RISK FACTORS ON FIRM RESILIENCE IN AGRICULTURAL SECTOR THE MEDIATING EFFECT OF SUPPLY CHAIN RISK MANAGEMENT PRACTICES

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by

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TABLE OF CONTENTS

CHAPTER 4 RESEARCH METHODOLOGY

CHAPTER 5 RESULTS AND ANALYSIS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATION

GDP	Gross Domestic Product
SRM	Supply Risk Management
CEO	Chief Executive Officer
SCO	Supply Chain Officer
SCM	Supply Chain Management
SEM	Structural Equation Modelling
PLS	Partial Least Square
HTMT	Heterotrait Monotrait
AVE	Average Variance Extracted
SRMR	Standardized Root Mean Square Residul (SRMR)
NFI	Normed Fit Index
SCRM	Supply Chain Risk Management
PCA	Principle Component Analysis

LIST OF APPENDICES

TADBIR URUS FAKTOR RISIKO TERHADAP DAYA TAHAN FIRMA DALAM SEKTOR PERTANIAN KESAN PERANTARAAN TERHADAP AMALAN PENGURUSAN RISIKO RANTAIAN BEKALAN

ABSTRAK

Kajian ini merupakan kajian kuantitatif yang membincangkan kesan tadbir urus faktor risiko terhadap daya tahan firma dalam industri pertanian Indonesia. Kajian ini dijalankan kerana keadaan semasa firma pertanian di Indonesia tidak dapat berdaya tahan dalam menghadapi risiko yang timbul. Penyelidikan ini membincangkan hubungan antara tadbir urus faktor risiko dan daya tahan teguh, amalan pengurusan risiko rantaian bekalan dan daya tahan teguh, dan tadbir urus faktor risiko dan amalan pengurusan risiko rantaian bekalan. Penyelidikan ini juga membincangkan pengaruh antara risiko pengantaraan perkongsian maklumat dan mekanisma perkongsian risiko (amalan pengurusan risiko rantaian bekalan) mengenai hubungan tadbir urus faktor risiko dengan daya tahan teguh firma. Penyelidikan empirikal ini dijalankan dengan menggunakan 204 firma pertanian di Indonesia yang terlibat dalam sembilan keperluan asas rakyat Indonesia. Kajian ini menggunakan Smart PLS-SEM 3.2.7 untuk menguji hipotesis hubungan. Hasil daripada analisis data, hubungan antara tadbir urus faktor risiko dan daya tahan teguh, tadbir urus faktor risiko dan amalan pengurusan risiko rantaian bekalan adalah separa penting. Amalan pengurusan risiko rantaian bekalan didapati berkepentingan positif dengan daya tahan yang teguh. Seterusnya, amalan pengurusan risiko rantaian bekalan didapati menjadi sebahagian pengantara kepada faktor risiko hubungan dengan daya tahan yang teguh. Oleh itu, firma pertanian di Indonesia harus memberi perhatian kepada faktor-faktor yang boleh mempengaruhi daya tahan teguh firma.

Metodologi, implikasi praktikal, dan beberapa kemungkinan untuk penyelidikan masa depan dibincangkan dalam kajian ini. Implikasi teori pertama untuk kajian ini adalah ia memberikan justifikasi empirikal ke atas kesan mediasi dalam hubungan antara tadbir urus faktor-faktor risiko dan daya tahan yang teguh. Hasil kajian ini memberikan sumbangan yang besar kepada secara saintifik mengenai kesan pengantaraan amalan pengurusan risiko rantaian bekalan dalam hubungan antara daya tahan teguh dan tadbir urus faktor risiko dalam bidang pertanian di Indonesia. Implikasi teori kedua dalam kajian ini adalah berkenaan kajian empirikal yang telah dijalankan untuk hubungan antara tadbir urus faktor-faktor risiko dengan daya tahan firma, amalan pengurusan risiko rantaian bekalan dengan daya tahan teguh dan tadbir urus faktor risiko dengan amalan pengurusan risiko rantaian bekalan. Dalam kajian terdahulu tidak terdapat perbincangan empirikal mengenai hubungan tadbir urus antara faktor-faktor risiko dengan daya tahan firma. Hasil kajian ini meningkatkan pelbagai pengetahuan untuk teori kontingensi, di mana dari hasil kajian, pemboleh ubah baru untuk teori kontingensi dalam mengukur hubungan ketahanan firma dengan tadbir urus faktor risiko dan amalan pengurusan risiko rantaian bekalan dari sudut pandangan firma pertanian di Indonesia boleh disimpulkan. Untuk mengurangkan risiko yang sering timbul di firma pertanian, firma perlu memberi perhatian kepada tadbir urus risiko yang dapat meningkatkan daya tahan firma pertanian. Firma pertanian perlu memberi tumpuan kepada tadbir urus risiko supaya strategi pengurangan risiko dapat berjalan dengan baik. Di samping membuat firma menjadi lebih berdaya tahan dalam menghadapi gangguan, firma pertanian harus melaksanakan amalan pengurusan risiko rantaian bekalan. Berdasarkan hasil kajian ini, dengan menerapkan perkongsian informasi risiko dan mekanisma-mekanisma perkongsian risiko, firma pertanian dapat lebih berdaya tahan.

RISK FACTORS ON FIRM RESILIENCE IN AGRICULTURAL SECTOR THE MEDIATING EFFECT OF SUPPLY CHAIN RISK MANAGEMENT PRACTICES

ABSTRACT

This research is a quantitative study that discusses the effect of governance of risk factor on firm resilience in the Indonesian agriculture industry. This research was conducted because the current conditions of agricultural firms in Indonesia cannot be resilient in the facing of the risks that arise. This research discussed the relationship between risk factor governance and firm resilience, supply chain risk management practices and firm resilience, and risk factors governance and supply chain risk management practices. This research also discusses the influence of mediation risk information sharing and risk sharing mechanism (supply chain risk management practices) on the relationship of risk factor governance with firm resilience. This research was conducted empirically by using 204 agricultural firms in Indonesia which are engaged in nine basic needs of the Indonesian people. This study used Smart PLS-SEM 3.2.7 to test relationship hypotheses. Result from the data analysis, the relationship between risk factor governance and firm resilience, risk factor governance and supply chain risk management practices, is partially significant. Supply chain risk management practices is positively significant with firm resilience. From the result, supply chain risk management practices is partially mediated to the relationship risk factors with firm resilience. Therefore, agricultural firms in Indonesia must give attention to factors that can affect firm resilience. Methodology, practical implications, and several possibilities for future research are

discussed in this study. The first theoretical implication for this study is to provide empirical justification of the mediating effect in the relationship between risk factors governance and firm resilience. The results of this study provide a great contribution to the scientific content of mediating effect of supply chain risk management practices in relationship between firm resilience and risk factors governance in agriculture in Indonesia. The second theoretical implication in this study, empirical investigation has been conducted for the relationship between risk factors governance with firm resilience, supply chain risk management practices with firm resilience and risk factors governance with supply chain risk management practices. In the previous study there has been no empirical discussion about the relationship between risk factors governance with firm resilience. The result of this study increases range of knowledge for contingency theory, in which from the result of study, a new variable for contingency theory in measuring relationship of firm resilience with risk factors governance and supply chain risk management practices from the point of view of agricultural firm in Indonesia can be concluded. To be able to reduce the risks that often arise in the agricultural firms, the firm must pay attention to the risk governance that can improve the resilience of the agricultural firms. Agricultural firms should focus on risk governance so that risk mitigation strategy can run well. In addition to making the firm be more resilient in the face of disturbance then the firm must perform supply chain risk management practices. Based on the results of this study, then by applying risk information sharing and risk sharing mechanism firms engaged in agriculture can be more resilient.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter contains the outline of the study. The problems and motivation of the study are described in the background section of the chapter. The chapter also contains problem statement which discusses the gap from previous studies of firm resilience and supply chain risk governance. Important research statements of the study are discussed in the section of research objectives and research questions. The study is expected to have an impact to the theoretical, practical and social significance as seen in this chapter. This chapter also discusses the definitions of key terms that contain explanation of the variables that exist in the research framework, and the organization of thesis which elaborates the structure plan of the thesis.

1.2 Background

Indonesia is a country with abundant natural resources and fertile lands. There are many areas that can be used as agricultural lands, thus, securing Indonesia into an agricultural country. In the 1980s, Indonesia was able to rise from adversity and became the largest rice exporting country in the world, and achieved food self-sufficiency (Rangkuti, 2015). Currently, Indonesia, an agricultural country, needs to import food from other countries. This is caused by the decline of agricultural production, which is the result of the decline of the agriculture business as a whole. In 2003, there were 31.2 million agricultural households which were economically active in agriculture. Whereas in 2013, there were only 26.1 million active

households. This means that the number of households are falling/declining by as much as 5.1 million or 16.3 % (Yonida, 2017).

Indonesia has an abundant source of agriculture. Indonesia's agricultural production must be able to meet the needs of 90 million people in the nation. Abundant resources and high demand should be able to cause agriculture business in Indonesia to be attractive. But, at the moment, Indonesian agricultural products are increasingly declining in quantity and quality. The decline in agricultural production can be seen from the decline in agricultural contribution to GDP. In 2014, the cumulative growth rate was 4.24%, decreased to 3.77 in 2015, and further decreased to 3.25% in 2016 (BPS, 2017).

Agriculture business is not attractive anymore, as many farmers sell their agricultural lands for property. Indonesian government anticipates this by creating laws to prevent conversion of agricultural lands. The laws have not been able to prevent the conversion of agricultural land into a non-agricultural area of 110 hectares per year (Ulil, 2015). For 26 years, from 1986 to 2012, the growth of peasant farms have become 2.9% from 7.77 million hectares to 8 million hectares in 2012 (Ulil, 2015). The quality of agricultural products has also decreased. The quality of firm produce has very low water content, thus during harvest and post-harvest, the quality becomes worse (Pulungan, 2017). The decrease in agricultural produce quality is caused by poor soil and poor quality of seeds (Pulungan, 2017). Poor quality causes agricultural products in Indonesia to experience decrease in sales.

The slow growth of agricultural land is not proportional with the growth of Indonesia's population (Nursiyono, 2015). The average growth of Indonesian population is around 1.49% per year, and the average population of Indonesia is very

consumptive (Investment, 2015). The slow growth of agricultural land cannot meet consumers' demand, especially for rice demand as a key commodity. To meet the consumption needs of rice, the government imports rice. The import of the Indonesian staple food which is rice increases from 2014 to 2018, which is shown in Table 1.1 (Kemendag, 2019).

Table 1.1 Indonesia Rice Export and Import 2014 - 2018

Year	Export (Kg)	Import (Kg)
2014	2,198,300	3,305,700
2015	1,842,600	3,004,600
2016	1,892,800	4,210,500
2017	2,508,300	4,139,400
2018	2,671,500	4,748,700

(Source: Kemendag, 2019)

The annual increase in imports (Table 1.1) is a sign that many agriculture firms in Indonesia are not able to meet the consumers' demand. Although some agriculture firms in Indonesia conduct export for rice commodities, the export of rice by the firm aims to increase the firm's advantage. Agriculture firms do not attempt to firstly meet domestic needs. In order to survive in their business, firms try to conduct export, so as to obtain bigger profit. This must be anticipated by the government, in which the domestic products must be used for domestic consumption. As for the management of domestic market needs, the government sets an import policy (Pertanian, 2016). In 2016, agricultural product contribution to overall exports was reduced by 2.38%. The figure was lower compared to the contribution in 2015 of 2.48%. This indicates that Indonesia's agricultural production exports are declining due to declining agricultural production (Pratomo, 2017).

Increased imports may be due to the reduction in the number of firms engaged in agriculture business. At a five-year agricultural census, the results of the census in 2013 suggested that agriculture business in Indonesia has decreased in

some sectors, as shown in Table 1.2. The decline in the number of agriculture firms, as seen in Table 1.2, indicates that agriculture firms are not resilient with their business. The decline in the number of firms has an impact on the decline of labour in the agricultural sector. In 2010, the number of workers in agriculture was approximately 41 million, and in 2016, it dropped to about 37 million (a decline of approximately 9.77%) (BPS, 2016). This decline in labour force affects the Indonesian economy.

Table 1.2. Results of Agricultural Census 2013

No	Type of Agricultural Enterprises	Individual Farmers		Firm	
		2003	2013	2003	2013
1	Crops	35.645.669	28.330.362	312	303
2	Plantation	14.128.539	12.770.090	1.862	2.216
3	Farms	18.595.824	12.969.210	475	629
4	Fishery	2.489.681	1.975.233	631	394
5	Forestry	6.827.934	6.782.885	740	678

(Source: BPS, 2019)

Business conditions of agriculture in Indonesia are deteriorating due to the risks that must be faced by firms, which include fluctuating prices, unbalanced supply and demand, natural disasters, pests, expensive transportation costs, and many others. One of the risks faced by agriculture firms is fluctuating prices, for example a chicken farm that suffers a huge loss due to high prices of seeds and fodder, but the selling price of chickens in the market decreases (Winata, 2016).

Indonesia, as a part of archipelagic countries, consists of more than 17.000 islands that are supported by many agriculture firms. Those firms are located in various islands that lead to longer distribution line. The line of supply chains in the distribution of agricultural products is from farmers to middlemen, then traders, and finally, the consumers. Difficulties in distributing the product lead to employers in the agricultural sector to be dependent middlemen, and declining profits, as well as farmers experiencing losses (Hasan, 2014).

Tummala and Schoenher (2011) state that emerging risk in business is a transportation risk. Higher cost of transportation becomes a trigger of high price in commodity products. Compared to developed countries, transportation charge in Indonesia is considered costly (Investment, 2017). This is due to the fact that the central government is unable to conduct good coordination with the regional government. Besides that, infrastructure in several areas is still insufficient. Such condition causes the domestic transportation cost in Indonesia to be far more expensive compared to transportation cost to other countries (Sulaiman, 2015).

The equal amount of demand quantity has become a concern in Indonesia's agricultural sector. Price of commodities in agribusiness has always fluctuated (Fettinger, 2017). The discrepancy of location, distribution channels and cost also affect the price of products that customers need to pay. In the provinces that produce commodity, they usually have excess supply, and the price of the commodities is considered low, but in other provinces, shortage of commodities tends to happen and the price is very high because of distance and unavailability of transportation infrastructure. In 2015, tomato and chili farmers in Indonesia suffered substantial losses. At the time of harvest, tomato prices plummeted. The price of tomatoes was originally valued at IDR 9,000 per kilogram, then in a few days, it decreased by 44.44%, reaching IDR 4,000 per kilogram. Chilli price dropped from IDR 80,000 per kg to IDR 25,000 per kilogram which decreased by 68.75%. Problems like these is the reason why agriculture firms in Indonesia are unable to continue their business, and exit the market (Wiyoso, 2015).

Natural disasters could disrupt agriculture, and often occur in Indonesia, as in 2013, when the eruption of mount Sinabung in North Sumatra led to vegetable scarcity. Mount Sinabung's eruption made farmers' activities faltered since the

farmers had to evacuate. As a result, farmers could not grow vegetables, causing shortages (Bisnis, 2015). Risks that are found in Indonesia's agriculture may come from the internal and external sides of firms, loss risk arising from supply and demand which are not suitable, natural disaster, pets, and others, which are caused by external factors. Firms are not able to take the risks not to arise in the firms, but they are able to carry out management towards the risks. Management on risks which arises from the external factors will enable them to be able to survive more and avoid substantial loss.

This is in accordance with the previous study conducted by Braunscheidel and Suresh (2009). The study states that firms need to carry out internal organization, external integration for upstream and downstream supply chain activity, and flexibility to be able to face business disturbances better. The firms must have the capacity to cope with market changes as potential and actual disruption. The firms engaged in agribusiness sector face highly volatile market conditions, therefore the firms must consider the supply chain's resilient strategy for future plan, and overcome the existing problems.

Every business activity conducted by a supply chain network has inherent risks and unexpected disruptions (Ponomarov & Holcomb, 2009). Firms will become resilient if they are able to govern risks through supply chain designing, a response which is effective and efficient towards risks, and the ability to survive and become better in facing risks (Ponomarov & Holcomb, 2009).

Competitive advantage may be achieved if firms are able to govern the business in fluctuating and uncertain conditions. Governance may be done by considering the risks that arise in firms' strategic levels. If risk governance is conducted from a strategic level, firms will become stronger in facing disturbances

and enable higher profit. Risk governance will make firms become more effective in facing problems that arise and eventually cause the firms to be more resilient (Elahi, 2013).

In Indonesia, agriculture firms face a lot of risks (Mulyati & Geldermann, 2017). To be able to deal with the existing risks, firms must determine a strategy. As done by Astuti, Arkeman, Poerwanto and Meuwissen (2013), their study focuses on risk mitigation strategies undertaken to reduce the disruption caused by the emergence of risks on mangosteen fruit farming. In this study, it was described that mangosteen farming firms implemented horizontal coordination strategy. By applying this, strategy the firm was able to survive in the face of disruption of the risks that arose, up to the extent that the firm could become the biggest fruit firm for export commodity from Indonesia. The horizon of coordination strategy was to share a common resource of production or distribution in a scale strategy. In this sense, it is explained that the horizon coordination strategy is sharing the risk of causing disruption to the chain in the production and distribution processes.

If agriculture firms in Indonesia are not able to manage the risks arising, this may cause firms to suffer from loss. If loss persists, firms, as a result, are not able to survive, and in the end, will go bankrupt. If firms apply risk management practices, firms may then survive more by conducting mitigation towards risks that arise. Risk mitigation may be conducted by supply chain risk management practices. Given the inherent complexities of these challenges in Indonesia in agricultural sector, this study attempts to complement previous scholars' works, which cover resilience and look at the issue of resilience in the agribusiness sector from a different angle. This study aims to understand the risk factors in agribusiness context in Indonesia, and

focus on firm resilience by investigating the risk factor governance, and supply chain risk management practices.

1.3 Problem Statement

The problems that often arise in the agricultural sector cause Indonesia to experience problems in food security. To break free from this problem, the government must pay attention to production factor, so the government should pay attention to the farmers (Endrawan, 2017). Farmers' welfare decreased in May 2017, inflation reached 4.33 percent, and farmer exchange rate decreased by 1.47%. Such conditions cause the economy of scale from farmers to be unable to compete with farmers in Thailand, Malaysia, Vietnam and the Philippines (Aziza, 2017). As farmers cannot survive the existing conditions, many of them sell their land to other industries. Based on the results of the 2013 census, 508,000 hectares of agriculture land has been transformed into property and manufacturing (Lestari, 2017).

Agriculture business in Indonesia is facing various problems which lead the firms to be unable to run the business anymore. The problems do not only arise from the internal side of the firm, but also externally. One example of an unstable price often causes harm to the firm, and the firm's ultimate resilience. Price changes can occur suddenly, like the recent significant price increases of chillies. Usually, in the market, price of chillies is around 28,000 / kg, and within one month, it rises to 90,000 rupiah / kg, an increase of about 69% (Lestari, 2017). Supposedly, the price increase in the market causes the chilli farmers to obtain a great advantage, but the opposite happens, since middlemen buy lace chillies with low price, and sell them back at a high price (Metro, 2016). Agriculture firms in Indonesia, especially those in the small and medium scale, do not collaborate with other firms, so the selling price

can always be controlled by a middleman, and this causes agriculture firms in Indonesia to not be resilient.

A middleman has a massive influence on the sales of agriculture produce. The downstream activity system on Indonesia's agriculture is unique. For the distribution of agricultural products to the end users, the firm must sell its products to the middlemen at a relatively low price, which are then sold to merchants at the market, and finally sold to the end users by the merchants (Olivya & Ilham, 2017). A supply chain system like this causes farmers to not be able to share the business risk with the chain below it, because farmers do not have a bargaining position with the middlemen's decision. This condition is a disruption for the supply chain that results in the agriculture business to not last long. In line with the above scenario, the resilience related issue has been highlighted by Ambulkar, Blackhurst and Grawe (2014). They conducted a study defining firm resilience towards disturbances which was arisen by a variety of risks that affected supply chain. Besides that, identification on any risk factor which contributed towards firm resilience development was also conducted. To achieve resilience, firms have to be able to manage risks. Risks found in firms are different, ranging from the type to the level of risks. Therefore, different strategies are needed, so that firms become more resilient in facing risks. Different risks and strategies are part of the contingency theory.

Every chain in a supply chain is a business partner that is willing to exchange information, be that the information is in regards to consumers' demand, issues that can affect businesses, as well as information system integrated to logistics services (Li et al., 2015). Information and communication systems among agriculture firms in Indonesia are not well integrated. Various problems occur due to lack of communication to obtain accurate information, such as the scarcity of food and the

excessive stocks of agricultural products that make firms lose their money (Adikusumah, 2015). Other factors that make agriculture firms in Indonesia not able to distribute their products well are because of the existence of good logistic system, which causes the cost of logistics to be expensive. The cost of logistics of agriculture supply chain is 20-30% from the cost of goods sold. If firms are able to share and apply mechanism sharing to the chains within its supply chain, then they will not bear the risk of losing caused by the high cost of logistics (Perdana, 2016). Share and apply mechanism is part of supply chain risk management practices. With the presence of supply chain risk management practices, it enables firms to be more resilient.

Risk governance is an interesting topic to be discussed, considering the fact that it can enhance the firm's resilience when facing risks. There are already several studies on the risks that may arise in business. However, there are only few studies that analyze supply chain risk management practices in agribusiness sector. Although Mirsah, El-Osta and Morehart (2002) HAVE carried out a study on risk governance in agribusiness, it is still limited to hedging and Insurance Corporation to sustain. In THE agribusiness industry, many risk factors can be found. The lack of literature in studying risk factors governance on firm resilience in the agribusiness industry has lead this study to expand the current literature from empirical based survey. It also takes into account a variety of risk factors that may arise but not similar to the manufacturing sector, and has different levels which affect the firm resilience in the agribusiness sector.

Distribution is part of supply chain. A good governance on distribution risk may not be done single-handedly by a firm. A cooperation with partners is needed in the supply chain. A good cooperation may be established if the firm is able to create

supply chain risk management (SCRM) practices. In a study conducted by Li et al. (2015), supply chain management practices are divided into two parts, namely risk information sharing and risk-sharing mechanism. By implementing supply chain risk management practices, it is expected that the firm and its partners are able to provide the right information at the right time on risks faced by the firms. Such supply chain risk management practices are known as risk information sharing (Christopher & Lee, 2004). Besides providing information at the right time and accurately, a clear regulation for each partner in supply chain called risk-sharing mechanism (Kleindorfer & Saad, 2005) is needed in supply chain risk management practices. Thus, it can be concluded that supply chain risk management practices can make a firm become more resilient in facing the risks.

The Perdana (2016) finding is similar to Ponomarov and Holcomb (2009), which states that risk sharing as the basis for developing the conceptual framework of supply chain resilience includes antecedents and consequences. The key elements of supply chain resilience and the relationships between the risk factor governance are associated with resilience. In their research, Ponomarov and Holocomb (2009) did not do any hypothesis testing on the relationship between logistics capability and supply chain resilience. Logistics capability is one of the firm's activities that may pose a risk in the enterprise, and supply chain resilience could affect the firm’s resilience. Therefore, the present study will measure the effect of risk governance to firm resilience in the agricultural sector.

A previous research has conducted a study in choosing and implementing an appropriate set of strategies for improving resilience. Much of the literature is conceptual, theoretical and normative (Benjamin et al., 2015). Based on the problems presented above, this study has strived to fill the gap, and aims to contribute to the

supply chain literature in regard to a firm's resilience. This study is trying to find out the connection between risk factor governance and firm resilience, by using the mediating risk information sharing and the risk-sharing mechanism.

1.4 Preliminary Study

Preliminary study is a phase in this research conducted to justify problems in the study and support the research objective. Besides that, in previous studies, only a few have discussed risk factor and its governance in agriculture firms. Therefore, a preliminary study was conducted to find information on risk factors implemented by agriculture firms in Indonesia, so that measurement on risk governance may be implemented. A preliminary study was conducted through interviews on four people who are involved in the agriculture field in Indonesia. One is a firm owner who produces vegetables, one is a manager in a sugarcane production firm, another one is an employee in a multinational firm in the agriculture field, and the other is the chairman of an agriculture firm association in West Java, Indonesia. Interviews were conducted via telephone calls, on 14 - 18 December 2015. Semi-structured interviews were conducted by spending 40 minutes on average. In the semi-structured interviews conducted, the researcher prepared several questions related to the problems. Semi-structured interviews enable the researcher to obtain deeper understanding, and may develop relevant topics (Cohen & Crabtree, 2006).

Questions in the interview in the preliminary study were more on the risks often faced by agriculture firms in Indonesia. Questions being asked first in the preliminary study interview were on important issues, which are still the obstacles faced by firms in the agricultural sector. The manager of sugarcane management firm stated that,

> "Obstacles faced by firms are agriculture firm's lack of purchasing power, due to problematic firm cash flow. This may be caused by firm employees' lack of knowledge on product management after harvest right through its distribution. A large amount of crop harvest went bad and discarded by firms. Besides that, product damage is often resulted due to pest attack and error in planting process. Government regulation on policy of subsidy and import makes it harder for firms to sell their products."

From the result of the interviews, it can be concluded that agriculture firms in Indonesia are facing risks caused by lack of good cash flow management, agricultural product damage due to pests, and error in planting process, as well as the government's policy that is disadvantageous. Firms need good governance in those risks. Unlike the owner of a vegetable firm who stated that,

> "Weather factor causes the incident of crop failure, causing firms to experience a loss and making them unable to proceed with seeding in the following planting season. Another effect of crop failure is unfulfilled demand. Crop failure also caused by error at the beginning of planting process. Product damage is also found due to unsatisfactory fertilizers from suppliers. Besides that, there was an incident when demand was low but stock in the stock room was abundant, due to a failure in previous demand prediction. Excessive stock in the store room is also due to error in ordering information system. This is because the missing link information is causing supply of vegetables to be more than the demand. Error in product delivery also happened, caused by error in goods delivery form. "

Based on the interview done on the vegetable firm owner, it was found that risks faced by agriculture firms in Indonesia are bad weather, unfulfilled demands, product damage, suppliers providing bad raw material, and faulty information system. In order to be more resilient, a firm must conduct management on risks. Risks faced by multinational firms dealing with agriculture may cause firms to be unable to maintain their business, as seen from the results of interview conducted on the manager of a firm, who stated that,

> "Firms may experience a loss caused by firm internal and external risks. External risk may arise from bad weather which causes damage to the product. Bad weather such as prolonged drought, and also flood causes crops not able to be harvested. Another external risk which arises is government policy on products to be made, thus reducing profit from the firm. Besides the external risk arising, the

> firm experiences loss due to risks which arise from within the firm (internally). Internal risks which arise, among others, failure in meeting consumers' demand because of plant type production error. Besides that, unbalanced supply and demand was found since there was a mistake in conducting forecasting."

Risks that are often found in multinational firms in agriculture in Indonesia are firms' internal and external risks. External risks arise from bad weather and government policy. Internal risks arise due to production failure and error in forecasting. A sound governance on internal and external risks is needed, thus creating a more resilient firm. This is in line with the statement from the farmer association chairman of West Java Indonesia, who stated that agriculture firms in Indonesia are experiencing a number of risks.

> "There is unbalanced supply and demand, and the problems of transportation in goods shipment. Transportation cost in Indonesia is quite costly, so that the main production price is higher and causing the selling price unable to cover production cost. The price of agricultural products in Indonesia is affected by transportation cost. This may take place because firms are not able to determine its own selling price due to interference from middlemen in the process of selling crops. Besides that, error was found as a result of production process, causing stocks to die. Agriculture firms in Indonesia experience risk of product damage because at the time of harvest the selling price was low, and firms keep their products to be sold when the price is high. Also, during storing the product becomes damaged and cannot be sold. Error in production is also often found since agricultural products are easily damaged. For example, wrong humidity level may damage the products."

Based on interview results with the agriculture firm association chairman of West Java, Indonesia, agriculture firms often experience problems of unbalanced supply and demand, interference of middlemen which causes loss, costly transportation, error in production process and product damage. Firms must have good governance to be able to anticipate the risks.

From the result of the preliminary study, it can be concluded that risks which are often found in agriculture firms may appear from the firms' internal and external risks. Firms' internal risks are in the form of financial risk, product risk and

manufacturing risk. Firms' external risks may arise from demand risk, supply risk, information risk, environmental risk and logistic risk. The risks found cause inability of firms to maintain business, which then cause them to not be resilient. Firms need to conduct governance on risks found and cooperation between firms and chains in the business, so that the firms will be more resilient. Results from preliminary study reinforce problems which are found in agriculture in Indonesia, and describe the situation of agriculture firms in Indonesia at present. Besides that, results from the preliminary study complements the previous studies, and supports in the making of the current research framework. With the provision of a preliminary study, it will reinforce research question making and research objective in this study.

1.5 Research Questions

Under the pressure of demand uncertainty, it is a challenge for firms to survive in the agriculture industry without proper risk governance strategy, as it can be seen from various risks faced by firms. Therefore, a strong resilience is highly needed to survive in this sector. In addition to that, firms should also be able to handle and minimize those risks with risk governance. Based on the background and problem statement, the research questions of the study are as follows:

1. Does risk factors governance affect firm resilience?
2. Does risk factors governance affect supply chain risk management practices?
3. Does supply chain risk management pratices affect firm resilience?
4. Does supply chain risk management pratices mediate the relationship risk factors governance and firm resilience?

1.6 Research Objectives

This study is conducted to determine the risks in firms' supply chain in agricultural sector to enable the firms to withstand business risks. Based on the background and problem statement of the research, the research objectives of this study are as follows:

1. To examine the relationship between risk factors governance and firm resilience.
2. To investigate the relationship between risk factors governance and supply chain risk management practices.
3. To examine the relationship between supply chain risk management practices and firm resilience.
4. To examine whether supply chain management practices mediates the relationship between risk factors governance and firm resilience.

1.7 Significance of the Study

1.7.1 Theoretical Significance

The theoretical significance of this study is to provide empirical justification for the inclusive mediation model of supply chain risk management practices in the agricultural sector. The issue of supply chain's resilience has been extensively studied in the supply chain management literature (Peck, 2005; Sheffi & Rice, 2005; Wieland & Wallenburg, 2013; Chopra & Sodhi, 2014; Falkowski, 2015). Thus, the existing study conducted on supply chain resilience is dominated by a qualitative case study, and only mentions factors which may damage firm resilience, yet does not mention clearly to what extent they influence the risk governance of the supply chain resilience. Most importantly, this study will contribute to risk governance in

the supply chain field to strengthen scholars' understanding on supply chain resilience theory.

This study presents the empirical finding to extend the current risk supply chain literature since this area has mostly been done in theoretical concept and qualitative based findings. However, since most of the literature are qualitative case studies, it might be useful to complement those studies with a quantitative survey based approach on the topic. A quantitative study is conducted since agriculture firms in Indonesia have to learn what factors affect firm resilience by using quantitative method, and factors that must be considered can be identified. This approach would allow the scholars in similar area to distinguish the importance of many other factors which are potentially relevant for supply chain resilience. Moreover, most of the literature found hardly any reference to the agribusiness sector (notable exceptions including a study by Leat and Revoredo-Giha (2013); and the report to DEFRA by Peck (2006); and Falkowski (2015)). Meanwhile, this study argues that supply chain risk management practices may improve firm resilience through mediating variables such as risk information sharing and risk-sharing mechanism.

Risks that firms face vary, depending on the challenges of the firms. In a previous study, many researchers mention risks that may arise within firms. Olson and Wu (2010) divided the supply chain risk into two categories: internal and external. A study conducted by Olson and Wu (2010) describes the internal risk of side capacity, regulatory, and organizational factors. Internal risks in firms may appear from all sides, among others, for production and organizational governance. For production, risks appear in the manufacturing process and the product itself. For

organizational management, risks may appear from unsatisfactory financial governance.

Therefore, this study analyses financial risk, manufacturing risk and product risk. External risk on research conducted by Olson and Wu (2010) discusses about the market prices, actions of competitors' enterprise risk governance, manufacturing yield and costs, supplier quality and political issues. In the agricultural sector in Indonesia, the risks appear from the aspects of fluctuating demand, unbalanced supply and demand, high distribution cost, sales often conducted conventionally causing consumers to be limited, and possibility of environmental threats, such as natural disaster. This study discusses the risk of external factors on demand risk, supply risk, information risk, environment risk, and logistics risk. This study expects to increase the repertoire of knowledge about governance risks that may arise in agriculture firms.

Several studies have discussed the supply chain risk governance and its influence on firm resilience. Those studies revealed that the firms' operations formed firm resilience. It has been supported by scholars that communication among supply chain networks can influence firm resilience (Yang & Xu, 2015). This study does not consider the risk factor governance that can lead to impaired firm resilience. The study only considers the effect of supply chain risk management to firm resilience.

Therefore, the present study aims to investigate the effect of risk factor governance on firm resilience. It also aims to find out whether risk information sharing and risk-sharing mechanism have an effect on firm resilience. Supply chain risk governance is essential to the governance of the firms. Besides that, this study analyses the relationship between risk factor governance and supply chain risk management practices. Previous scholars have put a lot of effort and interest in this

filed, yet scholars rarely covered the agricultural sector. The empirical finding of this study is useful to provide insight on the theoretical model of risk supply chain governance using the agricultural sector where the complexity of market turbulence and risk factors exist without proper investigation. Therefore, the second theoretical contribution of this research is to bridge the gaps in existing literature related to uncertain business environment and agriculture risk factors.

Besides that, each risk faced by the firms varies greatly, and can influence firm resilience at different levels. Different risks result in different governance. From the differences, each type of firm has its own strategy, like the previous study conducted by Park (2011), which states that resilience is the ability to adopt and apply flexible supply chain practices depending on perception and reaction towards risks which arise unpredictable risks. Since in this research studies the agriculture firms' suffering from various risks, they need different risk mitigations, so that the firms may become more resilient. Therefore, the third theoretical contribution for this study is increasing knowledge of contingency theory especially in risk governance that appear in agriculture firms' perspective.

1.7.2 Practical Significance

Practical significance is a contribution of the study which gives impact on the industry studied. The first practical significance of this research is to provide practical guidance for firms which currently exist in the agricultural sector to survive in the hyper-competitive market under economic uncertainty. The unpredictable agriculture market conditions in Indonesia give a huge pressure on the firms to have a proper risk mitigation strategy to survive. Moreover, since there are plenty of agriculture businesses which suffer many losses because they fail to sell most of their

products or unable to meet the business's break-even point, the industry needs to incorporate other variables as interventions, such as performing risk information sharing and a risk-sharing mechanism to increase the firm resilience to overcome supply chain disruption. To be able to survive in the competitive market, the firms' internal side must have rules which enable the firms to survive. Besides that, sharing information with partners in supply chain may cause the firms to understand more about the market condition.

The second practical significance of this study is to raise awareness relating to the risk factors, and to foresee future demands. With neighbouring countries getting ready to import their commodities to Indonesia, and fulfil the market demands, local agriculture firms should start increasing its competitive power, and gear themselves to face this global competition. This can be done by increasing the firms' ability in risk management. If firms are able to manage risks that arise, then firms will be more resilient, and increase production more and slowly, which will enable firms to meet domestic demands.

The third practical significance of this study is to improve the ability of agriculture businesses to survive in the global context from supply chain risk. The fourth practical contribution of this research is to provide suggestions to the government to improve the nation's granary and warehousing systems. Last but not least, the fifth practical significance of this research is to assist these small businesses in dealing with risk-related losses. Considering that most agriculture firms in Indonesia are small-scale businesses, it is critical to focus the effort on making sure that these small agriculture businesses manage to survive with all the risks facing the industry.

1.7.3 Social Significance

Social significance is a contribution which may be obtained by a study on social environment in the study population. In this study, social significance is expected to give good impacts on all Indonesians. According to Mishra and El-Osta (2002), the findings of future study should be able to enhance the understanding of risk governance issues of those involved in the agriculture industry. It means that the study should contribute in a way that it should inform the farmers regarding the matter, and also help policy makers to implement effective risk governance strategies. This study is expected not only to contribute in supporting agriculture firms and the Indonesian government, but also to feed the basic needs of people. Most of all, this study is expected to have an impact on firms' ability to produce high quality agribusiness products to develop high quality talents.

The modern supply chain principle should be well implemented among the agriculture communities, which are engaged in the business of agriculture and the people of Indonesia. That way, it is expected that this study will help the society, especially those who work in the agriculture business to survive and withstand the disruption. The second social significance of this study is to make sure that consumers will be able to enjoy the availability of nine (9) basic commodities with affordable price, and to improve the life quality of customers through reliable agriculture suppliers. The third social significance of this research is to contribute to the government's effort to establish food self-sufficiency and favourable policies for agriculture business.

1.8 Scope of the Study

Indonesia's agriculture can be divided into several sectors, namely the crops sector, farm sector, plantation sector, fishery sector and forestry sector. The crops sector includes the production of all food crops including: rice, corn, sago, vegetables, fruits and sugar. As for coffee, tea, palawija (second crops) and oil palm, they are categorized into the plantation sector. The farm sector consists of cow, chicken and goat farms, and farm processing. The fishery sector consists of fresh fish, marine fish and marine processing products. All sectors in agriculture have a contribution towards Indonesia's economy. For plantation sector, especially palm, it has a good contribution for Indonesia's economy. Other than the food sector, such as the nine basic commodities, their contribution towards Indonesia's economy is unsatisfactory. Besides that, firms which deal with agriculture may become more resilient compared to basic commodity sector. Therefore, this study focuses on firms engaged in businesses of nine basic commodities in Indonesia. Products included in the nine basic commodities in Indonesia are rice / corn / sago, vegetables, fruits, meat, eggs, salt, butter, milk, and sugar (agriculture, 2016). The scope of the study in this research is into the crops, farm and fishery sectors.

1.9 Definition of Key Terms

To avoid confusion and misinterpretation in the terminologies used in this study, below are the clarification of key terms in the study:

- **Manufacturing risk governance**: Manufacturing risk governance is the management conducted by firms to reduce the risks caused by a disruption in production, inflexible capacity, an inadequate flow of material, frequent

product recalls, and improper inventory management (Punniyamoorthy, Thamaraiselvan & Manikandan, 2013).

- **Financial risk governance:** Financial risk governance is a firm's internal management conducted to reduce the risks caused by price fluctuation (Jin & Turvey, 2002), middleman involvement (Arsyad & Kawamura (2010), higher product cost (Tummala & Schoenherr, 2011), and price fluctuation (Olson & Wu, 2010).
- **Product risk governance:** Product risk governance is a management conducted by firms to reduce risks of bad quality of products (Tummala & Schoenherr, 2011), reliability, product design (Aqlan & Lam, 2015), and damaged by diseases (Olson & Wu, 2010).
- **Logistics risk governance:** Logistics risk governance is the management conducted by firms to survive from risks caused by poor transportation system, wrong choice in mode of transportation, and delay in delivery time (Punniyamoorthy et al., 2013).
- **Demand risk governance:** Demand risk governance is the management conducted by firms to reduce risk impacts caused by error in forecasting demand, unpredictable and inconsistent customers, changes in consumer preference, and swing demands and seasonality (Tummala & Schoenherr, 2011).
- **Supply risk governance:** Supply risk governance is the management conducted by firms to rise from adversity caused by unprofessional suppliers, inflexibility of vendors, short suppliers, and frequent delays in material supply lead time (Tummala & Schoenherr, 2011).

- **Information risk governance:** Information risk governance is a firm's management to face risks caused by the unavailability of information and communication infrastructure, either within or outside the firm. It is also affected by breaks in external IT infrastructure, inadequate security of information system, and wrong choice of communication or information sharing medium, unavailability of the information and communication (Punniyamoorthy et al., 2013).
- **Environmental risk governance:** Environmental risk governance is risk management which arises from policy uncertainty, macroeconomic uncertainty, and uncertainty due to government regulations, natural disaster and weather (Punniyamoorthy et al., 2013).
- **Supply Chain Risk Management Practices :** Supply chain risk management practices are risk mitigations used by firms to reduce risk impacts. Supply chain risk management practices consist of risk information sharing and risk-sharing mechanism (Li et al., 2015).
- **Risk Information Sharing:** Risk Information Sharing is an activity to decrease and anticipate risks that appear in firms by sharing proprietary information with supplier, sharing accurate risk related information with supply chain members, sharing real time information on demands with supplier, sharing information between functional teams in a firm, keeping each other informed about events or changes that may affect the other party, and suppliers being informed about including logistics service providers (Li et al., 2015).
- **Risk-sharing mechanism:** Risk-sharing mechanism Risk-sharing mechanism is a step to anticipate risks that appear in a firm so that it may become more