SUPPLY CHAIN RISK MANAGEMENT OF FISHERY PRODUCTS IN THE SURABAYA TRADITIONAL MARKET

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ABSTRACT

This paper analyse the function of supply chain risk management of fishery products in fourteen Surabaya traditional markets. A framework in supply chain risk management employ to provide knowledge of supply chain risk in the distribution of fishery products as well as its impact on this commodity business performance. The supply chain risk management assessment can forecast and anticipated the possible disruption of the supply chain in the future. By forecasting and anticipating the potential disruption in its flow of goods, services, and information of fishery products, the sustainability aspect of fishery products can be determined precisely. Investigating the role of supply chain risk management in fishery product s will assist not only the aquaculture actors and traders in Surabaya traditional market, but also provide a benefit for end-user for having a high-quality product of fish in daily basis.

Keywords: Supply chain, risk management, end-user customer, fishery products.

1. INTRODUCTION

Supply risk management framing a condition where people and community can anticipate the failure of the process in fulfilling their need and desire. Referring to Johnson (2001) postulate that mentioned supply and demand risks are the source of risks in supply chain. The risks that occur from supply chain could be various including cost volatility, resources shortages, supplier financial issues, natural disasters, and human failures.

There are at least two reasons Surabaya as object of research in investigating supply risk management. Firstly, Surabaya is the center of urban migration. This is because Surabaya not only as of the center of government activities but also as the center of industry, trade, and services. During 2008-2017 Surabaya were experiencing 0.47% population growths. The population growth that combine with economic and industrial development would ended on several issues such as environmental degradation, the land changes function from agriculture function to become housing and offices that affect to food security issues in the long term.

Secondly, Surabaya is a metropolitan city has a high dependency on several regions surrounding Surabaya for supplying food and other agricultural supply. In this condition, Surabaya needs to have a mechanism in maintains the food supply stability and price stability.

The dynamic of urban population can become of variable in triggering risk in supply chains. The present researcher argues that supply risks include limited capacity, currency fluctuation and supply disruption. An anticipation of the population growth is as efforts in anticipate risk that occurs because of over demand. According to Christopher and Peck (2004) there are four factors that influence supply chain risk. Those factors are delivering process, policy control, demand, supply and environmental. Jüttner, Peck, and Christopher (2003) resume the factors that influence risks into three classifications: external, internal and network related.

Discussing about network relation into supply risk management cannot be separated from the demand assumption. Referring to Virgantari, Daryanto, Harianto, and Kuntjoro (2010) 50.17 percent of Indonesian families incomes allocated for food and 7.9 percent of those 50.7 percent were for purchasing fish. The budget allocation for fish further divided into: 55 percent spent on fresh fish, 40 percent for preserved fish including frozen and dried fish, and just 4percent for fresh shrimp and 1 percent for preserved shrimp. Furthermore, Indonesians' fish consumption level was 25 kg per capita per year in 2007 and increased to 38.67 kg per capita per year in 2014, a 55 percent increase over seven years (the Indonesian Marine and Fisheries Ministry, 2014). Back to Surabaya population which reaches 3.065.000 lives in 2014 means that the demand for fishery products is about 118.623,55 Ton per capita per year.

In regard to the high demand of fishery product in Surabaya, this writing analyse the function of supply chain risk management of fishery products.

2. SUPPLY CHAINS RISK MANAGEMENT AS A METHODOLOGICAL FRAMEWORK

The central of observing the behaviour of stakeholders involved in the Surabaya traditional market fishery product distribution is the distribution networking and the policy in anticipating the risk. Therefore this writing requires identifying literature relating to the supply chain of the fishery product distribution in Surabaya traditional market with some details on the concept of risk management.

There are four aspects of Supply chain risk management. These are: (i) identifying the sources of risks and consequences; (ii) overcoming any possible consequences; (iii) outlining the drivers of risks; and (iv) adopting risk mitigation methods (Jüttner et al, 2003; Tang, Matsukawa, & Nakashima, 2012). These four aspects of supply chain risk management assist the decision-makers to make the right decisions to protect the business from potential consequences including losses. Supporting four aspects of supply chain risk management, Ritchie and Brindley (2007) outline four strategic steps in measuring risk performance: (i) analysing the performance risks, (ii) their consequences, (iii) responding to risks, and (iv) evaluating outcomes.

Systematic consideration of the supply chain and its nodes, especially in the context of the fishery product distribution is important when understanding a supply chain as a whole (Collins, 2001; Stadtler, 2015). A supply chain is a complex interrelated network of activities of many contributors to obtain materials, transform the material into products, and finally distribute the products to consumers (Muckstadt, Murray, Rappold, & Collins, 2001; Stadtler, 2015; Tan, 2001). A supply chain includes any kind of processes and activities that relate to the flow of a product from suppliers to end-users and vice versa (Mensah & Merkuryev, 2014).

The fishery products distributions as a business have a supply chain system. The supply chain system of fishery product distributions is categorised as an agribusiness. According to Drilon Jr (1971, p. 21), agribusiness has four dimensions. First, agribusiness is multi-faceted. Second, it has decision-making complexities. The third dimension is that the long-term viability of the industry is derived from the viability of the firms that form the industry and the fourth dimension is that it has a market orientation.

In the context of agribusiness, fishery products distributions are linked with the supply chain system that secures the fishery product supply in the Surabaya traditional market. The supply chain analysis encompasses the harvest process, packing and delivery proses to market, market storage system, and selling to consumers directly. Traditionally, each activity connected with the supply chain such as planning, procuring, manufacturing, warehousing, and marketing have operated independently of each participant, a link in the supply chain, and each link often having their own sets of objectives that may conflict with other participants of the supply chain.

Spinosa, Klen, Rabelo, Camarinha-Matos, and Ferreira (1998) identify that the agribusiness supply chain consists of small and medium-size enterprises such as farmers, producers of raw materials, suppliers of agricultural inputs, processors of agricultural outputs, farmers' cooperatives, brokers, suppliers, distributors, wholesalers, and retailers who either tend to operate independently or cooperatively mainly in the last stage of the supply chain, which is product distribution to the end consumers.[1]

The agribusiness supply chain as a system can experience disruptions internally and externally. Those disruptions create risks and threats. In the context of the supply chain of the shrimp industry, Lave (1990) and Morgan (1993) define risk as any uninhibited event that creates a potential loss and damage to anywhere in the supply chain nodes, whereas Slack (2011) defines risk as a condition caused by uncertainty. From a supply chain perspective, Tang and Musa (2011) recognise risk as any kind of disruption to the functioning of a supply chain process, and other unclassified factors that negatively interfere with it.

The fishery supply chains depended on two factors, storage system, and delivery system. The quality of fishery product is the main consideration of consumer purchasing activities for fishery products. Risk and resilience of fishery supply chain in the traditional market should pay attention on storage and timely delivery system. Moore (1983) and Omera and Bernard (2007) argue that risk management and resilience of the supply chain are urgent measures to minimize losses and keep the pathways of distribution channels on the right track. Cousins, Lamming, and Bowen (2004) and Hendricks and Singhal (2005) highlight that a failure in managing supply chain risks can affect profit and income levels. In addition to loss or the decrease of income, failure to manage risks associated with a supply chain is also a result of poor management processes (Cousins et al, 2004). Poor governance in planning and identification of risks could also create tensions and conflicts between stakeholders (Hendricks & Singhal, 2005). Consequently, business organisations have to understand the benefits of managing risks and anticipating alternative actions in reducing risks and hazards (Lewis, 2003). Therefore, failures on the part of supply chain actors in managing and identifying environmental changes disrupt the supply chain. Hence Larry and Reham Aly (2004) define risk management as sustained long-term processes of the members (actors) of a supply chain system.

In summary, supply chain risk management has been developed and is usually undertaken by individual companies to assess and manage both their micro and macro operational risks. The rationale is to minimize losses and keep the pathways of distribution channels on the right track If this does not happen, and the risk is not anticipated, it can be costly in money and time to put the business back in the right direction. In this writing, supply chain risk management in the distribution of fishery products in the Surabaya traditional market is applied to the industry level to assess potential losses and risks due to miss management of the distribution system. The

[1] The three supply chain stages are : i) activities to obtain materials, ii) transform the material into products, and iii) distribute the products through many supply chain contributors to the end consumers (Muckstadt et al, 2001; Stadtler, 2015; Tan, 2001)

advantages of applying the supply chain risk management are similar to having an early warning system for any possible events that create vulnerability to the stakeholder who depended on the distribution of fishery products in the Surabaya market.

3. FINDING

The Food security issue is the main problem faced by the recent administration. This issue includes the quantities of food supply and its affordability of prices. The Surabaya municipality administration has an important role in ensuring the availability of goods, including in it to maintain price stability.

The food supply in Surabaya is generally quite stable such as sugar, garlic, onion, large chili, cayenne pepper, chicken eggs, duck meat. However, there was a little bit fluctuate in beef and chicken. Based on data from the Department of Food Security and Agriculture of Surabaya Administration Agency, the availability of fluctuating foods such as beef and chicken recorded as follows. The availability of beef in January 2016 was 992,500 tons and then decreased in December 2016 to 836,800 tons. For June 2017 the availability of beef was 986,000 tons, and the availability of chicken in the same month was recorded at 97.513 tons. These fluctuations are caused by several factors such as market demand conditions and some food commodities that depend on the current season. Detail of the numbers is shown in Chart 2.

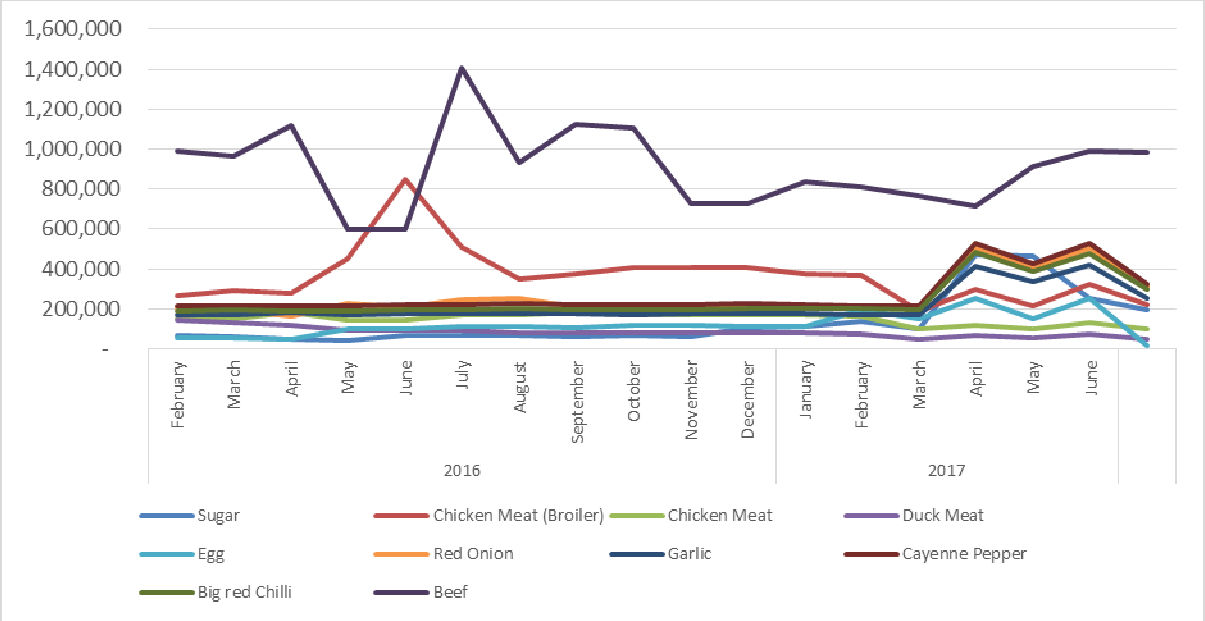

Figure 1. Food Availability in Surabaya (Ton)
Source: Food Security and Agriculture Department (2017)

Furthermore, the price accessibility of in Surabaya has a fairly fluctuating movement pattern. In several commodities the prices are increase such as cayenne pepper, beef, onion-garlic, granulated sugar and also chicken eggs. The Administration Division of Economy and Regional Enterprises data shows that the price of pepper in January 2016 was Rp120,000 / Kg then dropped at the lowest point of Rp18,932 / Kg in June 2016. In December 2016, the price of cayenne pepper rose again to Rp. 51,415 / kg and in June 2017 it was recorded at Rp53,750 / kg. For garlic commodity, in January 2016 was Rp35,000 / Kg then rises at the highest point to Rp48,000 / Kg in April 2016. In December 2016, the price of garlic fell back to Rp35,493 / kg and in June 2017 it

was recorded at Rp31,000 / kg or decreased from the previous month (May) with the price reaching Rp51,458 / Kg.

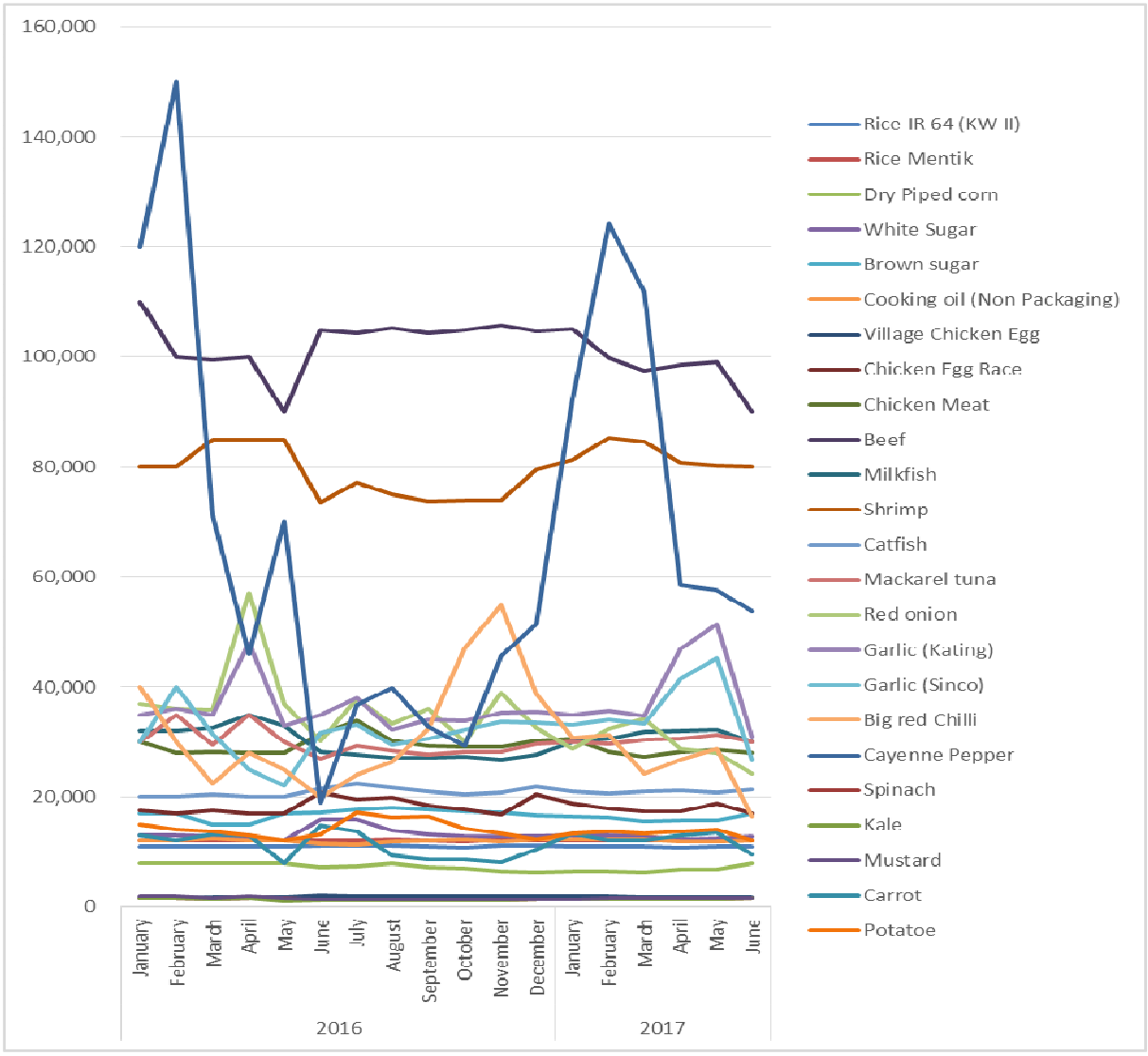

Figure 2. Price Movement of Basic Material (Rp / Kg)
Source: Division of Administration of Economy and Regional Business (2017)

As mentioned previously that the price and the availability of commodities are the main issues in consumption good supply chains. Once it has disruption, the government should take action in their food logistics management to keep the price of food commodity at affordable prices. The implementation of management Supply Chain in the traditional market has benefits in terms of increasing the synergy between Local Government Business Units, private and traders through the principle of integration.

Currently, in the Surabaya traditional market management, supply chain management has not been implemented integrative but it has been included in the medium-term urban planning (MTUP). In the MTUP of Surabaya 2016-2021 especially referring to the document of the Surabaya Mid-Term Development Plan 2016-2021 shows that Surabaya as a center of inter-island and international inter-island trade and services. Therefore the Surabaya policy directions chosen

in logistics activities in Surabaya are: 1) to increase access / supporting facilities and infrastructure to the logistics and distribution activities in the city and 2) development of supply chain management information system and management needed to integrate the components and activities in the logistics system.

After portraying the general position of food supply in the Surabaya traditional market, in the following paragraph is depicted the two major fishery products that dominates fishery commodities in Surabaya traditional market, finfish and catfish.

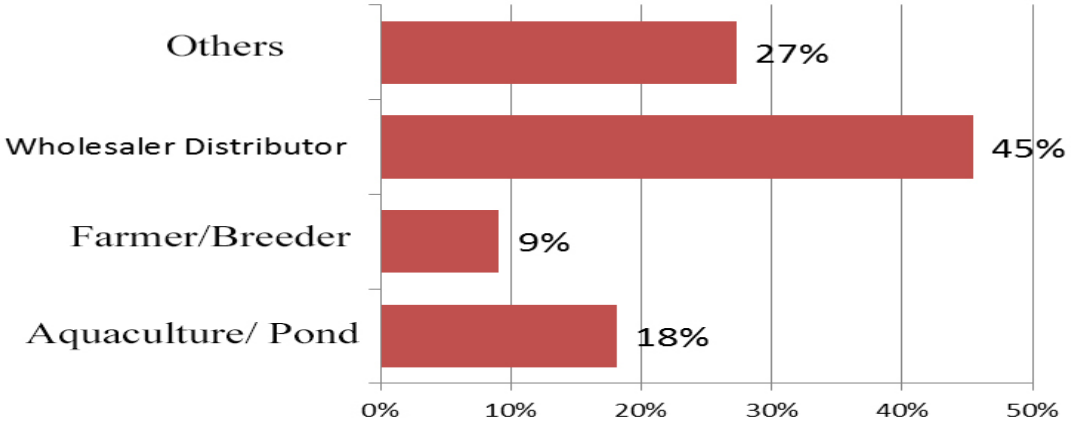

Figure 3. The origin of finfish supplier
Sources: Data Fieldwork, 2019

The figure above shows the finfish (mujaher) commodity, there was 9% of respondents or traders in traditional markets stated that they obtain finfish supply from breeder (finfish cultivator). Around 18% of respondents or traders in traditional markets stated that their finfish supply came from finfish ponds (Aquaculture). Approximately 27% of respondents or traders in traditional markets said that they obtained finfish supplies from agents and collectors (middleman). Wholesale distributor has supplied around 45% finfish in the Surabaya traditional market.

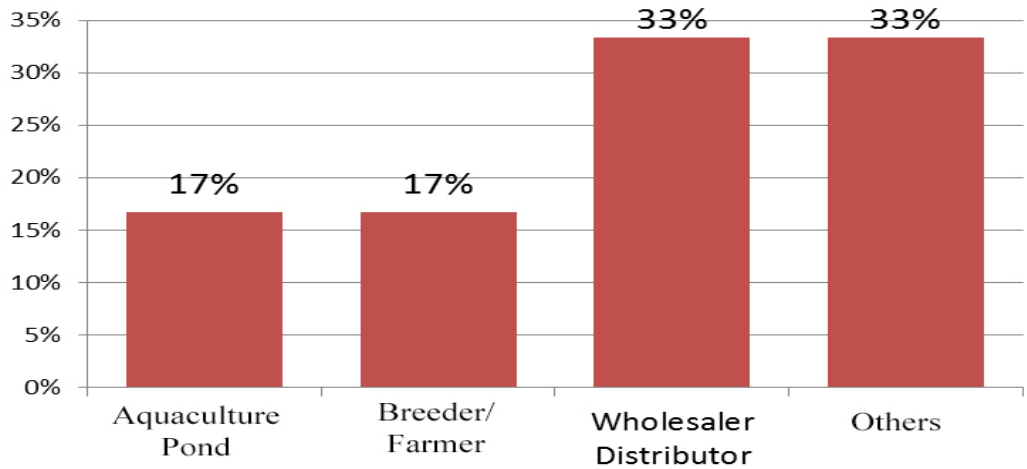

Figure 4. The origin of catfish supplier
Sources: Data Fieldwork, 2019

The figure above demonstrates the supply of catfish in the Surabaya traditional market. Around 17 % of Surabaya catfish originated from the catfish cultivator. Approximately 33% of Surabaya catfish has been supplied by middlemen and wholesale distributor contribute around 33%

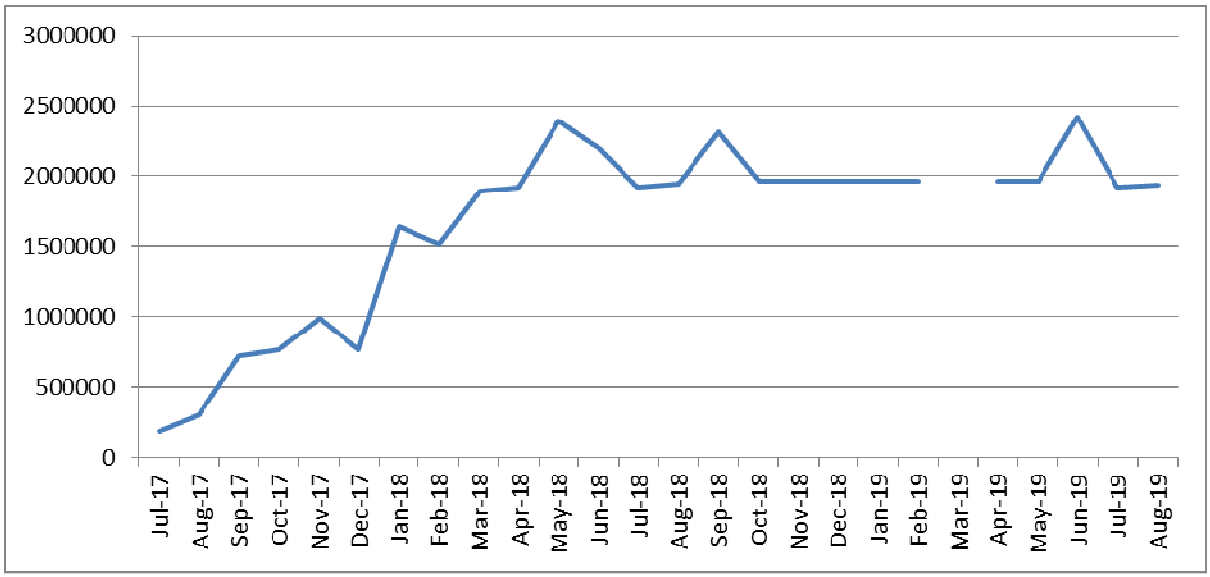

Figure 5. The availability of fishery product March 2017-August 2019
Sources: Data Fieldwork, 2019

Figure 5 shows the trend of the demand of fishery product in the eight Surabaya Traditional market. Since July 2017 up to May 2018 the demands were increase and slightly decrease in July 2018 then remains stable up to August 2019.

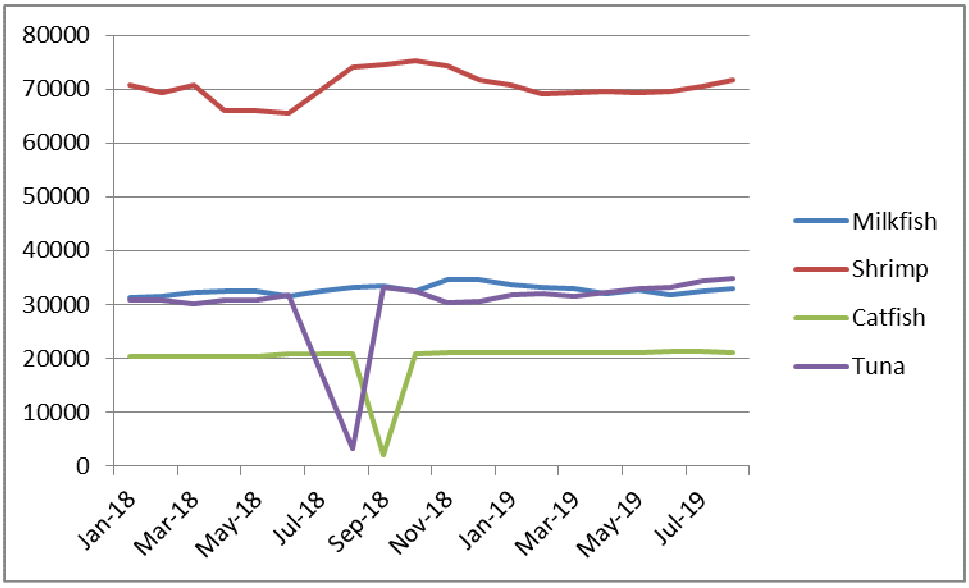

Figure 6. The prices of fishery product January 2018-July 2019
Sources: Data Fieldwork, 2019

Figure 6 show the price fluctuation of four fishery products that traded in seven markets in Surabaya. Those markets are Tambahrejo market, Pucang Anom market, Wonokromo market, New Genteng market, and Pabean market. The chart shows an small increase in prices for shrimp during January 2018 up to July 2019. Whereas the prices of milkfish remain stable. Interestingly, catfish and tuna demonstrated similar trend for their prices.

4. DISCUSSION

The supply chain risk management assessment forecast and anticipated the possible disruption of the supply chain in the future. By forecasting and anticipating the potential disruption, the sustainability aspect of livelihood strategies develop precisely. According to Jüttner et al. (2003) and Tang et al. (2012), the utilisation of the supply chain risk management has four aspects. These are: (i) identify the sources of risks and consequences; (ii) overcome any possible consequences; (iii) outline the drivers of risks; and (iv) adopt risk mitigation methods. These four aspects of supply chain risk management assist the decision-makers to make the right decisions to protect the business from potential consequences including losses.

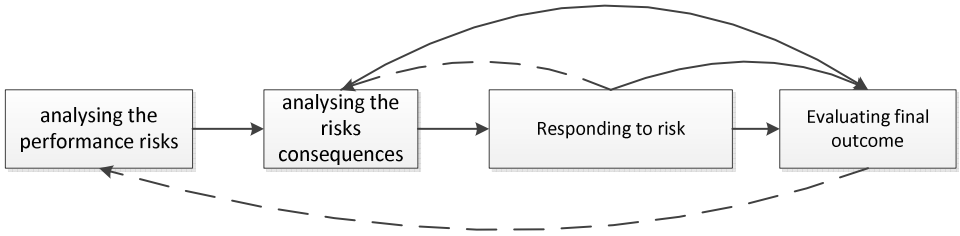

Figure 7. The four strategic steps in measuring risk performance

Supply chains are both capital assets for farmers and market traders, and also a structure that they utilise when putting together livelihood strategies. The capital that influence the supply chain management are: human resources (workforce), natural assets (raw material supply), and financial assets influence the production and sources aspect; social assets influence the market in strengthening the branding image; physical assets (infrastructure and technology including the packing) influence the delivery and returns.

In identifying a source of risk and consequences, understanding the flow of fishery is urgent in anticipating the risk that may occur. The following chart depicted the supply chains of fishery products in the Surabaya traditional market.

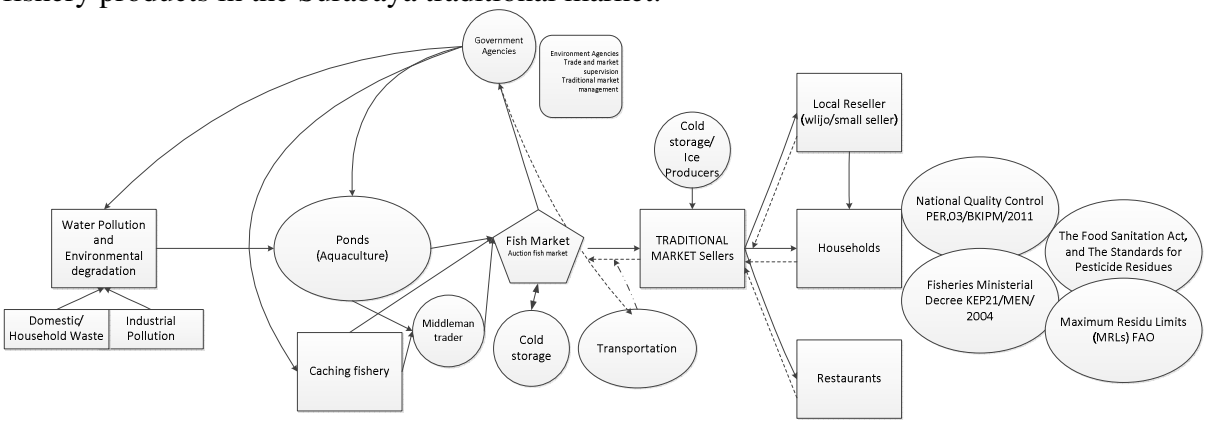

Figure 8. The Surabaya traditional market fishery product supply chains
Source: Fieldwork observation, 2019

Figure 8 shows that the quality of the environment determined the quality of fishery products. Not only that the storage system and distribution system also play significantly in maintenance of the fishery quality products until ended on the ended user. In the chart also shown about the standard of aquaculture that been issued by the central government through Regulation of the Minister of Marine and Fisheries No. PER.01 / MEN / 2007 on Control Systems Quality Assurance and Safety of Fishery.

The case of distribution that faced by Surabaya fisheries traders is the storage problems. The needs of a cold storage system in every traditional market are needed. These problems are typically faced in most traditional markets in Indonesia. The solution that has been over is providing ice company for supplying ice for keeping the fishery product in fresh condition.

However, the biggest problem of fishery distribution mostly occurs in *Wlijo* (Local reseller) that have no cold storage system. This is because the *Wlijos* are small trader who selling their goods door to door directly to end consumer. Mostly they operate in the housing area in Surabaya. Their operation hours are from six a clock in the morning until mid-day. In this case, sometime the fishery product that not been sold after nine a clock are rotten. Some of them cook the unsold fishery product and sell it as a cooked fishery product.

At these cases, the biggest problems of fishery product distributions are occur in *Wlijo* stage where they have no adequate system for keeping their fish fresh and safe to be consumed. Therefore it is needed for local government for providing small mobile cold storage that can be used/ purchased by *wlijos* to keep their fish fresh.

5. CONCLUSION

The fishery demand in Surabaya is high. Investigating the role of supply chain risk management in fishery product s will assist not only the aquaculture actors and traders in Surabaya traditional market, but also provide a benefit for end-user for having a high-quality product of fish in a daily basis. Need some effort for having fresh and consumable fish. The supply chains that depicted on chart 8 resumes all the fish distribution in Surabaya. From the brief supply chain schema, it could be used for have a risks management assessment that able to forecast and anticipated the possible disruption of the supply chain in the future. By forecasting and anticipating the potential disruption in its flow of goods, services, and information of fishery products, the sustainability aspect of fishery products can be determined precisely. The role of government which is Dinas Pasar and the awareness of all stakeholders especially the *wlijos* are needed for providing fresh and a high-quality fish for end-user in Surabaya.

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