

Business Model Canvas-Based Sustainable Supply Chain Design for Banyuwangi Coffee

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Abstract

Research Backgrounds: Banyuwangi has substantial coffee production potential and a growing ecosystem of smallholder farmers, cooperatives, and coffee-processing micro, small, and medium enterprises (MSMEs). Nevertheless, the existing supply chain remains characterized by traditional transactions, dependence on intermediaries, limited post-harvest capabilities, and restricted access to premium markets. **Introduction / Main Objectives:** This study aims to design a sustainability-oriented supply chain model for Banyuwangi coffee using the Business Model Canvas (BMC) framework. **Methods:** The study employed a mixed-methods approach with an exploratory sequential design. Data were collected through literature review, in-depth interviews, field observations, and secondary documentation. The field study focused on coffee-producing areas in Kalibaru, Glenmore, Songgon, and Gombengsari, involving approximately 20–25 informants comprising farmers, cooperative managers, and coffee-processing MSME actors. Analysis was conducted through supply chain mapping, SWOT analysis, development of the BMC, and integration of the Triple Bottom Line (TBL) principles into a Sustainable Business Model Canvas (SBMC). **Results/ Findings:** The findings show that the supply chain is primarily structured around farmers, cooperatives, and processing MSMEs, with consumers and exporters as downstream markets. The major constraints are dependence on middlemen, low value addition at farm level, limited post-harvest technology, constrained financing and logistics, and limited cooperative capacity for certification and premium-market access. The proposed SBMC emphasizes farmer empowerment, stronger cooperative functions, product differentiation, digital marketing, certification readiness, and environmentally responsible production. **Conclusions:** The model provides an integrated framework for improving economic value creation while strengthening social inclusion and environmental responsibility in the Banyuwangi coffee supply chain.

Keywords: Business Model Canvas; MSMEs; Supply chain; Sustainability; Triple Bottom Line

JEL Classification: M14; M41.

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INTRODUCTION

Coffee is a strategic agricultural commodity whose competitiveness is shaped not only by production volume but also by the organization of the supply chain, product quality, market access, and the capacity of actors to create and retain value. Recent studies on coffee and

sustainable business models indicate that supply-chain sustainability increasingly requires the integration of economic, social, and environmental considerations into business design (Kittichotsatsawat et al., 2024; Garmann-Johnsen et al., 2024). The challenge is therefore not simply to increase production, but to develop an ecosystem in which value is created, coordinated, distributed, and sustained across supply-chain actors.

Banyuwangi Regency is an important coffee-producing area in East Java. The research report underlying this article identifies approximately 12,000 hectares of coffee plantations and annual production exceeding 7,500 tons, with Arabica and Robusta as the principal types. Kalibaru, Glenmore, Songgon, and Gombongsari are identified as important smallholder coffee centers. These production characteristics, together with the distinctive geographical context of the Ijen–Raung area, provide a basis for developing differentiated coffee products and strengthening local economic linkages.

Despite this potential, the supply chain remains insufficiently integrated. The field findings indicate that many farmers sell coffee as red cherries or dried beans, while some transactions continue to depend on middlemen. This limits farmers' ability to capture downstream value. Cooperatives have an important aggregation and marketing role, but their capacity in quality management, certification, logistics, and premium-market penetration remains constrained. At the downstream level, coffee-processing MSMEs have expanded into roasted beans, ground coffee, and ready-to-drink products, but still face limitations in capital, equipment, logistics, and international market access.

Sustainability adds another dimension to this challenge. Sustainable coffee markets increasingly place attention on traceability, responsible production, farmer welfare, environmental management, and credible standards. The Business Model Canvas offers a structured way to connect these dimensions because it maps nine core elements of a business model: customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structure. Integrating TBL into BMC enables sustainability to be considered as part of the value-creation logic rather than as an additional activity outside the business model (Cardeal et al., 2022; Rugani et al., 2024).

Previous research has examined sustainable coffee supply chains and the use of business-model approaches in different geographical and industrial contexts. Kittichotsatsawat et al. (2024), for example, demonstrate the usefulness of combining sustainability measurement with business-model analysis in a coffee supply chain. However, a specific design for the Banyuwangi coffee ecosystem remains limited. Banyuwangi presents a distinctive configuration because smallholder production, cooperatives, processing MSMEs, tourism, and local branding opportunities coexist within the same regional ecosystem.

Accordingly, this study has three objectives: (1) to map the structure and flow of the Banyuwangi coffee supply chain; (2) to identify internal and external factors affecting the development of a sustainable supply chain; and (3) to formulate a Sustainable Business Model Canvas that integrates economic, social, and environmental dimensions. The study is expected

to provide a practical framework for strengthening local value creation and supply-chain coordination while offering a basis for future pilot implementation.

Recent studies demonstrate that Business Model Canvas can be used to structure sustainability-oriented coffee businesses, but important analytical gaps remain. Kittichotsawat et al. (2024) developed a sustainability measurement model for a Thai coffee supply chain by combining sustainability indicators, axiomatic design, and BMC. Mulyati et al. (2024) examined inclusive business models in West Java coffee value chains and emphasized stakeholder engagement, farmer empowerment, knowledge sharing, and context-specific business models. Meanwhile, the Triple Layered Business Model Canvas literature shows that sustainability can be embedded more systematically by connecting economic, environmental, and social value creation (Joyce & Paquin, 2016).

The present study extends this literature in a different direction: rather than designing a model for a single coffee enterprise, it treats the Banyuwangi coffee ecosystem as a territorial, multi-actor supply chain. The analytical unit is therefore the relationship among smallholder farmers, cooperatives, processing MSMEs, and downstream markets. This distinction is important because the sustainability problem is distributed across organizational boundaries: farm-level quality cannot be separated from cooperative aggregation; processing innovation depends on reliable raw-material supply; and premium-market access depends on traceability, consistent quality, and credible sustainability practices.

The conceptual contribution of this study is the formulation of a Sustainable Business Model Canvas for a territorial coffee supply chain. The model connects the nine economic BMC blocks with three cross-cutting sustainability logics—Profit, People, and Planet—and explicitly assigns strategic functions to the actors that control each part of the chain. In this sense, the novelty is not the use of BMC or SWOT independently, but the integration of supply-chain mapping, SWOT, multi-actor BMC, and TBL into one locally grounded design framework for Banyuwangi coffee.

RESEARCH METHODS

This study used a mixed-methods approach with an exploratory sequential design. The approach was selected because the sustainability problem in the Banyuwangi coffee supply chain requires an initial understanding of actors, relationships, practices, constraints, and opportunities before a business-model design can be formulated. Qualitative exploration was therefore used to identify the structure and problems of the supply chain, followed by analytical synthesis through supply-chain mapping, SWOT, and BMC development.

The study was conducted in Banyuwangi Regency, East Java, with field attention to Kalibaru, Glenmore, Songgon, and Gombongsari. These locations were selected because they represent smallholder coffee production and the activities of coffee cooperatives and processing MSMEs. Informants were selected purposively and consisted of three principal groups: coffee farmers as upstream actors, cooperative managers as aggregation and marketing actors, and coffee-processing MSME actors as downstream actors. The study involved

approximately 20–25 informants, comprising 10 farmers, 5 cooperative managers, and 5–10 MSME actors.

Data were collected through four complementary techniques. First, a literature review was conducted to establish the conceptual basis for supply-chain sustainability and BMC. Second, in-depth interviews explored product flows, information flows, marketing practices, constraints, and development strategies. Third, field observations were used to examine cultivation, post-harvest handling, processing, and distribution practices. Fourth, secondary documentation was used to obtain contextual information concerning plantation area, production, selling prices, MSME activity, and related official statistics.

The analysis consisted of five stages. First, supply-chain mapping was used to describe the movement of products, information, and financial transactions from upstream to downstream. Second, SWOT analysis identified strengths, weaknesses, opportunities, and threats affecting the supply chain. Third, the actual business model was represented through the nine components of the BMC. Fourth, sustainability dimensions were integrated through the TBL principles of Profit, People, and Planet to form the SBMC. Fifth, model credibility was strengthened through triangulation by comparing interview findings, observations, and secondary documentation. The resulting model is therefore a design proposition grounded in the empirical mapping rather than a statistical prediction of future performance.

RESULTS AND DISCUSSION

The empirical mapping identifies three principal supply-chain actors: coffee farmers, coffee cooperatives, and coffee-processing MSMEs. Consumers and exporters represent important downstream markets. The structure can be understood as an upstream–midstream–downstream system, although transactions with intermediaries may occur between these actors.

At the upstream level, farmers are responsible for cultivation and harvesting. Many farmers continue to use conventional cultivation and sell coffee as red cherries or dried beans. The form in which the product is sold is important because limited processing at farm level reduces the opportunity to capture additional value. Dependence on middlemen can also reduce farmers' bargaining position because transactions are frequently oriented toward immediate sale rather than coordinated quality-based marketing.

At the midstream level, cooperatives aggregate farmers' production and connect it with domestic markets and exporters. Their position is strategically important because cooperatives can potentially coordinate quality standards, collective processing, traceability, certification, and market access. However, the findings indicate that these functions have not yet been fully developed. Limitations in quality assurance, certification capacity, infrastructure, and market penetration constrain the ability of cooperatives to become stronger value-chain coordinators.

At the downstream level, coffee-processing MSMEs have shown substantial development. Their activities include roasting, grinding, packaging, and the production of ready-to-drink or other derivative products. These businesses can shorten distribution channels and create local demand through cafés, modern retail, tourism-related markets, and online

channels. Their main constraints are access to capital, equipment, logistics, and international markets.

The structure suggests that the central sustainability problem is not the absence of actors, but weak coordination of their complementary capabilities. Farmers provide the primary resource, cooperatives can aggregate and coordinate, while MSMEs create differentiated products and market interfaces. A sustainable model therefore needs to connect these capabilities through clearer partnerships, quality systems, traceability, and shared market development.

The SWOT analysis identifies a combination of strong production potential and market opportunities alongside structural weaknesses and external threats. The findings are summarized in Table 1.

Table 1. Analytical framework of the proposed SBMC

Dimension	Key Findings
Strengths	Large coffee area and production; Arabica and Robusta diversity; existence of cooperatives; growth of coffee MSMEs and local cafés; local-government support for coffee promotion and Ijen–Raung/Java Ijen Coffee branding.
Weaknesses	Farmers often sell cherries with limited value addition; dependence on middlemen; limited post-harvest technology for fermentation, drying and grading; constrained MSME capital and logistics; limited cooperative capacity for certification and global-market penetration.
Opportunities	Growth of specialty/third-wave coffee; expanding sustainable coffee markets; e-commerce and digital marketing; Banyuwangi tourism and ecotourism; potential partnerships with exporters and investors.
Threats	International coffee-price fluctuations; competition from other producing regions; climate-change effects on productivity and quality; limited adoption of sustainable practices; bargaining-power pressure from large firms or importers.

Source: data processed

The SWOT findings point to four strategic directions. First, the distinctive Ijen–Raung profile can be linked to specialty and tourism markets. Second, cooperatives and MSMEs can be used as channels for e-commerce, modern retail, and market diversification. Third, post-harvest capability, certification readiness, financing, and shared logistics need to be strengthened. Fourth, collaboration among farmers, cooperatives, MSMEs, government, and market partners is necessary to reduce dependence on intermediaries and respond to environmental and market risks.

The strategic implication is that sustainability should be approached as a system-level capability. Farmer training alone will not solve the problem if quality cannot be aggregated consistently; certification alone will not generate value if market access is weak; and digital marketing will have limited effect if product quality and supply continuity are not reliable.

The supply chain therefore requires simultaneous interventions across production, aggregation, processing, and market access.

Based on the supply-chain mapping and SWOT analysis, the BMC was formulated around the complementary roles of farmers, cooperatives, MSMEs, and market partners. Table 2 summarizes the nine elements.

Table 2. Summarize The Nine Elements

BMC Element	Proposed Model
Customer Segments	Domestic consumers, cafés, retail outlets, hotels, exporters, and international premium/specialty markets.
Value Proposition	Quality Banyuwangi coffee with distinctive Ijen–Raung characteristics, supported by sustainable production, local cooperative participation, and MSME processing.
Channels	Direct cooperative sales, souvenir shops, cafés/retail, digital marketplaces, social/digital marketing, and contracts with exporters.
Customer Relationships	Quality assurance, traceability, premium packaging, community-based coffee marketing, and sustained buyer relationships.
Revenue Streams	Green beans, roasted beans, ground coffee, ready-to-drink products, packaged coffee, and other differentiated coffee products.
Key Resources	Smallholder coffee plantations, farmer knowledge and labor, cooperatives, post-harvest facilities and technology, processing capabilities, and the Banyuwangi coffee brand.
Key Activities	Cultivation, harvesting, post-harvest processing, grading, roasting, packaging, certification preparation, quality control, distribution, and promotion.
Key Partnerships	Farmers, cooperatives, MSMEs, local government, coffee associations, exporters, financial institutions, investors, and market partners.
Cost Structure	Cultivation and harvesting, post-harvest processing, roasting and packaging, certification, logistics/distribution, digital marketing, and promotional activities.

Source: data processed

The BMC becomes more suitable for the Banyuwangi context when its value-creation logic is explicitly connected to the Triple Bottom Line. The integration does not replace the nine BMC components; rather, it adds sustainability criteria to decisions about resources, activities, partnerships, value propositions, revenue, and costs.

Table 3. Proposed Actor-Based Implementation Architecture

TBL Dimension	Strategic Focus	Supply-Chain Implication
Profit	Product differentiation, quality improvement, certification readiness, market diversification, and value-added processing.	Increase the opportunity to capture value beyond the sale of raw/cherry coffee and reduce dependence on a single market.
People	Farmer empowerment, cooperative strengthening, inclusive partnerships, skills development, and MSME growth.	Improve coordination, bargaining position, local employment, and participation of smallholder actors in value creation.
Planet	Environmentally responsible cultivation, waste management, soil/land conservation, and climate-resilient practices.	Reduce environmental pressure and strengthen the long-term production base, particularly in plantation areas around the Ijen highlands.

Source: data processed

The Profit dimension emphasizes that sustainability needs an economically viable foundation. Product differentiation, quality assurance, certification readiness, and processing can create opportunities for higher-value markets. However, the study does not establish a causal estimate of how much farmer income or selling prices would increase. These outcomes therefore need to be tested in a subsequent pilot.

The People dimension positions farmers, cooperatives, and MSMEs as interconnected actors rather than isolated businesses. Strengthening cooperative governance and capabilities can create a mechanism for collective marketing, quality management, shared facilities, and market negotiation. Meanwhile, MSMEs can become downstream partners for product innovation and local market development.

The Planet dimension recognizes that the continuity of the coffee business depends on the ecological condition of production areas. Environmentally responsible cultivation, processing-waste management, and conservation of plantation landscapes are therefore not merely compliance activities; they are part of maintaining the resource base of the supply chain.

The findings support a transformation mechanism in which the cooperative becomes a coordinating node connecting farmer production with downstream processing and market requirements. Farmers are encouraged to improve post-harvest handling and quality consistency; cooperatives aggregate, grade, document, and facilitate traceability; MSMEs transform beans into differentiated products; and market partners provide demand information and access. Digital channels can support direct marketing, while certification and traceability can strengthen the credibility of sustainability claims.

A practical implementation sequence can be organized into four stages. Stage 1 is capability preparation, focusing on farmer training, post-harvest handling, cooperative

management, and baseline sustainability practices. Stage 2 is supply-chain consolidation through shared drying, storage, grading, and documentation facilities. Stage 3 is market development through product differentiation, digital commerce, tourism-based promotion, and partnerships with exporters. Stage 4 is continuous evaluation using indicators related to quality, supply reliability, farmer participation, market access, product diversification, and environmental practices.

This sequence is consistent with the logic of the SBMC because changes in one component reinforce changes in other components. For example, traceability requires appropriate key activities, resources, and partnerships; premium market access requires a credible value proposition supported by quality and sustainability practices; and value-added products require processing resources, market channels, and customer relationships. The model therefore treats sustainability as an interconnected supply-chain architecture.

Theoretically, the study contributes by applying the BMC framework to a territorial agricultural supply chain and extending its logic through the Triple Bottom Line. Rather than viewing the BMC as a tool for an individual firm, the proposed SBMC treats the coffee supply chain as a multi-actor business ecosystem. This perspective is relevant because value creation in agricultural commodities is distributed across production, aggregation, processing, and marketing activities.

Practically, the model provides a basis for collaboration among farmers, cooperatives, MSMEs, government, financial institutions, associations, and buyers. For farmers, the priority is quality and post-harvest capability. For cooperatives, the priority is aggregation, traceability, certification readiness, and market coordination. For MSMEs, the priority is product innovation, packaging, digital marketing, and market diversification. For government and supporting institutions, the priority is enabling infrastructure, training, financing access, promotion, and ecosystem coordination.

The model should nevertheless be interpreted as a design proposition rather than evidence that the proposed configuration has already improved performance. The original study identifies the structure, problems, opportunities, and proposed model, but it does not report a controlled pilot or before-and-after performance measurement. Consequently, claims regarding increased income, efficiency, or export performance should be treated as expected outcomes requiring empirical validation.

A key implication of the findings is that the Banyuwangi coffee supply chain should not be understood simply as a linear sequence of transactions. The same actor can influence several dimensions of value creation. Farmers influence raw-material quality and environmental performance; cooperatives influence aggregation, traceability, bargaining, and market coordination; MSMEs influence product differentiation and consumer access. The sustainability of the system therefore depends on whether these functions are mutually reinforcing.

The proposed SBMC can be interpreted as a coordination architecture. The value proposition—distinctive and responsibly produced Banyuwangi coffee—requires

corresponding key resources, activities, and partnerships. Traceability as part of customer relationships requires data capture at farmer and cooperative levels. Premium positioning requires quality assurance and differentiated processing. Likewise, environmental claims require production and waste-management practices that can be documented. This horizontal coherence is consistent with the logic of sustainable business-model design, where sustainability is integrated across business-model components rather than treated as a separate program (Joyce & Paquin, 2016).

The model also introduces vertical coherence across the supply chain. The Profit layer is linked to value addition and market diversification; the People layer is linked to farmer participation, cooperative governance, knowledge transfer, and MSME development; and the Planet layer is linked to responsible cultivation, processing-waste management, and conservation. These dimensions should be implemented jointly because improvement in one dimension may be constrained if the other dimensions remain weak.

The indicators in Table 3 are proposed for future validation and are not reported as measured outcomes of the present study. Their function is to convert the SBMC from a conceptual design into an evaluable implementation model. This distinction is important because the present research identifies the supply-chain structure and formulates the model, whereas causal effects on farmer income, efficiency, market access, or environmental performance require a subsequent pilot and longitudinal measurement.

A pilot implementation should therefore be designed around a baseline–intervention–evaluation sequence. A selected coffee-producing village can first document baseline conditions for quality, marketing channels, farmer participation, processing practices, and environmental management. The SBMC interventions can then be implemented through coordinated action among farmers, cooperatives, and MSMEs. Subsequent measurement can examine whether the proposed coordination mechanisms produce observable changes. This research agenda would move the study from model design toward empirical model validation.

CONCLUSION

The Banyuwangi coffee supply chain is characterized by substantial production potential and an increasingly diverse downstream ecosystem, but coordination among actors remains a central challenge. The empirical mapping identifies farmers, cooperatives, and coffee-processing MSMEs as the principal actors, with consumers and exporters forming important downstream markets. Dependence on middlemen, low value addition at farm level, limited post-harvest technology, constrained financing and logistics, and limited cooperative capacity for certification and premium-market penetration are the main structural constraints identified in the study.

The proposed Sustainable Business Model Canvas integrates the nine BMC components with the Triple Bottom Line. Its central design principles are farmer empowerment, cooperative strengthening, MSME-based product innovation, market diversification, digital channels, certification readiness, traceability, and environmentally

responsible production. The model seeks to connect economic value creation with social inclusion and environmental continuity across the supply chain.

The main limitation is that the model has not yet been tested through a large-scale implementation or longitudinal performance evaluation. The next research stage should therefore conduct a pilot project in a selected coffee-producing village, such as Kalibaru or Songgon, and evaluate changes in supply-chain efficiency, farmer economic outcomes, market access, product quality, and sustainability practices. Subsequent research can also develop measurable SBMC indicators and examine whether the model can be replicated in other coffee-producing regions.

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