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SUSTAINABLE INNOVATION IN NORTHERN THAILAND'S ARABICA COFFEE COMMUNITIES

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Abstract

This study aims to develop a learning management model using design thinking to promote innovation and create a business operating model to develop the sustainable competitiveness of the Arabica coffee community business in the northern region of Thailand. The research utilized both qualitative and quantitative methods; the data were collected by gathering information from documents, in-depth interviews, observations, and focus groups by the critical informant using purposive sampling and analyzing the data with content analysis and quantitative methods; respondents from a sample of Arabica coffee consumers self-administer the questionnaire. The research results demonstrate that the process and procedures of design thinking can foster innovation by initiating problem discovery and testing with experts and business groups in the Arabica coffee community, leading to the development of prototype innovations and new products that meet customer requirements. These consistent outcomes suggest that this approach can be applied in developing new business models and innovations to create advantages further and develop sustainable competitive potential.

Keywords: Business Model, Innovation, Design Thinking, Sustainable Competitive, Community Business

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Introduction

The agricultural sector is vital to the economy, society, and well-being of people in various countries. In Thailand, 60% of the population works in this field (Luenglak, 2017), accounting for more than 30% of the national workforce, covering 6.4 million households and 40% of the area. Accordingly, it is immensely crucial in developing Thailand's structures and functions. Coffee is one of the most traded agricultural commodities and beverages consumed worldwide (Food and Agriculture Organization, 2024). In Thailand's economy, coffee is an important agricultural product with an increasing demand trend of 5.42%. It is also a source of income for farmers, approximately 5,500 million baht a year (Department of Trade Negotiations, 2019). Since it currently has a genuinely high growth trend with the continuous increase in its consumption in the country, Thailand has the potential to become one of the leading coffee manufacturers.

Coffee is grown throughout Thailand, and since 1973, the government has been encouraging the cultivation of Arabica coffee instead of cultivating opium and burning forests to shift cultivation. This initiative is carried out through cooperation between the Alternative Crops and Development of the Economy of Thailand's Mountain People Project and the United Nations (UN). At this moment, Arabica coffee is another important crop that can effectively generate income for highland farmers (Duangsingtham et al., 2023). Arabica coffee is popularly planted in Thailand (mainly in the highlands and upper northern regions); Chiangmai Thailand is ranked number 1 in production in the country (Office of Agricultural Economics, 2020).

The high plateau area in the north of Thailand is an area where the villagers in the past faced the problem of burning forests to shift cultivation and replace opium cultivation (Omko Department of Agricultural Extension, 2022) and had a strong business of growing Arabica coffee with the potential for effective community development. The hill tribe people live by running a community business related to growing Arabic coffee instead. Nevertheless, numerous challenges in production and marketing persist, necessitating adaptation to evolving consumer preferences and behaviors, which increasingly demand innovative products and services. Consequently, the community business model must evolve and utilize innovation and technology to enhance competitive capabilities and consistently elevate product value.

According to the National Economic and Social Development Plan and the Chiang Mai Provincial Development Plan for 2023-2027, enhancing community economic income necessitates innovation to cultivate competitive potential. Hence, it is imperative to study community business development, mainly focusing on local communities, as they possess the most comprehensive understanding of the area's conditions (Nurvianti & Hastuti, 2021). These efforts will enhance the production process and the value of coffee products within local communities, promoting self-reliance and environmentally friendly growth, aligning with the objectives outlined in the National Coffee Development Plan 2022-2031.

Innovation is vital in numerous organizations (Sukasiriwat & Gerdri, 2014). Therefore, it is essential to incorporate innovation into developing production processes to align with the needs of target customers and consumers. Implementing innovation and technology development can bolster the community business economy and serve as a critical foundation for the Thai economy. However, the innovation of products or services within a business does not guarantee market success. Therefore, innovations require an appropriate business model to thrive in the market (Lin et al., 2010). One valuable tool suitable for entrepreneurs seeking to invest in or improve their existing businesses is the assessment of business risks through creating a business model (Osterwalder et al., 2005).

This research aims to create an innovative business model to enhance the sustainable competitive potential of Arabica coffee community businesses in the northern region of Thailand. Moreover, the insights gained can be utilized in business operations management,

including enhancing competitive capabilities and knowledge transfer, or as a blueprint for developing similar Arabica coffee community businesses in highland areas. This initiative seeks to provide a framework for successful business management, enabling communities to achieve self-reliance and stable incomes while serving as stewards of the resources in their areas.

Literature Reviews

Competitive potential is a comparative factor used to measure one's ability or performance compared to competitors. Developing competitive potential to be ahead of competitors is a goal every country and organization has (National Innovation Agency, 2011). Thus, sustainable competition at the business level requires increasing the organization's productivity, which affects the cost and quality of products to outperform competitors (Huttasin, 2014). Therefore, developing business process innovation is necessary for potential business competition (Drucker, 1985; 1993) because it will change the production process, product delivery, technical tools, equipment, or operating system. It will help reduce production costs and increase the quality of product delivery or improve product quality (Sapsanguanboon & Auanguai, 2020; Organisation for Economic Co-operation and Development, 2005) and aims to develop innovative products that will be delivered to consumers efficiently (Organisation for Economic Co-operation and Development, 2005) for economic benefits (Utterback, 1971; 1994).

In order for a business to achieve success (Manowan, 2017), it is crucial to comprehend the Business Model as a foundational concept, like creating a strategy for a new business or startup entrepreneur (Clark et al., 2012), serving as a guideline for business planning (Manowan, 2017). The Business Model Canvas (BMC) is a tool to help design business models (Krimjai, 2022). BMC is a conceptual framework for creating new strategies and innovations resulting in systematic success in generating income and financial capability (Osterwalder & Pigneur, 2010). Its concept combines nine business aspects, including:

- a. Customer Segments: CS is the group of customers for which the business offers products or services.
- b. Value Propositions: The VP creates valuation products and services that may be innovative or new or add unique features that increase value (Taipale-Eräväla et al., 2021) to satisfy customers' needs.
- c. Channels: CH, which explains delivery channels for products and services to the customers.
- d. Customer Relationships: CR, which explains the method to care for the customer within the organization in business.
- e. Revenue Streams: RS, which explains all business systems to earn revenue.
- h. Key Resource: KR, which describes the tangible and intangible assets (Astro & Ghazali, 2022) to use in the organization's system.
- g. Key Activities: KA, which core of activities system to use in the organization.
- f. Key Partners: KP, which explains partner or supplier links with organizations.
- i. Cost Structure: CS, which explains the cost of all the business systems and relates.

BMC comprises essential elements for advancing ideas or navigating intense business competition, where maintaining competitiveness becomes challenging (Lindgardt et al., 2009). Business Model Innovation (BMI) (Osterwalder & Pigneur, 2010) is employed to generate new value and wealth for stakeholders, customers, and organizations (Saebi et al., 2017), facilitating cost management and competitive advantage (Parker & Van Alstyne, 2018) through innovation, thereby expanding economic opportunities via transformative business changes. An integral aspect of business is creating a business model prioritizing innovation (Lindgardt et al., 2009). Applying business model innovation can lead to a competitive advantage (Amit & Zott, 2001). Aungvaravong & Yanakittkul (2017) and (Lindgardt et al., 2009) divided their

analysis into two main areas: 1) creating value for products or services, which consists of 3 factors: determining customer groups, organizational goals, the value of the product or service presented to customers and determining the source of income 2) operational model which includes supply chain management factors.

Other methods are used for analysis, including SWOT analysis, to assess business situations for use in strategic decisions (Astro & Ghazali, 2022) and the potential impacts of these factors on business performance (Hollensen, 2014). Porter's (1980) Analysis of the Five Forces Porter Model is part of assessing the impact of the competitive environment in the market (Kerin et al., 2015). In analyzing business model innovation in this article, a business model innovation approach that combines BMC with creative technology is put forward value network life cycle assessment and product service systems with a sustainable strategic development framework (Jin et al., 2022).

By developing process innovations and creating innovation prototypes, considering the Design Thinking process, which is designing a solution (Lohsomboon et al., 2020) or responding to users' needs, the design thinking process has five steps. The steps (Plattner, 2019) include 1) understanding the target problem in depth (Empathize), 2) interpreting the problem (Define), 3) mobilizing unlimited imagination (Ideate), 4) creating a prototype (Prototype), and 5) Prototype testing (Test) and use to develop new business models and business model innovations have allowed businesses to compete sustainably in the market.

Research Methodology

The research utilized qualitative and quantitative methods to enhance the sustainable competitiveness of Arabica coffee community businesses in the upper northern region of Thailand. The details of this research study are structured into four main steps as follows:

Step 1: Review of theory and related research; this research's main idea and theory is the Business Model and related research documents, which consider problems and obstacles important to the promotion and economic development of Arabica coffee-growing communities.

Step 2: Studying to collect in-depth information. The key informants used purposive sampling, consisting of (1) reviewing documentary information and in-depth interviews of entrepreneurs who are leaders in producing quality Arabica coffee. (2) It is research, in-depth interviews, and focus groups with the community of Arabica coffee growers and distributors, who are critical informants for use in the innovation development process participation (Participatory action research; PAR) (Bergold & Thomas, 2012). (3) Observations and interviews to know the views of those involved or stakeholders, including consumers.

Step 3: Discuss the results with the expert panel. Using the information collected, I designed a business model canvas to discuss various issues and additional suggestions received on each issue in each component.

Step 4: Analysis and Conclusion of Research Results: The results are analyzed appropriately to become an innovative business model for the Arabica coffee-growing community business in the upper northern region to increase sustainable competitive potential. The consumer satisfaction data was collected through online questionnaires designed using Google Forms, an efficient platform for creating and administering surveys online. Respondents, consisting of a sample of Arabica coffee consumers, independently completed the questionnaire.

The population and samples used for the study were divided into four main groups. The key informants will select the sample using the Purposive Sampling method.

Group 1: to collect data from document review and in-depth interviews of selected entrepreneurs who are leaders in the quality 3 cases of Arabica coffee (Department of Agricultural Extension, 2021).

Group 2: The La Lu Community Enterprise Coffee, located in Mon Chong Subdistrict, Om Koi District, Chiang Mai Province, comprises 37 households. This community or group of farmers grows and processes Arabica coffee products for sale. They are establishing a platform to create career opportunities for individuals in the high plateau community eager to develop their potential.

Group 3: A sample group of 20 individuals was selected to represent consumers and stakeholders in the Arabica coffee community business.

The tools utilized for data collection in this research included reviewing relevant theories and research to inform the design of a semi-structured interview (Podhisita, 2021). The interview comprised open-ended questions to explore the main components of various business model canvases to collect data and validate the content. Three experts assessed the interview's consistency using the Index of Objective Congruence (IOC), ensuring a score greater than or equal to 0.50 (Phetcharot & Chamniprasat, 2004). This assessment aligned with the research objectives and definitions of key terms.

Group 4: The study focused on previous Arabica coffee consumers. The sample was determined using non-probability sampling methods, specifically purposive sampling, with a margin of error set at 0.05 or 5 percent, as per the principles outlined by Yamane (1976). The final sample size for this research comprised 400 participants. The data collection tools used in this research included a review of relevant theories and studies to guide the design. Five variables were studied using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree) through a questionnaire. The validity of the content was tested using the Index of Objective Congruence (IOC) method, evaluated by three experts, with an acceptable content accuracy value of 0.50 or higher (Phetcharot & Chamniprasat, 2004). The questionnaire was designed to align with the research objectives and definitions. To assess reliability, the questionnaire was tested on a sample of 30 participants, and the reliability was measured using Cronbach's alpha coefficient, which ranges from 0 to 1. A Cronbach's alpha coefficient greater than 0.7 indicates acceptable reliability (Taber, 2018), and the result was 0.88.

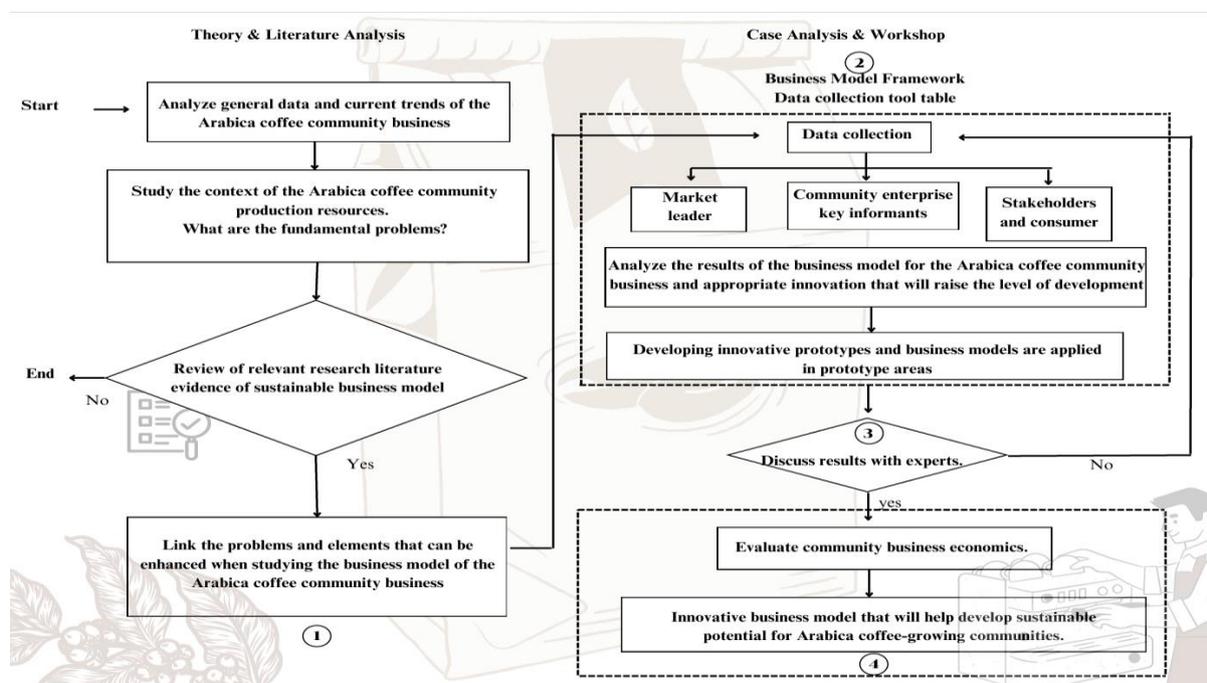


Figure 1 Method of research analysis: An extension of the methodology used

Source: Oderanti & Li (2018); Lin et al. (2010)

Research Results

The research was conducted with a specific purpose, involving the study and analysis of various data. This included reviewing theories, articles, and related research (Literature Study), as well as collecting empirical data (Empirical Study) through methods such as in-depth interviews, observation, and group discussions (Focus Group) with active participation. The analysis examined internal and external environments, including sample communities' resources, abilities, and potential. The aim was to understand various elements related to utilizing innovation and technology in the operations of Arabica coffee community businesses. This exploration sought to impact the development of business models, with particular focus on the essential components of the Business Model Canvas as outlined by Osterwalder et al. (2005). It was recognized that business model innovation plays a crucial role in fostering sustainable competitive advantage.

Developing a Learning Management Model Using Design Thinking to Promote Innovation

The empirical data collection yielded the following results: Firstly, among the three community business entrepreneurs leading the market, each employs distinct strategies with varying strengths across different components. However, a commonality exists in their emphasis on three main elements: the Value Proposition of the product they aim to present, nurturing Customer Relationships, and optimizing Distribution Channels. In-depth interviews, focus groups, and consultations with key informants from community enterprises, such as the Lahu coffee processing groups in Doi Monjong, were utilized to explore diverse strategies tailored to the potential and limitations of each community. Observations and interviews from the consumer perspective highlighted the significance of three key elements: the product itself (Product), the distribution channels (Distribution Channels), and customer relationship-building (Customer Relationship). These elements are crucial as they are tangible and directly perceptible. Data collected in this phase revealed that organizations operating within the Arabica coffee community in the highlands of Thailand face several limitations. Chief among these is the challenges posed by the vast distances between Arabica coffee-producing areas, complicating the adoption of learning technologies or various mechanisms.

Communities within this industry exhibit various business and organizational management styles, including limitations in data collection that affect their potential or ability to conduct business effectively. Strengthening the Arabica coffee community's businesses necessitates the application of creativity, skills, and knowledge in business development to enhance their image and add value to their products. This involves innovating new formats with distinctive features, meeting market demands, and adapting to evolving tastes and consumption habits. There is a growing demand for products and services that are both creative and globally competitive. Process innovation is essential for developing new products.

Based on in-depth interviews and focus group discussions within the community, a prevalent idea emerged: establishing a coffee grinder to bolster production capacity for community enterprises. This addresses the challenge of importing expensive coffee grinders from abroad, which often do not cater to the specific needs of domestic community businesses. Furthermore, developing coffee roasting machines using local materials instead of relying on imports and designing them according to the community's needs would benefit prototype coffee businesses.

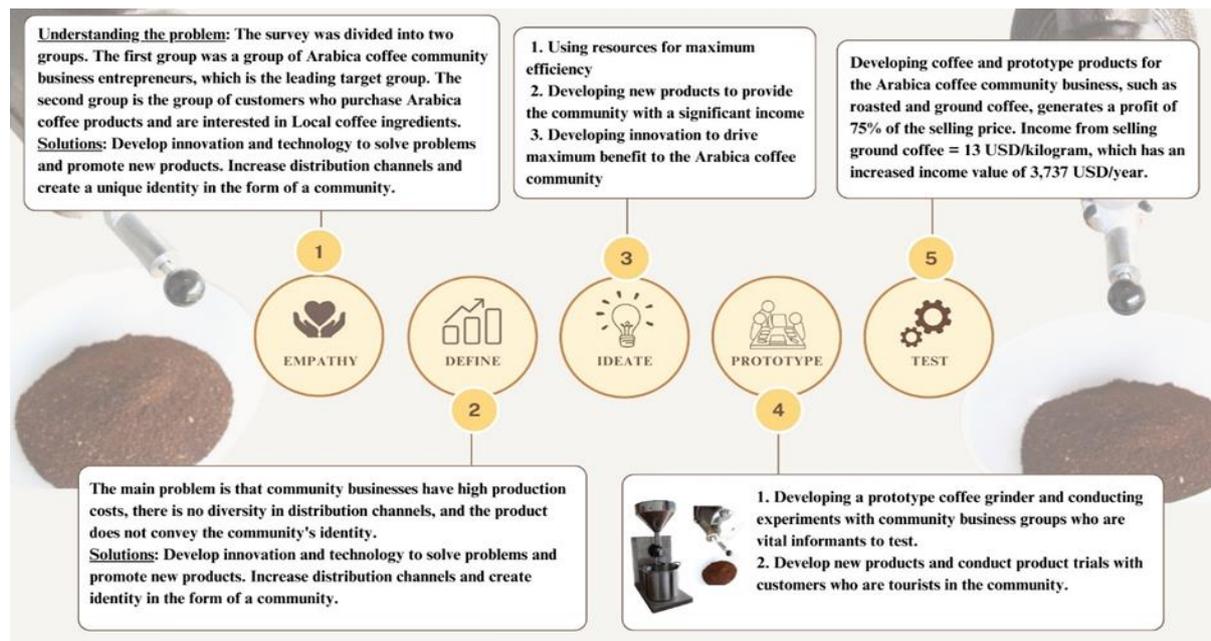


Figure 2 Applying design thinking methods to develop prototype innovations

The researcher developed a coffee grinder to address the challenge of entrepreneurs who require efficient coffee grinding processes, as imported grinders often pose issues such as overheating and sudden cessation of operation. This innovation underwent rigorous testing to ensure its reliability. It involved experts and Arabica coffee entrepreneurs from various sectors, including community enterprises like La Lu coffee processing group in Doi Mon Jong. The feedback from experts and entrepreneurs indicates that the coffee grinder has the potential to revolutionize business models by significantly reducing time and energy expenditure compared to traditional methods. This efficiency not only cuts down production costs but also enhances profitability.

Developing a Business Model to Develop the Sustainable Competitiveness of the Arabica Coffee Community Business

The activities and business practices are aligned with the objectives outlined in the innovation development concept. Operations are analyzed using SWOT and the Business Model Canvas (BMC) model, a valuable tool for entrepreneurs to assess their business comprehensively. This framework enables stakeholders to perceive the interrelation between the business model and its challenges. As a result of this analysis, the original business model was enhanced, leading to further development of the Arabica coffee community business's new business model.

Thailand's Arabica coffee community business has experienced a shift in community dynamics due to innovation development, evolving trends, and heightened competition in the industry. Entrepreneurs must devise a sustainable community business model to ensure continued operations. The SWOT analysis for the Arabica coffee community business canvas model is presented in Table 1, while the improvements to the Business Model Canvas (BMC) are shown in Figure 3.

Table 1 Matrix SWOT

<p>Internal Factors</p>	<p>Strength(S) 1) Coffee products receive quality certification. 2) High-quality coffee. 3) Arabica coffee is naturally grown without the use of chemicals. 4) A learning center is available to transfer knowledge from production to distribution.</p>	<p>Weaknesses(W) 1) High marketing costs. 2) Lack of a comprehensive marketing plan. 3) Insufficient production makes it difficult to expand distribution channels. 4) Limited technology for producing suitable processed coffee. 5) Modern coffee processing machinery must be imported, resulting in high costs. 6) Small farmers lack knowledge of quality standards and face issues with toxic residues. 7) The number of partners is minimal.</p>
<p>External Factors</p> <p>Opportunities(O) 1) Public agencies and the government support marketing and production activities. 2) The demand for coffee consumption is increasing within the country. 3) Consumers have more convenient options for purchasing products through online platforms. 4) The topographical conditions and climate are ideal for growing coffee. 5) The development of social media provides new opportunities for marketing activities. 6) Changing consumer Behavior presents opportunities for the products.</p>	<p>S-O Strategy 1) Utilize and enhance technology in product processing. 2) Conduct consumer surveys to generate ideas for product development. 3) Drive innovation and technology to boost profitability. 4) Partner with public agencies and the government to improve the efficiency and effectiveness of marketing and production. 5) Increase processing efficiency and enhance product quality.</p>	<p>W-O Strategy 1) Research consumer behavior to inform product development. 2) Leverage technological advancements to expand the customer base and increase profits. 3) Participate in events to attract new partners. 4) Use events and marketing activities to understand customer needs better. 5) Implement training programs for farmers. 6) Promote the Arabica coffee market both domestically and internationally.</p>

Threats(T)	S-T Strategy	W-T Strategy
1) Lack of public relations efforts, limiting widespread recognition. 2) Inconvenient access to coffee for consumers. 3) The distance between coffee production sites and markets increases transportation costs. 4) Due to limited space, Arabica coffee is grown in scattered areas of the northern highlands of Thailand, making it difficult to maintain consistent quality standards. 5) Neighboring countries are expanding their coffee-growing areas and innovating, becoming competitors to Thailand.	1) Utilize technology to enhance processing development. 2) Establish distributors capable of expanding market reach.	1) Regularly review and plan budget allocations for processing development. 2) Form additional partnerships with competitors. 3) Publicize and promote Arabica coffee products' trade domestically and internationally.

To achieve this, BMC is a pivotal tool for crafting the business innovation and sustainability development plan. Figure 3 summarizes the details of this plan, providing a comprehensive overview of the key factors influencing business operations across all nine areas. This analytical approach is crucial for gaining insights into the overall business landscape.

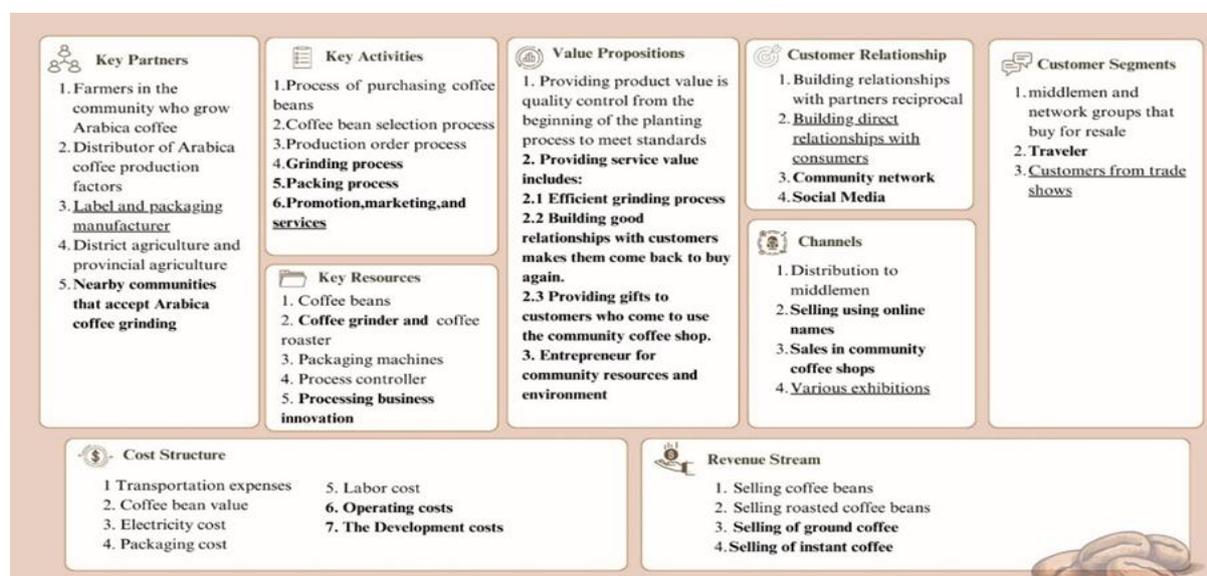


Figure 3 Business Model Arabica Coffee Community Business Development
 Description: Underline (creating), Bold (increase)

Customer Segments: The development of coffee roasting and grinding machines will offer a competitive edge, enabling operators to tailor the machine's functionalities to meet the demands of today's diverse consumer base. This innovation caters to two primary customer groups:

A. The General Consumer Group comprises local and international intermediaries and coffee shops. Their primary objective is to sustain and expand their customer base.

B. The Tourist Group, aligned with the government's tourism promotion policies targeting local communities, is anticipated to exhibit an improved trend during the COVID-19 crisis. This demographic seeks to explore and experience new products originating from local areas, reflecting the distinct characteristics of each location.

A total of 406 respondents participated in the consumer satisfaction survey regarding coffee roasting. Most of the sample were female (220) compared to male respondents (186). Most participants were company employees (28.6%), with monthly incomes ranging from 10,001 to 30,000 baht (34.7%). Over half of the respondents were single (72.9%) and held a bachelor's degree (62.1%). The analysis of consumer satisfaction was based on four factors and 19 variables, with the key findings summarized in Table 2.

Table 2 Statistical Values of The Consumer's Satisfaction Analysis

Variables	Mean	S.D.	Min	Max
The product quantity is appropriate for consumer needs	4.37	.65	3.00	5.00
The price is fair and in line with industry standards.	4.01	.72	3.00	5.00
Multiple convenient purchasing channels are available.	4.07	.68	3.00	5.00
Sales promotion activities, such as tastings, are offered	4.14	.68	3.00	5.00

Value Propositions: Developing coffee roasting machines will set businesses apart from competitors. They allow entrepreneurs to ensure quality throughout the product chain, attracting more customers. This makes quality control a selling point and creates distinctive local identities. To cultivate acceptance, loyalty, and repeat purchases, the community must uphold standards diligently.

Channels: There are three main distribution channels for products: 1) Retail sales in storefronts in communities that sell to tourists. This channel will communicate to new consumers or sell according to customer orders in nearby areas. 2) Online channels through Facebook and Line platforms. 3) Organizing activities with government and private sector agencies, such as coffee tasting activities and setting up a booth outside the venue.

Customer Relationships: We ensure customer retention by offering information and recommendations through Facebook and Line. We also try new products and track satisfaction via online communication with customers and partners.

Revenue Streams: The community seeks to boost revenue through new product development, particularly ground-roasted coffee. This generates a profit margin of 75% from the selling price, augmenting the primary income sourced from cherry and parchment coffee sales and processing roasted Arabica products, which yields a profit margin of 38.94%. The focus is on selling to tourists and local coffee shops.

Key Resource: The primary resource continuously used to circulate in business operations is coffee, a raw material in the community, financial resources, and coffee farmers' network regarding processing such as milling, roasting, and grinding to enable product development processes.

Key Activities: The main activities will consist of coffee plantation production, cherry coffee and parchment coffee processing, marketing activities in distribution, and stimulating repeat purchases from the existing customer base. An additional activity is jointly designing roasted and ground coffee products.

Key Partners: The main partners of community businesses are a network of processing plants, mills, roasters, and market operators. Private and government agencies promote coffee business activities, and nearby communities are interested in processing roasted and ground coffee.

Cost Structure: The development of roasters has led to new production processes and products; the financial analysis of the Coffee Roasting Machine is displayed in Table 3. The developing coffee generates a profit of 75% of the selling price and income from selling ground coffee of 13 USD/kilogram, with an increased income value of 3,737 USD/year.

Table 3 Financial Analysis of Coffee Roasting Machine

Indicator	Value	Conclusion
Payback Period (PBP)	1.24 years	1.24 years < 10 years, feasible
Net Present Value (NPV)	221,992 \$	NPV > 0, feasible
Internal Rate of Return (IRR)	40.51%	IRR 40.51% > loan interest rate 7%, feasible
Profitability Index (PI)	2.89	2.89 > 1, feasible
Net Profit Margin	24.47%	Before the project, 24.98%, After the project, 49.45%

The business model innovation of the Arabica coffee community business can be contrasted with the traditional business model, as outlined in Table 2. This innovation takes various forms depending on factors such as the business environment, resources, community characteristics, and management practices. It aligns with Na Ayudhaya's (2018) notion of developing innovations and business models through collaborative learning involving entrepreneurs, customers, and situational analysis. Such endeavors aim to meet customer needs and foster sustainable entrepreneurial growth, as highlighted by Trinestsampan and Ratanakuakangwan (2016).

Table 4 The Arabica coffee community business model innovation compared with the traditional business model

Business Elements	Traditional Business	Business Model Innovation
1) Customer Value Proposition	<ul style="list-style-type: none"> • Selling cherries coffee, parchment coffee, and roasted coffee. 	<ul style="list-style-type: none"> • Produce new products with more variety, such as ground-roasted coffee and instant coffee souvenirs from the community. • Community products are increasingly well-known because they can develop and create a unique identity to sell directly as community products.
2) Key Process	<ul style="list-style-type: none"> • Middlemen 	<ul style="list-style-type: none"> • Online • It is sold in coffee shops in tourist rest areas. • Promotion of sales through online media
3) Key Resource	<ul style="list-style-type: none"> • The main partners are middlemen, distributors, and farmers in the community. 	<ul style="list-style-type: none"> • Innovation and technology used in coffee grinders reduce costs and are suitable for use. • The leading partner that has increased is tourists.

4) Profit Formula Costs Revenue	<ul style="list-style-type: none">• The cost is high because employees must be hired to wait for production while the grinder is hot. Most community businesses rely on the grinder from an intermediary, and the operating distance is quite far from the community.• The primary income comes from selling products to intermediaries for distribution.	<ul style="list-style-type: none">• Costs are lower because there is no need to hire additional employees. After all, the machine does not generate heat during grinding.• Promotion through online media is low-cost and allows for broader exposure.• Income comes from various products, such as ground coffee ready-to-brew, instant coffee
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Conclusion and Discussion

In Thailand, coffee cultivation in the upper northern region has been part of forest conservation for over three decades. Arabica coffee, an economic crop, requires high-altitude areas and shade from large trees to protect it from direct sunlight. Coffee farming helps improve community income and promotes the expansion of conservation forests. This effort is supported by government agencies, development projects, and Non-Governmental Organizations to create sustainability between the economy and the environment (Meesaeng, 2022).

According to the researcher's survey, selling coffee beans alone is insufficient for generating sustainable income. As a result, a coffee grinder was developed that is easy to use and suitable for the community's context to add value to local coffee products. This grinder allows farmers to process coffee beans into roasted and ground coffee that is ready for sale, increasing income and creating a unique identity for coffee products. This concept aligns with the work of Azavedo (2024), who stated that adding value to products and building brand identity are critical factors in enhancing the competitiveness of community goods in the market.

A financial analysis of coffee roasters revealed their high investment worth. The payback period (PBP) is 1.24 years, significantly shorter than 10 years, indicating financial feasibility. The net present value (NPV) is 8,228,005.07 Baht, which is positive, showing profitability. The internal rate of return (IRR) is 40.51%, much higher than the loan interest rate of 7%, suggesting an attractive return. The profitability index is 2.89, greater than 1, indicating the project's profitability. This analysis supports the findings of research by Dai et al. (2022), who noted that investment projects with a PBP shorter than 3 years and an IRR exceeding the market interest rate are typically economically viable. This coffee roaster's development also positively impacts community business expansion. Communities can open local coffee shops with a natural ambiance or host activities to attract tourists. These activities generate direct income and add charm to the area while enhancing the image of local coffee. This concept aligns with the research of Richards & Wilson (2006), which indicated that creative product development tied to tourist experiences can sustainably add value to community goods and services. Alongside developing local activities, online marketing is crucial in promoting and increasing customer access. Various online channels help expand the customer base and boost the popularity of coffee products. This finding is consistent with the study by Tran et al. (2024) and Dai et al. (2022), which showed that online marketing significantly enhances the competitiveness of local communities. These approaches help increase community income and promote the sustainability of highland coffee cultivation. They balance economic development and natural resource conservation while fostering pride in the identity of local coffee, making it widely recognized.

Research Recommendations

This research study focuses on the specific context of Arabica coffee products. Those interested in exploring business model planning for communities with similar product formats and characteristics can apply these findings to various contexts. However, one should consider the potential or limitations of each community's operations before choosing the most appropriate model similar to your organization to increase efficiency and potential to compete with existing competitors within the industry and provide maximum benefit and efficiency to the organization; the following research should collect data with a larger sample size, for completeness and accuracy of the variables used to develop the conceptual framework to be a guideline that can apply to other industries.

References

- Amit, R., & Zott, C. (2001). Value creation in E-business. *Strategic Management Journal*, 22(6-7), 493-520.
- Astro, Y., & Ghazali, A. (2022). The Use of Marketing Mix and Business Model Canvas to Improve Sales Performance in MSME (Case Study: Waroeng 17). *International Journal of Current Science Research and Review*, 5(4), 1323-1332.
- Aungvaravong, C., & Yanakittkul, P. (2017). Business Model Analysis of Health-Supplement Product from the Organic Rice-Powder Drink. *University of the Thai Chamber of Commerce Journal Humanities and Social Sciences*, 37(4), 92-109.
- Azavedo, M. (2024). Arabica Coffee Growing in the Chiang Rai and Chiang Mai Areas of Northern Thailand and How to Make the Farming More Sustainable. *British Journal of Environmental Studies*, 4(2), 9-19.
- Bergold, J., & Thomas, S. (2012). Participatory Research Methods: A Methodological Approach in Motion. *Forum Qualitative Sozialforschung Forum: Qualitative Social Research*, 13(1), Art 30.
- Clark, T., Osterwalder, A., & Pigneur, Y. (2012). *Business Model You: A One-Page Method for Reinventing Your Career*. New Jersey: John Wiley & Sons.
- Dai, H., Li, N., Wang, Y., & Zhao, X. (2022). *The Analysis of Three Main Investment Criteria: NPV IRR and Payback Period*. A paper presented at the 7th International Conference on Financial Innovation and Economic Development, Harbin, China.
- Department of Agricultural Extension. (2021). *The Winner Thai Coffee Excellence 2021*. Retrieved from www.doa.go.th/hort/wp-content/uploads/2021/12/โครงการประชาสัมพันธ์สุดยอดกาแฟไทย-ปี-2564-Thai-Coffee-Excellence-2021-1.pdf.
- Department of Trade Negotiations. (2019). *Coffee products*. Retrieved from www.dtn.go.th/th/file/get/file/.
- Drucker, P. (1985). The Discipline of Innovation. *Harvard Business Review*, 63, 67-73.
- Drucker, P. (1993). *Post Capitalist Society*. New York: Harper Business.
- Duangsingtham, S., Prapatigul, P., Sreshthaputra, S., & Phayakka, N. (2023). Arabica coffee production conditions of Ban Pang Hai farmers Thep Sadet Subdistrict, Doi Saket District, Chiang Mai Province. *Khon Kaen Agriculture Journal*, 1(Suppl), 83-89.
- Food and Agriculture Organization. (2024). *Markets and Trade*. Retrieved from www.fao.org/markets-and-trade/en.
- Hollensen, S. (2014). *Marketing Management*. 3rd ed. London: Pearson Education Limited.
- Huttasin, N. (2014). The evolution of the competitiveness concept development: the modernization process perspective. *Journal of Management Science, Ubon Ratchathani University*, 3(6), 68-91.
- Jin, Y., Ji, S., Liu, L., & Wang, W. (2022). Business model innovation canvas: a visual business model innovation model. *European Journal of Innovation Management*, 25(5), 1469-1493.

- Kerin, R., Hartley, S., Rudelius, W., & Theng, G. (2015). *Marketing in Asia*. 3rd ed. Singapore: McGraw-Hill Education.
- Krimjai, N. (2022). Businesses Transitioning to a New Normal Way with the Canvas Business Model. *Journal of Suvarnabhumi Institute of Technology (Humanities and Social Sciences)*, 8(1), 66-78.
- Lin, S., Liu, J., Wei, J., Yin, W., Chen, H., & Chiu, W. (2010). A Business Model Analysis of Telecardiology Service. *Telemedicine and e-Health*, 16(10), 1067-1073.
- Lindgardt, Z., Reeves, M., Stalk, G., & Deimler, M. (2009). *Business model innovation: When the game gets tough, change the game*. Retrieved from https://web-assets.bcg.com/img-src/BCG_Business_Model_Innovation_Dec_09_tcm9-121706.pdf.
- Lohsomboon, N., Pichayapaiboon, P., & Sangvanich, K. (2020). Design Thinking PROCESS to Create Innovative Art Expression. *Journal of Education and Innovation*, 22(1), 343-354.
- Luenglak, S. (2017). *History of Agricultural Development*. Retrieved from www.eco-agrotech.com.
- Manowan, D. (2017). How to Design a Successful Business Model. *Christian University Journal*, 23(4), 655-667.
- Meesaeng, S. (2022). *Growing Coffee for Sustainable Agriculture: Pangkhon Village in Chiang Rai*. Retrieved from <https://th.boell.org/en/2022/07/15/coffee-chiangrai>.
- Na Ayudhaya, A. (2018). Business Model Innovation: A Solution for Thai Music Business in Thailand 4.0 Era. *Journal of Business, Economics and Communications*, 13(3), 1-14.
- National Innovation Agency. (2011). *Innovation Strategy Annual Report 2011*. Retrieved from www.nia.or.th/%28Annual%20Report%202011%29.
- Nurvianti, & Hastuti. (2021). Community Participation in the Development of Taman Sari Tourism Village, Yogyakarta, Indonesia. *Journal of Sustainability Science and Management*, 16(5), 263-287.
- Oderanti, F., & Li, F. (2018). Commercialization of eHealth innovations in the market of the UK healthcare sector: A framework for a sustainable business model. *Psychology & Marketing*, 35(2), 120-137.
- Office of Agricultural Economics. (2020). *Arabica coffee, an economic crop in the highlands, Chiang Mai Province*. Bangkok: Office of Agricultural Economics.
- Omkoï Department of Agricultural Extension. (2022). *Outstanding plants of Omkoï District*. Chiang Mai: Omkoï Department of Agricultural Extension.
- Organisation for Economic Co-operation and Development. (2005). *Scope of the Manual. In OECD. Oslo manual: Guidelines for Collecting and Implementing Innovation Data*. 3rd ed. Paris: OECD Publishing.
- Osterwalder, A., & Pigneur, Y. (2010). *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*. New Jersey: Wiley.
- Osterwalder, A., Pigneur, Y., & Tucci, C. (2005). Clarifying Business Models: Origins, Present, and Future of the Concept. *Communications of the Association for Information Systems*, 16, 1-25.
- Parker, G., & Van Alstyne, M. (2018). Platform Strategy. In M. Augier, & D. Teece. (eds.). *The Palgrave Encyclopaedia of Strategic Management* (pp. 1290-1298). London: Palgrave Macmillan.
- Phetcharot, L., & Chamniprasat, A. (2004). *Research Methodology*. Bangkok: Pimdeekarnpim Company Limited.
- Plattner, H. (2019). *An Introduction to Design Thinking PROCESS GUIDE*. Retrieved from <https://web.stanford.edu/~mshanks/MichaelShanks/files/509554.pdf>.
- Podhisita, C. (2021). *The art and science of qualitative research*. 9th ed. Bangkok: Amarin Corporations Public Company Limited.

- Porter, M. (1980). *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. New York: Free Press.
- Richards, G., & Wilson, J. (2006). Developing creativity in tourist experiences: A solution to the serial reproduction of culture?. *Tourism Management*, 27(6), 1209-1223.
- Saebi, T., Lien, L., & Foss, N. (2017). What Drives Business Model Adaptation? The Impact of Opportunities, Threats and Strategic Orientation. *Long Range Planning*, 50(5), 567-581.
- Sapsanguanboon, W., & Auanguai, P. (2020). The Development of Innovation in Manufacturing Industry to Enhance Enterprise Competitiveness. *Journal of Administrative and Management Innovation*, 8(2), 89-100.
- Sukasiriwat, N., & Gerdri, N. (2014). Challenges and Limitations of Driving Innovation in Thai SMEs. *KMUTT Research & Development Journal*, 37(1), 119-131.
- Taber, K. (2018). The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education. *Research in Science Education*, 48, 1273-1296.
- Taipale-Eräväla, K., Salmela, E., & Lampela, H. (2021). Towards a New Business Model Canvas for Platform Businesses in Two-Sided Markets. *Journal of Business Models*, 8(3), 107-125.
- Tran, T., Sarker, M., & Nemeth, N. (2024). Digital marketing in community-based enterprises: A systematic literature review and research agenda. *Journal of Open Innovation: Technology, Market, and Complexity*, 10(4), 100414.
- Trinestsampan, N., & Ratanakuakangwan, S. (2016). Development of Business Model Using Lean Startup Methodology. *KMUTT Research and Development Journal*, 39(3), 337-351.
- Utterback, J. (1971). The Process of Technological Innovation within the Firm. *The Academy of Management Journal*, 14(1), 75-88.
- Utterback, J. (1994). Radical Innovation and Corporate Regeneration. *Research Technology Management*, 37(4), 8-10.
- Yamane, T. (1967). *Statistics: An Introductory Analysis*. 2nd ed. New York: Harper and Row.

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