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Management and Performance Analysis of Strawberry Agribusiness Supply Chain (Case Study: Bantaeng Regency, South Sulawesi Province)

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A B S T R A C T

Strengthening the production of quality local fruit is a must, given the unmet demand of the domestic market which is still dominated by imported fruit. This is an opportunity to optimize areas that are centers of superior fruit production, one of which is Bantaeng Regency with its superior fruit, strawberries. Problems in the development of strawberry agribusiness are related to the suboptimal performance of the supply chain. The research aims to map the supply chain, and supply chain management of strawberry agribusiness; identify the driving and inhibiting factors in the strawberry agribusiness supply chain; and to analyze the performance of the strawberry agribusiness supply chain in Bantaeng Regency. The research method used a qualitative approach with the support of quantitative data. Data collection was conducted through interviews, literature studies, and observations. Data processing used the help of POMWIN software ver. 3.0. The results showed that the strawberry supply chain in Bantaeng Regency is categorized as multi-channel, the supply chain management includes traditional and partnership patterns, the main driving factors are the potential for agro-tourism development and high demand, while the inhibiting factors include difficulties in obtaining quality seeds, and supply chain institutions

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INTRODUCTION

Bantaeng Regency is one of the leading fruit commodity production centers in South Sulawesi Province. Based on data from the South Sulawesi Agriculture Office, one of the leading fruit commodities from Bantaeng Regency is strawberry. However, the development of strawberry agribusiness is not without problems. One of the problems in fruit agribusiness as well as other horticultural commodities is related to supply chain management. The supply chain is related to the flow and transformation of goods and services starting from the stage of supplying raw materials until the final product reaches the consumer.

Supply chain is a network of interdependent organizations that are directly involved in upstream and downstream flows through the development of management systems for the improvement of the delivery system of products, information, services and funds from suppliers to end users (consumers). The supply chain approach is based on; (a) the cultivation process to produce products (agricultural commodities); (b) transforming raw materials (harvest and post-harvest handling); and (c) delivering products to customers (Mentzer et. al., 2001). Quality products are one of the characteristics of competitive advantage that must be built to face the era of free competition, especially for export products in order to survive and contribute to the country's foreign exchange earnings.

Supply chain management of agricultural commodities is different from supply chain management of non-agricultural commodities, because it is related to the perishable nature of agricultural products, then the process of planting, growing and harvesting depends on the climate and season, and the crops vary in shape and size. All these factors must be considered in the design of agricultural commodity supply chain management in order to obtain a comprehensive, effective, efficient, responsive and sustainable supply chain system.

In today's competition, business actors are required to realize that the competition that occurs is competition between supply chain networks. Business actors in a supply chain must be able to deliver products in accordance with consumer desires in terms of quality, quantity, price, time and the right place, given that competitors in this abribusiness also include those from abroad who in some cases have implemented more advanced agricultural management and technology, among others marked by the still dominant imported fruit in our domestic market. With the characteristics of these agricultural products, an appropriate supply chain management must be arranged.

The explanation above illustrates that the development of strawberry agribusiness still requires a study to optimize the supply chain management of strawberries in Bantaeng Regency, therefore, it is deemed necessary to conduct further studies on the analysis of the management and performance of the strawberry fruit agribusiness supply chain in Bantaeng Regency. The objectives are to identify and analyze the factors that become drivers and inhibiting factors in the supply chain in the strawberry agribusiness in Bantaeng Regency and analyze the level of supply chain performance of strawberry agribusiness in Bantaeng Regency.

LITERATURE REVIEW

Supply Chain

As stated in the introduction, in general, the supply chain is related to the flow and transformation of goods and services starting from the stage of supplying raw materials until the final product reaches consumers. More clearly, the definition of supply chain is: "*A supply chain encompasses all activities associated with the flow and transformation of goods and services from the raw material stage to the end user (customer), as well as the associated information flows. The suuply chain also integrated group of process to source, make, and deliver product*." (Russel and Taylor, 2009: 406).

The supply chain is an integrated set of activities including the flow of information related to three aspects, namely: (1) sourcing; (2) production process, and (3) product delivery process. There are three components in the supply chain, namely:

1) The upstream supply chain includes the company's activities with suppliers, including the procurement of raw materials and auxiliary materials.
2) The internal supply chain, which includes all the processes of getting goods into warehouses that are used until the production process. Its main activities include production and inventory control.
3) The downstream supply chain includes all activities that involve delivering products to customers. The main focus of activities are distribution, warehousing, transportation and service.

Supply Chain Management

The definition of supply chain management according to Russel and Taylor (2009: 411) is as follows: supply chain management requires managing the flow of information through the supply chain in order to attain level of synchronization that will make it more responsive to customer needs while lowering cost. In the meantime Heizer and Render, (2014: 468) states that supply chain management describes the coordination of all supply chain activities, starting with raw materials and ending with a satisfied customer. Thus, a supply chain includes suppliers, manufacturers and/or service providers, and distributors, wholesalers, and/or retailerswho deliverthe products and/or service to the final customer.

Based on this definition, it can be said that supply chain management, or SCM for short, deals with the management of the flow of raw materials and services, the production process, and the delivery process along the supply chain. The goal of SCM is to integrate the flow of goods and services and information along the supply chain to maximize value to customers at a cost-efficient level.

Along with the changing times, several SCM development concepts were born, in response to the increasingly fierce competitive climate. More innovative ways are expected to help companies survive or even lead the market. These concepts include:

- Just In Time (JIT), This concept emphasizes a close partnership between a company and its suppliers, and the supplier will have a representative in the company it supplies. The representative replaces the role of the purchasing department in the buying company. On behalf of the buying company, the representative will make purchase orders to his company based on the production plan set by the buying company. This practice allows both parties to negotiate production and purchasing plans to the benefit of both parties. The

buying company will find it easier to negotiate delivery schedules because the representative can be found at his company at any time. Similarly, the representative will provide more input on his company's ability to supply the material or raw material needs of the buying company.

- Vendor Managed Inventory (VMI), is one of the variations of JIT II. This concept is widely used by suppliers who supply retail businesses. So far, it is the retailer who is obliged to make purchase orders to maintain the continuity of inventory of each item sold. In VMI, it is the supplier who is obliged to determine when and in what quantity an item should be sent to its retail, based on information on the level of sales and stock availability in the retail. In VMI, a smooth exchange of information is necessary. Suppliers will be able to make good decisions, if the information on the level of demand and the level of inventory owned by the retailer can be accessed easily.

The urgency of explaining these theories or concepts is that in studying the supply chain management of agricultural commodities, a reference is needed to map the existing conditions with the ideal framework from a theoretical point of view, compare them and provide recommendations for improving the management of the supply chain. Measuring supply chain performance is certainly related to many things, such as how product forecasting, inventory management, and so on. This will be described in more detail in the following research/study methods section.

METHODOLOGY

The research subject is the strawberry agribusiness in Bantaeng Regency while the research object is the Analysis of Supply Chain Management and Performance of Strawberry Fruit Agribusiness in Bantaeng Regency. The type of research conducted is qualitative research with the support of quantitative data. The focus and research objectives in qualitative research are a reference for selecting data sources and data collection techniques. Data collection was conducted through interviews, documentation/literature studies, and observations in Bantaeng Regency, especially in Muntea Hamlet, Bonto Lojong Village, Uluere Sub-district as the main center of strawberry fruit. The type of data collected refers to the research questions or research objectives which include: identification of driving factors and inhibiting factors in the supply chain, analysis of supply chain performance, and analysis of supply chain performance.

For the purpose of analyzing the performance of the strawberry supply chain, the method used is to measure the level of supply chain efficiency. The measurement takes into account the costs incurred for the benefit of marketing the product and the percentage of profit from each member of the supply chain. Supply chain efficiency can be described by calculating the percentage of marketing margin, profit margin, marketing cost ratio from the beginning to the end of the supply chain members. The benchmark, if the marketing margin is large, in the sense that each member of the supply chain incurs large costs and attracts large profits as well, then in general it illustrates that the supply chain is a long category with many supply chain members. The greater the margin percentage, the more inefficient the supply chain performance, as a result of which the end consumer obtains the product at a price that is relatively

expensive compared to its production cost. In general, the distribution of margins will increase towards the end of the supply chain, i.e. at the retailer position, which is logical considering that at the retailer level the risks borne are greater. The formula used in this measurement is as follows:

$$MP = \frac{HJK}{HJP} - 1\ x\ 100\%$$

$$MP_{Keselurhan} = MK_{Total} + RBP_{Total}$$

$$MP_{Keselurhan} = MP_{Distributor} + MP_{Pengecer}$$

Description:

MP = Marketing Margin

HJK = Consumer Selling Price (price at the end of the supply chain)

HJP = Producer Selling Price (price at the beginning of the supply chain)

MK = Profit Margin

RBP = Marketing Cost Ratio

Basically, the research conducted tries to combine various data both quantitative and qualitative, related to emic and ethic perspectives, and ultimately aims to obtain information that can be more trusted. More concretely, it is described as follows:

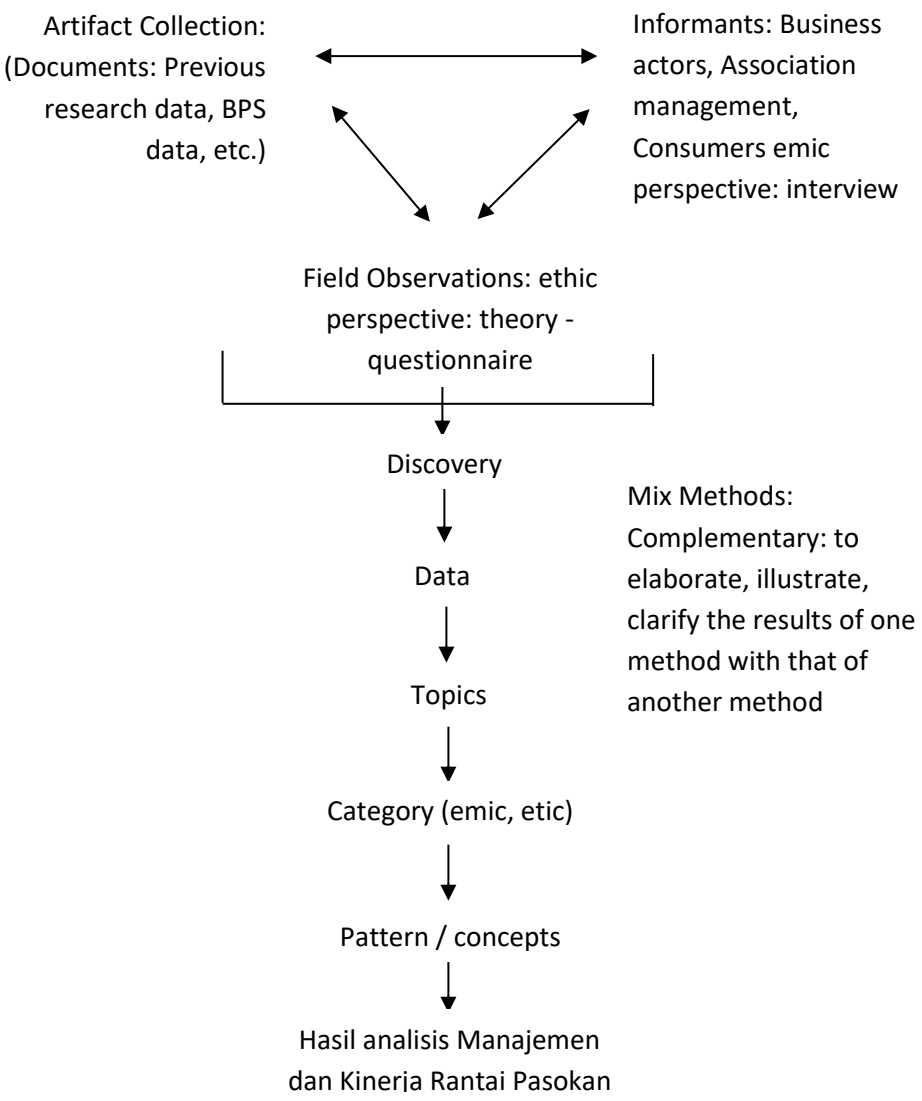

Figure 1. Triangulation for Logical Pattern
(McMillan & Schumacher, 2001: 478)

RESULTS AND DISCUSSION

Strawberry Supply Chain in Bantaeng Regency

The actors in the production centers are farmers, dealers, farmer groups, and processed industries. While suppliers are mostly outside the production centers, although some are in the production centers, the number is very small. The final markets for strawberries from this region are Bantaeng, Makassar and surrounding areas, as well as outside South Sulawesi.

Based on Figure 1, it can be seen that the strawberry marketing chain in the area is quite long. If farmers only sell strawberries with the abresan system, they will not get high added value. High added value can be enjoyed by actors who carry out advanced processing such as sorting and grading or post-harvest processing. This is because the price of strawberries that have been sorted and graded is much higher than the price of abresan.

As for the Strawberry Supply Chain in Muntea Hamlet, Bonto Lojong Village, Uluere Sub-district, the majority of strawberry farmers in this area sell their crops to suppliers and retailers. Strawberry sales from farmers are usually grade A, grade B and grade C strawberries, sorted by suppliers to be sold to supermarkets, while for retail traders strawberries of poor quality that do not go to suppliers.

Suppliers and retailers in Uluere Sub-district are individual entrepreneurs engaged in the packaging of vegetables and fruits. The following presents the strawberry supply chain in Muntea Hamlet, Bonto Lojong Village, Uluere Sub-district, Bantaeng Regency.

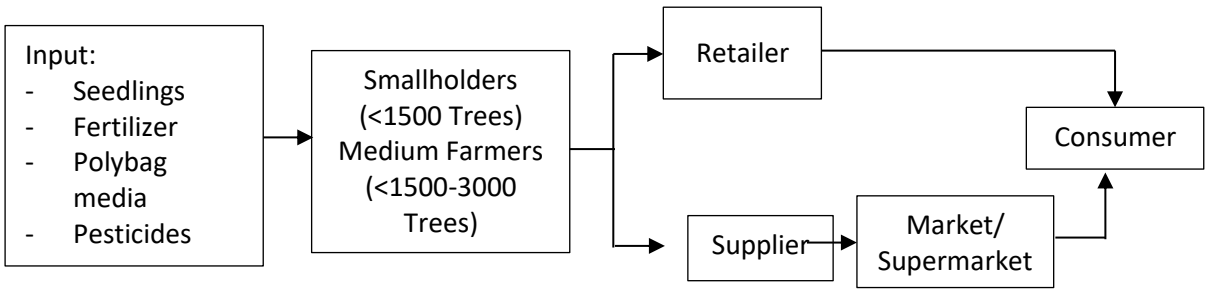

Figure 2. Strawberry Supply Chain in Uluere Sub-district, Bantaeng Regency

The actors in the production centers are farmers, retailers and suppliers. In addition to suppliers and retail traders there are also retail buyers who are visiting the area of Muntea Hamlet, Bonto Lojong Village, Uluere Subdistrict, often they visit strawberry gardens and pick them themselves. The final market for strawberries from Muntea Hamlet, Bonto Lojong Village, Uluere Sub-district is Makassar and surrounding areas. The supply chain of strawberries in Muntea Hamlet, Bonto Lojong Village, Uluere Sub-district is quite long. Similarly, if farmers only sell strawberries with the abresan system, they will not get high added value. High added value can be enjoyed by actors who carry out advanced processing such as sorting and grading or post-harvest processing. This is because strawberries that have been sorted and graded have a much higher price than the abresan price.

The Uluere Sub-district area itself has many tourist attractions, making it easier for retailers to sell strawberries at these tourist attractions, besides that retail traders are also very helpful to farmers and companies because goods that do not enter orders can be sold directly at retail, because retail traders do not sell super quality strawberries. In addition to many retail traders, there are also many strawberry plantations that are opened specifically for tourists who are visiting Muntea Hamlet, Bonto Lojong Village, Uluere Subdistrict, so this tourist spot makes strawberry gardens for tourist purposes, there tourists can pick their own ripe strawberries and tourists can also enjoy food dishes made from strawberries. With the existence of such agro-tourism, it provides positive value for the Bantaeng area itself because the area can be easily recognized by outside tourists to continue visiting the lembang area. When they visit the lembang area they have the aim of traveling to the strawberry farm. Therefore, strawberry farmers must continue to improve the quality of the strawberries they grow. Planning for the development of strawberry seed cultivation in Bonto Lojong Village, Uluere Sub-district is carried out by the process of developing seeds by the farmers independently, for strawberries themselves there is no development of cultivation in farmer groups, farmers stand alone from seed development, nurseries, planting to the harvest process. After this harvesting process, farmers hand it over to suppliers.

The strawberries are produced using superior seeds so that the fruit is large with a sweet taste and a variety of shapes. Another uniqueness is that this strawberry cultivation uses two systems, namely hydroponics in a green house and organically in an open garden, which is a distinct advantage for farmers. These advantages must be maintained to maintain consumer confidence, but farmers should continue to evaluate and develop products continuously in the future. So that the products produced by farmers will continue to improve the quality of their products. To continue to increase the yield of these products, farmers must be willing to continue learning about strawberry cultivation because the farmers of Bonto Lojong Village, Uluere Subdistrict still do not really understand the ways of cultivating strawberries unlike cultivating other vegetable crops.

Suppliers get their strawberries from farmers who are called partners. These farmer-partners grow strawberries individually or independently. They plant strawberries with superior seeds so that the fruit they produce is of good quality. After the harvesting process, these partners hand over the harvested fruit to the supplier and then sort and distinguish between A, B, C and BS strawberries. The A, B and C strawberries are sent to Jakarta supermarkets while the BS strawberries are sold back to the BS dealer and then sold by retailers in tourist attractions in Bantaeng.

Drivers and Barriers in the Strawberry Supply Chain

From the results of observations, interviews, and documentation studies, several factors that are drivers in the strawberry supply chain in Muntea Hamlet, Bonto Lojong Village, Uluere Sub-district, among others, are related to:

- Potential development of strawberries as agro-tourism

The potential for strawberry development as agro-tourism is supported by the existence of large tracts of land, most of which are scattered in Bonto Lojong Village,

Uluere Sub-district. Similarly, the growing popularity of pick-your-own strawberry agro-tourism is also a driving factor for strawberry agribusiness.

- Flexible cropping pattern

The flexible planting pattern of strawberries is related to the characteristics of strawberries that can be planted at any time, of course with suitable geographical conditions. This situation is utilized by strawberry farmers with a planting pattern called sekar interval, meaning that when the strawberry tree is already in the productive phase almost every certain interval, strawberries can be harvested. The advantage is of course that farmers will continuously earn income.

- High demand for strawberries

Another driving factor for strawberry agribusiness is the high demand for strawberries, especially the domestic demand for strawberries, which until now has not been met.

- Processed strawberry products

The development of industries that process strawberries into food or drinks, especially in Bonto Lojong Village, Uluere Sub-district, is currently one of the other driving factors. Strawberries are a perishable commodity but have the potential to be used as raw material for processed foods and beverages. Low grade strawberries are usually used for raw materials for the processing industry such as used for making jam (jam), juice, syrup, dodol, chili sauce and other types of food and beverages.

Meanwhile, some factors that are obstacles in the strawberry supply chain in Muntea Hamlet, Bonto Lojong Village, Uluere Sub-district, among others, are related to:

- Costs, marketing, and supply chain institutions

From interviews with farmers and suppliers in Bonto Lojong Village, Uluere Sub-district, one of the factors that hinder the marketing of strawberries is cost, marketing, and supply chain institutions. The cost factor is of course related to many other factors, but the cost is mainly related to the interest in marketing strawberries to large supermarkets, considering that some supermarkets apply a contract system, where new payments are made within a period of 2 weeks to one month after delivery, this will make operational funds held for a long time, meaning that farmers and suppliers on a small scale will have great difficulty following such a system, unless there is a forum that houses these farmers who can carry out coordination functions including accommodating the interests of farmers and suppliers who have limited funds. Actually, an institution that houses strawberry farmers already exists, in the form of an association that de jure functions as mentioned earlier, but from the latest conditions it can be said that the association does not function optimally, in the sense that only a small portion of them have access to business development facilitated by the association.

- Seedlings

Another factor that hinders the development of strawberry agribusiness is the availability of quality seedlings. Currently, farmers in the Uluere Sub-district area have great difficulty in obtaining quality seedlings. This is because there are no proven producers of strawberry seedlings in Indonesia. The use of imported seedlings to restore quality encounters obstacles in procurement and also in terms of cost. The

strawberry seedlings used today are the result of the decline of previous seedlings, so their productivity has greatly decreased. In addition, the resistance of the current seedlings is very weak against pests and weather. This can be seen from the significant difference in productivity between the rainy and dry seasons. One solution to the seedling problem is to use imported seedlings, but first trials must be conducted, because until now there has been no evidence that imported seedlings produce better results than local seedlings, if cultivated in Muntea Hamlet, Bonto Lojong Village, Uluere District. Therefore, a field seedling laboratory managed by the government, in this case the local Agriculture Office, in collaboration with experts or universities and by involving farmer groups, is needed.

- Post-harvest processing

Post-harvest processing is also a factor that can be an obstacle in the development of strawberry farming in Muntea Hamlet, Bonto Lojong Village, Uluere Sub-district, especially the human element which is the main obstacle during the implementation of fruit handling during harvest. Lack of experience in the accuracy of picking fruit that requires only touching the top of the fruit and the use of gloves during harvesting, making labor must make better preparations and accuracy than the usual harvesting method that does not require these two things. Good post-harvest handling is still lacking among farmers. This is because most of the sales are done with the abresan system, so farmers do not pay much attention to the quality of the results. In the abresan system, farmers sell strawberries without first sorting and grading them. All strawberries consisting of various quality classes are sold by farmers at one price.

- Climate change

The most direct consequence of climate change is a reduction in production yields. As stated in previous research conducted by Tommy Perdana, et al (2010), climate factors are exogenous factors that cannot be changed by humans. Although it cannot be changed, it can still be engineered to be anticipated through technology. Climatic factors that cause a decrease in strawberry production are high rainfall in a long period of time accompanied by low sunlight intensity. The lack of sunlight causes slow fruit ripening due to lack of energy in the photosynthesis process. In the process of slow fruit ripening, the raindrops that fall on the fruit cause the fruit to rot quickly, so most of the fruit will rot before reaching maturity. To overcome these problems, one of the technologies that can be used is shade technology. The use of shade is expected to prevent raindrops from falling directly on the fruit, thus maintaining stable strawberry productivity even during the rainy season..

- Strawberry supply continuity

An obstacle in marketing strawberry products to penetrate modern retail markets is the continuity of strawberry supply with stable quality and quantity in each shipment. This is a serious problem because the volume of product availability cannot be guaranteed because the majority of farmers in the Uluere Sub-district area still manage their gardens traditionally. Moreover, given that the characteristics of strawberries are perishable/rotten, and the yields vary both in flavor and shape.

- Implementation of strawberry cultivation SOPs

Another inhibiting factor is the non-implementation of the strawberry cultivation SOP by most farmers. This condition is due to the lack of socialization of the SOPs that

have been prepared by the Agriculture Office to farmers. Therefore, it is necessary to socialize the SOP through continuous assistance through farmer groups, so that it is more effective and efficient.

Analysis of Strawberry Supply Chain Performance

Based on observational data, this study attempts to analyze supply chain performance by measuring the level of supply chain efficiency. The measurement takes into account the costs incurred for marketing purposes and the percentage of profit from the beginning to the end of the supply chain, or in other words from farmers to consumers. The margins studied relate to profit margins, marketing costs, and marketing margins. The observation data used is obtained from the location in Muntea Hamlet, Bonto Lojong Village, Uluere Subdistrict, the data on the price of strawberry products used is the average price of strawberries per kilogram.

Table 1. The Recapitulation of The Calculation

	Profit Margin (PM)	**Marketing Expense Ratio (MER)**	**Marketing Margin (MM)**
Distributor	2500/10000 = 0,25	2500/10000 = 0,25	0,50
Retailer	26250/10000 = 2,625	8750/10000 = 0,875	3,50
Total	2,875	1,125	4,00

Based on the recapitulation of the calculation results, it can be seen that the overall marketing margin of 400% is very large, meaning that the marketing profits and costs received and paid by marketing institutions are relatively large as well.

This indicates that the strawberry marketing chain is saturated, in the sense that the margin is too large, although the portion is greater for retailers, because they bear a greater risk if the product does not sell, while for farmers, the margin is indeed small compared to retailers, however, in terms of quantity, it is quite large because accumulatively farmers sell strawberries to the next marketing chain which is quite a lot. The benefits for farmers will vary depending on the network they develop, as explained earlier. The network in question can be illustrated from the picture previously described.

Thus it can be said that the overall supply chain of strawberry products in Uluere Subdistrict, Bantaeng Regency is inefficient, given the too large margins between members of the supply chain to consumers, although when viewed from the following supply chain network scheme, the marketing path of strawberry products is categorized as multi-channel or in other words, farmers can sell directly to end consumers, given that strawberries are part of tourism products in Bantaeng Regency. So that the acquisition of margins for the supply chain will be relative depending on the channel used in marketing strawberry products.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of research that has been conducted by conducting observations, interviews, documentation/literature studies, and data processing, the following conclusions can be obtained.

1. Strawberry supply chain management in Bantaeng Regency, on the one hand, is still categorized as traditional, where the majority of farmers (small and medium) sell directly to collecting traders without sorting and grading, known as the abres system. The sorting and grading process is carried out by, among others, intermediary traders, suppliers. Meanwhile, on the other hand, strawberry supply chain management also has a partnership pattern, where there are cooperation contracts, usually occurring at the supplier (middle man) level with supermarkets, restaurants, hotels, as well as with large traders in market destinations..
2. There are several driving factors in developing strawberry agribusiness in Bantaeng Regency, including the potential for strawberry development as agro-tourism, flexible cropping patterns, high demand for strawberries, and the development of strawberry processing industries. Meanwhile, the inhibiting factors in developing strawberry agribusiness in Bantaeng Regency are related to the issues of; cost, marketing, and supply chain institutions, difficulty in obtaining quality seedlings, planting media that has the best composition, post-harvest processing, climate change, continuity of strawberry supply, and suboptimal implementation of strawberry cultivation SOPs.
3. From the results of the supply chain performance analysis, it can be seen that the strawberry supply chain in Bantaeng Regency is in the inefficient category, as seen from the very large overall margin, meaning that each member of the supply chain incurs large costs and attracts large profits as well, so in general this illustrates that the supply chain is a long category with many supply chain members. The larger the margin percentage, the more inefficient the supply chain performance, as a result of which end consumers obtain products at relatively high prices compared to their production costs.

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