



Business Model Strategy for Utilization of Pregelatinized Cassava Flour (PCF) by Micro-Small-Medium Enterprise (MSME)

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Abstract. Micro-Small-Medium Enterprise (MSME) Siengkong as a start-up that utilizes PCF for producing bakery and noodle needs to optimize existing opportunities. Lack of intensive marketing seems to be a crucial challenge in running the MSME Siengkong. This study aimed to analyze the existing value chain, to identify internal and external factors that influence business, and to determine development strategy for Siengkong business. Data were obtained from primary and secondary sources. The primary data were collected through observation, interview, focus group discussion (FGD) and formal survey, while secondary data were obtained from literature studies such as journals and other published articles. The results showed that MSME Siengkong activities consisted of primary activities and supporting activities. The primary activities included production, distribution and selling of PCF based bakery. As supporting activities, MSME Siengkong provided cooking class for PCF-based baking products. The uniqueness of finished products and affordable price of PCF was found as main strength, while the higher price of the products compared to the wheat-based products was seen as main weaknesses. In addition, the products of Siengkong were highly accepted by millennials, suggesting that it could be assigned as the main opportunity. Meanwhile, the main threat was the lower price of both wheat flour and its bakery products. Therefore, this study suggests that the Siengkong business development strategy should prioritize cooperation with various parties.

Keywords: pregelatinized cassava flour, business model canvas, micro-small- medium enterprise

1. INTRODUCTION

Cassava (*Manihot esculenta* Crantz) is a strategic crop for many countries, especially in Asia, Africa, and South America. Nigeria, Thailand, and Brazil are among the largest cassava producers in the world. Nigeria considers this plant a vital crop, especially in drought conditions where cassava can still grow well and adapt to climate change. Indonesia is also one of the largest cassava-producer countries, where this crop can be grown in various types of agroecosystems throughout the archipelago. Unfortunately, industrial utilization of cassava is limited by its short shelf-life due to a rapid post-harvest physiological deterioration (PPD) process. This process resulted in unpalatable roots within 72 hours after harvest [1]. Therefore, there is an urgent need to stabilize cassava by reducing potential economic losses due to post-harvest problems to meet industry and end-user needs. Pregelatinized Cassava Flour (PCF) was heat treated in order to gelatinize starch contained in it, either partially or completely through a heating process with availability of appropriate water [2]. The PCF was identified under category 06.2.1 according to

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Regulation number 13/2023 of the Food and Drug Regulatory Agency [3]. In addition, the PCF was reported to successfully substitute the wheat flour for making bread [4], noodle [5], low fat mayonnaise [6] and also wafer [7] that make the cassava attractive for health and economic benefits.

A micro small and medium scale enterprise (MSME) of Siengkong was established in 2022 in Bogor City. The business was focused on providing bakery products with PCF as raw material. Not only bakery was produced but also noodle. Several bakery variants of bakery products were produced such as pizza, cookies, cupcakes, etc. Noodle derived from PCF was also produced. The Siengkong business was expected to develop and sustainable. Comprehensive planning was needed for developing a business. A business model is a way to do innovation to execute a strategy to increase sales [8]. It was stated that the business model can describe the company's resources which are arranged in a process to generate value [9].

Lack of intensive marketing was identified to be a crucial challenge in running the MSME Siengkong. The problems can be analyzed by understanding the value chain activities created in business activities to formulate appropriate strategies for business development. The value chain was a series of activities carried out to produce products or services, from production activities and distribution of products to consumers to the final disposal of products after use (waste).

Business Model Canvas (BMC) is a business model which shows the rationale of how an organization creates, gives, and captures values [10-11]. According to [12], the business model canvas should be used at the start of the business. After that, entrepreneurs can try new variations suitable for their respective business. The objectives of this study were to analyze the value chain activities existing in MSME Siengkong, identify the internal and external factors that influence the business, and determine the development strategy for Siengkong business.

2. MATERIAL AND METHODS

This study was conducted at MSME of Siengkong which was established in Bogor City. MSME of Siengkong was purposely selected as one of the business units which provided bakery products with PCF that has a domestic demand and potential to develop. The research was carried out from July 2023 to October 2023. Primary data was obtained through observations, focus group discussion and formal survey covering of 30 respondents while secondary data was collected from literature studies. Respondents were purposively selected according to predetermined criteria. The respondents consisted of PCF provider, management of MSME of Siengkong, and consumers of MSME Siengkong. Business model mapping was carried out by identifying nine elements of Business Model Canvas (BMC). Strength Weakness Opportunity Threat (SWOT) analysis was performed to give an alternative strategy for developing of MSME Siengkong. Focused Group Discussion (FGD) was carried out to improve the depth of information on each aspect of the phenomenon, while formal survey was conducted to collect perception, quantitative and qualitative data.

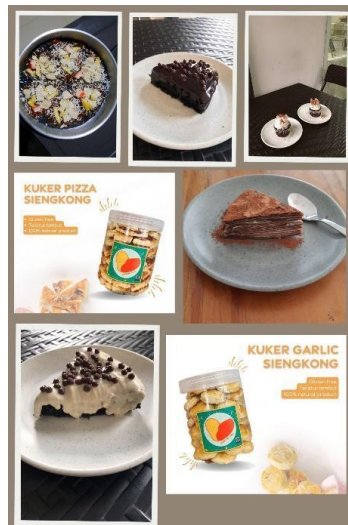
3. RESULTS

3.1 Profile of MSME Siengkong

The Siengkong was the micro-small-scale business units was established in November 2022. Thus, it could be categorized as a start-up business. This business provided food and beverage (F&B) ranging from bakery and cake to beverages such as iced coffee, milk shake, etc. PCF was applied as a special ingredient in the production of bakery and cake. The profile and food products of Siengkong was presented in Table 1 and Figure 1.

Table 1. Profile of MSME Siengkong

Element	Description
NIB number	1711220173338
KLBI scope	56104
Products	Bakery, fresh noodle
Vision	Diversity and Uniqueness of Indonesian local food was known and appreciated by the wider and world community.
Mission	The Siengkong could be found in every corner of the city by bringing a culture of enjoying and appreciating Indonesian food through better quality of raw materials which was purchased directly from farmers and processed carefully.

**Figure 1.** Bakery Product Derived from PCF Produced by Siengkong

The Siengkong vision provided a description of who the enterprises are and what the desirable enterprises are; it was feasible and included a long-term objective for the stakeholders. The vision has a clear meaning (focused), and it can be measured to make it possible to measure the performance, whether the vision has reached its goal or not (measurable). Meanwhile, the mission could help the enterprises improve their businesses, such as giving direction and focusing on the steps taken. It can be communicated to the stakeholders in or outside the organization.

3.2 Value Chain Flow & SWOT Analysis

Based on observation results, the business of Siengkong value chain was started from procurement material and providing inputs or facilities (PCF, ingredients, consumable, kitchenware), followed by production of finished food (pizza, bakery, cakes and cookies, noodle). The delivery service was given to consumers both for retail and wholesale consumption. The Siengkong business activities showed a simple and linear chain (Figure 2).

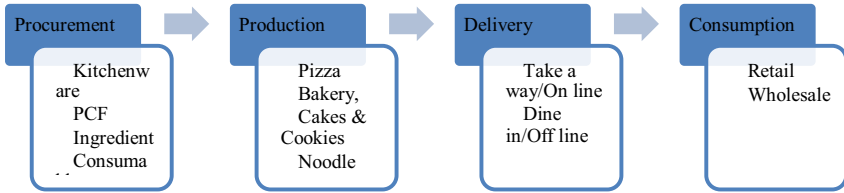


Figure 2. Value Chain Flow in Siengkong’s Business

The stakeholders as main actors participating in the value chain of Siengkong were identified. Table 2 presented the contribution of the actors in the value chain of Siengkong business.

Table 2. The main stakeholders participate in the value chain of Siengkong Business

Stakeholder/Actor	Contribution
PT Infiad Indonesia	Supply PCF
KPRI Pascapanen	Provide ingredient, Consumable, kitchenware
Manpower/worker	Produce and delivery product
Consumers	Consuming/Buying product
Social Media Account	Promotion, sales

The Siengkong business has primary or main activity and secondary or supporting activities. The primary activities consisted of all activity that was described previously in value chain business of Siengkong, and the supporting activities covered facilities, manpower management, technology development, procurement and cooking class for PCF-based baking products (Figure 3).

Supporting Activities	Facilities : owner's provide space for baking/making noodle , motor cycle for daily operational. BRIN researcher provide assistance on management/financial aspect		
	Promotion & education : provide cooking class activity concerning PCF for baking product		
	Man Power management : worker from local resident with special recruitment		
	Technology Development : Develop frozen dough, half baked dough, bakery & fresh noodle for infant		
	Procurement: purchase ingredient, consumables and kichenware		
Main Activities	Production	Delivery	Consumption
	Production process consisted production pizza, cupcakes, cookies and noodle	Deliver to customers through dine in/take a way order	Consumption through retail consumers or wholesales/reseller

Figure 3. Main and Supporting Activities of Siengkong business

SWOT was qualitatively analyzed, and it was summarized in Table 3. The main strength was the uniqueness of the finished products, while the main weakness was seen for the higher price of the products compared to the wheat-based products.

Table 3. SWOT analysis of Siengkong Bussiness

Description	Strengths	Weakness	Opportunities	Threat
PCF raw material	Having various health benefit	Limited producer (only produced by PT INFIAD)	Big production capacity	Less competitive to wheat flour price
Bakery product (Pizza, cookies, cupcakes), and noodle	Have a unique taste (more chewy than wheat flour product)	High expectation of local product market	Consumer education to consume healthy food (health care food)	Price of product relatively high, need more adjustment to compete with existing competitor
Addition of other nutrients	Addition of colouring agent or functional ingredients (charcoal, moringa, edamame, etc) with low concentration will improve nutrition image	Less composition of other nutrients	The business competitor is not yet prevalence	Weak market branding (exotic sides) and investors.
Production Type	Customized production capacity	Un availability of certification (Halal, GMP)	Supported food technology experts.	Simple processes and easy replication

3.3 Business Model Canvas (BMC)

The business model was explored through in-depth interviews involving internal parties of Siengkong including the owners and operational team. Nine elements of BMC were identified and developed further (Figure 4).

Production was divided by two activities, namely bakery and noodle production. Due to limited capital resources, the MSME Singkong use apprenticeship and independent study campus program as complementary human resources to run business activity.

Revenue stream was obtained from several sources instead of product sales. Grant was given by Bogor Municipality as appreciation and reward for valuable achievement in Bogor Innovation Award 2023. Meanwhile, fees were granted to MSME Singkong for the service of pizza made training in Bekasi Municipality.

<p>2. Key partners</p> <p>PCF provider (PT INFIAD), Ingredient/consumables provider (Toko Koperasi)</p> <p>Local/online Ojek to deliver product</p> <p>Research Institute/Government/Private sector: BRIN, BSIP, KIB</p>	<p>1. Key activities</p> <p>Production of bakery and noodle with PCF as raw material pregelatinized cassava flour</p> <p>Sells ready to eat (RTE) of Indonesian local food, allergen friendly, gluten free and contemporary.</p> <p>Running studio Siengkong as a</p> <p>3. Key Resources</p> <p>Investor</p> <p>Technology sources (of BRIN)</p> <p>Worker/baker</p>	<p>4. Value Proposition</p> <p>Canteens with modern and convenience services: cashless payment, available on line, take away and dine in services.</p> <p>Special and delicious food product derived from Indonesian sources: less/free gluten, less sugar, vegan and attractive appearance and customized nutrition content</p>	<p>5. Customer Relationship</p> <p>office employees, Visitors/tourist Individuals who need special food products for health reasons Literate millennials and Z Generation</p> <p>7. Channel:</p> <p>Social media, Landing page, Offline booth available at special points selling</p>	<p>6. Customer Segment:</p>
<p>8. Cost structure : Fix cost, variable cost, promotion, branding</p>		<p>9. Revenue stream : Sales of, Membership, Studio's fee, grant</p>		

Figure 4. Business Model Canvas of Siengkong

3.4 Willingness to Accept and to Pay of PCF

In general, the PCF product that is represented by pizza can be accepted by consumers aged from 20-50 years old as indicated by preferences to pizza taste, texture, and color. Although 90% of consumers considered the importance of gluten free products, it was only 33% of them having experiences in gluten free consumption. In addition, the consumer willingness to accept and to pay for the pizza was more than 80% (Table 4).

Table 4. Customers' Responds to Characteristics, Willingness to Accept and Willingness to Pay of Pizza as PCF Product

Description	Male n=9	Female n=21	Total n=30
1. Having experience in gluten free consumption (%)	0,07	0,27	0,33
2. Consider to importance of gluten free product (%)	0,27	0,63	0,90
3. Preferences to pizza taste (%)			
a. Like	0,27	0,57	0,83
b. Neutral-Dislike	0,03	0,13	0,17
4. Preferences to pizza texture (%)			
a. Like	0,27	0,57	0,83
b. Neutral-Dislike	0,03	0,13	0,17
5. Preferences to pizza colour (%)			
a. Like	0,23	0,60	0,83
b. Neutral-Dislike	0,03		0,03
6. Willingness to accept (%)	0,27	0,53	0,80
7. Willingness to pay (%)	0,27	0,57	0,83

4. DISCUSSION

The MSME of Siengkong had a simple and linear chain consisting of procurements followed by production, delivery and consumption of PCF products. A simple and linear value chain was also noticed on modified cassava flour (mocaf) enterprises [13]. To accelerate the adoption of PCF as a new product, the MSME Singkong provided cooking classes for PCF-based baking products. The uniqueness of finished products and affordable price of PCF was found as main strength, while the higher price of the products compared to the wheat-based products was seen as main weaknesses. In addition, the products of Siengkong were highly accepted by millennials, suggesting that it could be assigned as the main opportunity. Meanwhile, the main threat was the lower price of both wheat flour and its bakery products. Therefore, this study suggests that the Siengkong business development strategy should prioritize cooperation with various parties.

5. CONCLUSION

The MSME of Siengkong had a simple and linear chain consisting of starting from procurements followed by production, delivery and consumption of product. The appropriate business model was established to promote the PCF based food business. Products of Siengkong made by PCF were highly accepted by millennials, suggesting that it could be assigned as the main opportunity. Meanwhile, the main threat was the lower price of both wheat flour and its bakery products. Therefore, this study suggests that the Siengkong business development strategy should prioritize cooperation with various parties.

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REFERENCES

1. Zainuddin I M, Fathoni A, Sudarmonowati E, Beeching J R, Gruissem W, Vanderschuren H. 2018. Cassava post-harvest physiological deterioration: from triggers to symptoms. *Postharvest Biology and Technology*, 142: 115-12
2. Purwani E Y, Mulyono E, Tjahjohutomo R, Risfaheri, Wahyudi M, and Lestina P. 2018. Proses Pembuatan Tepung Pregelatinisasi Ubikayu. *IDS000001996*, issued 2018.
3. Badan Pengawas Obat Dan Makanan (BPOM). 2023. Peraturan Badan Pengawas Obat Dan Makanan Nomor 13 Tahun 2023 Tentang Kategori Pangan.
4. Ratnaningsih, Nilasari R and Purwani E Y. 2019. Bread Quality of Pre-Gelatinized Cassava Flour with Frozen Storage. *IOP Conf. Ser.: Earth Environ. Sci.* 309 012051
5. Parassih E K, Purwani E Y, and Warsono E. 2020. "Optimization of Cassava Dried Noodle Using Hydrocolloid and Protein Isolates : A Tropical Noodle." *Future of Food: Journal on Food, Agriculture and Society* 8 (4). <https://doi.org/10.17170/kobra-202010131943>.
6. Diyono W, Kusuma A, Purwani E Y, and Epriliati I. 2020. Aplikasi Tepung Ubikayu (Manihot Esculenta Crantz) Pregelatinisasi Dan Tepung Tempe Koro Benguk (*Mucuna Pruriens L.*) Pada Mayonaisse Rendah Lemak In Prosiding Seminar Nasional Online Teknologi Pangan Dan Pascapanen: Peran Pangan Fungsional Dan Nutrasetikal Dalam Meningkatkan Sistem Imun Mencegah Covid-19, 286–92. Bogor, Indonesia.
7. Haliza W, Kusuma A, Purwani E Y, and Wardana I P. 2022. "Consumer Acceptability of Special Wafer Made from Pregelatinised Cassava Flour." In *Proceedings of the 6th Food Ingredient Asia Conference-Food Science, Nutrition, and Health*, 88–91. Bogor, Indonesia. <https://doi.org/10.5220/0010529600003108>.
8. Ratih F, Mokhammad A S. 2019. Model bisnis canvas sebagai solusi inovasi bagi yang kecil bisnis. *Jurnal Ilmu Manajemen dan Bisnis* 10(2):197– 203.
9. Slavik S, Zagorsek B. 2016. Relationship between business strategy and business model studied in a sample of service companies. *Journal of Competitiveness* 8(4):72–84. doi:<http://dx.doi.org/10.7441/joc.2016.04.05>.
10. Osterwalder A, Pigneur Y. 2010. *Business model generation: A handbook for visionaries, game changers, and challengers.* Yves:288 p
11. Aslam, A.P., 2023. Application of business model canvas as a business strategy in creative economy businesses in the field of photography in Makassar City. *Indonesian Journal of Business and Entrepreneurship Research* 1(2):85-91.
12. Ching W, Hong Y, Clemens F. 2013. Criticisms, variations, and experiences with business model canvas. *Journal of European for Research Training and Development* 4(1):132–144.
13. Pribadi MI, Gunawan W, Maulani R R. 2022. Value Chain and Business Development Strategy of MOCAF Cap Kujang in Sumedang Regency. *3BIO: Journal of Biological Science, Technology and Management* 4(2):61-71.

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