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ENVIRONMENTAL UNCERTAINTY AND BUSINESS MODEL OF SATO SADED-NUM BUSINESS IN YALA, THAILAND

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Abstract

This study aimed to analyze the environmental uncertainty and business models of the Sato Saded-Num (*Parkia Speiosa* Hassk) business in Yala, Thailand. The sample included farmers, collectors, and processors/entrepreneurs involved in a research project that conducts economic activities related to Sato in five districts of Yala. Qualitative data was collected through structured interviews based on a business model framework. Environmental uncertainty was analyzed quantitatively, while business goals, issues, and development needs were analyzed qualitatively using frequency and percentage analysis. The Sato business model was analyzed qualitatively through content analysis. Three groups were identified based on environmental uncertainty: high demand and supply uncertainty, low supply and high demand uncertainty, and low demand and supply uncertainty. Business goals across these groups centered on five Sato product types: fresh, frozen, chilled, dried, and seasoned Sato. Most entrepreneurs focused on long pods/fresh Sator and peeled, halved, and frozen Sato. The primary challenges identified were customer acquisition and aligning product value propositions with market demands. The analysis resulted in a business model centered around peeled, fresh, and chilled Sato (OEM), emphasizing the value of fresh, peeled Sato. A checklist can be used to identify uncertainties that can be leveraged to align the business model with its context better.

Keywords: Environmental Uncertainty, Business Model, Sato Saded-Num, Yala Province

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Introduction

“Sato,” an identity crop of Yala Province of Thailand, is cultivated on approximately 5,739 rai of land, which is well-suited for its growth. Located 100-200 meters above sea level, these areas produce high-quality Sato with a rich flavor, commonly called “Sato Saded-Num” (premium Sato). According to the Office of Agriculture and Cooperatives in Yala, the Sato production in 2021 was 4,290 tons. The supply chain of Sato Saded-Num in Yala shows that farmers sell the majority (95%) of their produce to collectors, who purchase it directly from the cultivation areas, with only a small portion being sold directly to consumers. This led to the research project “Enhancing the Value Chain of Sato Saded-Num to Develop the Local Economy in Yala Province.” It aimed to increase income opportunities from Sato Saded-Num by restructuring its new value chain. The primary issue identified in the research is the lack of proper management to realize the full income potential from Sato Saded-Num.

Given the goals and objectives, enhancing the value of local identity crops requires improving production efficiency by upgrading the quality of inputs and planning effective production strategies. One approach to addressing these challenges is to increase customer access, build relationships, and create accessible channels for customers to communicate, thereby giving the business a competitive edge. Business models serve as the foundations of organizations, moving growth, adaptation, and sustainability (Sun & Liu, 2021). Understanding environmental uncertainty helps entrepreneurs adjust internal processes to match the changing environment (Ganbold & Matsui, 2017). This adjustment can assist in decision-making regarding harvesting and distributing agricultural products (Ahumada & Villalobos, 2011).

Based on these concepts and issues, one crucial tool for local development is promoting the geographical indications of agricultural products (Fricz et al., 2020). Studying Yala’s identity crop, particularly Sato, a promising Indigenous crop that grows well in the region and can be intercropped with other main crops, is essential. Applying a business model concept under cooperation, information exchange, and joint preliminary production planning is crucial, even in uncertain conditions (Taylor & Fearn, 2009). These conditions relate to competition, customer satisfaction, and a focus on innovation (Syed et al., 2020). In addition, the business model is a critical factor in adapting the business to align with and remain flexible in the rapidly changing business environment (Nyström & Mustonen, 2017), which can lead to market development, agricultural product distribution, and enhanced knowledge in product management. Integrating the concept of “area-people-product” will elevate the capabilities of those involved in the supply chain, from production planning and value-adding processing to marketing management. It will also foster collaboration among members, expand distribution channels, and enhance information management for production planning. This will increase the potential for entrepreneurs to gain an overall view of the Sato Saded-Num business and apply this understanding to strategy development or business adjustments. By knowing the current status and planning strategies to adapt to the circumstances (Kim & Park, 2021), businesses can reduce process inefficiencies and eliminate non-value-adding activities (Ganbold & Matsui, 2017). Although business models are fundamental to organizations, there is a limited understanding of how they interact in uncertain environments (Brillinger et al., 2020; Schneckenberg et al., 2017). A comprehensive understanding of business models is crucial to improve organizational resilience and competitiveness in dynamic market environments (Klimanov & Tretyak, 2019). The level of uncertainty varies depending on the unique characteristics of a business. Therefore, it is crucial to determine and investigate the uncertainties an individual company faces and their impact on its business model (Niemi et al., 2019). Adapting business model design under uncertainty factors will lead to a model that fits the context (Brillinger et al., 2020). Business models tend to be a framework that connects marketing strategies with consumer demands, enabling collaboration and driving

overall business success (Klimanov & Tretyak, 2019). This brings us to the analysis of environmental uncertainty and the business model of the Sato Saded-Num business in Yala.

Literature Review

Based on stakeholder theory, the design and development of business models should prioritize customers' perspectives. By integrating consumer data into their business models, enterprises can enhance their ability to meet customer needs and foster long-term relationships (Freudenreich et al., 2020). According to the firm's resource-based view (RBV), global value chains are sophisticated networks in which multinational firms from advanced economies collaborate with suppliers and partners in developing countries (Siauw & Sarpong, 2021). Entrepreneurial alertness to business ideas and opportunities can trigger proactive behaviors in response to environmental uncertainty (Yasir & Majid, 2017). Therefore, developing a new business model is the first step for microenterprises to adapt to market changes and achieve business growth (Veiga et al., 2024)

Demand Uncertainty and Supply Uncertainty

In rapidly changing market conditions, businesses face significant uncertainties, requiring them to adapt to the evolving external environment, which is crucial for survival and business development (Chen et al., 2017). The business environment has been analyzed to understand environmental uncertainty, particularly regarding demand and supply uncertainties (Ganbold & Matsui, 2017). When managers comprehend environmental uncertainties, businesses can better anticipate future events (Chenhall, 2003), enabling them to adapt operations to accommodate changes (Wang et al., 2011). Previous studies on environmental uncertainty have classified the sources of uncertainty, including supply uncertainty, customer or demand uncertainty, and technology uncertainty (Ganbold & Matsui, 2017; Li & Lin, 2006). Demand uncertainty reflects the inability to predict customer preferences or needs, especially as customers now have access to a wide range of products and demand high-quality goods. On the other hand, supply uncertainty refers to challenges in securing reliable suppliers or delivering quality raw materials on time (Li & Lin, 2006).

Business Models

Business models are widely recognized as tools for developing organizational strategies (Cortimiglia et al., 2016). Specifically, the Business Model Canvas (BMC) is a tool that highlights strengths and weaknesses, encouraging changes in business practices to create, deliver, and maintain customer value (Athanasopoulou & De Reuver, 2020). Osterwalder & Pigneur (2010) describe the BMC as a business tool for designing and mapping business models, comprising nine building blocks essential for creating, delivering, and maintaining customer value. These nine components cover four key business areas: 1) customer interface (customer segments, channels, customer relationships), 2) products and services (value proposition), 3) infrastructure (key activities, essential resources, key partnerships), and 4) financial viability (revenue streams, cost structure). The design of a business model illustrates the relationships among organizational data and components (Sachsenhofer, 2016; Wahl & Prause, 2013). Therefore, a business must design its model to explain and structure how value is created, delivered, and maintained, guiding its operations (Teece, 2018). When designing a business model, one must consider existing uncertainties to identify its components and structure (Niemimaa et al., 2019). The business model starts from a business concept connected to internal factors like the entrepreneur's capabilities and external factors like economic conditions or coordination with stakeholders (Fissi et al., 2020). This is often challenging for entrepreneurs, who must create and evaluate each component of the business model (Kajanus et al., 2014).

The nine components of the BMC (Osterwalder & Pigneur, 2010) include: 1) Customer Segmentation (CS): Customers are the heart of the business model and crucial for survival.

Therefore, businesses must understand the needs and behaviors of each customer group to tailor customer segments or distribution channels accordingly. 2) Value Proposition (VP): The value of products and services is a critical factor in retaining customers, which could be delivered through innovation or the rapid supply of new products meeting customer needs. 3) Customer Relationship (CR): This component represents the relationships businesses build with each customer group to access and retain them. 4) Channels (CH): Channels represent how the business communicates and delivers value to its customer segments, ensuring convenience before and after product delivery. 5) Revenue Streams (RS): Revenue streams represent the income businesses receive from each customer group (after expenses), depending on the pricing mechanisms and volume of products and services that meet customer demands. 6) Key Partners (KP): Key partners or networks are crucial for building a business model and helping reduce risks or the resources needed for business operations. 7) Key Activities (KA): These are activities essential for delivering value, accessing the market, and maintaining customer relationships. 8) Key Resources (KR): Key resources are the vital assets (physical, intellectual, and human resources) needed to drive the business model, encompassing value creation, market access, and customer retention. 9) Cost Structure (CS): Cost structure represents the costs incurred in executing the business model, including delivering value, building customer relationships, and maintaining customers to generate revenue.

Research Methodology

Population, Sample Group, and Sampling Method

The population for this study comprised farmers, collectors, and processors/entrepreneurs participating in the “Sato Processed Product” research project across five districts in Yala Province of Thailand: Thanto, Yaha, Mueang Yala, Kabang, and Bannang Sata Districts.

The sample consisted of individuals in the Sato industry, including farmers, collectors, and processors/entrepreneurs. The sample was selected in collaboration with the Provincial Agricultural Office, focusing on farmers and collectors who have Sato plantations and are interested in participating in the research project to enhance their income. The processors/entrepreneurs group initially consisted of 10 groups. However, due to issues in group formation, the final group of participants in the business model training workshop included eight groups, totaling 34 individuals. Sample selection was conducted in coordination with the Provincial Agricultural Office, considering the potential of the participants and their interest in joining the research project to elevate their income. The key informants were the leaders of the entrepreneur groups (e.g., group president, vice president, production committee members, marketing committee members, and secretaries), as these high-level managers have a thorough understanding of the business environment.

Data Collection

The research instruments for the quantitative method included a self-report questionnaire used by the entrepreneurs during the business model training workshop (Business Model Canvas: BMC). The questionnaire comprised three sections, based on the framework of Ganbold & Matsui (2017): 1) Characteristics of respondents, 2) Environmental uncertainty, and 3) Business problems and development needs. For the qualitative method, the research instrument was a structured interview based on the business model framework of Osterwalder & Pigneur (2010).

The data collection process for this study focused on the business model framework, designed according to the model of Osterwalder & Pigneur (2010) and the business model creation process guided by Athanasopoulou & De Reuver (2020). This process included the following steps: 1) Ideating a new business model concept, 2) Reframing and selecting a business model, and 3) Envisioning and evaluating alternative business models after six months of the Business Model Canvas (BMC) workshop (via interviews on business performance). The data collection

began with the Business Model Canvas (BMC) workshop, which followed these steps: 1) Dividing the participants into eight groups of entrepreneurs. 2) The research team conducted training on business model knowledge (BMC), and each group was asked to brainstorm and discuss business strategies based on the BMC structure. 3) The entrepreneur groups reviewed their business strategies following the BMC framework. 4) The research team instructed each group to write their goals on post-it notes within the BMC, identifying target customers and the products they plan to offer. The groups collaboratively set goals and discussed the feasibility of the business strategies within their context, prioritizing actions for future implementation (by ranking their importance).

During the business model drafting process, each group was encouraged to analyze their context and decide which products to produce or develop in the future (whether to stop, continue, or initiate new products). This was done using Post-it notes, a suitable method for designing each business model component (Osterwalder & Pigneur, 2010). Each group then prioritized the products they planned to pursue, using this prioritization to guide their goal-setting and business planning. After completing the workshop, data was collected from the entrepreneur groups to analyze the context and conditions of each group using a questionnaire. The questionnaire covered the Characteristics of respondents, environmental uncertainty, business goals, business problems, and development needs. The results were then analyzed to categorize the entrepreneur groups according to their specific context and conditions.

Data Analysis

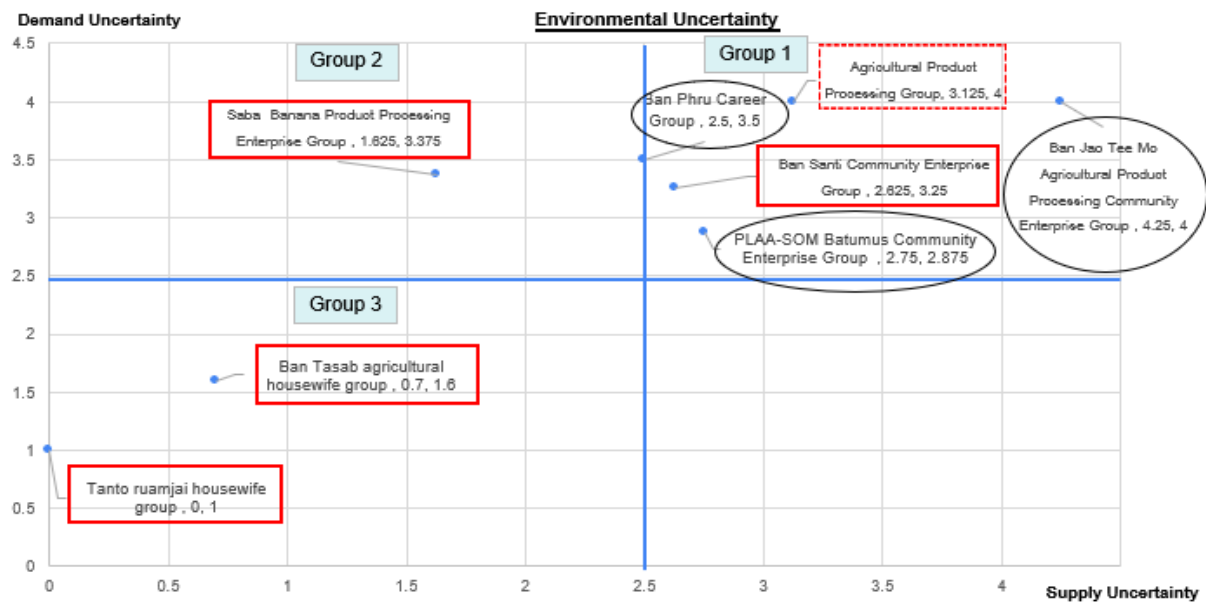
Environmental uncertainty was analyzed using Mean (\bar{x}). Data related to the Characteristics of respondents, business goals, business problems, and development needs were analyzed using frequency and percentage. The business model analysis for the processed Sato business in Yala was conducted through content analysis.

Research Results

The analysis of general data, environmental uncertainty, business goals, business problems, business development needs, and the business models of the entrepreneur groups, based on the Business Model Canvas (BMC) workshop, are presented as follows.

General Information of the Sample Group revealed that the sample group was predominantly female (94.10%), with most members holding the position of production committee members (35.29%). The majority had an education level of high school or vocational certificate (35.29%). The groups were distributed across four districts, with the majority coming from Than-To District (41.18%). Most groups operated as production/processing and sales businesses (85.29%), while a smaller portion was involved only in production/processing (14.1%). Most groups had been in business for 7-10 years (44.12%). The average number of members per group was about 23 (22.73 ± 19.96 members). Most groups had no prior experience with the Sato business (55.88%), though those with experience dealt primarily with shelled Sato beans (29.41%) and pickled Sato (14.71%). The primary occupation of the majority was farming (76.47%).

Environmental Uncertainty in Demand and Supply: Environmental uncertainty was categorized among the entrepreneur groups based on the overall average of demand and supply uncertainty. The groups were classified into three categories: Group 1: high demand and supply uncertainty; Group 2: low supply and high demand uncertainty; and Group 3: low demand and supply uncertainty. The classification and distinctions among these groups are illustrated in Figure 1.



Notes: This group has never had experience running a business related to Sato.
 It is a group where some directors have experience running a business related to Sato.
 This group has experience in running a business related to Sato.

Figure 1 Demand and supply uncertainty situation categorized by the entrepreneur groups

Business Goals: The business goals related to Sato for each entrepreneur group were identified through the Business Model Canvas (BMC) workshop, which included discussions and exchanges within the entrepreneur groups. The initial business goals regarding Sato were classified into five types: 1) long pods/fresh Sato, 2) peeled, halved, and frozen Sato, 3) peeled and chilled Sato, 4) dried Sato, and 5) Sato with seasoning sets. The majority of the entrepreneur groups aimed to focus on long pod Sato/fresh Sato peeled, halved, and frozen Sato.

Business Problems and Development Needs revealed that the most significant problem faced by the entrepreneur groups was finding target customers (26.47%). The most critical need for business development was creating product value that meets customer demands (35.29%), as shown in Figures 2 and 3.

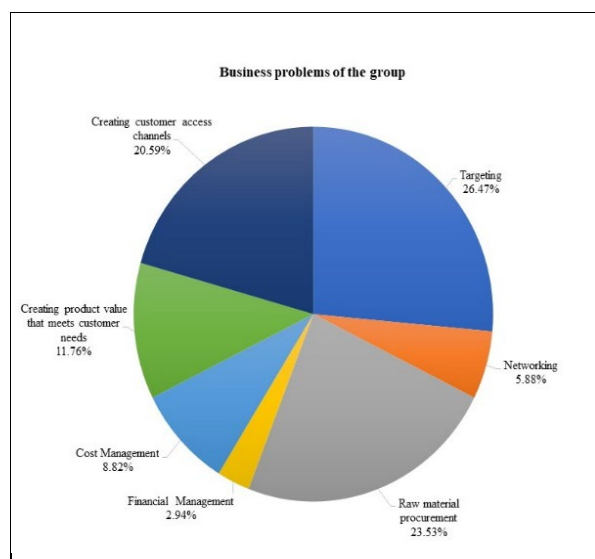


Figure 2 Business problems of the group

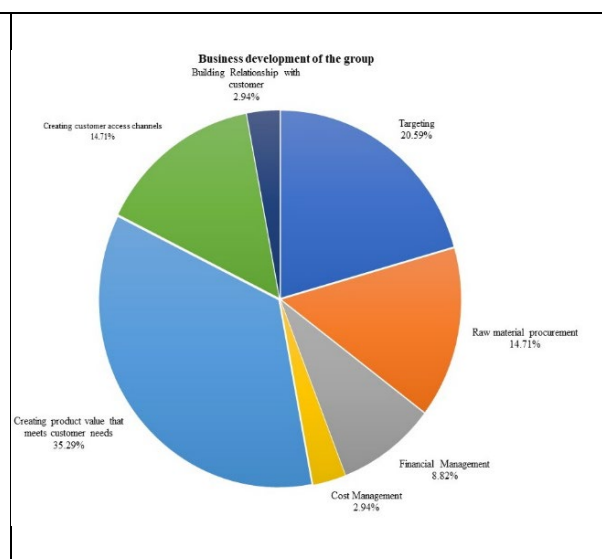


Figure 3 Business development of the group

Business Model: The analysis of the interviews with processors/entrepreneurs regarding the amount of fresh Sato, the volume of peeled Sato, and the data from sales reports of Sato Saded-Num on Facebook revealed the following: Six months after the Business Model Canvas (BMC) workshop, the groups engaged in the actual economic activities related to Sato Saded-Num, particularly in the form of chilled/frozen Sato. The business models entrepreneurs adopted to deliver value to their customers involved selling Sato in two primary forms: fresh peeled Sato and frozen peeled Sato (OEM). This led to the creation of the business model, as illustrated in Figure 4.

Key Partner : KP	Key Activities : KA	Value Proposition : VP	Customer Relationship : CR	Customer Segmentation : CS
<ul style="list-style-type: none">- Farmers in the local area- Local collectors- Yala Rajabhat University	<ul style="list-style-type: none">- Provide Sato- Peel Sato- Send Sato- Selling Sato	<ul style="list-style-type: none">- Peeled Sato- Frozen peeled Sato (OEM)		<ul style="list-style-type: none">- Online customers in other regions
	Key Resources : KR		Channels : CH	
	<ul style="list-style-type: none">- Fresh Sato		<ul style="list-style-type: none">- Sato Saded-Num Facebook page	
Cost Structure : CS			Revenue Streams : RS	
<ul style="list-style-type: none">- Packing cost- Fresh Sato price- The cost of peeling Sato- Shipping cost- Storage cost- Shipping preparation fee			<ul style="list-style-type: none">- Income from selling fresh Sato	

Figure 4 Business Model of Community Enterprise Groups Operating in the fresh peeled Sato and frozen peeled Sato (OEM)

From Figure 4, the community enterprise groups engaged in the Sato business offer two product formats: 1) fresh peeled Sato and 2) frozen peeled Sato (OEM). The frozen peeled Sato (OEM) product is still in production and has yet to enter the distribution phase to the target customer groups. Therefore, the business model for Format 1 focuses on delivering the value of fresh peeled Sato to the primary customers, which are general online customers outside the province who enjoy eating Sato or are located in other regions without access to Sato. The marketing channel is through social media, specifically the “Sato Saded-Num Yala” Facebook Page, with delivery channels including private companies and Thai Postal Services. Payment is handled via E-Banking, and revenue is generated solely from selling fresh peeled Sato. However, when considering the sales/marketing aspects of Business Model 1, there is no established method for building customer relationships. The key raw material is fresh Sato pods, which are utilized in production activities, including sourcing fresh Sato pods, peeling Sato, and shipping fresh peeled Sato to the refrigeration facility (OEM), as well as selling peeled Sato to online customers. The costs associated with these production activities include the cost of fresh Sato pods, peeling fees, packaging costs, transportation by bus, storage costs, and handling fees for preparing the products for shipment. The critical business partners are Yala Rajabhat University, which supports market research and product development, and the Sato farmers in

the area, as well as collectors who provide essential raw materials for the groups to process into products for sale.

Conclusion and Discussion

The analysis of environmental uncertainty, including demand and supply uncertainties, revealed that groups with high uncertainty, such as the Ban Jaotimo Agricultural Processing Community Enterprise and the Ban Batu Mas Fish Paste Community Enterprise, have long-standing business experience. This has led to solid business network integration with customers (Customer Integration) and suppliers (Supply Integration), enabling them to drive their businesses effectively. This finding is consistent with the study by Ganbold & Matsui (2017), which found that business experience and strong partnerships enhance responsiveness to changing environments. Similarly, Kim & Park (2021) noted that environmental uncertainty positively impacts organizational performance. Thus, under uncertain ecological conditions, businesses must strive to maintain close relationships with their business partners (Paulraj & Chen, 2007) or, in other words, continuously collaborate with stakeholders in the supply chain (Jangga et al., 2015). The overall goal of most entrepreneurs is to operate in the long Sato pod/fresh Sato and shelled frozen/chilled Sato markets. However, these groups need help finding target customers and strongly desire to develop their businesses by creating value that aligns with customer needs.

The business model analysis revealed that the most significant challenge for entrepreneurs is customer-related, with the primary need being to develop value that meets customer expectations. This finding is consistent with Ojala's (2016) research, which emphasized that business model development must respond to rapidly changing market conditions. Therefore, entrepreneurs must focus on market development to meet customer demands. However, the business model analysis indicated that critical components of the business model on the sales/marketing side are still missing, including customer segments, distribution channels, customer relationship building, and revenue streams, all of which are crucial for the revenue generation mechanisms that these business groups aim to establish. To address environmental uncertainty, management should develop marketing and technological competencies that improve competitiveness (Parnell et al., 2015). Digital marketing capabilities facilitate businesses to effectively respond to altering consumer behaviors by leveraging product information on digital platforms to engage with target audiences in a timely and cost-effective manner (Saputra et al., 2022). This includes reviewing a checklist of uncertainties to determine which issues might generate revenue or profit for the organization in conjunction with the ongoing business model (Brillinger et al., 2020).

Research Recommendations

Based on the analysis of the business model in a rapidly changing environment, it is evident that there needs to be more information regarding customers and establishing customer relationships. Therefore, entrepreneurs need to develop a plan to build relationships with target customers through distribution channels provided by business network partners. To gain a competitive advantage, entrepreneurs should focus on creating digital capabilities that support the creation of innovative business models, enabling direct value delivery to customers, and fostering collaboration with partners. Additionally, organizations should proactively leverage modern technology to streamline operations, emphasizing customer-centric product development. This will enable businesses to evolve their models and stay competitive in fluctuating markets.

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