Mapping the Potential for Digitalization of Coffee Marketing Based on Forest Village Community Institutions (LMDH) and Green Economy in Bandung Regency

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Abstract. Digital transformation is a change in how a job is handled by using information technology to gain efficiency and effectiveness, and it also includes the adoption and integration of various new information and communication technologies for the completion of sustainable solutions. This process also involves a new form of organization and a new business model. This technology is needed to increase the income of coffee farmers as members of the LMDH (Forest Village Community Institution) based on the agroforestry system (green economy). In addition, LMDH members can increase their role in the coffee supply chain by doing online marketing. The first objective of this study is to study the potential for digitizing coffee marketing based on LMDH and the green economy. The second objective is to study the factors that influence the interest of LMDH members in adopting digital platforms, namely skill level, group/LMDH factors, ability in terms of taking advantage of existing and/or emerging market opportunities, analysis of biophysical and socioeconomic conditions, and the will of local communities. The target activities include three things, namely a) mapping the potential of land, agroclimatic, and the needs of coffee farmers, b) research activities to find out how interested LMDH members are in using digital technology innovations for coffee distribution, and c) commercial activities in the form of making coffee supply chains and creating collaborative networks.

Keywords: digital transformation · marketing coffee · LMDH · green economy · Digital collaboration

1 Introduction

The notion of digital transformation includes the adoption and integration of various new information and communication technologies for the development of more efficient, flexible, and sustainable solutions for industrial systems [1]. This process also involves a new form of organization and leads to a new business model. Digital transformation

H. Nuriman et al. (Eds.): CODH 2022, ASSEHR 712, pp. 34–41, 2022.
https://doi.org/10.2991/978-2-494069-69-5_4

requires a digital collaborative network (DCN) among stakeholders in the dimension of the 4th industrial revolution and aims to balance competition and sharing which will bring many benefits to the creation of a profit strategy between collaborating parties [2]. The advantages of the rapid growth of the internet, resulting in the implementation of collaboration through the WWW (The World Wide Web) platform will go beyond the limitations of time and place, as well as expand the spectrum of collaboration [3].

Coffee farmers in Bandung Regency are partly members of the Forest Village Community Institute (LMDH), which grows coffee in forestry tree stands in an agroforestry system that is ecologically and economically beneficial. LMDH Tenjolaya has 313 members, who experience communication barriers between members and administrators [4]. Apart from that, the management is not able to know the condition of coffee cultivation in the field, coffee fruit harvest, coffee fruit quality, green bean-shaped coffee fruit stocks, and roasting coffee. When it comes to coffee marketing, the board has not been able to determine a strong position in the existing coffee supply chain in the area. Limited communication, knowledge, and better marketing methods further reduced the income of coffee farmers during the Covid 19 pandemic.

1.1 Purpose

The first goal is to study the potential for digitizing LMDH-based coffee marketing and the green economy. The second objective is to study the factors that influence the interest of LMDH members in adopting digital platforms, namely skill level, group/LMDH factors, ability in terms of taking advantage of existing and/or emerging market opportunities, analysis of biophysical and socioeconomic conditions and the will of local communities. The target activities include three things, namely a) mapping the potential of land, agro climate, and the needs of coffee farmers, b) research activities to find out how much interest LMDH members are in using digital technology innovations for coffee distribution, and c) commercial activities in the form of making coffee supply chains and creating collaborative networks. Sample Heading (Third Level). Only two levels of headings should be numbered. Lower-level headings remain unnumbered; they are formatted as run-in headings.

1.2 Research Urgency

This research is to support food security in villages, especially during the COVID-19 pandemic. This pandemic has an impact on people's purchasing power, which affects the income of coffee farmers. From the social side, there is a separation of coffee prices at the collector level with the prices obtained by farmers is different, while the quality has not met the standards. During the Covid-19 pandemic, the purchase price of coffee fruit was very low, so farmers did not harvest it or leave it in the garden [4].

This research is also useful in creating new technology-based business models and forming digital communities so that the ability of coffee farmers in terms of digital technology will increase and coffee farmers can increase their role in the coffee supply chain because they can directly connect with buyers. The digital community model is also useful as a reference for the formation of digital communities in other LMDHs in Indonesia, especially in West Java. The relationship with research programs in higher

education is an increase in the ability of young lecturers to research, the development of campus capacity in adopting digital technology, and an increase in campus statutes.

2 Literature Review

2.1 Co-innovation Platform in Agriculture

Co-Innovation platform is defined as a place for joint work to be carried out in producing innovations carried out by various stakeholders [5]. In agriculture, the Agriculture co-innovation platform (ACP) is defined as a place where innovation is generated from interactions between farmers, researchers, governments, companies, customers, and cooperation partners. The platform facilitates stakeholder interaction, agenda setting, and collective action towards sustainable agriculture development [6]. ACP'S challenge is to increase product value [7], productivity, land use and irrigation [8], sustainable production and market access [9].

Actors in the agricultural supply chain are farmers, middlemen, traders, companies providing agricultural facilities, distributors, and markets. risks and uncertainties are ubiquitous and vary in agricultural supply chains, and these supply chain failures are influenced by several factors including inclement weather, the unpredictable nature of biological processes, crop failures, distribution, and the political economy of the food and agriculture sector. another factor is the level of ability of supply chain actors to manage or control identified risks, including market risks.

Therefore, innovations in the coffee marketing system need to be implemented in farmer groups or LMDH. Co-innovation in practice requires network-level capability and legitimacy, an understanding of priorities among actors, and adequate resources, to ensure proposed outcomes are likely to be achieved [7]. Furthermore, to ensure that the interaction of the actors goes well, the project leader needs to ensure that the actors are the right mix of actors in the research program and they also need to create and encourage space for dialogue between open and honest actors to develop a shared vision of the future. The role of stakeholders to address these issues is urgently needed by establishing a co-innovation platform, as well as increasing agricultural production and productivity by increasing the adoption rate of new technologies [10]. The platform is formatted by developing key stakeholders in the development and dissemination process such as the government, private sector, researchers and farmers [8].

Furthermore [11] linking co-innovation platforms to the value chain, which suggests that technology operates more at the end of the supply chain. The disadvantage of this implementation is that there must be commercialization of farmers' products so that the adoption of technology will be more successful. For the broad adoption of a set of technology adoption practices, the enabling environment and the provision of inputs and services must work in harmony and have continuity over time [5]. Vereijssen et al. [5] state that the development of solutions from co-innovation platforms must use strategies that can adapt to local situations and conditions such as the use of local inputs.

2.2 Adoption of a Co-innovation Platform in Increasing the Added Value of Agricultural Commodities

The innovation that will be applied to this research is the creation of a digital platform for coffee marketing based on existing data at LMDH (Forest Village Community Institute) in Bandung Regency (West Java), which will form a digital community with three main networks, namely ICT (Information and Communication Technology) networks, knowledge networks and social networks. This technology is based on a green economy production system in the form of an agroforestry system, namely an agricultural system that combines agricultural crops (coffee), tree plants (forests) and pasture or grazing fields in the aisle [12]. This system is also applied in mountainous areas for landslide and flood prevention because it can absorb 0.97 million liters more water than in monoculture farming systems for every hectare of land in every one hour of rain. The combination of the components of the system with the output produced in one system becomes input in another system, making low inputs coming from outside the system so that the coffee produced is in the form of organic coffee.

There are two main drivers of the success of agricultural technology in developing countries; first is the availability and affordability of technology; The second is the farmer's expectation that adoption will remain profitable, both of which determine the extent to which farmers avoid risk. Aerni et al. [9] mentioned the lack of interaction between stakeholders in the implementation of innovations to farmers. His research in Africa reveals that the main challenges of successful adoption of agricultural innovations are (a) limited access to innovation due to lack of support from the financial sector, technology costs, lack of training, and communication infrastructure, (b) lack of farmer involvement, (c) environmental aspects especially climate change, (d) difficulty access.

Another factor driving innovation in small-scale farmers is their likelihood of participating in the commercial marketplace. The network that this innovation system builds is based on trust between actors i.e. trust among farmers can increase cooperation, lower transaction costs, raise bargaining positions in the market and allow groups of individuals to share the risks associated with the adoption of new innovations. There is some evidence that such innovations correlate positively with the power of public relations, particularly without formal sector support and intervention. Innovation on this scale also requires innovation intermediaries, namely supporting actors who facilitate interaction among farmers or between farmer innovators and formal innovation systems. The success of the functions of intermediary actors depends on their relationship with all relevant actors, their legitimacy in the eyes of each group, funds, operational capacity of non-governmental and civil society organizations, producer cooperatives, and grassroots innovation movements.

2.3 Digital Community for Coffee Marketing

The latest developments of internet-based WWW (World Wide Web) technology have made it easier for everyone to be able to communicate, participate, share with each other and form a network online, so as to disseminate their own business. Information technology can be the basis for cyber communication, which will further form cyber groups because they have interests and things that have something in common, for

example, the same interests will form a community in cyberspace [13]. Adipradana and Shihab [14] stated that the commitment of the cyber community is strongly influenced by respect for the membership, as well as trust in the community, feelings of being treated the same as other members, and support from the community.

The MSME digital community is built not only with ICT networks, but also knowledge networks and social networks. This enables MSMEs to overcome barriers and engage with current or potential stakeholders globally, and expand the horizons of businesses that generate their economic growth. Moreover, more and more MSMEs are doing online business or online interaction with partners, resulting in additional tasks on how to maintain this digital community [2].

3 Method

This study used a mix of quantitative and qualitative methods. Quantitative methods are used to calculate how many samples will be taken and then the data is taken by interviewing the number of data needed.

4 Result

Data collection is taken based on direct interviews with people in the Bandung Regency area. The mapping results taken directly are as follows (Table 1).

Based on the data taken through interviews, the education level of most farmers is high school and a small part is at the undergraduate level. Some LMDHs in the Bandung

Table 1. Mapping coffee plantation land in Bandung Regency area

LMDH Name	Land Area (Ha)	Harvested coffee (Ha)	Vegetative coffee (Ha)	New Coffee Planted (Ha)
LMDH Bukit Monteng 1	300	180	20	100
LMDH Bukit Monteng 2	50	40	5	5
LMDH Cibuliran	200	170	5	25
LMDH Dukuh Munggaran	250	200	20	30
LMDH Mekar Wangi	200	170	10	20
LMDH Neglasari	300	250	10	10
LMDH Laksana	95	60	5	10
LMDH Cimaung	300	200	20	10
LMDH Bukit Amanah	306	250	10	20

Regency area have carried out the marketing process through digital media, but only about 70% of marketing still depends on direct marketing. LMDH and farmer groups have a control role to maintain the post-harvest quality of coffee plants in accordance with the minimum standards on the market. The management of coffee products in the form of cherry, most of which is handed over by farmers to LMDH to be processed into green bean and ready-to-consume coffee. The rest is used for self-consumption. The government is expected to provide access to information to farmers about exhibition or competition information that can increase the value of products. Assistance and assistance from local and provincial governments in the form of counseling or training and some processing equipment. Some *unggulan* (excellent) products such as Wonoja Kamojang and Puntang have been able to penetrate the international market through programs bridged by the government. The coffee varieties grown are a mix of varieties ranging from Sigar Untang, Kartika, Typika, and Lini S.

4.1 Constraints

Erratic weather is one of the factors that quite a lot affects the process of harvesting and post-harvesting coffee in this region. The dry season causes many coffee plants to die of drought and coffee flowers fall off. Of course, this greatly impacts the quality of cherry coffee and the quantity of the amount of harvest that decreases in the current period. According to the manager of the Wanoja farmer group, ideally the harvest they produce per year is above 400 tons while in this period it is only able to produce 140 tons. Like farmer groups in the Puntang area, the coffee harvest produced can only be as much as 2 kg per tree.

Assistance to LMDH and farmer groups that have been socialized by the local government cannot be absorbed perfectly due to time constraints and uneven counseling themes, causing the coffee plant maintenance process, and harvesting process to not meet ideal quality standards and uniform handling. What the government usually does is only the provision of seeds and fertilizers within a certain time scale.

Limited information about the market and selling price of coffee is an obstacle for farmers to focus on processing the land they have for coffee crops so that most farmers still choose to grow vegetables.

Thus, collectors who usually buy people's coffee, only provide general information about how to harvest coffee so that the variety of quality harvested but has not yet reached the provisions of provisions to farmers regarding post-harvest coffee according to SOP and GHP which will improve the quality of the coffee produced.

Marketing so far still depends on local markets and tourists, local markets usually to shops and stalls that sell coffee, tourists themselves, namely people who visit tourist attractions located in the Bandung Regency area.

The coffee varieties used are mix Kartika, Typika, Lini S and Sigarar Utang, which are the leading varieties of arabica coffee that have been designated as superior varieties through the Decree of the Minister of Agriculture Number: 205 / Kpts / SR.120 / 4/2005.

5 Conclusion

Bandung Regency has good potential to develop a business in the coffee sector. Planting areas and marketing access are superior things that can be better developed to increase people's income. Digital access in the Bandung Regency area is quite good, therefore marketing through digital access is expected to be more developed.

The author would like to thank the Ministry of Education and Culture for funding this research through the Simlitabmas 2022 Penelitian Dosen Pemula (PDP).

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