THE FUNCTION OF WAREHOUSE
IN ELEVATED SUPPLY CHAIN:
(The case study of farmer's shallots in East Java)

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ABSTRACT

Purpose — This research aims to evaluate the function of the warehouse in increasing the supply chain of shallot production in East Java

Design/methodology/approach - This research uses explanatory research with a quantitative approach. The object of this research was in four districts of East Java at Nganjuk, Kediri, Malang, and Probolinggo which are the centers of shallot production that have similar environmental conditions. The sampling method in this research used multistage proportional random sampling with 200 respondents as a sample of this research. Data analysis uses the path analysis method by software SEM PLS Software 3.0.

Findings - The results show that the warehouse has a significant effect on the integrative supply chain variable, the warehouse *has* no significant effect on the performance Effort variable and the integrative supply chain has a significant effect on the performance efforts variable.

Practical Implications - Supply Chain Improvement is greatly influenced by the warehouse but not by performance Efforts.

Originality/value - The key aspect of this research is increasing the effectiveness of warehouse operations in the logistics system and integrated supply chain activities as well as improving the performance of businesses focused on horticulture by approaching farmers and partners (traders). This study expands

the literature on the function of warehouse utilization in Supply Chain activities so that it has an impact on improving business performance.

Keywords: Warehouse, Supply Chain Integration, Performance Efforts

INTRODUCTION

The management supply chain is a set of activities and decisions that are interrelated in integrating suppliers, warehouse, transportation, manufacturing, traders, and consumers in an efficient (Ling, 2007). The supply chain is a process of interaction between producers, processors, distributors in distributing goods, wholesalers, retailers, and consumers in a marketing system (Chopra and Meindl, 2007; Hudson, 2007). Supply chain management is defined as a set of practices that aim to manage and coordinate the entire demand chain, starting from the needs of the end customer and linking customers and suppliers together into a tightly integrated network (Frohlich and Westbrook, 2002). Other objectives of supply chain management are to improve performance in practice, namely strategic supplier partnerships, customer relations, information sharing, information technology, training, and internal operations (Petrovic, 2007).

Supply chain actors involved in the distribution of shallots are collectors, wholesalers, including *suppliers* of processing industries, and retailers, both traditional and modern market retailers (supermarkets, hypermarkets, and supermarkets).
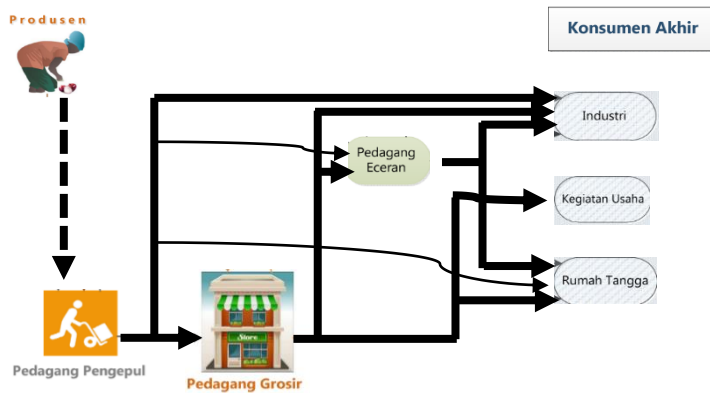
Source: East Java BPS, 2015, compiled by researchers, 2018

Figure 1.1 Distribution pattern of shallots in East Java Province

Based on Figure 1.1 the distribution and marketing system of shallots from production centers to various market destinations for shallots production centers in East Java (Malang Regency, Nganjuk Regency, Kediri Regency, and Probolinggo Regency), producers to several to sell freely of the products. There is no partnership between farmers, traders, and processing industries.

The supply chain is an integrated activity from raw materials to finished products and can be delivered to consumers (Meindel, 2001), stated that the purpose of the supply chain is to maximize the value of the entire supply chain. A well-managed supply chain can provide added value to consumers so as to increase competitiveness. Implementation of the supply chain in the horticulture sector, especially the shallot is more complex because the shallot is seasonal as well as the influence of nature in its production process. Therefore, the supply chain of shallots can be carried out through partnership relationships between farmers and

industrial companies, traders/collectors, or those engaged in the agricultural business.
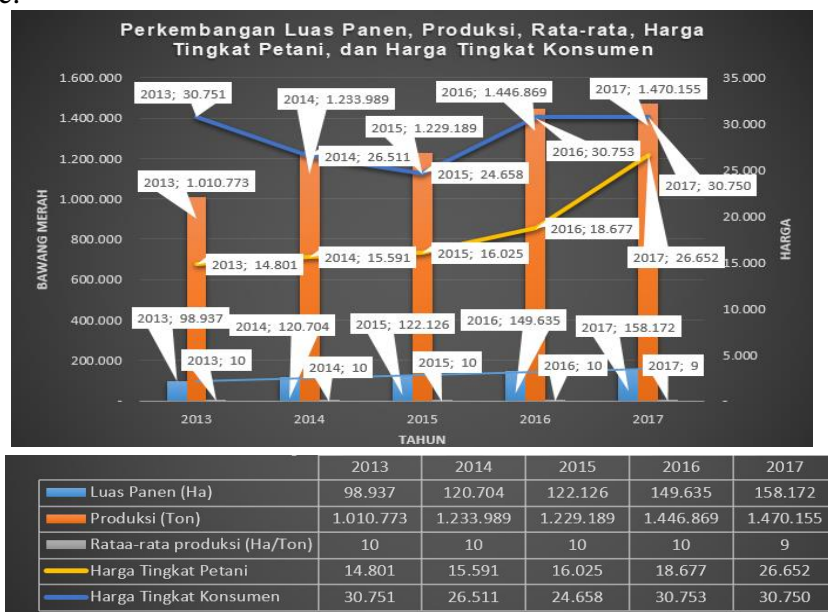
The integrative supply chain is defined as an activity in the organization of suppliers, customers, and members of the integrated supply chain (Flynn, et al., 2010). Therefore companies must be able to create value by integrating supply chains so that higher product quality can be achieved, increase productivity, machine use efficiency, and increase logistics efficiency and flexibility (Kim and Narasimhan, 2002). A key factor in the success of an integrative supply chain is improving the cooperative relationship between different partners in the supply chain, in particular, trust and relationship commitment in improving performance Efforts (Suhaiza, 2005).

Measuring farmer performance Efforts needs to develop skills in improving land and crop management, crop yields, storage, and transportation. In improving farmer performance Efforts, it is necessary to support farmer groups and all parties involved in improving supply chain management (Orsi, et al, 2017).

Agricultural sector business development plays an important role in the national economy. Indonesia is a potential producer of horticultural commodities. The shallot commodity is a source of income and provides job opportunities for farmers so that it provides a high contribution to income and economic development, especially in production center areas. Consumer demand for shallots must be fulfilled so that consumers are satisfied and business actors' profit targets can be achieved. Shallots are one of the strategic commodities in East Java Province. Shallots as one of

the horticultural commodities are included in the high-value commodity category so that many farmers cultivate them.

However, there are some significant problems in the shallot supply chain. The longer the product distribution chain, the higher the product price.

	2013	2014	2015	2016	2017
Luas Panen (Ha)	98.937	120.704	122.126	149.635	158.172
Produksi (Ton)	1.010.773	1.233.989	1.229.189	1.446.869	1.470.155
Rataa-rata produksi (Ha/Ton)	10	10	10	10	9
Harga Tingkat Petani	14.801	15.591	16.025	18.677	26.652
Harga Tingkat Konsumen	30.751	26.511	24.658	30.753	30.750

Source: Data processed by researchers, 2018 (www.bps.go.id)

Figure 1.2 Harvest Area, Production, Average, and Price

The productivity of shallots in East Java province from 2013 to 2017 has increased. In 2013, shallot production amounted to 1,010,773 tons and an increase in 2017 of 1,470,155 tons. The increase in shallot production was also followed by the development of shallot prices at the producer (farmer) level, but the price of shallots at the consumer level fluctuated in 2013 at IDR 30,751 / kg, and there was a decrease in 2014 to 2015, while in 2016-2017 the price of shallots back up.

The problem of shallot production is not only price fluctuations at the consumer level, but there is also a low level of productivity of shallots with the average level of shallot production locally and nationally only being able to produce around 9-10 tonnes/ha, this is still far below potential or production targets that should be above 20 tonnes/ha. The low productivity of shallots is due to the lack of quality seeds available, limited production facilities and infrastructure, and the inadequate implementation of specific SOPs in locations (www.bappenas.go.id).

The warehouse has an important role in the process of controlling productivity and reducing costs and production the warehouse is closely related to inventory so that demand can be carefully anticipated. Shallots production is increasing so that optimal warehouse function is needed for shallot damage which can harm farmers, especially in the research location.

Warehouse plays an important role in supply chain activities and affects the costs and activities of the supply chain (Kiefer and Novack, 1999). Warehouse (warehouse) has a role in company logistics to store products (raw materials, semi-finished goods, and finished goods) and provide information about the status, condition, and use of stored goods (Nova, 2012).

The role of warehouses in the agricultural sector is needed during the harvest season to solve post-harvest problems because shallots are easily damaged, difficult to maintain in fresh form so that they can affect prices. The role of warehouses in the agricultural sector is needed during the harvest season to solve post-harvest problems because shallots are easily damaged, difficult to maintain in fresh form so that they can affect

prices. The warehouse functions to accommodate the harvest of shallots in order to reduce prices and maintain supplies. The high productivity of shallots in the province of East Java can provide a more competitive price. Even so, there are several problems that arise in shallot supply chain activities, including storage. Poor handling of shallots will cause damage or even grow in storage. Good post-harvest handling efforts are needed to extend the shelf life and increase the economic value of shallots.

The role of the warehouse for farmers is very important in distribution. The warehouse is part of a supply chain system that can be applied to store shallot yields from the source point to the warehouse location point. The warehouse has a very important role in the success of farmers in supporting the smooth running of the supply chain. As one of the central areas for producing shallot producers, it is faced with the problem of determining the location and warehouse facilities that have not met standard operating procedures for storage. So far, farmers have relied on houses that are used as warehouses with traditional facilities.

The aim of this research is:

The purpose of this study was to determine the function of the warehouse in integrative supply chain activities in improving the performance of the efforts of shallots farmers in East Java Province.

RESEARCH METHODS

Research Type

The type of research in this research is explanatory research with a quantitative approach. Explanatory research is research that is used in

explaining the causal relationship between latent variables through the process of testing hypotheses that have been formulated or often said to be explanatory research (Singarimbun, 2006). The research method used in this research is to use the survey method.

Research Location

The location of the research is in Nganjuk Regency, Probolinggo Regency, Kediri Regency, and Malang Regency. Selection of the research sites for consideration geographic location, easily accessible, the central area of shallot production, and the largest land area. The data analyzed is considered able to answer the hypothesis, so that it is able to generally answer the problem of supply chain integration in East Java Province.

Population

The population in this research are all farmers who are members of the Combined Farmers Group in the villages that have been selected in each Regency. The total population of secondary data obtained is 2390 shallot farmers, with details:

Table 1 Number of Farmers in the Four Districts that Are Research Sites

Wilayah	Populasi
Nganjuk Regency	1256
Kediri Regency	597
Malang Regency	297
Probolinggo Regency	240
Total	2390

(Data source: Food and agriculture security service, 2018)

Samples

The sampling method in this research used multistage proportional random sampling. Multistage is sampling in two stages or more (Nazir, 2014: 243)**.** This research used multistage because researchers cannot identify the population easily and the population is very large. Having difficulties in identifying a very large population, the sample size in this research was determined using the Roscoe formula. Roscoe's formula is at least 10 times the number of variables studied and multiples thereof (Sugiyono, 2010: 124) with a degree of error of 5%. Based on the calculation of the roscoe formula, it was obtained the size of up to 200 respondents. This research used 50 times the number of variables, namely 50 x 4 = 200 respondents.

Sampling Technique

The sampling technique is done in various stages (multistage). The same stages are carried out in each selected Regency. The first stage until the last stage is explained as follows:

1. Four districts were selected as centers of shallots in East Java Province, namely, Nganjuk Regency, Kediri Regency, Malang Regency, and Probolinggo Regency. This selection is based on the shallot planting area in East Java and is chosen as the largest.

2. Selecting the sub-district which is the center of shallot centers from each selected district. Subdistricts are chosen based on the largest shallot producer so that the results are obtained as follows:

    Nganjuk Regency   > sub-district Rejoso

    Kediri Regency   > sub-district Badas

    Malang Regency   > sub-district Ngantang

Probolinggo Regency   > sub-district Dringu

3. Selecting the village which is the center of shallots from each selected district. The villages chosen based on the biggest shallot producer and planting are obtained, as follows:

    Nganjuk Regency   > sub-district Rejoso   >Ngadiboyo Village

    Kediri Regency   > sub-district Badas   >Sekoto Village

    Malang Regency   > sub-district Ngantang   >Purworejo Village

    Probolinggo Regency   > sub-district Dringu
       >Watuwungkuk village

4. Choosing Farmers Group Association (FGA) to identify the number of populations in the research sites. In each village only have 1 Farmers Group Association, so that the following results are obtained:

    Nganjuk Regency   =   Mandiri   Farmers   Group Association

    Kediri Regency   = Berkah Mulya Farmers Group Association

    Malang Regency   =   Karya   BaktiFarmers   Group Association

    Probolinggo Regency   =   Harapan   JayaFarmers   Group Association

5. Get the number of members of each Farmers Group Association from each Regency, so that the following results are obtained:

Nganjuk Regency   = Mandiri Farmers Group Association = 1256 Petani

Kediri Regency   =   Berkah   Mulya   Farmers   Group Association = 597 Petani

Malang Regency   = Karya Bakti Farmers Group Association= 297 Petani

Probolinggo Regency   = Harapan JayaFarmers Group Association = 240 Petani

 The total number of the Farmers Group Association members is 2390 farmers.

6. The sample distribution corresponds to the size of the selected Farmers Group Associationmember population with the sample size obtained by the Roscoe formula. The sample size in this research was 200 respondents.

Nganjuk Regency,   1256/2390 x 200   = 105 Farmers

Kediri Regency,   597/2390 x 200   = 50 Farmers

Malang Regency,   297/2390 x 200   = 25 Farmers

 Probolinggo Regency,   240/2390 x 200   = 20 Farmers

Table 2. Sampling Techniques

N o	Regencies	Sub Districts	Villages	Farmers Group Association	Number of Farmers Group Association	Samples
1.	Nganjuk	Rejoso	Ngadiboyo	Mandiri	1256	105
2.	Kediri	Badas	Sekoto	Berkah Mulya	597	50

3.	Malang	Nganta ng	Purworejo	Karya Bakti	297	25
4.	Proboling go	Dringu	Watuwungk uk	Harapan Jaya	240	20
Jumlah					**2390**	**200**

The number of samples and the name of the sample were chosen by random using the Microsoft Excel application. Sample names, number of samples, and Farmers Group Associationobtained from the Department of Agriculture in each region are included in Microsoft Excel in accordance with those provided by the Agriculture Service. Then, using the RANDBETWEEN function and formula = RANDBETWEEN (1; number of samples / farmer name) or == RANDBETWEEN (drag from first name to end) - Enter. Then we get a random sample of farmers.

Data Collection Technique

Data collection techniques in this research use primary data and secondary data. Primary data is in the form of data obtained from survey results using questionnaires and supported by interviews to strengthen the results obtained. Secondary data in the form of initial supporting data obtained directly from the Department of Agriculture and Horticulture in each district and data obtained through search engines.

Data collection techniques with surveys are conducted by a questionnaire method or questionnaire which lists or sets of questions systematically arranged to get answers in the form of opinions from respondents. The questionnaire was used as a research instrument to collect data and information from respondents. The questionnaire was

designed in such a way as to record and obtain data about the conditions experienced by the respondents themselves.

The questions are formulated to ask the responses or perceptions of farmers as respondents who are involved in the supply chain integration of shallots. The questionnaire is distributed to respondents and asked to fill out / answer / provide responses to a series or list of questions that have been listed in the questionnaire.

The steps in collecting primary data in this research are as follows:

1. Arranged research instruments, namely research questionnaires covering the characteristics of respondents and items of questions that include each variable used by researchers to conduct research.

2. Conduct testing of research instruments, namely validity and reliability test by distributing questionnaires to 30 initial respondents to find out whether the questionnaire used is valid and reliable. 30 respondents were randomly selected and used as the initial sample of the research.

3. After the research instrument was declared valid and reliable, the research was continued by distributing questionnaires to 200 respondents who had been randomly selected.

4. The distribution of questionnaires is done by the door to door to respondents according to the number of samples and according to the name that has been randomized.

5. Respondents filled out the questionnaire accompanied by researchers to be able to understand the questions and answer questions on the

questionnaire. This assistance also functions as a deeper data extraction by conducting unstructured interviews with the respondents

6. After filling out the questionnaire, researchers conducted in-depth interviews in accordance with the answers given by respondents to the filled questionnaire and also some open questions. Open questions are given to the respondent when the researcher obtains data outside of the questionnaire questions that have been prepared, in order to deepen the analysis of the data obtained. This question is also done to confirm to the respondent that the answer given is the right answer according to the opinion of the respondent.

Validity Test

The validity test is to determine the validity of a research instrument that will be measured using a measuring instrument (Cooper, 1995). A validity test is the accuracy or accuracy of an instrument used as a measurement. Validity coefficient> 0.30 can be considered for the minimum level. Loading approximately 0.40 will be better and> 0.50 is practically significant (Syamsul, 2014: 33). Testing the validity in this study using Sem PLS 3.0 software with testing 30 respondents.

Reliability Test

Reliability tests to measure the consistency of measuring instruments that can show accuracy, consistency, and accuracy of measuring a concept (Abdillah, 2015).

Tabel 3 Parameter reliabilitas menurut Chin

Validity test	Parameters	*Rule Of Thumb*
Convergent	*Faktor loading*	>0,70
	Average variance extracted	>0,50
	Community	>0,50
Discriminant	AVE roots and correlation of latent variables	Roots *AVE* > correlation of latent variables
	Cross Loading	>0,70 in a variables

Sumber: Syamsul, 2014:33

Construct reliability cut off value > 0.70. Significant factors can be obtained with a low value so that the estimated standardized loading value must be equal to 0.50 or more and ideally it should be 0.70 (Imam Ghozali, 2012 in Syamsul, 2014; 34). Construct reliability of 0.70 or more shows good reliability, while 0.60-0.70 is still accepted by fulfilling the validity requirements of indicators or items in a good mode.

Variance extracted cut off value > 0.50. Paying attention to the number of variants of the indicator or item extracted from the variable of formation. A high extracted value indicates that the indicator or item has met the requirements to represent the well-formed variable being developed.

Cronbach's alpha. Measuring the lower limit of the value of a construct on reliability. The alpha value must be greater than 0.60.

Composite reliability is used to measure the value of the construct on reliability. Composite reliability is considered to be able to estimate internal consistency in a construct (Gopal, 2002 in Syamsul, 2014; 34).

RESULTS AND DISCUSSION

Research Hypothesis

Based on the background, the formulation of the problem, the purpose of the research, and the explanation of the theoretical studies and empirical data of previous research. Then the hypothesis proposed in this research are as follows:

H1: Warehouse has a significant effect on supply chain integration

H2: warehouse has a significant effect on performance Efforts

H3: supply chain integration has a significant effect on performance Efforts

Table 4. Variables, operational definition, Indicators, Items

No.	Variable	Operational Definition	Item	Researcher
1.	Warehouse	The farmer's assessment involving the warehouse includes consideration of location, storage standards, and monitoring of shallots harvest.	1. The strategic storage palace. 2. Standard storage 3. The monitoring storage	(Faber et al., 2002)

2.	Supply chain integration	The farmer's decision-making process which deals with chains of integrative includes the farmer's networking, dealers, merchants, and moderators who work together collectively in a production process and quality assessment systems of production to create the deliver shallots to the costumer.	1. Together it's a growing process 2. Together with monitoring the harvest process 3. Quality improvement technical training	(Huo et al., 2014)
3.	Performance efforts	The farmer's perceptions as the subject to increased performance include the quantity of production, quality of production, and the profit that results.	1. Crop increase 2. Improved yields 3. Increased profits of the business 4. Tips from the traders using organic fertilizer 5. Tips from traders using organic pesticide fertilizer 6. Advice from traders to hire farm workers from	(Orsi et al., 2017)

neighbors
7. Advice from traders to set aside partly profit ventures for the benefit of the people around
8. Earned a business certification
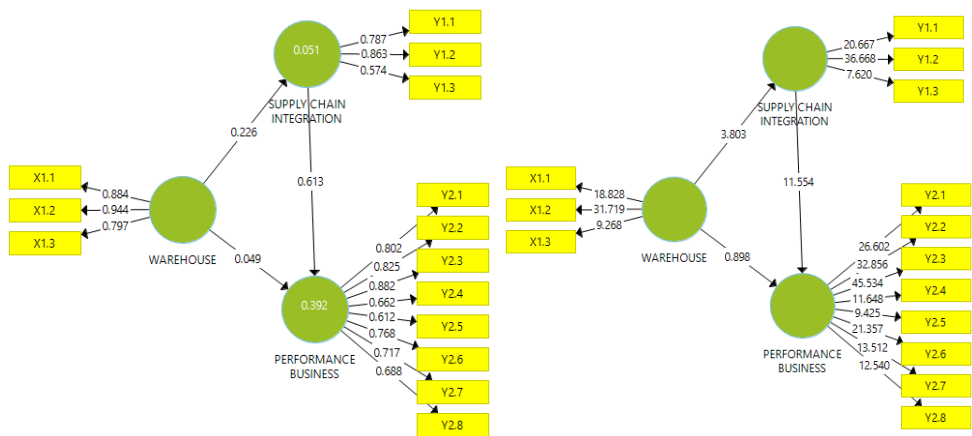
Source: Primary data from SEMPLS output processed by researchers, 2020

Table 5. Hypothesis Testing Results

	Sampel Asli (O)	Rata-rata Sampel (M)	Standar Deviasi (STDEV)	T Statistik (O/STDEV |)	P Values	Ket.
Warehouse -> supply chain integration	0,226	0,239	0,064	3,510	0,000	Signifikan
Warehouse -> performance business	0,049	0,050	0,057	0,866	0,387	Tdk. Significance
Supply chain integration -> performance business	0,613	0,619	0,058	10,652	0,000	Signifikan

Source: Primary data from SemPLs output, processed by 2020 researchers

Testing Warehouse has a significant impact on the supply chain integration

The results of testing of Warehouse has a significant impact on the supply chain integration can be seen in table 5, the research hypothesis tested as follows:

H1: Warehouse has a significant effect on the Integrative Supply Chain

Table 5 shows the path coefficient of 0.226 with a t-statistic of 3.510 and a p-value of 0.000, so the conclusion is H1 is accepted. This shows that an increase in warehouse activities will have an effect on increasing supply chain integration activities

This is because the warehouse is used to accommodate seeds and store the harvested shallots. Although Warehouse is still traditional and the unavailability of modern facilities, while farmers still use the warehouse with minimal facilities as storage shallots. However, the traditional use of warehouses still supports the process of supply chain integration and provides benefits for farmers. Richards (2011), said that a warehouse is a special facility designed for the storage of goods that are planned and fixed with the optimal level of service and the most affordable total costs. This is evidenced by several previous studies which state that the warehouse plays an important role in supply chain activities, which can affect both costs and supply chain activities (Kiefer and Novack, 1999). Research conducted by Rene, et al. (2002), said that the world of warehousing is changing rapidly and improving the overall supply chain performance.

The warehouse is a logistics system for a company or organization that stores products (raw materials, spare parts, goods-in-process, finished goods) (Lambert, 1993). The warehouse is part of logistics which has the role of storing products (semi-finished goods, raw materials, and finished goods) and the warehouse can provide information about the status, condition, and use of stored goods. Warehouse management includes all planning and control procedures for operating the warehouse (Nova, 2012). Warehouses today play a more important role in the success (or failure) of a business (Frazelle, 2002).

Testing the Effect of the Warehouse on performance Efforts

The results of testing the effect of the Warehouse on the Integrative Supply Chain can be seen in table 5, the research hypothesis being tested is as follows:

H2: Warehouse has a significant effect on performance Efforts

Table 5 shows a path coefficient of 0.025 with a statistic of 0.449 and a p-value of 0.654. This shows that the warehouse has a significant effect on performance Efforts. This shows that the warehouse does not affect increasing the farmer's performance Efforts.

This is because farmers choose to use the warehouse to store seeds. Farmers do not use the warehouse as a place to accommodate their crops. The impact of using a warehouse resulted in farmers not monitoring the yield of shallots. To avoid the risk of damage to shallots, the majority of producers (farmers) choose transactions directly against traders. This shows that in this study the warehouse system does not influence performance Efforts so that it cannot affect the increase in performance Efforts of producers (farmers).

The research that has been conducted is not in line with the research conducted by Ramaa, et al. (2012) which states that the warehouse management system is a contributing factor to the increase in performance Efforts and productivity in the supply chain activities. Therefore it can be said that warehousing affects the performance of the entire supply chain. Warehouse productivity warehouse management system is much faster and more accurate than when operations are performed manually.

The research that has been done does not support each other with the theory put forward by Warman (2004), which states that a warehouse is a facility used to store goods. Warehousing processes that need to be planned and controlled include: handling of inflows, assigning location to location, storing products, allocating locations for inventory, collecting and releasing orders, taking orders, packaging, value-added logistics activities, and shipping (Ackerman and La Londe, 1980; Frazelle, 2002). In this study, farmers did not use the warehouse according to its function, where the warehouse should be used as a storage area for crops, but farmers used the warehouse as a place to store shallot seeds.

Supply chain integration has a significant effect on performance Efforts

The results of testing the effect of the Warehouse on the Integrative Supply Chain can be seen in table 5, the research hypothesis being tested is as follows:

Table 5 shows that the path coefficient is 0.613 with a t-statistic of 10.652 and a p-value of 0.000, so the conclusion is that H3 is accepted. This shows that an increase in supply chain integration activities will have a significant effect on improving performance Efforts. Because the producers (farmers) and cooperating merchants have a good relationship for the creation of an integrated supply chain that is mutually beneficial. This means that the more enhanced integrative supply chain will improve performance Efforts (farmers). This is evidenced by several previous studies which stated that an integrated supply chain has an impact on improving performance Efforts and can help companies to invest more

resources and time. A key factor for the success of an integrative supply chain is the cooperative relationship between different partners in the supply chain, in particular, trust and relationship commitment to improving performance (Suhaiza, 2005).

Another study conducted by Setiawan (2005) states that traders decide which integrative method is the most effective in serving their suppliers and customers. By choosing the approach of suppliers and customers are expected to be more competitive and have the performance Efforts and competence better.

Increasing integration between suppliers and consumers, the performance will increase to gain the trust of suppliers and consumer loyalty. Performance measurement is needed for monitoring and controlling, communicating organizational goals to functions in the supply chain, knowing where the position of an organization is relative to competitors and the objectives to be achieved, and determining the direction of improvement to create competitive advantage.

This research is also in line with research conducted by Suhaiza (2005), which states that an integrative supply chain has an impact on performance Efforts thereby helping local buyers prepare to buy more crops. Local traders must continue to integrate their main strategies with suppliers and customers and a key factor for the success of an integrative supply chain is the cooperative relationship between different partners in the supply chain, in particular, trust and relationship commitment.

Integrative supply chains connect customers, suppliers, and other channel members by integrating relationships, activities, functions,

processes, and locations (Kim and Narasimhan, 2002), integrative supply chains are defined as the extent to which all activities in an organization and activities of suppliers, customers, and other integrated supply chain members (Flynn, et al. 2010).

CONCLUSION

The conclusion in this study is that the warehouse provides an important role in the logistics system and integrative supply chain activities as a whole. Integrative supply chain activities have an influence on improving the performance of farmers' efforts in the management of the shallot harvest. This occurs because of the relationship of trust between farmers and partners (traders) in harvest management activities. This research is used as input for farmers and partners (traders) in activities to improve horticultural resource management.

SUGGESTION

Based on the foregoing conclusions, researchers provide advice and are expected to benefit farmers and others. As for the advice given to scientist as follows:

1. For the shallots producers to increase cooperation and implement a chain of well-integrated integration between farmers, trade partners, agricultural and local government counseling because the yields from four areas as the research locations are one of the production centers for the province of East Java.

2. The next research to consider the criteria of respondents based on

minimum education (junior high school).

3. For the government to immediately build a specially constructed storage system on farmers at the research site because it had a system that would help boost the yield of the farmers.

4. The next research is expected to add other variables like information quality, information sharing, strategic supplier partnership, forecasting, and competitive advantage. The research is done on farmers and partners as the object in order to make the larger information.

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