

Developing a Business Logistics to Improve Economics in Rural Area After Covid-19 Pandemic

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Abstract - The SDGs agenda is to solve the problem of poverty and increase food security. Currently, there are 49.41% of poor people who depend on agricultural production in Indonesia. In reality, farmers often do not get benefits that increase poverty. The causes of poverty are cheap selling prices, the presence of speculators, and the unavailability of post-harvest facilities. This condition was exacerbated by the COVID-19 pandemic which made farmers difficult to sell crops due to social distancing rules.

This research proposed a logistics business model in rural areas to selling and distributing agricultural products to consumers. There are six steps in designing a trade logistics network that is suitable for business. The entities will be involved in the rural logistics business model are farmers, rural shops, logistics terminals, sub-terminal logistics which will serve consumers in urban areas. There are five Types of logistics networks that proposed with conventional and e-commerce platform. Based on the Paired t-test, the Type-3-Type-5 pair has mean paired difference higher than the other pairs, about 1.2046 points. It means Type-3 trade logistics network is preferable to be implemented in logistics business model.

Keywords - business model, rural, trade logistics network, intermediaries

I. INTRODUCTION

A. Background

The United Nations in 2015 has designed an agenda that aims to become a reference for the Sustainable Development (SDGs) of countries in the world until 2030. The SDG framework includes 17 goals and 169 targets and is measured by more than 200 indicators [1]. Although the concept of sustainable development among countries is no uniform, it is hoped that the SDGs agenda can answer various problems faced by developing countries especially in the fields of poverty, food security, and improving people's welfare. The ability to earn income to meet the necessities of life is a measure of the welfare of people in rural areas [2]. Conditions in which a person is unable to fulfil their basic needs such as housing, food, clothing, education, and health are categorized as poverty. The poverty rate in Indonesia currently ranks 5th highest compared to countries in ASEAN with a composition of 9.8% of the total population [3].

Before the COVID-19 pandemic, 49.41% of the poverty people in rural areas depend on agriculture for their livelihoods [4]. The poverty of farmers is caused by cheap product selling prices, trapped by speculators, and the unavailability of post-harvest facilities. Indonesian government is trying to improve poverty conditions in rural areas with several development programs, including post-harvest training, capital assistance, and the development of an agribusiness sub-terminal. The development program of Agribusiness Sub-terminal by the government is expected to support the harvest trading system in rural areas, but it had no impact on improving the lives of rural communities.

The COVID-19 pandemic has attacked worldwide in early 2020 and created economic conditions that experienced major upheavals. Some businesses, especially small and medium-sized enterprises (SMEs), and individuals have problems with capital shortages, cash flow is not smooth due to decreased income [5]. Small investors who do not have wide access to the public financial markets will have difficulty maintaining the continuity of operations of the company. Consumer buying interest declined due to a long quarantine period make most of the industry suffered heavy losses.

The pandemic also affected Indonesia. The percentage of poor people in rural areas in September 2019 was 12.60, rising to 12.82 in March 2020. The COVID-19 pandemic has also affected the price fluctuations of agribusiness commodities in rural area. The price disparity between producers or farmers and the consumer community is most widening.

This condition also exacerbated poverty for farmers in Indonesia, because they have difficulty in selling and distributing crops due to the rules of social distance. Agricultural products have properties that are easily damaged, if not immediately sold it will be even more detrimental. In addition, farmers also need money to meet their needs and capital for replanting. Some of them even have to pay the loan from middlemen or speculators.

The following section discusses how to propose to build a rural logistics system as a new business to assist in marketing and distribution of agricultural products as well as providing the products needed by the rural community. The objective of this research is to produce a conceptual model of a rural logistics network that can benefit farmers and consumers in fair price and availability of the product.

The proposed logistics business model is expected to be a strategy to reduce the impact of COVID-19 on poverty in a rural area and becoming one of the alternative businesses in the new normal era. This is also in line with the Rural SDGs Agenda of Indonesia for rural development, especially the improvement of the welfare of the rural people through reducing poverty, the fulfilment of basic needs, and the development of rural infrastructure.

B. Literature Review

Logistics network consist of many heterogenous actors that work together to supply and distribute products, where each actor has the ability to control certain resources. The company that controls the rarest resource in the logistics network usually has the strongest power to control the line and do opportunistic action [6]. However, through the proposed rural logistics business, all entities can perform coordination and consolidation to get mutual benefits.

Discussion about rural logistics deals with the flow of agricultural products and the flow of products for the life necessities of a rural community. Rural logistics has developed in many countries such as China and India. Building a rural logistics network based on harvesting capabilities and consumer needs for agricultural products can reduce costs and increase farmers' income [7]. Innovation in rural logistics organization based on market-oriented business is an important strategy to increasing the efficiency and effectiveness production of agricultural products [8].

Aspects that must be considered when building logistics facilities that connect rural and urban areas are the number of product flows, technology platforms, and regional conditions [9]. The choice of a logistics center location is important given the limited information available in rural areas but the effect on shipping costs [10]. Improving the performance of the logistics business in rural areas can be done by cooperating with retail and wholesaler in rural areas or utilizing post networks.

II. METHODOLOGY

The development of the rural logistics business in this paper is a conceptual model. We performed a detailed design configuration rural logistics network as a business institutional. Furthermore, this study will conduct a quantitative comparison through questionnaires to obtain respondents' perspectives about the network that we are proposed.

There are six elements to analytic performance of a sustainable logistics chain and network, namely network infrastructure, environment management, market strategy, administration and policy, social relationships, and technology innovation [12]. The Methodology to develop

the structure of logistics network trade in a rural area consist of six steps:

1. Determining the products to be distributed in the SLP
2. Identify the relevant components of the logistics network
3. Determining the needs of network entities in rural logistics
4. The network model approach used
5. Designing trade logistics network for rural logistics
6. Statistics analysis to comparative the proposed model scenario based on farmer perception

Agricultural products are diverse, as well as products needed by rural communities. every product has certain characteristics it is important to consider the Type of product that will be distributed through a logistics network to get the best model. The concept of producers, intermediaries and consumers in logistics network are clearly. It is important to identify the existing actors are involved in hierarchy for examination the relation between actors, so that when designing the network structure for rural logistics relevant to real conditions. The logistics network in rural areas that is designed must be shorter than the existing network so that it can reduce logistics costs. Determination of these network entities is arranged for the answer of three categories of problems in rural logistics, namely (1) problems with farmers in rural areas, (2) problems with the distribution of agricultural products from rural areas to urban areas, and (3) marketing problems. agricultural products in urban areas. Through these steps, we select logistics entities in the existing network for replacement in trade logistics network that proposed.

The rural logistics network that has developed can be used to distributing agricultural products from farms to customers and industrial products needed by rural communities from industries simultaneously. Developing a model of trade logistics network in this research refers to the rural logistics model by [8] and [11] as shown in Figure 1.

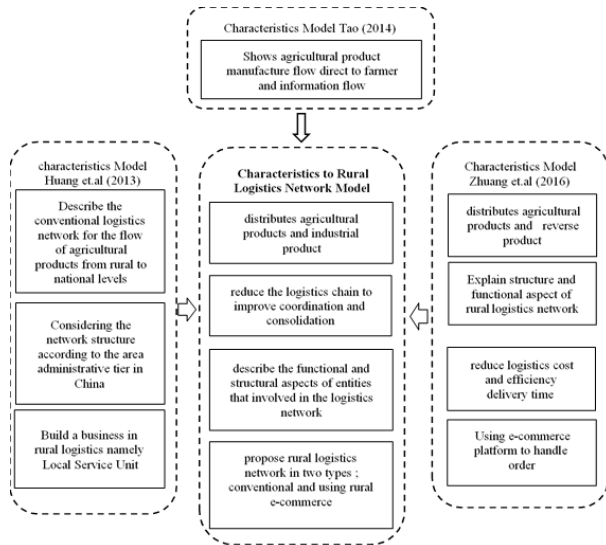


Fig. 1. Characteristics of model are developed

III. RESULTS

This step is an effort to reconfigure intermediaries involved in the logistics network in a rural logistic business model. The logistic network model that was built should be shorter than the previous network so that it is expected to increase the smooth flow of products in rural areas, reduce the number of middlemen and reduce logistics costs. The kind of agricultural products distributed in the rural logistics business model is commonly referred to as agricultural commodities, such as vegetables, fruits, and horticultural products.

The results of the selection of relevant entities for rural logistics business are:

- Rural shops which are located in rural areas as entities for collecting agricultural products and distributing needs product of rural community.
- Logistics Terminal (TL), which is located in the district capital as an entity for collecting and distributing agricultural products from each rural shop, also distributes industrial products to rural areas.
- Logistics Sub Terminal is an intermediary between the Logistics Terminal and farmers to minimize the role of middlemen re-entering the rural logistics network caused farmers unable to take them directly to the Logistics Terminal. Locate of Logistics Sub Terminal is in sub-districts, and only if rural areas are far away from the district capital.

Increasing marketing and the availability of products in rural logistics business can be done by building cooperation with urban logistics networks and developing e-business that connecting urban logistics with rural logistics. The trade logistics network shows business practices that will be carried out between entities and is related to financial flows due to the exchange of ownership of goods. The development of trade logistics

network in rural areas is carried out in two categories, such as conventional and using rural e-commerce.

A. Conventional Scenarios of Trade Logistics Network

There are two forms of configuration results for the conventional trade logistics network categories. Model of Type-1 have intermediaries in the trade logistics network involved are Rural Shops and Logistics Terminals. Rural Shops act as spoke of collecting the agricultural product from farmers and distributing manufacture product to a rural community. Logistics Terminal acts as a hub in rural logistics. The design of the Type-1 rural logistics network is shown in Figure 2.

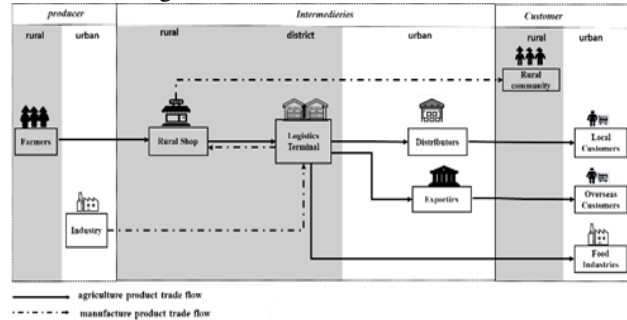


Fig. 2. Trade Logistics Network Type-1

Some rural areas have locations that are very far from the district center so that it is possible for problems to occur in the product delivery process such as late delivery, high shipping costs, and damaged products. This risk is anticipated by adding a logistics sub-terminal entity at the sub-district level. Although it impacted to operational costs, Subterminal logistics can be a buffer warehouse to reduce risks due to the wide area. This network model is called Type-2. It shown in Figure 3.

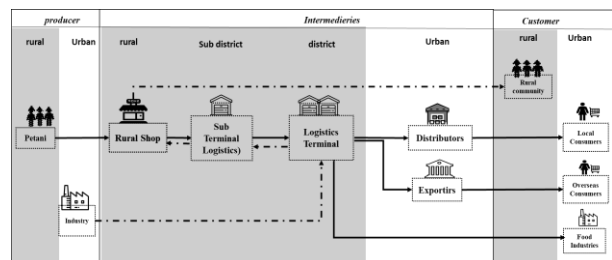


Fig. 3. Trade Logistics Network Type-2

B. e-Commerce Scenarios of Trade Logistics Network

The most popular marketing strategy is to use ecommerce to make it easier to expand geographic reach and increase sales. The objective of an e-commerce trade logistics system is to increase speed and data accuracy in product transactions and distribution and improve service quality. In the Rural e-commerce logistics network, the system applied is business to customer, where rural shops directly interact with all entities through e-commerce (distributors, exporters, food industries, consumers, and rural communities). The model of the trade logistics network based on e-commerce (Type-3) is shown in

Figure 4.

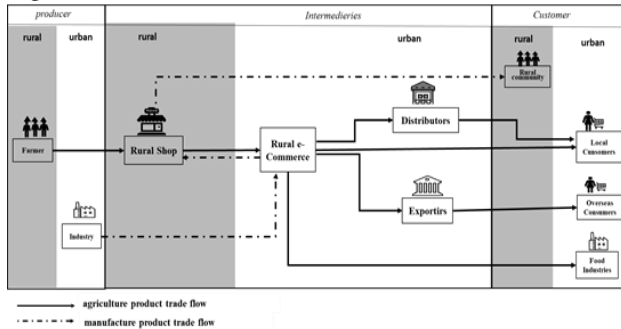


Fig. 4. Trade Logistics Network Type-3

Some people in rural maybe still have not good skills or feeling insecure using the digital marketplace so they still need conventional transactions, so we develop Type4 model and Type-5 that is the result of the integration of e-commerce platform network with the Type-1 model. We also develop Type-5 model that is the result of the integration of e-commerce with the Type-2 model. Its shown in Figure 5 and Figure 6.

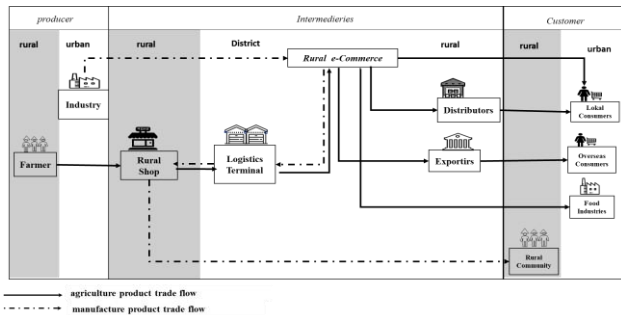


Fig. 5. Trade Logistics Network Type-4

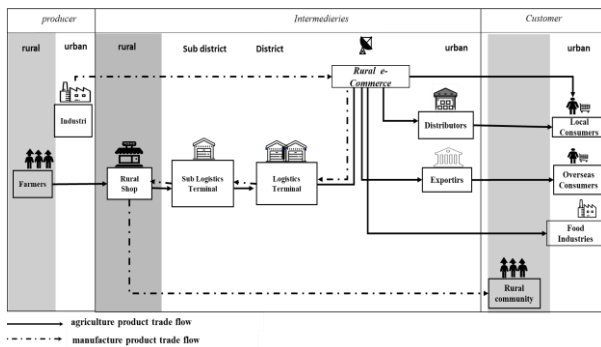


Fig. 5. Trade Logistics Network Type-5

C. Choose the preferred network based on the respondent's perception

The collaborative goals of a supply chain and logistics are efficiency, effectiveness, and profitability [13]. Rural people are one of the main actors of rural logistics because it is necessary to get their perception of an alternative form of trade logistics networks that is considered the most beneficial for the welfare of the rural community. Questionnaires are organized based on 17 indicators from 3 performance measurement criteria in the supply chain

such as implementation, benefit, and cost [14,15, 16]. The indicators of implementation consist of availability of information, reliability of communication, utilization of technology, preparation of joint plans and implementation of cooperation. The indicators of benefit consist of cost reduction, productivity improvement, profit achievement, reduced risk of damage, utilization of resources, availability and product prices. The indicators of cost are investment cost, coordination and integration cost, information costs, partnership management costs and Partnership replacement cost. The assessment measure is in the range of 1 to 10, where the number 10 indicates excellent performance.

We use Paired t-test to test for statistical differences in perceptions between the respondents. Paired t-test is a hypothesis testing conducted to determine whether the mean of the same sample group has a significant difference or not.

At the initial survey, 26 respondents were obtained from a rural community that requested to compare directly the five network which proposed simultaneously. By using the Shapiro Wilk test to data processing show value of Sig $x > 0.05$ means that the results of the respondents' answers form a normal distribution. The result Shown Table I. It indicates that the data processing can be analyzed with a t-paired sample test.

TABLE I TEST NORMALITY OF DATA

Model	Networ k		Shapiro-Wilk Test	
	Statistic	df	Sig.	Distribution
Type-1	0.925	26	0.058	normal
Type-2	0.936	26	0.108	normal
Type-3	0.946	26	0.183	normal
Type-4	0.942	26	0.151	normal
Type-5	0.939	26	0.127	normal

There are ten pairs of hypotheses to compare one type of trade logistics network with other trade logistics network types. For the example; the hypothesis used in the t-paired test for pair type-1 with type-2 in this study are:

H_0 : There is no significant difference between network Type-1 and Type-2

H_1 : There is significant differences between Type-1 and Type-2

Furthermore, the hypotheses used in the paired t-test for type-1 and type-3 pairs in this study are:

H_0 : There is no significant difference between network Type-1 and Type-3

H_1 : There is significant differences between Type-1 and Type-2

The other pairs of hypotheses use in paired t-test are Type1-Type3, Type1-Type4, Type1-Type5, Type2-Type3, Type2-Type4, Type2-Type5, Type3-Type4,

Type3-Type5 and Type1-Type5. Paired t-test results for all paired patterns can be seen in Table II.

According to the result of paired t-test, the choice of the trade logistics network preferred by the respondents can look from the highest main paired difference. The highest main paired difference of pair 9 (Type-3–Type-5) is 1.2046 points, higher than other pairs. It means the rural community has perceptions Type-3 is preferred logistics network that most influences to selling and distributing agricultural product from rural to urban areas.

Type-3 network has the shortest network structure if compared with 4 (four) alternatives of proposed networks. The Type-3 network can be a business logistics are developed to selling agricultural products directly from Rural shop to those who need them in an urban area, so it is the most efficient network because only requires a rural shop as an intermediary in the rural area and e-commerce platform. The function of rural e-commerce is a marketplace that facilitates farmers to sell agricultural products and buy industrial products they need, also make it convenient for consumers in the urban region to reach agricultural products. This business model will need the determination of business strategy for rural logistics management, especially in making decisions regarding product prices, inventory, and service standardization. In addition, rural e-commerce can also be information resources to contain agriculture problems di rural areas, such as crops, seed, and plant systems.

TABLE II
T-PAIRED TEST OF DATA

Pair	Correlation	Sig.	Mean paired difference	t	df	Sig. (2tailed)
1	Type-1	0.405	0.040	0.1554	0.58	25 0.567
	Type-2					
	Type-1 2	0.385	0.052	-1.0277	-3.73	25 0.001
	Type-3					
		-0.065	0.752	-0.4135	-1.22	25 0.235
3	Type-1					
	Type-4					
4	Type-1	0.226	0.266	0.1769	0.63	25 0.533
	Type-5					
5	Type-2	0.468	0.016	-1.1831	-4.97	25 0.000
	Type-3					
		0.072	0.726	-0.5688	-1.94	25 0.063
	Type-2 6					
	Type-4	0.356	0.074	0.0215	0.09	25 0.927
7	Type-2					
	Type-5					
8	Type-3	0.051	0.803	0.6142	2.04	25 0.052
	Type-4					
9	Type-3	0.200	0.328	1.2046	4.58	25 0.000
	Type-5					
		0.481	0.013	0.5904	3.06	25 0.005
10	Type-4					
	Type-5					

Ownership of rural shop can come from private property, cooperatives, groups of farmers, or rural-owned enterprises. Rural e-commerce in business organizations is referred to as an information partner. The shareholder of rural e-commerce can from private enterprise, although it is recommended from public corporations or public private partnerships that focus on the development of rural communities.

One of the keys to a successful logistics business is maintaining the product quality, while rural communities generally have limited capabilities. Rural e-commerce managers and rural shop staff should educate farmers on how to select, package and improve the product quality for uniformity in logistics services. In addition, the implementation of rural logistics business also requires the support of telecommunications infrastructure in rural areas. However, applying this model requires support for the development of telecommunications infrastructure that spreading all rural in Indonesia.

The results in this study are expected to be considered in increasing sales of agricultural products directly from farmers to reduce the role of speculators in determining agriculture product prices and add on market share in the new normal era. In addition, rural communities will obtain cheaper prices to fulfill their life necessities.

V. CONCLUSION

In this research, we proposed five type model of logistics business in a rural area that is configurations of intermediaries such as a rural shop, terminal logistics, and subterminal logistics and rural e-commerce. The function of the trade logistics network in this business is selling and distributing agricultural products from rural to consumer. Finally, according to the perceptions of the rural community, The Type-3 network is the most favourite business logistics in rural to be implemented after covid19 pandemic. This network can sell agricultural products directly from Rural shops to consumers in an urban area to reduce the role of speculators in the distribution network.

This conceptual model utilizes the rural shop entity as an intermediary for logistics activities in rural areas and rural e-commerce as media to assist in selling transactions and information sharing. The next research, an operational model will be developed by considering the price fluctuations and amount of harvest to increase the complexity of the business logistics model if applied in rural areas. We plan to continue this research to develop a operational model of rural logistics.

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