

DESIGNING A FINTECH CROWDFUNDING BUSINESS MODEL TO SUPPORT THE SUSTAINABILITY OF SMALL-SCALE COFFEE FARMERS IN DAIRI REGENCY

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ABSTRACT

This study aims to develop a fintech crowdfunding model suitable for smallholder coffee farmers in Dairi Regency, North Sumatra. These farmers face major financing constraints due to low financial literacy, unstable coffee prices, and lack of collateral. Using a qualitative approach, the study involved in-depth interviews with 28 farmers, 3 investors, and 2 loan providers. The Business Model Canvas and Value Design Model were applied to design a solution. Results show that a lending-based crowdfunding platform can improve financial inclusion, offering flexible repayment, agricultural input access, and transparent reporting, leading to increased productivity, sustainable income, and stronger farmer investor relations.

Keywords: *Fintech Crowdfunding, Business Model Canvas, Inclusive Finance, Sustainable Agriculture, Smallholder Farmers*

INTRODUCTION

Small-scale coffee farmers in Dairi Regency, North Sumatra, face structural challenges in accessing financing, mainly due to limited collateral, low financial literacy, and unstable income (Beck et al., 2008; Tambunan, 2019). In fact, the agricultural sector, especially Arabica coffee, is the backbone of the regional economy with a contribution of around 48% to the Gross Regional Domestic Product (GDP) of Dairi Regency (BPS Dairi, 2022). However, fluctuations in coffee prices (Gilbert, 2006), climate risks (Bunn et al., 2014), and dependence on the harvest season cause farmers' capital needs to be not met in a sustainable manner.

Formal credit such as People's Business Credit (KUR) is difficult for smallholders to access due to bureaucratic processes and collateral requirements that they are unable to meet (Ledgerwood et al., 2013). On the other hand, cooperatives and microfinance institutions are often inadequate in meeting long-term investment needs and setting relatively high interest rates. This situation leads to low financial inclusion and limited development of productive and sustainable farming businesses.

In this context, crowdfunding financial technology (fintech) has emerged as a promising alternative to financing. This model allows farmers to obtain capital directly from investors without going through traditional financial institutions, with more inclusive, digital-based, and collateral-free schemes (Belleflamme et al., 2015; World Bank, 2021). In addition, the crowdfunding model also offers transparency, digital reporting, community empowerment, and wider market access (Mollick, 2014; Kamilaris et al., 2019).

To design the right and contextual solution, a business model that suits the characteristics of small-scale coffee farmers is needed. The Business Model Canvas (BMC) approach (Osterwalder & Pigneur, 2010) is used to map key elements such as customer segments, value propositions, and revenue streams. Meanwhile, the Value Design Model (VDM) (Westerlund et al., 2014) is used to analyze the process of creating, exchanging, and distributing value between stakeholders.

Previous studies support the integration of BMC and VDM in the development of adaptive and collaborative agricultural fintech models. Research by Aqmalia et al. (2024) and Rahadian et al. (2024) shows that the integration of these two approaches is able to strengthen stakeholder engagement and

increase trust and transparency in the agricultural fintech ecosystem. Successful examples of the implementation of a similar model can be found on the FarmCrowdy platform in Nigeria (Atuahene-Gima & Amuzu, 2019) which connects farmers with investors, as well as Kickstarter in the United States which has funded various community farming projects (Belleflamme et al., 2015).

Therefore, this research is important to design an adaptive, inclusive, and sustainable crowdfunding fintech business model for small-scale coffee farmers in Dairi Regency. This research is expected to provide concrete solutions to financing problems, improve the sustainability of farming businesses, and encourage the welfare of farmers as a whole.

Financial Technology (fintech) is an innovation in the financial sector that uses digital technology to improve the efficiency, accessibility, and quality of financial services (Arner, Barberis, & Buckley, 2015). Fintech encompasses a wide range of services such as digital payments, peer-to-peer (P2P) lending, investment management, and digital insurance with the support of technologies such as mobile applications, blockchain, and artificial intelligence (Gomber, Koch, & Siering, 2017).

Fintech plays an important role in expanding financial inclusion, especially for individuals and small businesses that were previously underserved by the traditional financial system (Lee & Shin, 2018). In developing countries such as Indonesia, fintech is a bridge of access for rural communities and the MSME sector (World Bank, 2020). In the agricultural sector, fintech is a potential solution for smallholders to obtain financing more easily and quickly (World Bank, 2016).

Globally, fintech has changed the face of agriculture through services such as digital payments, P2P lending, blockchain for supply chains, and agricultural insurance (Zhang, 2020). Examples of its application can be found on platforms such as FarmBee in India and FarmDrive in Kenya that help farmers access agricultural capital and information (Kumar & Sinha, 2019; Kieti & Ogallo, 2020).

In Indonesia, the growth of fintech in the agricultural sector is also growing. Platforms such as Crowde, Tanijoy, and iGrow offer P2P lending and crowdfunding-based financing to farmers (OJK, 2020). In addition to capital, the platform provides technical assistance and access to the market (Astari et al., 2019).

Fintech regulations in Indonesia are regulated through POJK No. 77/POJK.01/2016 concerning Information Technology-Based Money Lending Services. This regulation aims to protect consumers and maintain financial system stability (OJK, 2016). In addition, initiatives such as Bank Indonesia's Regulatory Sandbox encourage innovation in the fintech ecosystem in a safer manner (Bank Indonesia, 2018).

Crowdfunding itself is a method of raising funds from many individuals through online platforms to support a project or business (Belleflamme et al., 2014). Crowdfunding leverages the power of community and technology to connect project owners with potential investors (Mollick, 2014). The four main types of crowdfunding according to the World Bank (2013) are:

1. Donation-based crowdfunding, with no financial reward (usually for social purposes);
2. Reward-based crowdfunding, rewards in the form of products or services;
3. Equity-based crowdfunding, in the form of shares from funded businesses;
4. Debt-based crowdfunding (P2P lending), in the form of loans with interest.

The crowdfunding model offers more inclusive financing for smallholders, without strict collateral and complex procedures (Rahman & Islam, 2018). This scheme can also be adjusted to the farmers' harvest cycle, thereby minimizing the risk of default (Astari et al., 2019). In addition, the community approach used can strengthen trust, collaboration, and public awareness of the importance of supporting sustainable agriculture (Gerber & Hui, 2013; Brown et al., 2016).

Business models play an important role in ensuring the sustainability of the platform and its successful implementation (Teece, 2010). One of the strategic tools used is the Business Model Canvas (BMC) developed by Osterwalder and Pigneur (2010). The model consists of nine core elements: Customer Segments, Value Propositions, Channels, Customer Relationships, Revenue Streams, Key Resources, Key Activities, Key Partnerships, and Cost Structure. As a successful example, the

FarmCrowdy platform in Nigeria successfully connected smallholders with investors through a P2P lending-based crowdfunding fintech scheme (Atuahene-Gima & Amuzu, 2019).

The integration of BMC and VDM has proven to be effective in designing crowdfunding fintech platforms that are relevant to local needs, as shown in the research of Aqmalia et al. (2024) and Rahadian et al. (2024). As a complement, the Value Design Model (VDM) introduced by Westerlund et al. (2014) provides a holistic approach to value creation. The model consists of four main components:

1. Value Drivers: Access to technology, financial innovation, social and environmental impact.
2. Value Nodes: Farmers, investors, platforms, and strategic partners.
3. Value Exchanges: Funds, information, digital services, project reporting.
4. Value Extracts: Financing and training for farmers, return for investors, revenue for platforms, and partner program achievements.

Although various studies have discussed fintech crowdfunding business models, research specifically designing models based on the needs of small-scale coffee farmers in Indonesia, especially in Dairi Regency, is still very limited. The studies of Aqmalia et al. (2024) and Yossi Artika Puti et al. (2024) integrate the Business Model Canvas (BMC) and Value Design Model (VDM) approaches, but the focus has not yet touched the agricultural sector specifically. Other studies such as Prasetyo et al. (2019) and Purnamasari & Kassim (2021) highlight sharia-based business models, but do not target coffee farmers or consider the harvest cycle and local socio-economic conditions. Meanwhile, overseas research by De Meijer (2021), Filimonova et al. (2019), and Pokam Tchawa (2023) is more relevant in different geographical contexts. In Indonesia, studies such as Avisha et al. (2019) and Qalby et al. (2020) focus on the technical aspects of the platform, not on the sustainability of community-based farmers. Similar things can also be seen in the IFC (2024) and Landström et al. (2019) studies that discuss the importance of business models in access to funding, but have not yet answered the concrete challenges of smallholder coffee farmers in rural areas. Therefore, there are three main gaps that this study aims to address: (1) the absence of a fintech crowdfunding model specifically designed for small-scale coffee farmers in Dairi, (2) the lack of integration of coffee commodity characteristics and local contexts in the design of business models, and (3) the lack of an approach that combines digital innovation, business sustainability, and community participation in one integrated framework.

METHODOLOGY

This research is a descriptive-exploratory qualitative research with an interpretivism approach and inductive method, which aims to describe and explore the challenges of access to financing faced by small-scale coffee farmers in Dairi Regency and design an appropriate crowdfunding fintech business model. The population in this study includes small-scale coffee farmers, fintech crowdfunding platform providers, investors, and other related stakeholders. Samples were determined using purposive sampling techniques based on criteria of direct involvement and relevance to the research topic. The operationalization of variables is based on the key components of the Business Model Canvas and the Value Design Model, which are relevant to the goal of designing a fintech crowdfunding business model that is flexible, adaptive, modifiable, and resilient in supporting the sustainability of smallholder coffee farming enterprises in Dairi Regency.

Table 1. Operationalization of Variables: BMC & VDM-Based Fintech Crowdfunding Model.

No	Variable	Operational Definition	Source
1	Customer Segment (BMC)	Target users needing crowdfunding services (smallholder coffee farmers).	Farmers, Investors, Platform
2	Value Proposition (BMC)	Unique value for farmers (easy funding, lower cost) & investors (clear ROI).	Farmers, Investors, Platform
3	Channels (BMC)	Digital platform as delivery channel for services and funding access.	Farmers, Investors, Platform

No	Variable	Operational Definition	Source
4	Customer Relationship (BMC)	Trust and long-term relationships between farmers, investors, and platform.	Farmers, Investors, Platform
5	Revenue Stream (BMC)	Income from profit sharing, investment return, and platform commission.	Farmers, Investors, Platform
6	Key Resources (BMC)	Tech platform, market data, and professional HR supporting operations.	Farmers, Investors, Platform
7	Key Activities (BMC)	Training, tech implementation, and business sustainability support.	Farmers, Investors, Platform
8	Key Partnerships (BMC)	Strategic cooperation with government, financial institutions, and farmer associations.	Farmers, Investors, Platform
9	Cost Structure (BMC)	Development, operational, and transaction costs.	Farmers, Investors, Platform
10	Value Drivers (VDM)	Enablers such as funding access and technology for business growth.	Farmers, Investors, Platform
11	Value Nodes (VDM)	Main actors in the ecosystem: farmers, investors, fintech platform.	Farmers, Investors, Platform
12	Value Exchanges (VDM)	Fair exchange of capital, services, and value within the ecosystem.	Farmers, Investors, Platform
13	Value Extracts (VDM)	Financial gain for investors, farmer empowerment, and social impact.	Farmers, Investors, Platform

To support the process of processing and analyzing qualitative data, this study uses the NVivo 15.0 application, which allows the coding, thematic analysis, content analysis, and data mapping processes based on the Business Model Canvas and Value Design Model frameworks in a systematic and structured manner.

Testing the consistency or inter-rater relationship to the results of data encoding. One commonly used method is the Pearson Correlation Coefficient, which is a parametric statistical technique that measures the strength and direction of the linear relationship between two data sets. According to Ulber (2022), the value of the Pearson coefficient is in the range of -1 to +1. The general interpretation of the cut-off point of the correlation value is as follows:

- a) 0.00–0.199 : Very low correlation
- b) 0.20–0.399 : Low correlation
- c) 0.40–0.599 : Moderate correlation
- d) 0.60–0.799 : Strong correlation
- e) 0.80–1.00 : Very strong correlation

Correlation values that get closer to +1 or -1 indicate a stronger relationship, while values closer to 0 indicate the absence of a linear relationship.

Reliability testing technique using Inter-Rater Reliability or Inter-Coder Reliability (ICR). ICR in qualitative research is used to determine the consistency of coding results so that it requires the presence of more than one coder or rater. The approval of both coders can be expressed in the percentage of approval, ranging from 0% to 100%, coding consistency must be appropriate at least 80% of the time for good qualitative reliability. However, Cohen's Kappa coefficient is a statistical measure of reliability between raters that many researchers consider more useful than the percentage of agreement figures, because it takes into account the number of agreements that can be expected to occur by chance. The criteria for interpreting Cohen's Kappa coefficients are:

Table 2. Cohen's Kappa coefficient interpretation guidelines

Koefisien Cohen's Kappa	Information
< 0.40	Poor agreement
0.40 - 0.75	Fair to good agreement
> 0.75	Excellent agreement

Source: Fleiss, Levin, & Paik, (2003) and Budiastuti and Bandur (2018)

RESULTS

Characteristics of Smallholder Coffee Farming Enterprises in Dairi Regency

This study involved a total of 33 respondents, consisting of 2 financing platform managers, 3 investors, and 28 coffee farmers as beneficiaries of the coffee farming financing scheme in Dairi Regency. This research involves two crowdfunding financing platforms, namely the P***** Foundation, which has been operating since 2001 with 28 staff and funded by grants, and the Cooperative Tap***** which was established in 2020 with 9 staff and funded from members' savings. The foundation focuses on financing and assisting farmers, while cooperatives are more active in coordinating with local governments. In addition, the research also involved three investors, consisting of one individual and two institutions, who have experience in the agricultural sector and focus on investing directly to farmers or through ESG approaches, namely Individuals, Institutions (PT V*****), and Institutions (Banks ***).

Table 3. Demographic Profile of Small-Scale Coffee Farmers in Dairi Regency

Variabel	Category	n	%
Gender	Man	12	42.9%
	Woman	16	57.1%
Age	20-29 years old	2	7.1%
	30-39 Years	3	10.7%
	40-49 Years	14	50.0%
	50-59 Years	7	25.0%
	60-69 Years	1	3.6%
	≥ 70 Years	1	3.6%
Year of Starting to Actively Grow Coffee	≤2009	2	7.1%
	2010-2014	6	21.4%
	2015-2019	9	32.1%
	2020-2024	11	39.3%
Types of Coffee	Arabika	28	100.0%
Farmer Group Member	No	4	14.3%
	Ya	24	85.7%
Education	D1	1	3.6%
	D3	1	3.6%
	S1	7	25.0%
	SD	1	3.6%
	High School	6	21.4%
	SMA	10	35.7%
	SMP	2	7.1%
Agriculture/Digital Finance Training	Not yet	4	14.3%
	Pernah	24	85.7%
Internet Access & Smartphone	No	5	17.9%
	Ya	23	82.1%
How to Sell Coffee	Middleman	27	96.4%
	Coffee Toke/Collector	1	3.6%
Funding Assistance	Never	16	57.1%
	Ya	12	42.9%

Source: Researcher-processed data (2025)

Based on data, the majority of coffee farmers in Dairi Regency are women (57.1%) and are in the productive age of 40-49 years (50%). Most started growing coffee since 2015, with 39.3% starting in 2020-2024. All farmers grow Arabica coffee (100%) and 85.7% are members of farmer groups. Education is dominated by high school graduates (35.7%), and 85.7% have participated in agricultural or digital finance training. As many as 82.1% have internet access and smartphones. However, 96.4% still sell coffee to middlemen, and 57.1% have never received funding assistance.

Table 4. Land Area of 28 Coffee Farmers in Dairi Regency

Information	Value
Average (average)	0.67 hectares
Maximum (max)	2.5 hectares
Minimum (min)	0.12 hectares

Source: Researcher-processed data (2025)

Data shows that the average land area managed by coffee farmers in Dairi Regency is 0.67 hectares. This figure reflects that the majority of coffee farmers are small-scale farmers (people), who usually have limited access to capital, technology, and markets. The smallest land area was recorded at only 0.12 hectares, while the largest reached 2.5 hectares. This shows that there is an inequality in the scale of business between farmers, although in general this group is still included in the category of smallholders.

The characteristics of coffee businesses in Dairi Regency can be seen from various aspects, ranging from the area of planting, production, to the existence of the processing industry. The characteristics of the coffee business in Dairi Regency are as follows:

Table 5. Area of Arabica and Robusta Coffee in Dairi Regency per District (2023–2024)

District / Sub-district	Arabica Coffee 2023 (ha)	Arabica Coffee 2024 (ha)	Robusta Coffee 2023 (ha)	Robusta Coffee 2024 (ha)
Sidikalang	1.102,1	1.117,1	-	-
Berampu	430,1	430,1	122,5	122,5
Sitinjo	673,0	673,0	-	-
Parbuluan	3.487,0	3.486,0	15,0	15,0
Sumbul	6.938,5	7.023,5	466,0	402,0
Silahisabungan	12,5	12,5	6,5	6,5
Silima Pungga-Pungga	59,0	59,0	952,2	902,0
Lae Parira	147,5	148,5	549,0	499,0
Siempat Nempu	160,3	160,3	905,4	804,0
Siempat Nempu Hulu	364,8	364,8	593,0	563,0
Siempat Nempu Hilir	-	-	263,0	263,0
Tigalingga	2,0	2,0	209,0	159,0
Gunung Sitember	42,0	42,0	434,0	234,0
Pegagan Hilir	793,3	793,3	521,0	421,0
Tanah Pinem	45,5	51,0	20,0	20,0
Total Kabupaten Dairi	14.257,6	14.363,1	5.056,6	4.411,0

Source: Researcher-processed data (2025)

Based on data on the area of plantation crops by sub-district and plant type in Dairi Regency in 2023 and 2024, it is known that the area of Arabica coffee plants has increased significantly, from 14,257.6 hectares in 2023 to 14,363.1 hectares in 2024. This increase shows that there are sustainable efforts in maintaining and developing Arabica coffee cultivation as one of the region's leading commodities. The sub-district with the largest arabica coffee area is Sumbul District, which increased from 6,938.5 hectares in 2023 to 7,023.5 hectares in 2024. An increase was also seen in Sidikalang and Tanah Pinem, indicating that these areas are still active in developing Arabica coffee plantation areas. Meanwhile, several sub-districts such as Sitinjo, Silima Pungga-Pungga, and Siempat Nempu Hulu showed stable figures.

On the other hand, the area of robusta coffee has actually decreased completely, from 5,056.6 hectares in 2023 to 4,411.0 hectares in 2024. The decline was quite striking in Sumbul District (from 466.0 to 402.0 ha), Silima Pungga-Pungga (from 952.2 to 902.0 ha), and Siempat Nempu (from 905.4 to 804.0 ha). These results show a shift in focus from robusta to arabica coffee cultivation, or it could be due to other factors such as land conversion, pest attacks, or decreased interest from farmers. In general, it is known that coffee commodities are still the backbone of the plantation sector in Dairi Regency, with the dominance of Arabica coffee that is getting stronger. However, the decline in robusta areas indicates that there is an imbalance in development between commodities that can have an impact on the diversification of farmers' income and local economic resilience. Therefore, policies are needed that not only encourage an increase in coffee production, but also maintain a balance in the development of these two types of coffee so that there is no dependence on one type of commodity. The local government also needs to strengthen support for coffee farmers through the provision of superior seeds, environmentally friendly

cultivation training, fair market access, and innovative financing of the fintech crowdfunding model to support the sustainability of coffee agribusiness in Dairi.

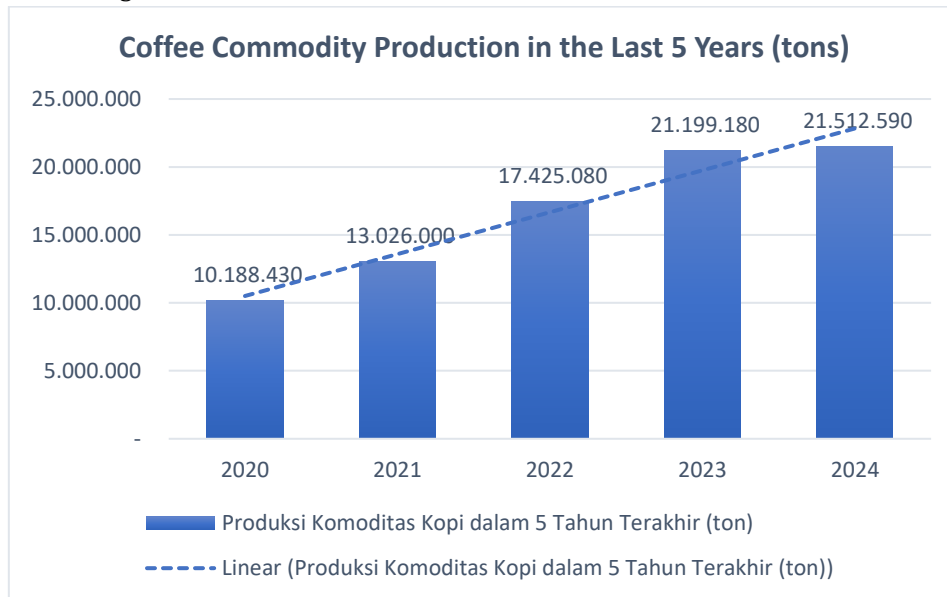


Figure 1. Coffee Commodity Production for the Period 2020-2024

Source: Researcher-processed data (2025)

Based on the graph of Coffee Commodity Production in the Last 5 Years (tons), it is known that there is a significant trend of increasing coffee production in Dairi Regency from 2020 to 2024. In 2020, coffee production was recorded at 10,188,430 tons and experienced a consistent increase every year, namely to 13,026,000 tons in 2021, 17,425,080 tons in 2022, 21,199,180 tons in 2023, to reach 21,512,590 tons in 2024. This increase shows that the coffee farming sector in Dairi Regency has very high and sustainable growth potential, both in terms of productivity and its contribution to the local economy.

Designing a Fintech Crowdfunding Business Model: Business Model Canvas

The fintech crowdfunding Canvas (BMC) model was developed to answer the real needs of the main players in the small-scale agricultural financing ecosystem, especially in Dairi Regency. Investors, both individuals and institutions, convey the need for data transparency, periodic reports, and reasonable returns with measurable risk. They also showed interest in impact investing, especially in the coffee sector which has high market value and sustainability. On the other hand, farmers conveyed their main challenges, namely limited capital, market access, and lack of digital and financial literacy. However, farmers showed enthusiasm to develop, were open to technology, and appreciated the direct assistance from field officers or agricultural extension workers. Meanwhile, the platform emphasized the importance of the involvement of various partners such as cooperatives, PPLs, and regulatory institutions to maintain the trust and integrity of the system.

The designed business model includes nine main components: (1) customer segments include novice investors, CSR institutions, young farmers, and farmers that have not been reached by conventional financial institutions; (2) value proposition in the form of unsecured financing, transparent reporting, technical assistance, and post-harvest payment schemes; (3) communication channels utilizing Android applications, WhatsApp, farmer group meetings, and social media; (4) customer relationships are built through real-time reporting systems, field visits, as well as trust-based approaches and continuous education; (5) the source of income comes from transaction commissions, CSR cooperation, and farmer project profit sharing schemes; (6) key activities include farmer verification, project selection, education, and reporting to investors; (7) key resources include technology systems, field HR, and local partner networks; (8) key partners consisting of cooperatives, coffee agents, PPL, agricultural insurance, OJK, and Kominfo; and (9) a fee structure that includes application development, field verification, training, and marketing. This design reflects the synergy between technology, institutions, and socio-economic needs, so that it is expected to be able to support the sustainability of farmers' businesses and create a fair and transparent investment ecosystem.

The Pearson correlation coefficient test was used to assess the strength of the relationship between coding results. Additionally, Inter-Rater Reliability was tested using Cohen’s Kappa to evaluate the consistency of coding, requiring more than one coder or rater.

Table 6. Correlation and Inter-Rater Reliability Test

Coding Topic	Test Type	Score	Interpretation
Fintech Crowdfunding Business Model for Smallholder Coffee Farmers in Dairi Regency	<i>Pearson Correlation Coefficient</i>	0,407	Moderate and significant correlation
	<i>Cohen’s Kappa Coefficient</i>	0,864	<i>Excellent Agreement</i>

Based on NVivo 15 analysis, the average Pearson correlation coefficient score was 0.407, indicating a moderate and statistically significant correlation among coding categories. The average Cohen’s Kappa coefficient was 0.864, which falls under the category of *excellent agreement*, indicating very high reliability in the qualitative data coding.

The Business Model Canvas for the Fintech Crowdfunding Platform Supporting Smallholder Coffee Farmers in Dairi Regency reflects a well-structured, multi-stakeholder ecosystem designed to create mutual value among farmers, investors, and the platform itself. In the Key Partners section, the platform collaborates with various actors such as cooperatives (Gapoktan), local governments, agricultural extension agents (PPL), insurance providers, and regulatory institutions like OJK and Kominfo, reflecting an integrated network crucial for risk mitigation and operational legitimacy. The Key Activities are clearly segmented based on stakeholder roles: investors engage in project evaluation and fund tracking, farmers are responsible for data input and implementation, while the platform focuses on verification, monitoring, education, and digital application development. This distribution of tasks supports transparency and ensures accountability at all levels. The Value Propositions emphasize a triple-win framework: investors gain socially impactful investments with competitive returns; farmers access collateral-free financing, improved market access, and agricultural support; and the platform ensures data protection, fair financing mechanisms, and shared benefits across actors. These value propositions are tailored to address specific pain points and aspirations of each segment.

In terms of Customer Relationships, the platform fosters trust through transparency, regular reporting, and personalized support. Investors benefit from real-time updates and responsive communication, while farmers receive field assistance and empathetic engagement. Long-term relationship building, especially with farmers, is a core strategy that enhances retention and loyalty. The Customer Segments are also well-targeted: the investor base includes socially conscious urban individuals and CSR institutions, while the farmer segment focuses on smallholder coffee growers, particularly younger and tech-adaptive farmers with limited access to traditional financing. This segmentation demonstrates alignment with the broader goal of financial inclusion and rural empowerment.

The Key Resources supporting the model include digital infrastructure (dashboards, databases), skilled human resources (tech team, trainers, field staff), and physical assets (farmland, mobile access). These resources are fundamental for ensuring the platform’s scalability and service delivery. In terms of Channels, the platform employs a blend of digital (apps, websites, dashboards) and offline (farmer groups, PPL visits, village meetings) strategies, recognizing the technological limitations in rural areas while leveraging digital tools for efficiency and scale. The Cost Structure is primarily driven by operational costs such as staffing, platform development, marketing, insurance, and compliance. However, a unique aspect is the shared risk approach: both farmers and investors are partially protected from losses, reinforcing a sense of collective responsibility and resilience. Finally, the Revenue Streams include platform fees, transaction commissions, white-label services for CSR initiatives, and farmer training incentives. For investors and farmers, returns come not only in financial terms but also through impact, recognition, and improved yields highlighting a hybrid model of financial and social return on investment. In conclusion, the BMC demonstrates a comprehensive, inclusive, and impact-driven approach to financing smallholder agriculture through fintech crowdfunding. It integrates technology, human connection, and institutional partnerships to create a scalable and sustainable business model that supports both rural development and ethical investing.

Table 7. Business Model Canvas Planning *Fintech Crowdfunding*

Business Model Canvas		Designed for: Designing a Fintech Crowdfunding Business Model	Designed by: Denny Indra Simson Simangunsong	Date: 19-05-2025	Version: 01
Key Partners <ul style="list-style-type: none"> Investor: Coffee agent, Capex/Inv, Risk Insurance, Investment auditor, KYC provider, OIR Farmer: Capitalism, Family/Friends, local NGOs, PPL (Agriculture Office), Suppliers, Middlemen Platform: Investor community, Agricultural insurance, Payment gateway, KYC/AML provider, OIR/Reamatic, Field staff, Shops/farmer-cooperatives 	Key Activities <ul style="list-style-type: none"> Farmer project due diligence Interaction with farmers & platforms Risk management & fund tracking Customer service & transparent reporting Farmer: Farm data input Plan & schedule Periodic digital reports Business implementation according to plan Platform: Verification and selection of farmers Project monitoring & investor reporting Farmer assistance and education Transaction & app development Harvest assessment & traceability 	Value Propositions <ul style="list-style-type: none"> Social impact investing Competitive returns on deposits Transparency of farmer and project data Mutual benefit for all parties Farmer: Easy access to capital without collateral Better selling & market prices PPL Assistance & Cultivation Training Post-harvest payment scheme Fair process, tool support & tutor feasibility Platform: Fair & transparent financing system Complete facilities (reporting, traceability) Farmer data protection (third-party guarantee) Models for the Harvest Season Collaboration benefit all parties 	Customer Relationships <ul style="list-style-type: none"> Investor: Dashboard personal investor Customer support via WA, chatbot, call center Periodic reports of projects & milestones Real-time notifications (email, WhatsApp, app) Farmer: Field staff assistance Long-term relationships based on trust Regular communication & in-person visits Capital assistance and an empathetic approach Platform: Commitment to transparency & consistency Ongoing program for active investors & farmers Direct mentoring & field visits Continuous communication management & reporting 	Customer Segments <ul style="list-style-type: none"> Investor: <ul style="list-style-type: none"> Beginner investors who want to learn micro-investing with low risk Urban investors care about social impact (green investing) Coffee community & coffee lovers CSR institutions that want to distribute impact funds Farmer: <ul style="list-style-type: none"> Independent and progressive smallholder coffee farmers Young farmers (millennials) who are open to technology Farmers with limited capital from conventional financial institutions Farmers who are ready to cooperate and receive assistance 	
Cost Structure <ul style="list-style-type: none"> Investor: <ul style="list-style-type: none"> Platform service fees (1-2%) Fair profit-sharing scheme Risk of loss borne jointly 0-10 billion loan ceiling Farmer: <ul style="list-style-type: none"> Low loan interest & light installments Flexible repay (flexi repayment) Payment delay/extension facility Payment for each harvest season No deduction from sales Shared risk Platform: <ul style="list-style-type: none"> Operational & HR costs Risk insurance & data protection Marketing & education costs Platform development & maintenance KYC & security system Field verification (farmer survey) 	Revenue Streams <ul style="list-style-type: none"> Investor: <ul style="list-style-type: none"> Commission (fee on funds disbursed) White-label services for CSR (reporting & branding) Referral bonus (if the affiliate system is active) Profit-sharing scheme from farmer projects Farmer: <ul style="list-style-type: none"> Increased yield = higher net income Potential market access through the platform Revenue sharing system Non-financial rewards (training, recognition, certificates) Platform: <ul style="list-style-type: none"> Transaction commission (2-5% of funds raised) CSR cooperation for social financing Impact reporting services for institutional investors Subscription/ white-label for cooperatives/NGOs 				

Business Model Design of Fintech Crowdfunding: Value Design Model

Based on the results of analysis and interviews, there are a number of main value drivers in the fintech crowdfunding business model that are the driving factors for creating value for all actors in the ecosystem, especially small-scale coffee farmers. First, market access is an important key so that farmers no longer depend on middlemen and have the opportunity to sell their crops at a fairer price. Second, the accessibility of agricultural inputs such as fertilizers, superior seeds, and modern agricultural technology helps to improve production efficiency and quality. Third, the development of farming businesses through training, technical assistance, and a simple financial reporting system makes farming more structured and measurable. In addition, the increase in the amount of production both in terms of quality and quantity also has an impact on increasing farmers' income, as well as strengthening the stability of coffee supply in the region.

In this ecosystem, there are a number of value nodes or value nodes that strengthen collaboration networks, such as Bumdes, investors, farmer groups, cooperatives, local governments, and families and farmers themselves. The existence of PPL (Field Agricultural Extension Officers) and field staff also plays a crucial role in bridging communication and ensuring the implementation of activities directly in the field. Value exchanges between these parties include financial incentives such as instalments and low interest, implicit benefits for farmers, investors, and platforms, improved crop quality, accuracy of reporting and payment, and relationships built on transparency and long-term trust.

These values are then extracted in the form of value extracts, such as easy access to fertilizers and financing, increased agricultural and financial literacy, periodic reporting, a better understanding of cultivation techniques, and bonuses as a form of financial reward. Furthermore, market price stability is a very important added value for farmers to plan their businesses more sustainably. All of these aspects show that fintech crowdfunding not only provides access to capital, but also creates a sustainable and inclusive value system for small-scale coffee farmers.

The Pearson correlation coefficient test was used to assess the strength of the relationship between coding results. Additionally, Inter-Rater Reliability was tested using Cohen's Kappa to evaluate the consistency of coding, requiring more than one coder or rater.

Table 8. Correlation and Inter-Rater Reliability Test

Coding Topic	Test Type	Score	Interpretation
Business Model Design for Fintech Crowdfunding: Value Design Model	Pearson Correlation Coefficient	0,587	Moderate and significant correlation
	Cohen's Kappa Coefficient	0,781	Excellent Agreement

Based on the NVivo 15 analysis results, the average Pearson correlation coefficient was 0.587, indicating a moderate and significant correlation between codings. The reliability test in this qualitative research used

Cohen's Kappa coefficient. The average Cohen's Kappa coefficient was 0.781, which falls into the **excellent agreement** category, indicating a very high level of reliability.

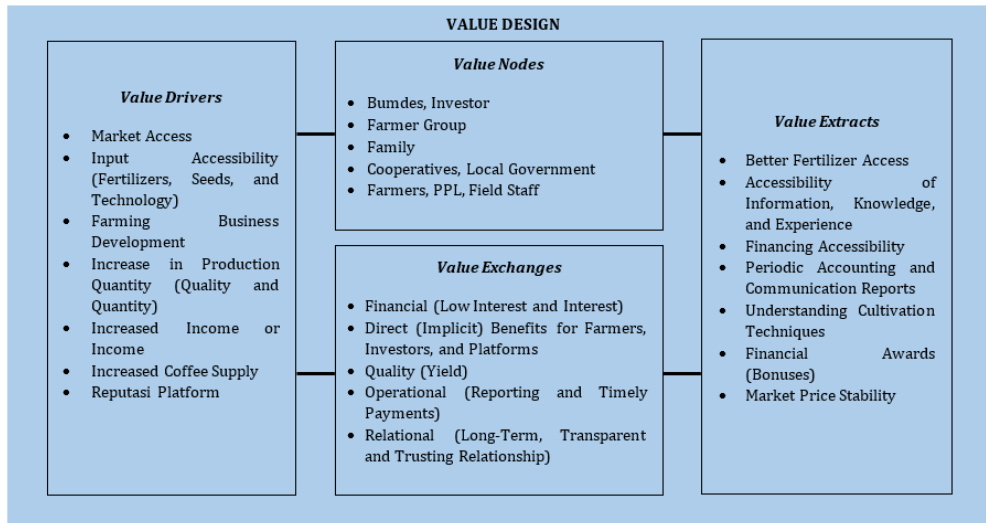


Figure 2. Business Model Design Fintech Crowdfunding: Value Design Model

CONCLUSION

This study found that small-scale coffee farmers in Dairi Regency face challenges in accessing financing due to limited collateral, low financial literacy, and minimal access to formal institutions. The financing scheme needed is flexible and community-based. The lending-based crowdfunding model is considered the most suitable because it is able to meet seasonal capital needs in a practical and safe way. As a solution, a business model based on the Business Model Canvas and Value Design Model is designed, which emphasizes the platform's reputation, potential for revenue increase, and access to technology as value drivers. Interaction between actors such as farmers, PPLs, investors, cooperatives, and local governments creates value exchanges in the form of financing and quality crops, which results in tangible benefits such as increased income, price stability, and more inclusive financing.

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