

BLOCKCHAIN-BASED RICE COMMODITY SUPPLY CHAIN STRATEGY IN PALOLO DISTRICT, SIGI REGENCY, CENTRAL SULAWESI PROVINCE

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Abstract

Blockchain can be defined as a distributed ledger that tracks every activity in the block chain, where each record of that activity is a validated activity. The application of blockchain in the supply chain is able to streamline the supply chain network, build trust between stakeholders and strengthen the supply chain. Palolo District has not yet implemented Blockchain technology, so it is necessary to implement a Blockchain system model design in the rice commodity supply chain in Palolo District so that actors in the supply flow can get information about the entire rice supply chain flow. This study aims to find out the form of the rice commodity supply chain in agribusiness activities and to find out the strategy for the application of Blockchain in the rice commodity agribusiness supply chain in Palolo District, Sigi Regency, Central Sulawesi Province. The data analysis used was a descriptive analysis of the supply chain and a SWOT analysis. The results show that the form of a Blockchain-based supply chain is a system that offers accurate and transparent information. The information provided is in the form of quantity, quality, delivery and prices upstream and downstream. The results of the SWOT analysis provide a situation to create a strategy that minimizes weaknesses to take advantage of opportunities in the application of Blockchain technology in the rice commodity supply chain with the following strategies; Improving the quality of internet connections to support the community in terms of the process of obtaining information, utilizing technological developments to promote or publish information on rice and its marketing seeing the great potential for consumption and the breadth of the market, socializing about blockchain as a source of information for business actors.

Keywords : Strategy, Supply Chain, Rice Commodities, Blockchain

1. Introduction

Rice commodity is one of the leading and potential commodities in Palolo District, Sigi Regency, Central Sulawesi Province. Rice commodities have been cultivated and



cultivated by farmers and its spread is almost throughout the Sigi regency area. The vast area of rice commodity distribution creates obstacles in the supply chain system to reach or reach the market to consumers.

Rice trading business actors in Palolo District, both farmers as producers and distributors of rice, and other institutions that play a role in rice marketing do not get information about the prices set by the government, and there are also still many farmers who are tied to middlemen so that they sell their products at prices set by the middlemen themselves. Then there are fluctuations in rice prices and there is a fairly high price difference from producers to consumers. The price of rice in Palolo District for now paid by consumers is Rp. 13,000/kg while the price received by farmers is Rp. 9,800 – Rp.11,000/kg. Seeing the price difference between the amount of price paid by consumers and the amount received by farmers is due to the involvement of institutions involved in the process of incurring costs and taking profits in marketing. The amount of costs incurred will affect the price of rice marketed, the longer the marketing channel, the higher the price obtained by the final consumer.

The distribution of agricultural goods from producers to consumers there are traders who help the distribution process, so that the selling price in the market changes from the price given by the farmer to the price given by the trader in the market or there is an increase in price (Christoporus and Sulaeman, 2009). It is recognized that efforts to create the welfare of farmers, especially rice farmers, will not succeed if it is only done partially, but comprehensive, transparent, mutual trust and mutual cooperation is needed between facilitators, farmers, consumers and all other elements of agribusiness actors. Along with the ever-increasing consumer demand, it demands a supply chain business system and marketing of agricultural and business products that is able to improve efficiency and service by using a new approach. (Emhar, et al., 2014).

Wahyu (2021) stated that in the 4.0 revolution period, technology-based supply chains have the goal of directing consumers to be closer to producers and agricultural companies. To face the industrial revolution 4.0 period, it is necessary to revitalize and adjust business processes along the agro-industrial supply chain from upstream to downstream. Intelligent systems that were created in the industrial period 4.0 can form a system in supply chain management to streamline and streamline the flow. Bogart (2015) stated that the intelligent system produced from technology in the 4.0 period is Blockchain.

Blockchain can be defined as a distributed ledger that tracks all activities in the blockchain, where each record of such activity is a validated activity. In addition, through the application of blockchain to the supply chain, it can streamline the supply chain network, build trust between stakeholders, and strengthen the supply chain (Iswari & Arkeman, 2019).

Palolo District has not currently implemented Blockchain technology, so the researcher considers it necessary to implement a Blockchain model design in the rice commodity supply chain in Palolo District so that actors in the supply flow can get information about all rice supply chain flows. Based on the background and problems that have been stated above, the objectives of the research are

1. Knowing the form of the rice commodity supply chain in Blockchain-based agribusiness activities in Palolo District, Sigi Regency, Central Sulawesi Province.
2. Knowing the strategy for the application of Blockchain in the rice commodity agribusiness supply chain in Palolo District, Sigi Regency, Central Sulawesi Province.

2. Research Methods

This research has been carried out in Palolo District, Sigi Regency. The researcher took Tanah Harapan Village and Tongoa Village as research sites considering that both are rice paddy production center villages in Palolo District. This research was carried out for 3 months, from April to June 2023. The respondents in this study amounted to 45 respondents consisting of farmers, mill owners, swordsmen and consumers. The method of sampling farmers in this study uses the intentional slice technique or data collection technique with certain considerations (Sugiyono, 2004). The criteria used in this study are paddy rice farmers who collaborate with the mill. Sampling of farmers was carried out randomly by 15 respondents from two villages in Palolo District who were intentionally selected. Sampling of traders was carried out using the snowball slice technique by tracing the rice supply chain channel at the research location based on information obtained from previous supply chain members. The milling samples were 4 people, 8 traders and 18 consumers. The data used in this study is sourced from manual data and secondary data. Manual data was obtained from observation and direct interviews with respondents using a list of questions (Quesioner). Secondary data was obtained from BPS Central Sulawesi Province, BPS Sigi Regency, Agriculture Office of Sigi Regency and BPP of Palolo District.

Data Analysis

Qualitative descriptive analysis is a method used to describe or analyze a research result but is not used to make broader conclusions (Sugiyono, 2016). This analysis is an analysis method used to obtain an in-depth and objective picture of the rice *supply chain* and blockchain implementation strategy.

1. Supply Chain Systems

The *supply chain* process is when products are still raw, semi-finished products and finished products are obtained, altered and sold through various facilities connected by the chain along the product, financial, and information flows described below.

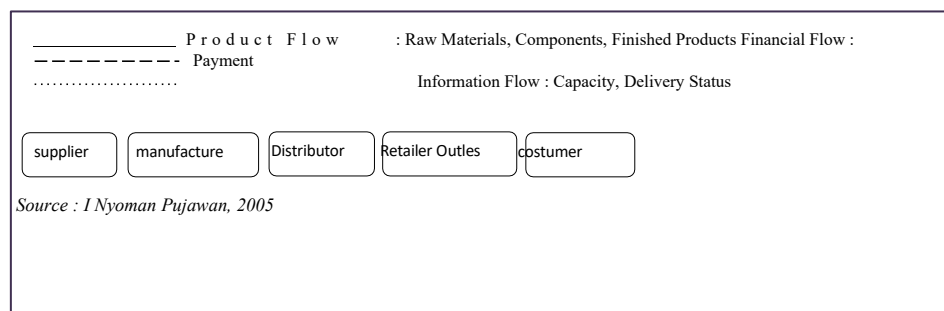


Figure 1. Supply Chain Flow Pattern

2. SWOT Analysis

SWOT analysis is the systematic identification of all factors to formulate a strategy. In accordance with the purpose of the research, the data that has been collected is then tabulated using geek analysis to see and design the right strategy in the application of Blockchain in the supply chain.

3. Results And Discussion

Rice Commodity Supply Chain Analysis in Palolo District

The structure of the rice supply chain in Palolo District can be analyzed through the members who make up the supply chain. There are three types of flows that must be managed in a supply chain. The first is the flow of products that flows from *upstream* to downstream, the second is the financial/financial flow from downstream to upstream and the third is the flow of information that flows from upstream to downstream or vice versa. The picture below shows the pattern of the three streams in the rice supply chain in Palolo District.

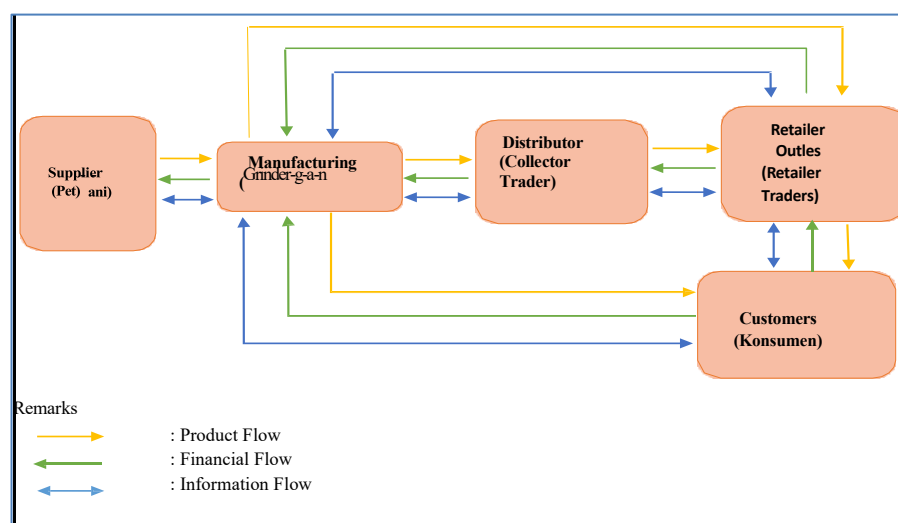


Figure 2 . Rice Supply Chain Flow

1. Suppliers

Suppliers are farmers who are members of the chain that start the rice supply chain. Rice that has been harvested either using dorsal technology or using convicted labor will be packaged and put into grain sacks provided by the farmers themselves, which is 95-100kg/sack and will be taken to the mill in Palolo District. The transportation of grain is carried out by a *pick-up* car belonging to the rice mill and is monitored directly by the farmer and the mill so that the movement of the grain supply that will be sent to

the mill is in accordance with the time and quantity needed. Farmers have made plans for the amount/production capacity of rice to be sold and to be stored for daily family needs. Rice field farmers in Palolo District distribute their crops in the form of grain to marketing institutions. The marketing institution in question is a rice mill. Farmers harvest grain from their land and then packed with sacks provided by the farmers themselves containing 95-100 kg/sack. The respondents in the study sold their rice to the milling party because they were bound by cooperation in this case related to lending farming capital and borrowing household needs. The price received by farmers is Rp. 9,800 – Rp. 10,000 /Kg for the price of rice while the payment of service rental, payment made using rice, with a cost determined by the rice mill of 14% - 15% of the total production, the financing of the rental of services includes the cost of transporting grain from the rice farmer's land to the rice mill and grain drying place.

2. Manufacture

Manufacture is a rice mill which is a place to process grain into rice in Palolo District. The rice mill provides facilities that are used, namely starting from lending business capital to farmers, transporting grain from farmers' land used for rice cultivation to milling sites, providing a grain drying place, providing tools used for the grain drying process such as brooms, grain leveling tools and tarpaulins as grain coverings, and preparing places for farmers to store dry grain ready for grinding. Rice milling is also responsible for the quality and quality of rice during the process of milling rice into rice. Milling is often an option because of its location very close to the farmer's land, on the other hand there are several farmers who collaborate with the mill in the form of capital loan assistance for land processing costs, the cost of using saprodi and labor costs. After harvesting, farmers will return the capital loan assistance to the milling party in the form of a grain cut of 14-15% of the harvest. The purchase price of rice from the milling to partner farmers is Rp. 9,800 – Rp. 10,000 / Kg while to non-partner farmers is Rp. 10,000 – Rp. 10,500. Then the mill sells its rice to collectors, retailers and consumers who come directly to the mill with the same selling price of Rp. 11,000 /kg.

3. Distributor

The distributors in this study are collectors who buy rice from farmers/producers in large quantities. Collector traders in Palolo District buy rice directly from farmers at rice mills, this is done so that collector traders get affordable prices from farmers, and then the rice that has been purchased below to sell it to retailers in Palolo District or directly to consumers there.

4. Retailer Outlets

Retailer Outlets or retailer traders are traders who buy rice from collectors and also some buy directly from farmers. Retail traders are market traders or stall owners who open their businesses in consumer locations. Retail traders have a role that connects rice products from producers to the end consumer. The first thing that retailers do is to select rice suppliers through collectors or directly to the mill. Furthermore, rice purchase activities are carried out according to the number of needs by retailers. To overcome the availability of rice supply to always be available, retailers monitor the movement of rice supply related to the mutually agreed amount. The purpose of the cooperation is so that



every request by consumers will always be met. Some retailers also repackage with various sizes to market. Retail traders sell rice to markets in Palolo District. The costs incurred by retailers are transportation costs from the market, labor wages and repackaging. The price of rice received by retailers from collectors is Rp.11,000/kg. The capital used by retail traders is their own capital and payments for rice are obtained in cash.

5. Customer

Customer or Consumer is the last chain of the rice supply chain located in Palolo District. In this chain, rice products are consumed and processed into various kinds of processing. All financing processes from consumer payments for rice products purchased at the market and stalls in Palolo District. This financial flow occurs directly at the point of purchase with a cash payment system. The price of rice spent by consumers is Rp. 12,000 – Rp. 13,000/kg.

Blockchain-based Supply Chain Forms

The agricultural supply chain involves all complete processes involving various stages, from production, distribution, to consumption. In traditional supply chains, documentation and tracking often consume significant time and resources. With the adoption of blockchain, the process can be done automatically and in real-time. Every party in the supply chain can access the latest information quickly and efficiently, reducing administrative costs and accelerating the flow of goods from producers to consumers. Based on the analysis, recommendations can be given for the form of a Blockchain-based rice commodity supply chain, as follows:

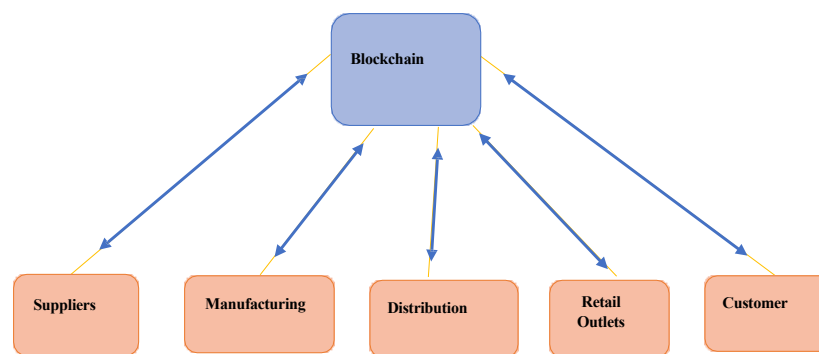


Figure 3. Recommendations for a Blockchain-Based Supply Chain Model for Rice Commodities in Palolo District, Sigi Regency

Line description :

— = Product Channel

— = Information Channel

In the flow of information, *Blockchain* provides accurate, transparent and decentralized information on quantity, quality, delivery and prices upstream and downstream. With a decentralized system, the parties in the supply chain will know all the information provided. The parties in question are those who play a role in producing raw materials (farmers), processing (milling), and distributing to end consumers. In addition, consumer product channels that are outside the Sigi Regency area and even outside Central Sulawesi Province can purchase products directly to farmers or millers with this information.

With this transparency, agricultural supply chain management can track every step from production to consumption. Information about product origin, production methods, processing, and quality can be clearly verified. This helps increase consumer confidence in agricultural products and ensures that the information provided about the product is accurate. In addition to transparency, security is also an important factor in agricultural supply chain management. With blockchain technology, any transaction or data change in a block must be approved by a decentralized network of users. This ensures that the data fed into the blockchain cannot be easily altered or manipulated.

This is in line with the research of Kumar and Iyengar (2017) which resulted in a proposed *blockchain* scenario in the rice supply chain. The scenarios compiled show how a decentralized system based on *blockchain technology* guarantees product safety in supply chain management and helps in increasing the efficiency of the rice supply chain by providing a tracing system that records all events that occur in the rice supply chain and monitors the safety and quality of rice. Blockchain technology is used by every food supply chain that guarantees the delivery of quality products to the public.

SWOT Analysis of the Application of Rice Commodity Blockchain

After knowing the flow of the rice commodity supply chain in Palolo District and designing a blockchain-based supply chain form, the next stage is to conduct a SWOT analysis. A SWOT analysis is an analysis tool aimed at describing the situation that is being faced or may be faced by a company. Broadly speaking, this analysis is based on the relationship between internal environmental elements and external environmental elements. Internal Factors

According to David (2010), the internal environment (the environment from within) is the strength and weakness of the company. Based on the results of observations directly related to the rice commodity supply chain activities in Palolo District which aims to identify the key factors that are strengths and weaknesses as follows:

1. Strengths

Strength is an advantage owned by the internal rice commodity supply chain of Palolo District to help the implementation of Blockchain, which is obtained by the following indicators:



a. Offering transparency in doing business

Blockchain is secure in recording all activities and decentralized which can provide convenience and openness in the delivery of information to make transactions. Technological developments in the industrial era 4.0 is an important foothold for the community, especially farmers, to support and develop farming in doing business. The condition of farmers who are overwhelmed in the marketing stage of their products has become a shackle that has long been their problem. Through the nature of *Blockchain* technology, it is expected to become a force in the agribusiness of rice commodities.

b. Valid Information Available

Information is something that is needed in business. The availability of valid and accurate information can help business actors and consumers in the buying and selling process. *Blockchain* is here to meet the need for the availability of valid information from supply chain actors for business actors and consumers in Palolo District.

c. The rice produced has good quality

The quality of rice includes aspects of rice color, aroma, taste, rice integrity, rice hygiene, always new products and packaging (Hanifah, 2019). According to the results of the interview, most of the respondents agreed that rice in Palolo District has good/good quality, namely having a fragrant rice aroma, natural color, fluffy taste, rice does not have many fractures, clean rice does not contain stones and fleas, products are always new, and strong packaging.

d. The price of rice offered is affordable

The results of the study show that the price of rice in Palolo District is quite affordable for traders and some consumers, with good quality and also competing with competitors' products. The results of observations to offline and online stores confirm the fact that the price of rice in Palolo sub-district is significantly cheaper than similar products. However, when compared to the price of similar products sold in markets outside Palolo District, the price is more expensive. These findings hint at the marketing strategy that needs to be pursued by the Palolo District Rice Commodity Marketing Institute.

2. Weaknesses

Weaknesses are internal conditions of the company that can hinder the supply chain of rice commodities in Palolo District to help the implementation of *Blockchain*, which is obtained by the following indicators:

a. Business actors who do not have adequate IT

There are still many people in Palolo District who have inadequate information technology to support providing and accessing data. This is certainly a weakness for *blockchain* implementation.

b. Lack of publication advertising for rice information

Publicity advertising is a means by which companies try to inform, persuade, and improve consumers directly or indirectly about the products and brands they sell.



To build a communication through the marketing communication media of rice that is marketed, especially rice in Palolo District, it is necessary to pay attention to the effectiveness through marketing communication media, hoping that the strategy used can create an effective communication relationship in order to promote products to consumers.

- c. Public understanding of mobile phones is only limited to communication tools via telephone, SMS, WA and Facebook

Low information technology is a term for any technology that can make it easier for humans to create, change, communicate, and disseminate information. Information technology typically produces data, sound and video. The IT expertise of the respondents is quite sufficient, the respondents, especially farmers, use *mobile phone* technology with a sufficient level of expertise, just using *mobile phones* to contact each other family and friends.

- d. Weak internet connection

The internet network is closely related to the use of technology. Blockchain systems not only require reliable IT (Information Technology) personnel, but also require an adequate internet network. An unreliable internet network will limit communication and information. Respondents from the study said that the internet network in the region is quite adequate for mobile data packages, but the network uses WIFI (Wireless, Fidelity, Wireless Local Area Network (WLAN) not good enough. This makes the internet network one of the important weakness factors in the application of Blockchain.

External Factors

Umar (2008) explained that the external environment is a process carried out by strategic planning to be able to monitor the external or external environment sector in determining opportunities and threats to the company. The external environment is things that are related to the company's activities but cannot be controlled or managed by the company. The analysis of the external environment of rice aims to identify the key factors that are the company's opportunities and threats.

1. Opportunity

- a. High potential for community rice consumption

The culture of the Indonesian people makes rice as a staple food difficult to replace. Even though there are various kinds of substitution products, the Indonesian people still choose rice as their staple food. The growth of community democracy also has the potential to boost rice consumption. This condition creates an opportunity for rice commodity supply chain players to continue to develop their rice business.



- b. The Breadth of the Market in Indonesia
The Indonesian people make rice as their staple food every day, this causes a high demand for rice in Indonesia. Responding to the high amount of existing rice demand, rice products in Palolo District have a great opportunity to enter the local market in Indonesia because of the large demand and the breadth of the existing market.
- c. The public needs diverse information, services and payments that are not complicated and fast. The community needs diverse information, services and payments that are certainly not complicated and fast so that the time used is more efficient and makes the work done by humans easier. This is an opportunity for the application of Blockchain which is an information center to utilize new energy sources that are useful for human survival.
- d. Technological Developments
Technological developments mean that from time to time technology continues to develop in a more sophisticated direction. This development is based on innovation and community creativity. The transition to industry 4.0 will have an impact on how we live our lives starting from the way we produce, distribute, to consume goods and go hand in hand with the development of information technology.

2. Threat

- a. The difficulty of getting investment funds
Investment is one of the things needed in a business to develop the business. The agricultural sector of course also needs investment, if investment in the agricultural sector increases, the opportunity to increase the number of production and develop the agricultural sector will be even greater. This is a threat to business actors in Palolo District, because it is difficult to get investment funds. This certainly makes it difficult for business actors to get capital to develop and increase the amount of production in Palolo District.
- b. There is business competition from other regions
Business competitors in the agricultural sector, especially rice, are of course very numerous, this is of course also experienced by rice products from Palolo District which have competitors from other regions, especially in Central Sulawesi. This competition is certainly a threat to business actors in Palolo District because it can affect the selling price
- c. Market bargaining power
Market bargaining power is a form of bargaining power that occurs between buyers and sellers. Buyers will always want to get the lowest price possible, while sellers will try to sell at the highest possible price. The price of rice commodities in Palolo District is determined by traders who are sometimes erratic and



capricious. The change is not so significant but has quite an impact on farmers. Farmers in Palolo District do not have high bargaining power so they are forced to sell rice at a price determined by millers and traders. Parties with urgent needs for a deal have very little bargaining power.

d. Lack of IT personnel

Operators in implementing information technology are a demand for market needs in the era of industry 4.0, the quality and capabilities of operators must continue to develop and improve. Information technology is one of the strategies in time and cost efficiency. This can be one of the measures to improve the effectiveness of farmers' productivity and in making sales.

IFAS Matrix

The results of the analysis of Internal Factors in the application of Blockchain to rice commodities in Palolo District, Sigi Regency, are shown in the following table.

Table 1. SWOT Analysis of IFAS Matrix Implementation of Blockchain-based Rice Commodity Supply Chain Strategy in Palolo District

Yes	Internal Factors	Weight	Rating	Bobot Rating x
A. Strengths				
1	Offers transparency in Doing Business	0,12	4	0,48
2	Have valid information	0,12	4	0,48
3	The rice produced has good quality	0,12	4	0,48
4	The price of rice offered is affordable	0,13	4	0,52
Sub Total		0,49		1,96
B. Weaknessess				
1	Business actors who do not have Adequate IT	0,13	5	0,65
2	Lack of publication advertising for Product Information	0,13	4	0,52
3	Public understanding of <i>mobile phones</i> is only limited to communication tools via telephone, SMS, WA and <i>Facebook</i>	0,13	4	0,52



4	Weak internet connection	0,12	4	0,48
Total		0,51		2,17
Total IFAS				4,13

Source : Primary Data analysis results, 2023

IFAS Matrix

The results of the analysis of External Factors in the application of *Blockchain* to rice commodities in Palolo District, Sigi Regency, are shown in the following table.

Table 2. SWOT Analysis of the EFAS Matrix Implementation of Blockchain-based Rice Commodity Supply Chain Strategy in Palolo District

YES	External Factors	Weight	Rating	Bobot x Rating
A. Opportunities (Peluang)				
1	High potential for public consumption	0,14	5	0,70
2	The breadth of the market in Indonesia	0,14	5	0,70
3	The community needs diverse information, services, and payments, which are not complicated and fast	0,13	4	0,52
4	Technological Developments	0,13	4	0,52
Total		0,54		2,44
B. Threats				
1	The difficulty of getting banking credit	0,10	3	0,30
2	There is competition from other regions	0,12	4	0,48
3	Market bargaining power	0,12	4	0,48
4	The Cost of IT Personnel	0,12	4	0,48
Total		0,46		1,74
Total EFAS		1,00		4,18

Source : Primary Data Analysis Results, 2023

Based on the results of the analysis *External Factor Analisis Summary (EFAS)* in Table 12 it is known, that the probability factor (*Opportunities*) has a value of 2.49 and is threatened (*Threats*) has a value of 0.9. This value can be interpreted as an opportunity that has greater than the existing threat, namely 73% of the opportunity compared to 27% of the threat, so that the implementation of *blockchain* in the rice commodity supply chain at the research site is good to be carried out

The results of the calculation of the IFAS (*Internal Factor Analisis Summary*) matrix and the EFAS matrix (*External Factor Analisis Summary*) which produced the X axis value were the result of the reduction between the strength factor (1.96) and the weakness factor (2.17) from the internal environment which was -0.21 and the Y axis



value which was. The result of the reduction between the opportunity factor (2.44) and the threat factor (1.70) from the external environment is 0.75. So it can be illustrated in the following SWOT diagram:

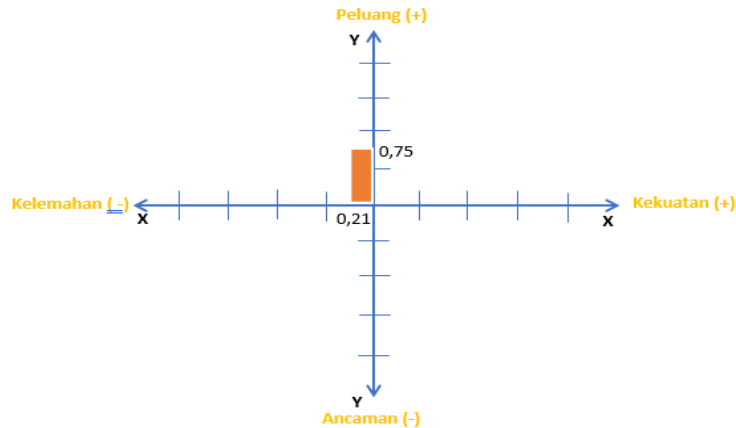


Figure 4. Position of Blockchain Application Strategy in the Rice Commodity Supply Chain in Palolo District, Sigi Regency.

The SWOT diagram in figure 4 shows that the position of the strategy for the implementation of *Blockchain* in the rice commodity supply chain in Palolo District in the mapping of strategic environmental analysis (internal and external environment) is in the third position or in the position of supporting the *Trun Around strategy*, namely the WO strategy. This is a situation that minimizes the weakness to take advantage of opportunities. By looking at the results of the SWOT quadrant above, the application in using the SWOT matrix is as follows:

Table. 3 SWOT Matrix of Strategies for the Application of Blockchain Technology in the Rice Commodity Supply Chain in Palolo District, Sigi Regency

IFAS EFAS	Strength 1. Offers transparency in Doing Business 2. Have valid information 3. The rice produced has good quality 4. Availability of rice stock 5. The price of rice offered is affordable.	Weaknesses 1. Business actors who do not have adequate IT 2. Lack of publication advertising for product information 3. Public understanding of <i>mobile phones</i> is only limited to communication tools through telephone, SMS, WA and Facebook. 4. Weak internet connection
	SO Strategy	WO Strategy

1. High potential for public consumption 2. The breadth of the market in Indonesia 3. The community needs diverse information, services and payments, which are not complicated and fast 4. Technological developments	1. Utilizing technological developments to create a Blockchain strategy that offers transparency in doing business (S1-04) 2. Formulate a Blockchain-based supply chain system that offers the best benefits for all parties, both farmers, traders and consumers with easy access and valid information (S2-03) 3. Setting competitive prices in the Indonesian market (S2-02) 4. Taking advantage of high public consumption by offering quality rice and available rice stock (S3, S4-01)	1.Improving the quality of internet connections to support the community in terms of the process of obtaining information (W2, W4, - 02, 04) 2.Utilizing technological developments to promote or publish product information and market rice seeing the great consumption potential and breadth of the market (W2,04,02) 3.Conducting socialization about <i>blockchain</i> as a source of information for business actors (W1-03,04)
Treaths 1. The difficulty of getting investment funds 2. There is competition from other regions 3. The Bargaining Power of the Market. 4. Lack of IT personnel	ST Strategy 1. Taking advantage of good quality rice and affordable prices in market competition with products from other regions (S3, S5, T2, T3) 2. Offering transparency in doing business and valid information to gain the trust of investors to invest (S1,S2-T1,T4) 3. Availability of rice stock and affordable prices to answer the large market bargaining power (S3, S4-T3)	WT Strategy 1. Improvement of internet connection to support and assist business actors in marketing their products (W4-T1,T2) 2. Providing IT that can be accessed by every business actor that can help the community in obtaining information and to promote products through information media (W1,W2,W3-T4) 3. Introducing rice through social media so that it can be known and compete with products from other regions (W3- T2,T3)

Source : Primary Data after processing, 2023

Based on the strategic position obtained, namely in quadrant III, the strategy priority is focused on *Weaknesses - Opportunity* (WO) by minimizing weaknesses to take advantage of opportunities to carry out activities application of *Blockchain* in the rice commodity supply chain in Palolo District, Sigi Regency. According to the SWOT matrix of IFAS and EFAS above, the formulation of strategies that can be used as a strategy for the implementation of a Blockchain-based supply chain in rice commodities in Palolo District, Sigi Regency can be determined as follows:

1. Improving the quality of internet connections to support the community in terms of the process of obtaining information (W2, W4, - 02, 04).
2. *Blockchain* is here to be a solution for business actors in marketing their products seeing the great consumption potential and the breadth of the market (W3- 01,02).
3. Conducting socialization about *blockchain* as a source of information for business actors (W1-03,04)

The results of the SWOT analysis show that the supply chain has the potential to develop. The available resources, the high demand and price of rice, as well as the good quality of rice, make it a strong potential to be developed by the community, entrepreneurs, and the government. By using *Blockchain*, the information needed by all parties upstream and downstream is obtained in a transparent, efficient, secure and easily trackable manner. *Blockchain* can also be used in making transactions or payments.



In a study (Rahardja, Aini, Yusup and Edliyanti, 2020) regarding the application of *Blockchain* as a security medium in the transaction process, it was said that the use of *Blockchain* provides the efficiency of identity management, builds tracking and can identify the authenticity of products, becoming an easy, efficient and well-documented payment system.

4. Conclusions

Based on the results of the research on the Blockchain-Based Rice Commodity Supply Chain Strategy in Palolo District, Sigi Regency, the following conclusions were obtained:

1. The form of the Blockchain-based rice commodity supply chain in Palolo District has a relationship between each institution involved in the supply chain that is connected through product and information channels. The distribution of products on *the blockchain* is carried out by each institution after getting an agreement, there will be a distribution process. The application of *blockchain* can make it easier for every institution that will distribute its products, because of the ease of transactions and transparency. *Blockchain* gives the supply chain boards involved the option to choose the source of the products to be purchased. Blockchain information flows provide accurate, transparent, de-decentralized and validated upstream and downstream information on quantity, quality, delivery and pricing.
2. The strategy for applying *Blockchain* technology to the rice commodity supply chain in Palolo District is recommended as follows:
 - a. Improving the quality of internet connections to support the community in terms of the process of obtaining information.
 - b. Taking advantage of technological developments to promote or publish information on rice and its marketing seeing the great potential for consumption and the breadth of the market
 - c. Conducting socialization about *blockchain* as a source of information for business actors.

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