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Submission date: 23-Nov-2019 02:42PM (UTC+0700)
Submission ID: 1220076686
File name: B1a-Risk_of_Shallot_Supply_Chain.pdf (518.79K)
Word count: 4932
Character count: 25603

Risk of Shallot Supply Chain: An Analytical Hierarchy Process (AHP) Model in Brebes Java, Indonesia

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***Abstract*--- This study aimed to determine actors and to identify the types of risk in the shallot supply chain. It was conducted in Central Java, Indonesia, involving an expert from goverment representatives, academician, and actors of thechain as the respondents. Descriptive analysis was used to describe actors of chain.To identify risk of the chain,the AHP model was applied. The results showed that farmers, middlemen, businessmen, consignors, big-scale merchants, traders, retailers, and consumers are the actors of the chain. Meanwhile, the price risk played the most important one in the chain, followed by quality risk and market risk.**

Keywords--- Actors, AHP Model, Risk, Shallot, Supply Chain.

1. Introduction

The centers of shallot production in Indonesia are still centralised in Java. There are someregions in Java whichproduce shallots including West Java, Central Java, Special Region of Yogyakarta, East Java, and Banten. During the period between 2010 and 2012, Central Java was ranked the first and has the highest contribution towards the shallot production in Java, followed by East Java, West Java, Special Region of Yogyakarta, and Banten. Furtheremore, one regency in Central Java which becomes the center of shallot production is Brebes. In fact, during the period between 2010 and 2012, Brebes is able to supply 67.83% of the shallot production in the province.

The planting season of shallot in Java has almost been done simultaneously. This condition can cause problems on the number of shallot supplies in the market including one market in Jakarta which belongs to the biggest one for vegetables trade named Kramatjati Central Market Jakarta (KCMJ). There is approximately 80% of shallot which is transfered to Jakarta everyday. The distribution of shallot to Jakarta cannot be separated from the concept of supply chain. To gain cost advantages and market share, many firms implemented various initiatives such as aoutsourced manufacturing and product variety. These initiatives are effective in a stable enviroment, but they could make a supply chain more vulnerable to various type of discruptions caused by uncertain economic cycles, consumer demands, and natural and man-made disaster [1]. The supply chain is dynamic and cover the flow of information, product, and money in the levels of the supply chain [2]. The supply chain is a number of physical activity and decision making related to the flow of product and information as well as the flow of money [3]. Another problem in the shallot supply chain is the number of actors involved.

The origins of the word risk itself are debated, even within the supply chain management [4]. Risk is the expectation of failure, the greater the failure probability is, the biggerthe risk will be [5]. In recent years the issue of supply chain risk has been pushed to the fore. Supply chain risk can be defined as a disruption of the flow of information and resources in the supply chain network for their termination and uncertain variations and sources of risk that can not be predicted with certainty [6]. The risk in the supply chain can occur internally (relationship between the organization and the supplier networks) and external (between the supplier network and its environment). Supply Chain Risk Management is rapidly developing into a favored reserach area for academicians as well as practitioners, especially in the modern era wherein firms operate in global enviroments [7].

There are two main methods for evaluating the risk of supply chain, both based on experts' opinions and statistics [8]. Risk evaluation method based on the experts' opinion is usually referred to as a qualitative risk assessment models and methods of deterministic and statistical evaluation known as quantitative risk evaluation model. Some qualitative risk evaluation model that have been using AHP to select off-shore locations in the network-based supply chain with internal and external risks [9, 10]. While some quantitative model of supply chain risk management which uses a linear programming optimization to maximize profits by risk considerations [11, 12, 13]. Additionally it has a well-developed model of a combination of qualitative and quantitative which uses a dynamic simulation system model of supply chain risk management [9].

The actors who deal with the shallot supply chain from Brebes to Jakarta are relatively large, thus it makes the

International Journal of Supply Chain Management
IJSCM, ISSN: 2050-7399 (Online), 2051-3771 (Print)

unfavorable performance of the supply chain. This was because each actor has their own level of importance, which cause division of the risk between the actors disproportionate. Based on the problems above, it is important to do a research that aims to identify the actors involved in the shallot supply chain from Brebes to Jakarta and to analyze the risks in the supply chain since there have no previous studies about shallot supply chain with the methodology used in this research. The results of this study are expected to be used as information for supply chain performance improvement inregard to minimize the risk that occurs along the chain.

2. Literature Review

Risk in the supply chain can be defined as damage which caused by the incident happened in a company of supply chain. So, it made negative impact to the process of business in more than one of company in the supply chain [14]. Increasing level of a dependency and the complexity of the network supply chain makes the supply chain overall become more prone to distraction. Any interference that happened in one of the supply chain can affect the supply chain as a whole network. Then, it caused imbalance between supply and demand. Therefore, risk of supply chain can be defined as disorder information and resources in the network supply chain because of the termination and a variety of uncertain [6] as well as a source of the risk has uncertain result.

Identification and risk grouping happened depend on business subject or viewpoint faced by decision taker [15]. For the example risk of supply chain categorized into five risks, such as strategy risk, demand risk, market risk, implementation risk, and performance risk [8]. Others categorized risk of supply chain into demand risk, supply risk, environmental risk, control risk, and process risk [16]. There are 11 risks of supply chain in commodity corn, such as environmental risk, technology risk, price risk, supply risk, transportation risk, market risk, production risk, information risk, quality risk, storage risk, and partnership risk [15].

There were two main methods to evaluate risk of supply chain such as method based on expert judgment and statistic [8]. Evaluation of the risk method based on expert judgment called as model evaluation of the risk of qualitative and evaluation method in a deterministic and statistic called as model evaluation of the risk of quantitative. Several models evaluation of the risk of qualitative used AHP to choose located off-shore in supply chain network with based on internal and external risk [9, 10]. While several models quantitative management risk of supply chain which used optimize linear program to maximize an advantage by consideration risk [11, 12, 13]. In addition, it has been improved the model combination of qualitative and quantitative which used system simulation dynamic in the model management the risk of the supply chain [9].

3. Research Methods

The shallot supply chain networks analyzed by description. For shallot commodity, have never done reserach on supply chain risk qualitatively with the AHP model, so this research was analyzed using the AHP model through ***expert choice software version 9***. The processed data for AHP analysis of the data in the form of risk faced by each shallot supply chain actor, resulting 12 types of risk, namely production risk (R1), environmental risk (R2), quality risk (R3), price risk (R4), supply risk (R5), transportation risk (R6), partnership risk (R7), information risk (R8), market risk (R9), inventory risk (R10), technology risk (R11), and policy risk (R12). These data were obtained from the literature review and in-depth interviews with several experts consisting of academician, government representative, and the supply chain actors. The examples of different types of risks occured in such literature who categorized the risk of supply chain as strategic risk, demand risk, market risk, implementation risk, and performance risk [8, 16]. There are eleven types of risk in the supply chain maize namely environmental risk, technology risk, price risk, supply risk, transportation risk, market risk, production risk, information risk, quality risk, retention risk, and partnership risk [15].

The working principle of AHP consists of five stages [17]. The first one is defining the problem and detailing the desired solution. The first thing to do is to identify problems with the analysis or in-depth understanding of the problems to be solved. The next process is the identification and selection of the elements that will enter the system components, such as goals, objectives, actors, and alternatives inthe next AHP structures.

The second principle is Making Hierarchical Structure. Hierarchy is an abstraction structure, a system to study the function of the interaction between components and their impact on the system. Hierarchical structure by type of decision to be taken based on the viewpoint of the peak level up to the level where it is possible to intervene to solve the problem. Hierarchical structure can be obtained by previous studies and literature studies or through experts' opinion. The hierarchical structure in this study consisted of four levels including the focus or goal, the goal being considered, actor/criteria, and alternatives. Goal is such as shallot supply chain risk identification actors. The purpose consists of three, namely the smooth flow of goods, cash flow, and the flow of information (T1); the efficiency of the supply chain (T2); and the balance of advantage between supply chain actors (T3). Criteria on the structure of hierarchy of the risk identification includes all actors on the shallot supply chain from Brebes to Jakarta. An alternative form of risks faced by the perpetrators of the supply chain of shallot that is the risk of production (R1), the risk of environment (R2), the risk of quality (R3), the risk of price (R4), the risk of supply (R5), the risk of transportation (R6), the risk of partnership (R7), the risk of information (R8), the risk of market (R9), the risk of inventory (R10), and the risk of technology (R11), and policy risk (R12).

The third one is Assessment Each Level Hierarchy. Process of assessment is done to determine the most influential element to the overall goal. Steps to be done is to make judgments about the relative importance of the two elements at a certain level in relation to the next

higher level. The assessment results are presented in the form of a matrix pairwise comparison matrix size nxn. Questions that can be asked in preparing the scale of interest are: (1) where the element is more (important, preferably, maybe) and (2) how many times more (important, preferably, maybe). In order to assess the interest rate comparison of an element to another element, Saaty set a scale of 1 to 9. The description is presented on Table 1.

The fourth principle is The determination of Weights or Priority Elements. For each level of the hierarchy, should be paired with comparisons (pairwise comparisons) to determine priorities. A pair of elements compared based on specific criteria and weigh the intensity of preference between elements. The relationship between the elements of each level of the hierarchy determined by comparing the elements in the pair. The relationship illustrates the relative influence of elements on the level of the hierarchy to each element on a higher level. In this context, the elements at a higher level serves as a criterion and called properties (property). The results of this differentiation process is a priority vector or the relative importance of the elements of any nature. Pairwise comparison is repeated for all elements in each level. The final step is to weigh each vector with its priorities. Pairwise comparison process starts at the top of the hierarchy (goal) and it is to be used for comparison first. Then from levels right below (criteria), take the elements to be compared.

The fifth principle is Logical consistency. The assessment that has high consistently is needed in the question of decision-making, so that the result is an accurate decision. Consistency is made to obtain authentic results in the real world. AHP measures the overall consistency of the various considerations with a ratio of consistency. Value consistency ratio should be 10% or less. If it is more than 10%, the assessment is still random and needs to be repaired. The detailed explanation is described in Table 2. Consistency ratio is calculated using the following formula:

$$(1) \quad CI = \frac{\lambda_{max} - n}{n - 1} \quad \text{dan} \quad CR = \frac{CI}{RI}$$

where:

CI = consistency index

CR = Ratio Consistency

RI = Random Index

n = size of the matrix

The setting of the research was selected in Brebes because it has become the center of the largest shallot production in Java and even Indonesia. In addition KCMJ also became the research setting because its the largest vegetable market in Indonesia. Respondents in this study were the expert respondents including government representatives, academicians and actors that involve in the shallot supply chain from Brebes to Jakarta. The number of the expert respondentsused in this study is one respondent from an academic expert, one respondent from the governmental worker , and practitioners consisting of the supply chain actors from Brebes to Jakarta each practitionerconsists of one person.

Respondents were selected purposively using three criteria, namely they must have a reputation for expertise and has demonstrated credibility as an experienced expert in the field of supply chain of agricultural products. Second, they know the general conditions of cultivation, post harvest, and marketing of shallot. Third, they know knowledge of the sources of risk and the risk that may be faced by the agricultural product supply chain actors, especially shallots.

4. Results and Discussion

4.1 Network of Shallots Supply Chain from Brebes to Jakarta

Shallot supply chain actors from Brebes to Jakarta is still relatively long because it is formed by eight actors, namely farmers, middlemen, businessmen, consignors, big-scale merchants, traders, retailers, and consumers.Out of the eight actors, the consignors belong to the dominant actor in the shallot suply chain. The structure of the supply chain actors relationship shallots can be seen in Figure 1.

4.2 Shallot Supply Chain Risk from Brebes to Jakarta

The hierarchy structure of the shallot supply chain from Brebes to Jakarta consisting of *goal*, criteria, sub criteria, and alternative. *Goal* is in the form of identification the risk of shallot supply chain is smooth the flow of product, flow of money, and the flow of information; efficiency of supply chain; and balance between the actors of the chain. Sub criteria is the actors of shallot supply chain consisting of eight actors and the alternative is type of risk that amounts to twelve. The hierarchy structure of shallot supply chain from Brebes to Jakarta shown by Figure 2.

The result of the assessment on the academician's opinion showed that the three biggest risks that require attention in the shallot supply chain from Brebes to Jakarta is price risk, quality risk, and market risk. The risk of price is the most important to note, followed by the quality risk and market risk.

The risk assessment according to the expert respondents from the government side showed the three biggest risks namely the price risk, quality risk, and market risk. This means that the risk of price becomes the most important risk in the shallot supply chain from Brebes to Jakarta.

For the asessment according to farmers' opinion, they considered that the three biggest risk is the production risk, price risk, and environmental risks. Production risks become the most important risk for farmers because the farmers are the ones undertake the production process and during the process, they

experience these risks. Price and quality also make farmers at risk conditions because the quality of the resulting shallots at harvest determines the selling price at the farmer level.

From the point of view of midllemen, they considered that the three types of the biggest risk in the shallo tsupply chain is the partnership risk, quality risk, and price risk. The partnership risk are the most important risk for all this time working with entrepreneurs middlemen in the purchase and sale of shallot. The middlemen must make arrangements with employers to spend a number of selling spotin the capital of stalls for business entrepreneurs shallot. In the event of such business loss, then the middlemen come to feel it.

The three biggest risk in the opinion of the big-scale merchants in Brebes is quality risk, partnership risk, and market risk. Quality risk become the most important note in the opinion of the big-scale merchants. This can happen because the shallot shipped to KCMJ were in wet conditions including theleaves that are still green. The condition causes the variation of the quality or the quality of the shallots.

Overall, the consignors in Brebes categorised that partnership risk, quality risk, and market risk into three biggest risks that must be considered. The risk of partnership of the most important because consignor's buy the shallot from businessmen who often do the price. Market conditions also cause the sender is in a state at risk due to uncertainty of the number of deals or supplies to KCMJ. For example, the middlemen ordered the shallots with certain price, however, when the shallots arrived in KCMJwith abundant supply, the price has declined. The condition causes many shippers are turning to the other markets or shipped the tooutside of Java.

The middlemen and the traders at KCMJ give the same assessment of the risk of shallot supply chain from Brebes to Jakarta. The assessment suggests that three types of biggest risk are thepartnershiprisk, price risk, and quality risk. The risk of partnersip became the most important riskfor both actors. The traders are the only actor who can buy shallots directly into the middlemen and even the supply has been provided by the middlemen as requested. Therefore, the partnership between them has already been established adn maintained. The condition sometimes arouse a risk for the middlemen to feel powerful or to have higer position than the traders. Quality of cause risks for the middlemen sell shallots bought into the traders under what conditions the existence of the sender, so that variations in the size of each package. Centheng
likewise buy shallots from centheng already packed in a plastic bag in red (waring), so there are also variations in terms of size.

From the retailers' point of view, it shows that the three types of the greatest risks in the shallot supply chain from Brebes to Jakarta is quality risk, partnership risk, and price risk. Quality risk is considered the most important for retailers to buy shallots to trader KCMJ in two forms namely peeled and unpeeled shallots. Usually peeled shallothas unclear colour and smaller size, however, the price is more expensive than unpeeled shallots. The condition occured becausethe traders pay more for labor to peel the shallots.

The three types of risk in the judgment of the consumer is quality risk, price risk, and the storage risk. The risk of quality rated the most important by consumers, followed by the price risk and the risk of storage. Consumer food stalls usually buy shallot at retailers in the form of peel, while the household consumers buy in the form of peeled. The quality of shallot caused a risk mainly in consumer food stalls because usually small in size but they are expensive, so the price risk is in the second place. Storage cause the risk of household consumers, especially consumers, because the use of the relatively small each day and the time of purchase based on a survey is two weeks, resulting in shrinkage. Consumers often get the wrong information from retailers, especially the problem of the purchase price from retailers that eventually resulted in thebuying price of consumer.

The combined risk assessment according to all the experts are presented in Table 3. In the table, it is shown that three major risks in the shallot supply chain from Brebes to Jakarta that must be considered and addressed include price risk, quality risk, and market risk. This result is different with risk on the shallot supply chain from Nganjuk Regency to Jakarta, namely market risk, partnership risk, and quality risk [18]. Price risk rated the most important by all the respondents then followed by the quality risk, and market risk. This can occur because every transaction between actors in the supply chain can not be separated from the price decision either the selling price or the purchase price.

5. Conclusion

Networking in the shallot supply chain from Brebes to Jakarta is formed by eight actors, namely farmers, middlemen, businessmen, consignors, big-scale merchants, traders, retailers, and consumers. The results of the risk identification with AHP model showed that the risk of price becomes the most important risk in the shallot supply chain from Brebes to Jakarta by representatives of academia and government ratings. Risk partnership rated most important by midllemen, consignors, big-scale merchants and traders. Meanwhile, according to retailers and consumers the most important risk is the risk of quality. Farmers assess the risks of production being the most important to note. The combined vote across the experts indicate that price risk is the most important risk in the shallot supply chain from Brebes to Jakarta, followed by the quality of risk, and market risk.

Acknowledgment

Thanks to Universitas Muhammadiyah Yogyakarta which has provided funds for this research. Also thanks to Ir. Indira Prabasari, M.P, Ph.D and Puthut Ardianto from Universitas Muhammadiyah Yogyakarta has accompany writing this paper.

This publication process is fully funded and supported by the Universitas Muhammadiyah Yogyakarta as part of the university program in improving its lecturer's quality in writing articles in a Scopus-indexed journals.

References

[1] Christopher, S.Tang. *"Perspectives in Supply Chain Risk Management"*, International Journal of Production Economics 103(2) : 451-488, 2006.

[2] Copra, S., and Meidl, P. *Supply Chain Management Strategy, Planning, and Operation* (2nd Eds). New Jersey : Pearson Education International, 2004.

[3] Vorst, J.G.A.J. van der. *Supply Chain Management: Theory and Practice*. Elsevier, Hoofdstuk. 2004.

[4] Rao, S., and Golbsby, T.J. "*Supply Chain Risk: A Review and Typology*", The International Journal of Logistics Management 20 (1): 97-123, 2009.

[5] Mitcell, V.W. "*Consumer Perceived Risk: Conceptualizations and Models*" European Journal Marketing 33. (½) : 163-195. 1999.

[6] Juttner, U., Peck, H., and Christopher, M. "Supply Chain Risk Management: outlining an agenda for future research", International Journal Logistic: Research and Applications, 6(4): 197-201, 2003.

[7] Manuj, I., and Mentzer, J. "*Global Supply Chain Risk Management*", Journal of Business Logistics 29 (1): 133-156, 2008b.

[8] Klimov R.A., and Merkuryev, Y.A. "*Simulation Model for Supply Chain Reliability Evaluation*". Technology and Economic Development of Economy, 14 (3): 300-311, 2006.

[9] Wu, D., and Olson, D.L. "*Supply Chain Risk, Simulation, and Vendor Selection*." International Journal Production Economics, doi:10.1016/j.ijpe.2008.02.2013. 2008.

[10] Schoenherr, K.J., Rao, T.V.M., and Harrison, T.P. "*Assesing Supply Chain Risk with Analytic Herarchy Process: Providing decision support for the offshoring decision by a US manufacturing company*", Journal of Purchasing and Supply Management, doi: 10.1016/j.pursup. 2008.01.008, 2008.

[11] Nagurney, A., Cruz, J.M., and Dong, J. "*Global Supply Chain Networks and Risk Management: A Multi-Agent Framework*", Multiagent- Based Supply Chain Management 103-134, 2005.

[12] Li, J., and Hong, S.J. "*Towards a New Model of Supply Chain Risk Management: The Cross-Functional Process Mapping Approach*", International Journal Electronic Customer Relationship Management, *1*(1): 91-107, 2007.

[13] Lee, T.Y.S, "*Supply Chain Risk Management*", International Journal Information and Decision Sciences, (1)1: pp. 98-114, 2008.

[14] Kersten, W., Hohrath, P., and Boger, M. "*An Empirical Approach to Supply Chain Risk Management: Development of A Strategic Framework*", Proceeding POMS 2007 Conference, 2007.

[15] Suharjito, "*Modelling Smart Support System on the Corn Supply Chain Management*", dissertation, Postgraduate School. Bogor Agriculture Institut, 2011.

[16] Xiaohui, W., Xciaobing, Z., Shiji, S., and Chenf, W. "*Study on Risk Analysis of Supply Chain Enterprises*", Journal Systems Engineering and Electronics 17(4): 781-787. 2006.

[17] Marimin, Djatna.T, Suharjito, Hidayat, S, Utama, D.N., Astuti, R., and Martini, S. *Techniques and Analysis Fuzzy Decision Making on Supply Chain Management* (Teknik dan Analisis Pengambilan Keputusan Fuzzy pada Manajemen Rantai Pasok). Bogor Agriculture Institut Press. (in Indonesian), 2013.

[18] Susanawati, Jamhari, Masyhuri, and Dwidjono, H.D. "*Identification of Risk on Shallot Supply Chain in Nganjuk Regency*", (Identifikasi Risiko Rantai Pasok Bawang Merah di Kabupaten Nganjuk), AGRARIS Journal 3(1) :15-22. (In Indonesian). 2017.

[19] Saaty, T.L. "*Decision Making, Scalling, and Number Crunching*", Decision Science 20(2): 404-409, 1989.

[20] Hakimi, R. "*A strategy Improve the Competitiveness of the Nata de Coco Industry in Bogor City with the Fuzzy Approach*. (Strategi Peningkatan Daya Saing Industri Nata de Coco dengan Pendekatan Fuzzy)" M.S. thesis, Bogor Agriculture Institut. (in Indonesian) 2007.

Appendix

Table 1. *Comparison Scale [19]*

Value	Description	Explanation
1	Both elements are equally important	Two elements have the same influence greatly to the goals
3	Elements of a little more important than other elements	Experience and judgment slightly favor one element compared to other elements.
5	Elements which one is more important than other elements	Experience and strong vote supporting one element compared to the other elements
7	One element is obviously more important than other elements	One very powerful element supported, and the domain has been seen in practice.
9	One absolutely essential element than other elements	the evidence that supports one element against another element has the highest possible degree of confirmation strengthens.
2,4,6,8	The values between two adjacent values	Values consideration is given when there are two compromises between two options.

Table 2. Random Index Value [20]

Matriks Size	RI	Matriks Size	RI
1	0	9	1,45
2	0	10	1,49
3	0,58	11	1,51
4	0,90	12	1,48
5	1,12	13	1,56
6	1,24	14	1,57
7	1,32	15	1,59
8	1,41		

Table 3.The Risk Assessment of the Shallot Supply Chain from Brebes Regency to Jakarta according to all Participants

Actors	Type of Risk											
	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12
Farmer	0,138	0,113	0,110	0,131	0,046	0,093	0,058	0,051	0,055	0,074	0,069	0,062
Middleman	0,102	0,057	0,134	0,135	0,067	0,040	0,089	0,084	0,123	0,056	0,050	0,062
Businessmen	0,100	0,057	0,126	0,131	0,071	0,045	0,086	0,095	0,120	0,060	0,047	0,062
Consignor's	0,107	0,053	0,129	0,134	0,066	0,037	0,101	0,079	0,128	0,057	0,048	0,060
Big-scale merchant	0,099	0,051	0,128	0,139	0,068	0,036	0,114	0,073	0,124	0,057	0,048	0,064
Traders	0,069	0,042	0,125	0,153	0,076	0,039	0,137	0,074	0,124	0,057	0,041	0,063
Retailer	0,088	0,056	0,135	0,134	0,069	0,047	0,103	0,101	0,127	0,056	0,037	0,047
Consumers	0,089	0,055	0,125	0,130	0,069	0,047	0,090	0,103	0,116	0,071	0,040	0,063
Government Rep	0,092	0,048	0,125	0,144	0,070	0,035	0,105	0,071	0,124	0,060	0,052	0,073
Academician Rep	0,067	0,047	0,113	0,141	0,071	0,034	0,101	0,085	0,113	0,088	0,043	0,098
Combination	0,091	0,052	0,127	0,138	0,070	0,040	0,104	0,086	0,123	0,061	0,044	0,064

Remarks :
R1 = production risk; R2 = environmental risk; R3 = quality risk; R4 = price risk; R5 = supply risk; R6 = transportation risk; R7 = partnership risk; R8 = information risk R9 = market risk; R10 = inventory risk; R11 = technological risk; R12 = policy risk

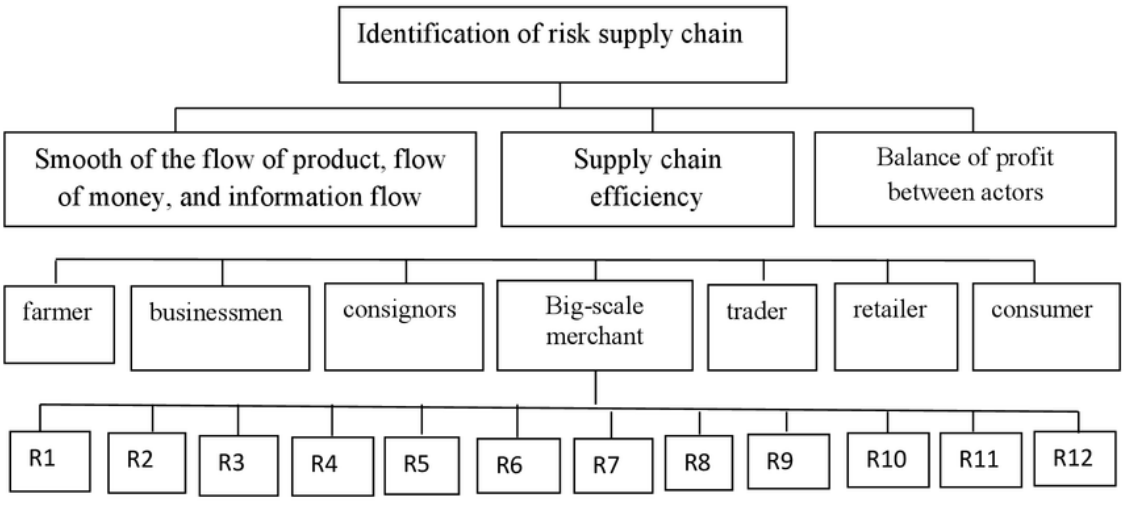
Figure 1. Shallots Supply Chain Network from Brebes to Jakarta

Definition of each actor

Farmer	: the one planting and harvesting the crops
Middlemen	: a person who buys products from the farmers
Businessmen	: a businessmen who has a business venues
Consignor	: shipper
Big-scale Merchant	: big merchant
Traders	: a merchant in between the big-scale merchants and retailers
Retailers	: buyers in a small number
Consumers	: buyers

Figure 2. Hierarchy Structure of Shallots

Supply Chain from Brebes to Jakarta



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