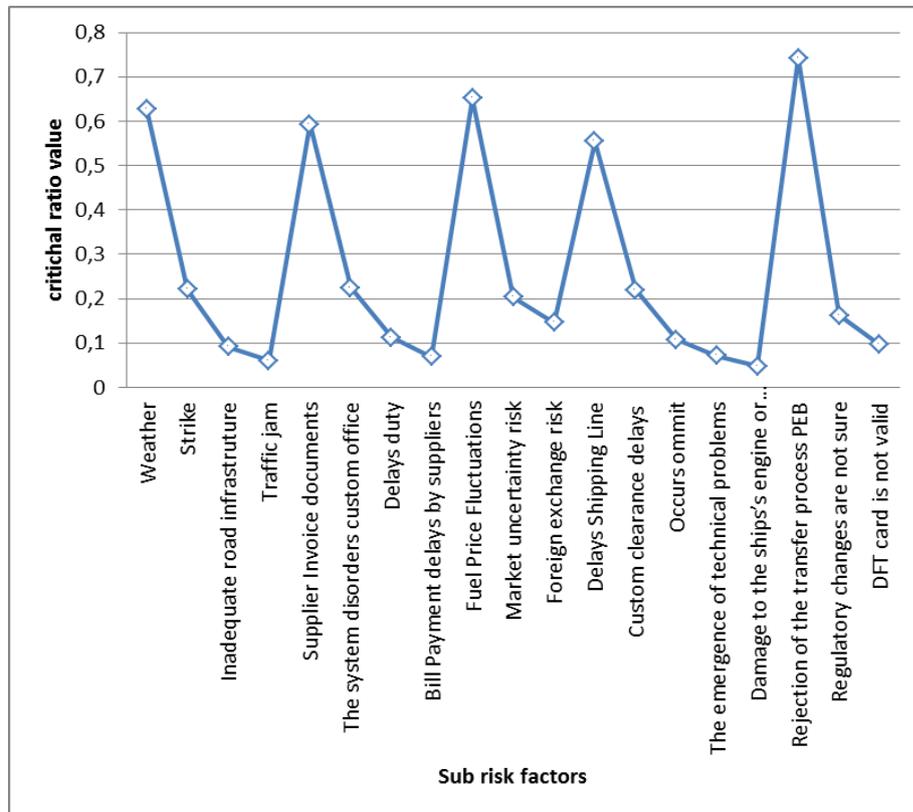
Figure 1. The Rankings of risk events that often arise in the scope Forwarder

AHP model in this research was conducted in order to determine the priorities on the various risks that arise in the process of supply chain manufacturers. Pairwise comparisons done by using the weighting scale of one to five.

Consistency ratio (Critical ratio or CR) is calculated with a degree of consistency of risk pairwise comparisons using role of thumb from the highest value of principal vector. If the CR value is less than 10%, the assessment is considered consistent. But if the value of CR is greater than 10%, the quality of the assessment must be increased in order to have a CR value less than or equal to 10%. Results of this study resulted in CR value of each criteria and sub-criteria risk of less than 10%, which means decisions subjectively perceived risk assessment has analyzed the respondents and the results are satisfactory and can be used for further analysis. It can be concluded that the company has risks that are consistent and the most important risk agents are regulatory risks while significant risk event is the rejection of PEB. This finding is consistent with the results of interviews with managers Asmindo researchers stating that triggers the failure of furniture exports caused by the lack of export documents and is in line with agency managers perceived that the incidence of the risk of rejection forwarder PEB documents most frequently occur and trigger a failed export. Risk regulai urged governments to be addressed because of the handling of these risks can reduce losses in the supply chain manajerman. While the sub-factors associated with regulatory risks also need to be resolved in accordance with the ranking of each sub factors identified risks.

CONCLUSIONS AND IMPLICATIONS

AHP concept is the concept of making complex decisions, which are generally companies focus on internal supply chain systems in the enterprise (Faisal et al, 2006). However AHP has advantages because the proposed framework decision is structured, simple and efficient as well as having the capability that is able to provide guidance on the level of impact on existing risks. The level of impact of each risk factor providing input for the company to be able to optimally allocate effort in order to maximize the benefits. The results proved that the regulation of risk factors have the highest impact on the successful implementation of supply chain. Here are some managerial implications to support the creation of supply chain reliable furniture industry, among others: EDI-based logistics system improvement help desk; import request staff to constantly monitor the condition of the field (either at the port or shipment process); using UPS (Uninteruptable Power System) to improve coordination with the department of export - import of the manufacturer or supplier; Request Shipping Line to inform the delivery schedule updates.

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