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# Process and Performance of the Chicken Egg Supply Chain at CV Anugerah Akmas Bone Bolango Regency

**Nurul Fadly[1], Ria Indriani[2*], Irwan Bempah[3]**

[1]Master of Agribusiness Study Program, Posgraduate Program, Gorontalo State University, Gorontalo
[2,3]Agribusiness Study Program, Agribusiness Depatement, Agriculture Faculty, Gorontalo State University, Gorontalo

[2*]Corresponding Author: ria.indriani@ung.ac.id

**Abstract**

*The main problem lies in the composition between the increasing demand for purebred chicken eggs while production capacity is stagnant. This study aims to look at the supply chain process, supply chain mechanisms and the performance of the supply chain for broiler eggs. The research is a case study using supply chain operation reference (SCOR) analysis. The results of the analysis show that the supply chain process starts from planning how much to produce, where to supply DOC, how much costs will be incurred in the cultivation process, where the chicken eggs will be distributed, and returning eggs if there are damaged ones. The performance of the chicken egg supply chain at CV Anugerah Akmas is very good, it just needs monitoring to maintain performance.*

**Keywords: Supply Chain, Chicken Egg, Supply Chain Operation Reference**

## INTRODUCTION

Agribusiness is a system of a series of businesses ranging from procurement of agricultural production facilities, farming, post-harvest handling, sorting, storage and packaging of agricultural products, the agricultural product processing industry and various businesses delivering agricultural-based products to consumers, as well as a number of other supporting activities. Conceptually, agribusiness is a system consisting of subsystems that play a role and are related to each other, as follows: 1) Upstream



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agribusiness subsystem, 2) Primary agriculture subsystem (on farm), 3) Downstream agribusiness subsystem, 4) Product marketing subsystem. The four subsystems are supported by supporting subsystems as supporting services

This explanation aligns with the supply chain management idea. The synchronization and coordination of operations pertaining to the movement of goods or raw materials, both inside and between businesses, is essentially the foundation of supply chain management. Suppliers, manufacturers, distribution hubs, wholesalers, and retailers are the "channels" that make up a basic supply chain and all contribute to the end result. Several manufacturing sectors may be involved in a supply chain, ranging from upstream to downstream (Puryantoro et al., 2019)

Among the agricultural sector, the livestock sub-sector is one of the important subsectors that are widely carried out by businesses in agriculture (Lihawa et al., 2024) The need for animal food, especially eggs at the household level, will continue to increase along with increasing understanding of nutrition and increasing income. Eggs are one of the commodities that contribute to nutritional needs for the community derived from animal protein other than meat. Currently, various forms of business continue to be developed in the field of layer agribusiness to meet market needs.

This is also inseparable from the increasingly complex and diverse demands and desires of consumers (Is, 2019) There are various small and medium enterprises managed by the community in the livestock subsector that can be a source of livelihood, including layer farming.

Demand for eggs will always increase every year because besides being easy to get, the price is also affordable. In the production of broiler eggs, the total production of broiler eggs in Gorontalo Province in 2022 was 2164.63 tons and the population of laying hens was 147,226 (Badan Pusat Statistik Indonesia, 2022). CV Anugerah Akmas is one of the farming businesses located in Bone Bolango Regency. This business has been operating since 2019 with a current number of 3,312 laying hens with the ability to produce eggs reaching approximately 2,820 eggs per day (85%)

The main problem lies in the composition between the increasing demand for eggs while the production capacity is stagnant. This imbalance will certainly disrupt the process and performance of the chicken egg supply chain. This is in line with the statement (Supu, 2013; Suudi & S, 2021; Talumewo et al., 2014) that the amount of raw material supply will affect production. Therefore, an academic approach is needed in order to see how the chain process and supply chain performance are in what position.


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## METHODS

In this research, a case study type of research is used. According to Creswell (2007) in Wahyuningsih (2013) defines as research to explore a case in detail within a certain period of time and data collection in detail and detail. The data used in this research is primary data obtained directly from the interview process. This research uses Supply Chain Operation Reference analysis. The SCOR model application identifies indicators of supply chain performance assessment by describing the company's supply chain flow which can be used as a reference in improving and increasing performance (Prayogo et al., 2018). The SCOR supply chain has attributes including reliability, responsibility, agility, asset management, and cost. After calculating the value of each supply chain performance indicator, the next step is to compare the results of the actual data calculation with the superior food SCOR Card value as a benchmark (Bolstorff & Rosenbaum, 2007) which has been authorized by the Supply Chain Council. There are three Benchmark classifications namely parity, advantages and superior which can be seen in table 1 below.

**Table 1. Supply Chain Performance Benchmarking Criteria**

| **Atribute of SCM** | ***Bencmarkig* Performance Indicator** | | | |
|---|---|---|---|---|
| | | ***Parity*** | ***Advantage*** | ***Superior*** |
| **External Performace** | | | | |
| *Reliability* | Delivery Performance (%) | 85% | 90% | 95% |
| | Order Fulfillmentm(%) | 85% | 90% | 95% |
| *Responsibility* | Order Fulfillment Cycle (day) | 13 day - 15 day | 9 day - 12 day | ≤ 8 day |
| | *Lead Time* (day) | 25 day | 20 day | 15 day |
| *Agility* | Supply Chain Flexibility (day) | 42 day – 27 day | 26 day – 11 day | ≤ 10 day |
| **Internal Performance** | | | | |
| *Asset* | *Cash to Cash* (day) | 45 day – 34 day | 33 day – 21 day | ≤ 20 day |
| | Daily Inventory (day) | 27 day – 14 day | 13 day – 0.01 day | = 0.00 |



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| | | | | |
|---|---|---|---|---|
| *Cost* | *Total Supply Chain Management Cost* (%) | 13%-19% | 8%-4% | ≤ 3% |

Source: (Bolstorff & Rosenbaum, 2007; Marimin & Maghfiroh, 2010)

Table 1 is a benchmark or data that is used as a benchmark that aims to see whether the performance of a company as measured by supply chain operation reference (SCOR) is included in the parity, advantage, or superior category.

## RESULT & DISCUSSION

### Chicken Egg Supply Chain Process

#### Plan

Planning is an early stage in a supply chain process. In this process, CV Anugrah Akmas will conduct simple forecasting related to how many production targets and market fulfillment it wants to achieve in the current year. The forecasting process is done simply by considering the ability of the cage to accommodate DOC (Day Old Chick), the price of eggs in the market, where it will be marketed, and estimated consumer demand. This process is done independently without involving a planning expert. Based on the results of the forecasting, it was formulated that the target production of chicken eggs to be achieved in a month is 3,300 tubs or the equivalent of 99,000 eggs.

#### Source

Procurement is an activity that aims to provide primary materials which in this study are day old chick ordered from PT Sreeya Sewu Indonesia located in Wonoayu District, Sidoarjo Regency, East Java Province. The DOC ordering process is carried out once a year with a volume of 1,500 per one shipment. The order process takes 1 week for the DOC to arrive at the cage. However, there is usually a reduction in the number of DOC due to death, so PT Sreeya Sewu Indonesia exceeds the order to 1,510. The DOC delivery process is carried out by air using an airplane and continued with delivery to the CV Anugerah Akmas cage using a pick-up car. The total cost incurred for the procurement of DOC chickens amounted to IDR 17,250,000 with distribution costs borne by PT Sreeya Sewu Indonesia.


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**Make**

The production stage is the stage of raising docs into chickens that are ready to produce eggs. It takes approximately 4 to 5 months (18-21 weeks) until the chicken can produce its first egg even though it has not been able to produce quality according to consumer demand. In the production process CV Anugerah Akmas incurs costs in one month of 18,000,000 for feed and so on while for chickens that have produced eggs (adult chickens) the cost of maintenance rations consisting of corn, cost concentrate feed and rice bran is IDR 55,250,000 and for medicines, vaccinations IDR 1,500,000

**Deliver**

The delivery process for consumers, either collectors or retailers, is done via land. The ordering process is usually carried out through social media using electronic media (cellphones), after which the distribution process will be carried out with the distribution costs borne by the cage, or consumers can also come directly to the cage to buy the eggs with a note that the CV does not incur shipping costs. However, what happens most often is that both collectors, retailers and consumers come directly to the cage.

**Return**

Returns are the end of a chicken egg supply chain process, namely when there is damage either broken or rotten eggs. The return process is carried out by consumers providing information in the form of photos to the CV, then the CV will replace the eggs with new ones. All return costs are borne by the CV. This aims to increase customer satisfaction and can make consumers loyal to CV Anugerah Akmas

**Supply Chain Operation Reference (SCOR) Analysis**

The performance of the chicken egg supply chain is carried out using the Supply Chain Operation Reference (SCOR) analysis which aims to see how CV Anugerah Akmas is performing in managing the chicken egg supply chain. SCOR analysis uses 5 attributes consisting of reliability, responsibility, agility, cost and asset management. Each of these attributes has 1 to 2 metrics or measures. For more details can be seen in the following table.


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**Table 2. Chicken Egg Supply Chain Performance Attributes**

| No | Atributtes | Indicator | Actual Data |
|---|---|---|---|
| 1. | Reliability | Perfect Order Fulfillment | 100% |
| | | Delivery Performace | 100% |
| 2. | Responsibility | Order Fulfillment Cycle | 8 day |
| | | *Lead time* | 8 day |
| 3. | Ketangkasan | Volume Flexibility | 9 hari |
| 4. | Biaya | Total Cost | 1,95% |
| 5. | Manajemen asset | *Cash to cash Cycle* | 7 day |
| | | Daily Inventory | 1 day |

Source: Primary data after processing, 2024

Table 2 explains the measurement of chicken egg supply chain performance as measured by 5 attributes and 8 assessment indicators. The reliability attribute explains that CV Anugerah Akmas can produce chicken eggs and distribute them to collecting traders and retailers as well as consumers because the actual data of the perfect order fulfillment indicator and delivery performance is 100%. This means that CV Anugerah Akmas is able to meet market demand for chicken egg products perfectly both in terms of product quantity and timeliness.

Furthermore, the responsibility attribute is the ability of Cv Anugerah Akmas in carrying out the chicken egg production process to fulfill consumer orders with the assessment indicators being the order fulfillment cycle and lead time. The actual data for both responsibility indicators is 8 days. This means that in one year the supplier, PT Sreeya Sewu Indonesia, supplies day old chick continuously every 1 year to Cv Anugerah Akmas with a waiting time from the initial order of 7 days plus the distribution time of approximately 1 day of the maintenance process until it becomes a chicken that can produce good quality eggs and is marketed. The lead time calculation explains the time required by Cv Anugerah Akmas in fulfilling orders, which is calculated from the fulfillment of raw materials, namely 7 days plus a 1-day distribution process.

Next is the agility attribute, in the supply chain performance of chicken eggs agility is measured by flexibility as an assessment indicator that describes the average time required by Cv Anugerah Akmas in overcoming possible spikes and decreases in demand for eggs. The actual data shows that it takes 9 days to overcome this, meaning that if


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there is a surge in demand such as on holidays, consumers must wait 9 days for the product to be received.

The lead time and flexibility indicators and the order fulfillment cycle are interrelated with each other. Where consumers are required to wait approximately 9 days for orders to reach consumers. However, this can be overcome due to the availability of chicken egg stock as measured by the daily inventory indicator. Daily inventory is an indicator of asset management in measuring supply chain performance which defines the number of chicken eggs that are able to meet consumer needs when there is a delay in the fulfillment of egg stock and a surge in egg demand. The actual data of this indicator shows that the daily inventory of eggs is able to last for 1 day. In addition to daily inventory, the cash to cash cycle is an asset management indicator that describes the average payment time of collectors and retailers and consumers to Cv Anugerah Akmas. Actual data shows that this cycle occurs once every 7 days. This means that Cv Anugerah Akmas will pay for the purchase of raw materials as well as receive payments from collectors and retailers every 7 days. This number of days is obtained from the average time of Cv Anugerah Akmas payments from collectors, retailers and consumers.

In the chicken egg supply chain process, the cost of running the process is called the total supply chain management cost (TSCMC). The total cost incurred to run the supply chain process is Actual data shows that the cost incurred by Cv Anugerah Akmas in running the chicken egg supply chain process is 1.95% in one production process. This cost is obtained from the summation of 5 supply chain processes, namely plan, source, make, deliver, return and divided by weekly revenue multiplied by 100%. The results of this study are in line with the research of Suud et al (2021)which uses perfect order fulfillment, delivery performance, lead time, order fulfillment cycle, flexibility, daily inventory, cash to cash cycle and total cost as indicators of supply chain performance assessment. Meanwhile, in Sembiring's research (2018) there are several different assessment indicators from this study, namely upper adaptability, lower adaptability, overall risk value, return on fixed assets and return on fixed capital.

After obtaining actual data on the performance of the chicken egg supply chain at Cv Anugerah Akmas, a comparison will then be made between the actual data and the benchmark data that has been authorized by the supply chain council. One determination of company performance can be seen from benchmarking data divided into 3 elements, namely parity, advantage and superior. The comparison between actual data and benchmarking data can be seen in Table 3.


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**Tabel 3. Comparison of Performance Attributes and SCOR Benchmarking**

| Atribute of SCM | Performance Indicator | Actual Data | *Parity* | *Bencmarkig Advantage* | *Superior* |
|---|---|---|---|---|---|
| **External Performance** | | | | | |
| *Reliability* | Delivery Performance (%) | 100% | 85% | 90% | 95% |
| | Order Fulfillment (%) | 100% | 85% | 90% | 95% |
| *Responsibility* | Order Fulfillment Cycle (day) | 8 day | 13 day -15 day | 9 day - 12 day | ≤ 8 day |
| | *Lead Time* (day) | 8 day | 25 day | 20 day | 15 day |
| *Agility* | Volume Flexibility (hari) | 9 day | 42 day – 27 day | 26 day – 11 day | ≤ 10 day |
| **Internal Performance** | | | | | |
| *Asset* | *Cash to Cash* (day) | 7 day | 45 day – 34 day | 33 day – 21 day | ≤ 20 day |
| | Daily Inventory (day) | 1 day | 27 day – 14 day | 13 day – 0.01 day | = 0.00 |
| *Cost* | *Total Supply Chain Management Cost* (%) | 1,76% | 13%- 19% | 8% - 4% | ≤ 3% |

Source: Primary data after processing, 2024

Table 3 shows that the reliability attribute has an indicator value of 100% each on perfect order fulfillment and delivery performance, which means that the company's performance is in a superior position. This is in accordance with the statement of Yolandika et al (2016) that performance achievement is getting better if it is getting closer to 100% and the achievement of delivery performance is already in a position of perfection when it reaches 100%.

Using order fulfillment cycles and lead time indicators, the responsibility attribute is used to evaluate the success of the business. The lead time is the amount of time needed to complete egg orders, from the completion of manufacturing procedures to distribution, while the order fulfillment cycle is the amount of time needed to complete


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customer orders, beginning with the delivery of raw materials to customers. The results of the performance calculation produced real data of 8 days each, which when compared to the benchmark, the order fulfillment cycle indicator is in the higher group. The supply chain performs better when the order cycle is shorter (Prayogo et al., 2018; Yolandika et al., 2016) and the lead time indicator is in the superior category. It is difficult to ascertain the various factors that affect order lead times. Fluctuations in the number of raw material shipments are one of the factors that influence the calculation of lead time (Apriyani et al., 2018) but this can be resolved because PT Sreeya Sewu Indonesia always sends DOC in excess of the number of orders to overcome the dead docs in the distribution process.

The agility attribute in measuring supply chain performance using the volume flexibility indicator is the time required by the company if at any time there is a change in orders that must be fulfilled. The actual data shows a value of 9 days which is smaller than 10 days, meaning that the company's agility is in a profitable position. This is in accordance with the opinion of Bai and Sarkis (2013), the circumstances and capabilities of the system affect the size of the flexibility value in an effort to achieve the target.

In the asset management attribute, the cash to cash cycle shows the company's ability to convert product inventory into cash which has reached its best performance because it has a value of 7 days. The better the achievement of supply chain performance, the faster the time used in converting inventory (Pujawan & Mahendrawati, 2017). The company's daily inventory performance is 1 day, which is in a profitable position because the stock of chicken eggs is always available in the cage.

Finally, the supply chain cost attribute. This cost is the amount of money spent by Cv to carry out supply chain activities based on the supply chain process, namely plan, source, make, deliver, return. This supply chain cost is measured by percentage because it is the difference between the costs incurred and the revenue. The actual data on supply chain costs for chicken eggs is 1.76%. This amount falls into the superior category. This is very possible due to the high consumption of chicken eggs which causes a large demand for chicken eggs.

From the results of the analysis of the performance of the chicken egg supply chain using the SCOR model which is then compared with the database (benchmark), it is clear that the performance of the chicken egg supply chain is very good, this is supported by attributes and performance metrics in the superior category, improvement is not needed,


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only monitoring and performance evaluation need to be carried out to maintain the performance of the supply chain.

## CONCLUSION

Based on the discussion above, it can be concluded that: 1) The chicken egg supply chain process starts from planning how many DOC and eggs will be produced, where the DOC will be supplied from, how much money will be spent on the cultivation process, where the chicken eggs will be sold and how to return the chicken eggs if they are damaged. 2) The supply chain performance of chicken eggs at CV Anugerah Akmas has reached its best position, this can be seen in the attributes of reliability, responsibility, agility, asset management and cost reaching the superior category.

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