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Managing quality risk in a frozen shrimp supply chain : a case study

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Abstract

Frozen shrimp is a product that is very sensitive to temperature changing, therefore its quality has to be carried out from the supplier to customer stage. Quality itself consists of product hygiene and freshness as a healthy food. Company X as a frozen shrimp manufacturer faces quality losses of the product, which often caused by both production process and external factors. The accuracy of supplied shrimp specification and unpredictable supply demand pattern influence losses. This research analyse the quality problems of frozen shrimp product along its supply chain, involving supplier, Company X, logistic provider and customer. Firstly, all the activities are mapped by using Supply Chain Operations Reference (SCOR) model. Supply chain activities are divided into five categories namely plan, source, make, deliver and return. Secondly, potential quality risks are analyzed in a House of Risk 1 (HOR-1). Furthermore, some mitigation actions are deployed, then being analyzed by using HOR-2. Lastly, 41 risk occurance and 52 risk agents are identified. Regarding to the result of risk analysis, there are 11 most critical risk agents which is derived from the highest Aggregate Risk Potential (ARP). According to the selection analysis, there are 12 proposed mitigation actions to be implemented in Company X.

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Keywords: ARP, frozen shrimp, HOR 1, HOR 2, quality risk management, SCOR, supply chain

1. Introduction

Indonesia is an archipelagic country with 7.1 million square kilometers of total territorial and 5.4 million square kilometers surrounding sea [16], which 70% of total area in Indonesia is ocean. So that Indonesia has a great potential in fisheries and sea food industry. The total economic potential of Indonesia maritime reach 7.20 trillion Rupiah per year or four times more than 2014 state budget, APBN [19]. Based on its high potential of natural resources, there are some seafood companies established in Indonesia, including Company X. Seafood is any form of sea life regarded as food by humans. Company X as if seafood company as usual involved getting supply from fisherman, processing,

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distributing and marketing its product. The main product of Company X is frozen shrimp. Company X exports its product abroad such as United State of America, ASEAN countries and Japan. To be able to compete among the competitors, Company X has to assure its product quality. Product quality itself includes freshness of shrimp, hygiene of production process, also packaging cleanness. So that the customers are satisfied and get highly trust to recommend later.

In the last few years, Company X has obtained quality certification of food safety, HACCP (*Hazard Analysis Critical Control Point*). HACCP certification is one of preventive risk management to ensure food safety [5]. Company X applies HACCP since the preparation of supply its raw materials, until the product distributed to customers. By implementing HACCP, Company X product has never been rejected by the market, because it has met minimum standard of quality and food safety. However, there are still some quality issues to increase company's profit. The most important problem is shrimp grade that is remain declined, that is occurs damaged shrimp in production process. It caused by the sensitiveness of shrimp production process to the temperature. Once the temperature changed, the shrimps becomes discolored and declining grades. Shrimp damage also occured in deheading and skin stripping process.

Moreover, a fluctuative supply and demand also affect shrimp quality. Based on the information from Company X, the number of demand is slightly decreased in last 3 months, and will rise significantly in the end of the year. On the other hand, there is an unpredictable supply from supplier. To anticipate this condition, Company X implement a strategy to accept good quality of raw material, and hold the stocks of shrimp in a big cooling storage until company get sufficient demand from the market. Holding stock in longer time will increase the cost saving, also risk of rejection occurance. Based on its current condition, it is necessary to observe deeper about risk management related to product quality for frozen shrimp, involving Company X supply chain. The main objective is minimizing case of product rejection, therefore the company profit will be highly increased.

2. Literature Review

This chapter presents some relevant theory about risk and risk management, quality risk management, supply chain management, supply chain operation reference (SCOR), and house of risk. Other sub chapter is review of previous research that is in relevant with this topic.

2.1. Risk and risk management

Risk has been defined in a number of ways, that is never entirely true of false. Based on Australian New Zealand Standard [1], risk is an unpredictable effect of specific objective. Sinha et.al. [15] defines risk as a function of the level of uncertainty and the impact of an event, and as pointed out by Goh et.al. [14] there are two types of supply chain risks based on their sources, risks arising from the internal of supply chain networsk and those from the external environments. The definition of risk that we will use for this research is the possible deviation distribution from expected results and objective due to internal or external events. Quantitative risk requires calculation of likelihood multiplied by consequences. Likelihood is a risk probability, and consequences is the magnitude of potential loss. Furthermore, risk management is a scientific approach to manage risks by doing anticipating losses, and designing procedures that will minimize financial losses [6]. These are seven steps of risk management process:

1. Communication and Consultation.
2. Establishing the context.
3. Risk Identification.
4. Risk Analysis.
5. Risk Evaluation.
6. Risk Treatment.
7. Monitoring and Review.