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Vegetable Commodity Supply Chain Integration Between Productivity of Transportation, the Farm Share and Margin of Measurement for Profits at North Sulawesi

David Oscar Simatupang

Musamus University, Merauke 99600, Indonesia

Corresponding Author:
David Oscar Simatupang
simatupang@unmus.ac.id

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Abstract

The objective of this study is to analyze the effectiveness of the supply chain in Gapoktan (farmers group) organization, characteristics and transportation productivity and the margin measurement for profit and farmer share agents on the level of supply chain from sub-district Modoinding (the production central area for vegetables) South Minahasa, into city regions Manado through traditional and modern markets. The method that is used in this study is descriptive analysis for qualitative and quantitative data by dividing three kinds of vegetables namely potato, cabbage and tomato. The research areas were selected through purposive sampling, namely sub-district Modoinding and the city of Manado. The research results show that the integration of supply chain, in this case an effective partnership, occurs at the farm gate itself in a Gapoktan organization. The result also shows that Track 1 is the most efficient but Tract 2 is the most effective with the ratio of productivity for 42%, the highest margin and profit are found in large middlemen, and tomato has the highest R/C and farmer share in small merchants and traders also an intermediary.

Keywords: Integrated supply chain, productivity of transportation, profit margin and farmer share.

1. Introduction

Handling and supply chain are needed not only to prevent or reduce damage or alteration of horticulture product quality, but also increase consumption, the value and product quality of horticulture. One producer horticulture area in Indonesia is North Sulawesi with vegetable as main commodities in South Minahasa, with broad land 7.574 Ha and the volume of production 114.115 tons in 2011 (data processed BPS 2012 North Sulawesi) and commodity development horticulture in North Sulawesi is very

TABLE 1: The average consumption calories and protein per capital, the land, and the volume of production.

Years	Vegetable consumption		The Land		Vegetable
	Calori (gram)	Protein (gram)	Lad Area (Ha)	Harvested Area (Ha)	Production(Ton)
2009	49,23	3,47	7.566	7.520	149.456
2010	41,00	2,86	6.866	7.019	129.258
2011	37,41	2,58	7.574	7.589	144.115

Source: BPS data north Sulawesi 2012

conducive. But there is fluctuation, a decline in number of public consumption in North Sulawesi in the past three years. This can be seen in Table 1.

This condition is feared by many vegetable farmers/producer in the South Minahasa because it will not be able to attract competitive buyers [1] and also many agricultural land are located in relatively remote area, with a great distance from the access to the market thus to compete in the price is relatively hard [2, 3]. In results, it takes times for the vegetable to reach the market or it takes times to fulfil the availability of the products in the market. Thus, supply chain is needed to coupe these obstacles, mainly in the planning, socialization, and delivery. With the high increased availability of production and also supported by productive land availability, it should be able to increase the demand significantly in North Sulawesi especially in Manado (as an ideal market share because it has modern market and also traditional markets as an institution marketing). This will be influenced by consumer behaviour that live in the city where they need better quality vegetables and high healthy lifestyle. Based on the necessity to integrate the supply chain to ideal market areas, the characteristics of the products, and some previous studies; research in supply chain integration between the productive transportation, farmers share, and profit measurement is needed especially in North Sulawesi.

2. Methods

2.1. Research Approach

Research approach that is used in this study is descriptive approach. This study describes the vegetable supply chain activities from the farmers, middle-men, intermediate traders at South Minahasa and traders in the traditional and modern markets in Manado. The data was collected through survey.

2.2. Data Analysis Techniques

The data was collected then processed and analyzed using two methods of data analysis:

1. Qualitative analysis

   This analysis is used to provide the general overview of agricultural sector in Minahasa, mainly in analyzing the supply chain network system from farmers to the intermediaries or from farmers to end consumers in Manado through traditional or modern markets. Tables and charts are used in this method, without any hypothesis presented.

2. Quantitative analysis

   a. Farmer's share

Farmer's share is comparisons price paid by end consumers usually expressed in the percentage. Farmer's share has reversed (negative) correlation with marketing margin, thus higher margin marketing means worse farmers condition. Farmer's share is calculated as follows:

$$\text{Fsi} = \frac{Pf}{Pr} \times 100\% \tag{1}$$

In which:
Fsi = The percentage received by the farmers (%)
P_f = The Price received by farmers (Rp/kg)
P_r = The price paid by the end consumers (Rp/kg)

   b. Analysis for supply chain efficiency

Supply chain efficiency is measured by means of compare the total cost transportation, and prices based on the allocation deficient [4]. Allocation optimal is to provide funds to at least where can be controlled by using the ratio productivity.
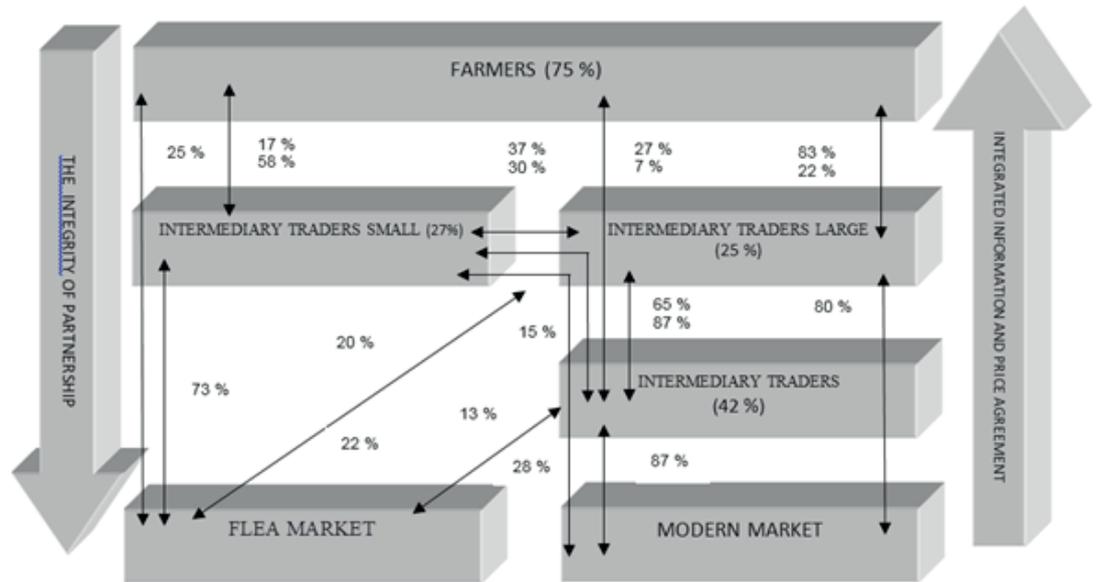
$$\text{Productivity} = \frac{\text{The measurement of output}}{\text{The measurement of input}} \tag{2}$$

To the ratio of transportation including:

$$\frac{\text{Ton- the distances sent}}{\text{the total actual cost of transportation}} \tag{3}$$

$$\frac{\text{Stop Served}}{\text{the total actual cost of transportation}} \tag{4}$$

$$\frac{\text{Shipping to the point}}{\text{the total actual cost of transportation}} \tag{5}$$

Figure 1: Structure integration supply chain from Modoinding to traditional and modern markets in Manado.

3. Result and Discussion

3.1. Supply Chain Integrity

Figure 1 is the structure of integration supply chain from Modoinding to traditional and modern markets in Manado. There are three forms of vegetables integration supply chain that are based on a percentage of partnership, information supply, and a price deal.

From Fig 1, it can be seen the integration levels of each agent. The farmers who have integration are high on one another farmers of 75% of the average integrated information and partnerships. Partnership between farmers or Gapoktan has proven to be effective in the formation of the farmers in the sub-district area Modoinding, where the average farmers overall form Gapoktan to ease in distributing or sales as well as on technology adoption, and information.

Integration at the level of market supply needs information is obtained from the market traders (modern and traditional) in the event that partnership, modern markets more to rely on the intermediate traders/an agent that has long partnership with modern market with the integration percentage is 87% so is mostly on middle-men great with the percentage of integration which is 80%, this is because the terms of the quality of the products, quantity and the continuity has been well understood by the brokers. This cannot be done by small traders, but rather to supply needs for traditional markets (the integrity percentage is 73%) that can be pervaded based on information from traders the traditional markets of whom there are and provisions the quality can be inserted or taken by traders in the traditional markets.

Figure 2: Track 1 transportation ruminant of sub-district Modoinding to the city Manado.

Figure 3: Tract 2 transportation ruminant of sub-district Modoinding to the city Manado.

For partnership are not bound by its very nature, in the sense of small and large middle-men can make the sale or become a retailer if there is excess or annulment from the traders in the traditional markets. For an agreement esteem has been determined from the traders, but to a commodity which is sold to retailer is based on an agreement that is agreed by both sides (occurring bargaining).

3.2. Transportation Characteristic and Productivity

For delivery from the region in Modoinding to Manado, traders use two different tracks. The first one is: Modoinding-Tomapaso Baru-Amurang–Manado.

The second track is: subdistrict Modoinding-Kotamobagu-subdistrict Tenga–subdistrict Tumpaan–Manado.

On the Tract 1, it has characteristic manifest risk that is having great alignment vertical and horizontal synchronization. So as to the second tract is the road that more effective in terms of reducing risk transportation to bring the commodities although the travel distance is longer for along transport routes, very influential to level for cost

Table 2: Productivity for transportation.

Track	Total cost (Rp/month)	Travelled distance (Km)	The amount of charge (Kg)	The ratio productivity
1	4,750,000	173	8500	31%
2	4,262,000	210	8500	42%
Source of data: primary data processed				

in the process commodities displacement of the sub-district Modoinding to the region Manado.

In Fig 2 and Fig 3 above, it can be seen the comparison in terms of the distance and time that Tract 1 is very efficient with an average distance is 173 km and travel time is 3.5 hours, compared to the second tract with an average travel distance is 210 km and travel time is four hours. However, in terms of productivity, Track 2 is more efficient with the ratio of the level of productivity 42% higher than the Tract 1 which is 31%. Detail information can be seen in Table 2.

3.3. The Margin Advantage Supply Chain

The results of the analysis in Table 3 shows advantage chain differences. For potatoes, the profit margin is highest at a locality supply chain large middle-men. At a cost of Rp. 580,- every kilogram, a large collector can yield a profit for every kilogram as much as Rp. 170,-. This happened because purchasing system from the large middle-men which are in contract with the farmers. So that the purchasing price from the farmers can be suppressed, coupled with other kinds of vehicles are used have of charge bigger than small middle-men. For cabbage and tomatoes, these two commodities have profit margins as much as Rp. 267 and Rp. 313.34 every kilogram sold by a large collector. It is caused by the sale of out of the region which has high price and large demand.

In the farmers supply chain, it can be seen that on the distribution of tomatoes, it has high R/C as much as 15.7. This means that tomatoes has efficient economic competitiveness better compared to potatoes (that has R/C of 2.3) and cabbage (with R/C of 0.35). In this case, counterpoise the cost of revenue better on the distribution of tomatoes. So that in urban supply chain farmers, it is more efficient to plant tomatoes and potatoes, when value the ratio equal to or >1.

3.4. Farmer Share

Farmer share in it is one of benchmark for in a chain supply, where more high levels of the percentage farmer share received by farmers and more efficient received by farmers or in other words the supply chain more efficient. From the data in Table 4 can be seen that there are farmer share highest on the distribution of potato is in the supply

TABLE 3: Analysis of the costs supply chain commodity.

No	Description	Rp/Kg (potatoes)	Rp/Kg (cabbage)	Rp/Kg (tomato)
1	The selling price farmers	2900	1250	5000
	Costs	65	54.2	43.3
	Packaging	60	50	40
	Transportation	1.0	1,0	1.0
	loading and unloading	0	0	0
	Labor	4	3	3
2	The purchase price of intermediary traders small	2900	1250	5000
	Traders sell the gatherer small charges	3600	1500	5700
	Costs	230	191.6	153.7
	Packaging	0	0	0
	Transportation	10	8.3	6.7
	loading and unloading	0	0	0
	Labor	220	183.3	147
	The margin advantage	70	58,4	546,3
3	The purchase price of large intermediary traders	3000	1250	5000
	Intermediary traders sell the large packaging costs	3750	2000	5700
	Costs	580	483	386,66
	Packaging	100	83,33	67,67
	Transportation	40	33,33	27,67
	loading and unloading	220	183,33	146,67
	Labor	220	183,33	147,67
	The margin advantage	170	267	313,34
4	the purchase price of intermediary traders	3000	1250	5000
	The selling price intermediate trades	3750	2000	5700
	Costs	626,7	522,2	417,7
	Packaging	120	100	80
	Transportation	6,7	5,5	4,4
	Loading and unloading	200	166,67	133,33
	Labor	300	250	200
	The margin advantage	123,3	227,8	282,3
5	The purchase price of traditional market traders	3750	1800	5500
	Traders sell the traditional markets	4200	2500	6500
6	The purchase price of modern market traders	4200	2500	6500
	Traders sell the modern markets	11500	7100	9000

Source of data: primary data processed

TABLE 4: Value received by producers at each level supply chain.

Channel supply chain	Types of commodities	The price received by farmers (Rp/Kg)	Price to the seller (Rp/Kg)	Percentage difference (%)
Middle-men in their small	potatoes	2900	3600	80.56%
	cabbage	1250	1733	72.13%
	tomato	5000	5500	90.91%
Middle-men large	potatoes	2900	3800	76.32%
	cabbage	1250	2000	62.50%
	tomato	5000	5700	87.72%
Intermediary traders	potatoes	2900	3600	80.56%
	cabbage	1250	2400	52.08%
	tomato	5000	6500	76.92%
Flea/Traditional Market	potatoes	2900	4200	69.05%
	cabbage	1250	2500	50.00%
	tomato	5000	6500	76.92%
Modern Market	potatoes	2900	11500	25.22%
	cabbage	1250	7100	17.61%
	tomato	5000	9000	55.56%

Source of data: primary data processed

chain intermediary traders small and also intermediate traders of 80.56 percent, which means farmers receive 80.56 percent of the price paid consumers. And for commodities vegetable cabbage, farmer share is highest in the channel intermediary traders fraction of 72.13 percent or it can be said farmers receive of 72.13 percent of the price paid by consumers intermediary traders small. And for commodities tomatoes is highest in the intermediary traders fraction of 90.91 percent, or can it also said that farmers tomatoes got the part the selling price of 90.91.

4. Conclusions

Based on the results and discussion, the conclusion that can be drawn is as follows: effectiveness of the vegetable's supply chain for the overall configuration in modern market channel is found in the large intermediary trader (with highest integration on a chain supply) and in traditional market is small intermediary trader. For the transportation on both market types, Track one is more efficient in term of the distance; but it term of productivity Track two is better. On the effectiveness in term of risk, Tract two is also better than the Tract one. In term of margin, the highest profit in the supply chain is achieved by large intermediary trader. In the farm gate, tomatoes has the highest effectiveness level with R/C of 15.7 and for the farmer share the potatoes

distribution has the highest level in the supply chain are small intermediary trader and also intermediate trader with 80.56 percent.

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