

Conference Paper

The Readiness of Cooperatives in Digitalizing Smallholder Palm Oil Plantations

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Abstract

The era of the industrial revolution 4.0 is marked by a smart industrialization process, which refers to increasing automation, machine-to-machine and human-to-machine communication, implementing artificial intelligence, and developing sustainable digital technology. Increasing the productivity of smallholder oil palm plantations with the application of the right technology will deliver optimal results to improve the welfare of farmers and independent smallholders. This research focused on increasing productivity through digitizing smallholder oil palm plantations. The research was conducted in Siak Regency, Riau Province. This study analyzed the readiness of the Village Cooperative (KUD) of Tunas Muda, including the weaknesses and strengths, as well as the opportunities and threats (SWOT) that existed in preparing for the digitization of smallholder palm oil plantations in Siak Regency.

Keywords: industrial revolution 4.0, KUD Tunas Muda, smallholder oil palm digitalization, institutional dimension, SWOT

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1. Introduction

Implementation of industry 4.0 is expected to increase productivity and innovation, decrease operational cost, and achieve efficiency to further result in increasing product export. The process of industry 4.0 implementation includes the determination of five manufacturing sectors to be the main priority, those are the industry of food and drink, automotive, electronics, textile, and chemicals. In term of food and drink sector, there is oil palm industry with export of palm oil and its derivatives that contributes to the highest national foreign exchange revenue.

In the context of land ownership, the productivity of oil palm plantation in Indonesia reached 3.16 ton/hectare/year for smallholder plantation, approximately

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3.60 ton/hectare/year large state-owned plantation, and about 3.94 ton/hectare/year for large private plantation. The productivity of smallholder plantation was not yet optimal due to poor implementation of technology. Hence, this study was focused on the readiness of smallholder oil palm digitalization. One of the cooperatives that has applied digitalization was KUD Tunas Muda in Siak Regency.

The objectives of this study were listed as follows:

1. To identify and examine the system of oil palm digitalization concerning the comprehension and problems found in the implementation of technology in KUD Tunas Muda
2. To analyze various weaknesses and strengths, also opportunities and threats in KUD Tunas Muda

2. Research Method

2.1. Location and Time

This study was conducted in Village Cooperative (KUD) Tunas Muda located in Teluk Merbau Village, Dayun Sub-district, Siak Regency, Pekanbaru Riau Province. The field study was done twice, namely during 8-11 August 2020 and 5-8 September 2020.

2.2. Type and Source of Data

Type of data used in this study were primary and secondary data. Primary data were obtained through direct interview and discussion with administrators and members of KUD Tunas Muda. Moreover, secondary data were collected through the examination of scientific papers, institutional reports, and related institution.

2.3. Methods and Data Collection

The method applied to obtain data and information included direct observation in the field, interview with informants, and conducting documentation or archival study. Direct observation was done by directly observing the plasma and self-sufficient plantation owned by the member of KUD Tunas Muda. The method of data analysis for the first period of study is explained in Table 1.

TABLE 1: Analysis methods

No	Objective	Type of Data	Analysis	Data required
1.	Identify and examine the system of oil palm digitalization concerning the comprehension and problems found in the implementation of technology in KUD Tunas Muda	Primary and Secondary	Descriptive	- Data of and member of KUD Tunas Muda - Provider of communication and information service that provides essential support for KUD Tunas Muda - Format of reporting and information service available in KUD Tunas Muda
2.	Analyze various weaknesses and strengths, also opportunities and threats in KUD Tunas Muda	Primary and Secondary	SWOT (Strengths, Weaknesses, Opportunities, Threats)	- Information from administrators and members of KUD Tunas and information from related stakeholder

3. Result and Discussion

3.1. The History of Teluk Merbau Village

Teluk Merbau Village is an ex-village of UPT VII Buatan II PIR ADB PTPN II Nusantara V which has currently changed to PTPN V that has been operated since 1989. Teluk Merbau Village was previously a filial village of Dayun Village, Siak Sub-district, Bengkalis Regency. However, since 1997 Teluk Merbau Village has become a definitive village that is also a part of Dayun Village, Siak Sub-district, Bengkalis Regency. Based on the Law No. 53 in 1999 about Regional Expansion, Teluk Merbau Village who was previously a filial village of Dayun Village, Siak Sub-district, Bengkalis Regency, is now belonged to Dayun Sub-district of Siak Regency.

People of Teluk Merbau Village are highly heterogeneous, consist of many ethnics and religions. There are many ethnics in Teluk Merbau Village, consisting of Java from West Java, East Java, and Central Java, Madura, Batak, and Melayu that is the indigenous

ethnic in Siak Regency. People in Teluk Merbau Village are mostly working as oil palm plantation farmers, while other works as entrepreneur, trader, driver, and labor of oil palm plantation. The development in Teluk Merbau Village continuously result in better facility and infrastructure ever since the regional expansion.

People living in Teluk Merbau Village are originated from a different region, dominated by ethnic from West Java, East Java, Central Java, Madura, and Batak. Hence, the traditions of deliberation for consensus, communal work, and local wisdom have been conducted by the community since the existence of Teluk Merbau Village. These traditions also effectively prevent conflicts between community groups. The total population of Teluk Merbau Village is approximately 2.085 people, consists of 1.077 male and 1.008 female. There are 604 heads of family in 2020 which are distributed in 3 (three) hamlets. Overall, male population in Teluk Merbau Village is more than female population, about 52%: 48% in a percentage.

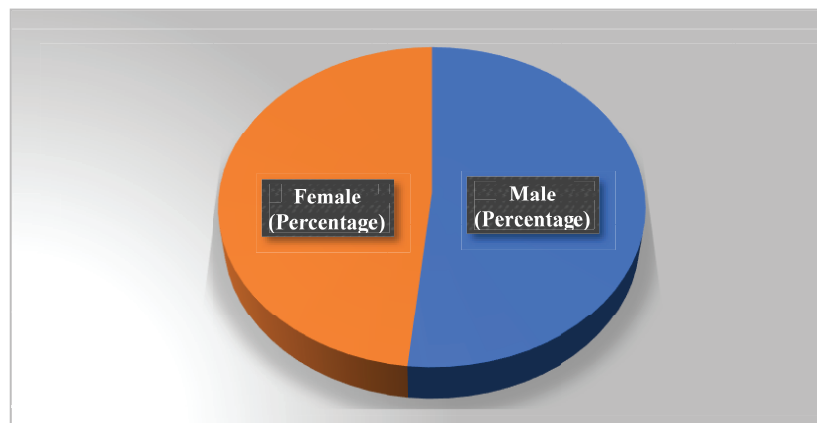


Figure 1: Comparison between Male and Female Inhabitants in Teluk Merbau Village, Siak Regency

In term of educational background, most people of Teluk Merbau Village has completed elementary school/SD at a percentage of 29.40%. Moreover, the number of people that have completed high school/SLTA reached 21.49% and those graduated from higher education (D1-S2) amounted to 6.28%.

Teluk Merbau Village is a village developed from the location intended for transmigration, thus people in this village mostly work as farmer/plantation farmer, that is 433 people of a total of 2,085 people (20.77%). Furthermore, 57 people work as entrepreneurs or about 2.73% of the total population. Detail explanation is provided in Table 3.

Land of Teluk Merbau Village is mostly used for Palm Oil Plantation and agriculture, while the rest is dryland for building and other facilities.

TABLE 2: Data of education level in Teluk Merbau Village

No	Education	Total	
		N	%
1.	Uneducated/Kindergarten	503	24.12%
2.	Elementary School (SD)	613	29.40%
3.	Middle School/equivalent (SLTP)	390	18.71%
4.	High School/equivalent (SLTA)	448	21.49%
5.	D1 s/d D3	27	1.29%
6.	S1	102	4.89%
7.	S2	2	0.10%
Total		2,085	

TABLE 3: Livelihood of Villagers in Teluk Merbau Village

No	Type of Work	Total	
		N	%
1.	Farmer	433 people	20.77%
2.	Soldiers/Police	4 people	0.19%
3.	PNS	29 people	1.39%
4.	Entrepreneur	57 people	2.73%
5.	Trader	7 people	0.34%
6.	Others	1,591 people	74.58%
Total		2,085 people	100%

3.2. Comprehension and Problems Concerning the Application of Technology in KUD Tunas Muda

KUD Tunas Muda is one of a technologically literate cooperative in Indonesia, where communication technology is already applied in its daily activity. This cooperative has applied a cooperative application, especially related to the relationship between cooperative and its members. Therefore, it is possible to choose this cooperative as the backbone in the activity of smallholder oil palm digitalization. The activity that links with the cooperative application is multi- payment service which facilitates members to pay electricity, purchase credit, and other related services.

Another plus point owned by the cooperative is a communication network that has been effectively established, thus eases the cooperative to implement the application in its activities. Almost of all provider signals are detected in this area. In fact, cooperative has already used the internet that connected to the office wifi, facilitating the activity.

However, there are also problems in the application of information technology. Members of KUD Tunas Muda, especially those above 50 years old cannot really understand the use of smartphone and computer. Another issue is that field data obtained from

the farming activity are not inputted yet to this application, such as data reporting of production, fertilizing, and maintenance that are still recorded manually, particularly by self-sufficient farmers.

3.3. Community Social Institution in KUD Tunas Muda

In performing its daily activity, KUD Tunas Muda also established partnership. Several partners of KUD Tunas Muda includes the village, Office of Agriculture and Plantation, Bank (Bank Mandiri), Palm Oil Plantation and Mills (PTPN V, PT. Sinar Agro Raya, PT Berlian Inti Mekar), middleman, input supplier, particularly fertilizer, and contractor for heavy equipment. In detail, the role of each institution is presented in Table 4.

TABLE 4: Identification and mapping of institutional access of KUD Tunas Muda

Name of Institution	Description
• Office of Teluk Merbau Village	- Central government of Teluk Merbau Village - Coordinating land and building tax payment for members of KUD Tunas Muda
• Office of Agriculture and Plantation	- Providing information about FFB price - Providing training and processing technique of oil palm plantation
• Bank Mandiri of Siak Perawang	- Keeping the members' money generated from selling FFB - Providing People's Business Credit (KUR)
• PTPN V Plantation and Palm Oil Mill	Plasma plantation and FFB selling partner
• PT. Sinar Agro Raya	FFB selling partner
• PT. Berlian Inti Mekar-	FFB selling partner
• Middleman	FFB selling partner for self-sufficient plantation
• Supplier and agent of local fertilizer	Fertilizer purchasing partner
• Supplier of fertilizer in Siak	Fertilizer purchasing partner
• Supplier of fertilizer in Pekanbaru	Fertilizer purchasing partner
• Contractor of heavy equipment	Heavy equipment procurement partner

3.4. Strength, Weakness, Opportunity, and Threat (SWOT) in KUD Tunas Muda

In performing its business, problems are often found in KUD Tunas Muda. Altogether, the strength, weakness, opportunity, and threat obtained from the result of Forum group discussions (FGD) with several stakeholders of KUD Tunas Muda are listed in Table 5.

TABLE 5: Identification of SWOT Obtained from The Result of FGD and Visitation to the Office of Agriculture and Plantation of Siak Regency

Strength	Weakness	Opportunity	Threat
<ul style="list-style-type: none"> - The role to distribute replanting fund - Facility of building, warehouse, and convenience store (waserda) - Mobile application that facilitates members to pay electricity, purchase phone credit, electricity token, and transfer money to all State-owned Bank - Members of cooperative are able to save money securely and through the sharia cooperative system - Cooperative with sharia operational system is expected to provide financial support (financing) that helps customers to meet their needs. 	<ul style="list-style-type: none"> - Member solidarity is decreasing since some members sell FFB outside the cooperative, that is to the middleman - Less awareness of the right and responsibility of members - The need for regeneration of administrators - Convenience store (waserda) is not optimally utilized - The business unit of saving and loan is not running optimally since many members do not pay loans - Payments of principal saving and mandatory saving are frequently forgotten by members - Cooperative does not have FFP grading team in oil palm mill - There are members with loan problem that causes the cooperative experiences loss since the payment is not in accordance with the agreement. 	<ul style="list-style-type: none"> - The existence of grant funds from BPDPKS intended for replanting activity for members at a nominal Rp. 25,000,000 per Ha 	<ul style="list-style-type: none"> - High number of FFB agents eliminates member solidarity since FFB is sold to the middleman - There are other institutions that also provide loans - A high number of supplier and sales marketing officer who directly sell fertilizer, medicine, electronic devices, and other household goods to consumer and other stores makes the convenience store (waserda) does not optimally run - Value Added Tax (VAT) imposed on goods sold in the convenience store (waserda) of cooperative results in higher price of goods compared to those in other stores.

4. Conclusions

1. The cooperative has experienced in applying digital activity in addition to the fact that the area is supported by the communication network. This becomes the strength of cooperative in performing digitalization of smallholder oil palm. The cooperative has many partners in conducting its activity, which also becomes the strength of cooperative to implement smallholder oil palm digitalization.
2. The thing to consider in applying digitalization is that several farmers are the first generation in the area, thus they are not familiar in using a smartphone.
3. Based on the mapping result of strength, weakness, opportunity, and threat, the strength of KUD Tunas Muda includes many facilities in the cooperative, such as mobile application, building, convenience store (waserda), and its role as replanting fund distributor. The weakness of this cooperative are the existence of members who are not loyal and have problem with the cooperative and the absence of grading team in palm oil processing plant. The opportunity of this cooperative is the fund provided by BPDPKS for replanting activity. The external threat includes middleman and free trade, where the supplier of various inputs are able to directly sell to store or consumers, thus reducing the role of KUD Tunas Muda.

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