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Business Feasibility Study and Added Value of Broccoli Stem Stick Products at CV Tani Organik Merapi

Yolanda Desi Aggraini Silalahi[1*], Dahri Tanjung[2],
Agribusiness Management Study Program, Bogor Agricultural Institute
*Correspondence email: yolandadesianggrainisilalahi.@gmail.com

Abstract

CV Tani Organik Merapi is a company that produces organic vegetables, one of which is broccoli. The discarded broccoli trimmings are a weakness of the company. The solution that can be done by the company is to process the trimmings into broccoli stem sticks. This study aims to determine consumer preferences, analyse and compile business feasibility and add value to the O'Bro Stik business. The methods used include conjoint analysis, business feasibility of non-financial and financial aspects, and added value. The results of consumer preferences indicate that the attributes that consumers consider before purchasing O'Bro Stik are texture, price, and packaging. The results of the non-financial and financial analysis are declared feasible with an NPV of Rp86,166,474; IRR 102.17%; gross B/C 4.58; net B/C 1.40; and a payback period of 2.0 years. The switching value results show that the maximum tolerance limit for changes in production is 30.13% and 534.65% for increases in wheat flour. The value-added analysis produces a significant value of 47.70%.
Keywords: Conjoint analysis, broccoli, value added, O'Bro Stick, feasibility study

A. Introduction

The horticulture subsector plays a crucial role in a regional economy. Vegetables, as horticultural crops with high economic value, offer significant potential as a source of income for communities and farmers, both small, medium, and large-scale. The advantages of vegetables lie in their high market value, diverse varieties, easy access to land and technology, and substantial market absorption potential (Sayrifuddin 2020). CV Tani Organik Merapi (TOM), located in Wukirsari Village, Yogyakarta, is a company specialising in organic vegetables. The company produces 40 types of vegetables through partner farmers, who are fully responsible for cultivating their land. The harvest is then sold to CV TOM, which acts as the core marketing arm.

Harvesting activities at CV TOM are carried out daily, according to the number of requests or orders set. The harvested vegetables are then transported to the packing room, where a series of post-harvest handling processes, such as sorting, are carried out. *Trimming* is done to ensure the quality of vegetables meets established standards for marketing in supermarkets in Yogyakarta. However, the sorted vegetables collected in crates are often discarded as byproducts, resulting in an unpleasant odour.

Vegetables that produce significant amounts of byproducts include cabbage, Chinese cabbage, bok choy, lettuce, and broccoli. Of these five, broccoli produces a relatively large amount of byproducts. These byproducts are obtained from the processing of broccoli, including *trimming*, which is the process of pruning or cutting the stems and base of broccoli. Broccoli itself is a type of horticultural vegetable in the cabbage family, known as cauliflower, and is widely consumed for its high nutritional content, including essential minerals, vitamins A, B complex, and C, iron, and calcium.(Roeswitawati and Ningsih 2018).

Production and yield data trimming CV TOM broccoli from March to December 2024 showed fluctuations, reaching a peak production of 2,235 kg with a yield of 447.0 kg in September, and ended with a significant decline in December. This condition indicates that the company has not maximised the utilisation of its production results. *Trimming broccoli* stems, which have great potential to be processed into economically valuable products, such as animal feed, fertiliser, or other processed raw materials. Broccoli stems, which are often considered a byproduct of processing, contain high levels of vitamin C and fibre. Broccoli stems have the potential to be highly nutritious and can increase the nutritional value of food products (Rahayu and Rahayu 2021). According to the USDA (2024), broccoli stems have antioxidant and anti-inflammatory properties found in phytochemical compounds such as glucosinolates, isothiocyanates, flavonoids, and carotenoids.

Seeing this potential, one interesting form of processing is to convert the broccoli stems into... *trimming them into* healthy snacks like vegetable sticks. Sticks are a popular pastry in Indonesia. While vegetable sticks generally use spinach, carrots, or pumpkin, sticks made with broccoli stems as the main ingredient are still rare on the market. This presents a market opportunity for CV TOM to become a pioneer in the unique and innovative healthy snack segment, potentially attracting consumers seeking new and healthier snack alternatives.

This opportunity is further strengthened by consumers' purchasing power for similar snacks. According to the Central Statistics Agency, the average per capita weekly expenditure on cookies in the Special Region of Yogyakarta (DIY) in 2021-2023 showed a consistent upward trend, indicating that public interest and purchasing power in snacks continues to grow. Changes in consumer consumption patterns, which now seek practical, nutritious, and affordable food products, further strengthen this opportunity (Nurhaeni 2019). Thus, the establishment of the O'Bro Stik business unit not only addresses the company's weaknesses by utilising broccoli waste into innovative, value-added products, but also contributes to increasing CV TOM's revenue, reducing food *waste*, and supporting sustainable agriculture.

B. Methodology

1. Research Design

The research was conducted at CV Tani Organik Merapi, located on Jl. Tegalsari, Sembungan, Wukirsari, Cangkringan District, Sleman Regency, Yogyakarta Special Region. Two analytical methods were used in this study: qualitative and quantitative. Qualitative analysis studied non-financial feasibility aspects, such as market and marketing, technical aspects, management, and socio-economic aspects of the environment. Quantitative analysis studied consumer preferences, added value, and financial feasibility aspects.

2. Participants/Respondents/Population and Sample

Sample selection in this study used the method of purposive *sampling*(non-probability), where respondents were selected based on relevant age criteria. Referring to Gay and Diehl (1992), who recommend a minimum of 30 subjects for correlational research, the researcher selected 61 respondents to increase data validity.

3. Technique of Data Collection

The data for this business planning study comes from primary sources, obtained through observations, interviews, and a questionnaire on O'Bro Stik consumer preferences. Secondary data was collected indirectly from literature such as journals, theses, books, and related institutions to complement the primary data.

4. Technique of Data Analysis

a. Consumer Preference Analysis

Conjoint analysis is an approach used to measure consumer preferences for goods or services. Furthermore, conjoint analysis measures relative importance by examining customer utility and importance at various attribute levels (Silalahi et al. 2024). Several steps are involved:

(1) Attribute and level planning

There are three attributes, namely texture, packaging, and price. The texture attribute levels are hard, crunchy, soft, Packaging - Standing pouch, Plastic; Price - Rp10,000, Rp15,000, >Rp15,000) based on pre-surveys and literature.

(2) Designing stimuli
Creating realistic attribute-level combinations. Methodful *profile*(3x2x3 = 18 stimuli) was used, then reduced to 9 experimental stimuli using an orthogonal *design* in SPSS.

(3) Data collection of respondents
Respondents rated the product level using a Likert scale (1=Disagree to 4=Strongly agree).

(4) Entering data into the conjoin process
The assessment is processed through conjoint analysis with SPSS to determine the most desirable attributes.

(5) Analysis results
Provides three main values, namely utility value, importance value, and significance value.

b. Non-Financial and Financial Feasibility Analysis
The main focus of this research on the non-financial feasibility aspect is the market and marketing aspect, technical aspect, management aspect, social, economic and environmental aspect.

(1) Market and marketing aspects
Market and marketing analysis is key to assessing whether a company's investment has sufficient market appeal. This means evaluating the market opportunity for the product being offered, as well as the market share already achieved by competitors. Furthermore, how the marketing plan will be implemented to capitalise on current market opportunities (Adnyana 2020).

(2) Technical aspects
Technical aspects include determining the business location, building layout, equipment and machinery, including room layout, and future business development plans. Considerations in selecting a business location include factors such as proximity to markets, raw material sources, labour availability, relationships with government and financial institutions, access to ports, and other important factors (Adnyana 2020).

(3) Management aspects
This aspect includes an evaluation of the company's management team and its organisational structure. The success of a project is closely linked to the competence of the professionals who manage it, from design and implementation to control in the event of deviations (Adnyana 2020).

(4) Social, economic and environmental aspects
Socioeconomic aspects refer to the impact of business on the economy and society. Environmental aspects are a crucial analysis today because every project has a significant impact on the surrounding land, water, and air, ultimately affecting the lives of humans, animals, and plants (Adnyana 2020).

The financial analysis of the O'Bro Stik product at CV Tani Organik Merapi includes several aspects, namely the preparation of investment criteria, switching *value*.

(1) Investment criteria analysis
A business feasibility study is conducted to determine the potential success of a business based on several investment criteria. Commonly used criteria include NPV (*Net Present Value*), *Gross* B/C (*Gross Benefit Cost Ratio*), *Net* B/C (*Net Benefit Cost Ratio*), IRR (*Internal Rate of Return*), and PP (*Payback Period*)

(2) Analysis *switching value*
Switching value is a calculation that determines the "maximum change" that can be tolerated or allowed to maintain business profitability, whether it's a decrease in production costs or an increase in input prices. However, this calculation only calculates the amount of change that occurs until NPV = 0 (Nurmalina et al. 2023).

c. Value Added Analysis
This study analysed value-added using the Hayami method. The value-added analysis in this study was conducted using the Hayami method. The purpose of this method is to determine output value, added value, productivity, profit, labour compensation, and processing profits.

C. Results and Discussion

Conjoint analysis

a. Respondent characteristics
The majority of respondents were female, with an age group of 15–25 years. Their average education level was at the Diploma/Bachelor's level, with monthly expenses ranging from Rp500,000 to Rp3,000,000. Respondent selection was based on the non-probability *sampling* type, *purposive sampling,* as many as 60 people were distributed questionnaires and processed using conjoint analysis.

b. Conjoint analysis results
The attribute-level utility values in the conjoint analysis indicate that attributes that are more attractive to respondents have higher utility values. Details of the utility results are shown in Table 1.

Table 1. Utility values

Attribute	Attribute level	*Utility estimate*	*Std. Error*
Texture	Hard	-0.764	0.055
	Crispy	0.641	0.055
	Soft	0.123	0.055
Packaging	Standing pouch	0.019	0.041
	Plastic	-0.019	0.041
Price	Rp. 10,000	0.165	0.055
	Rp. 15,000	-0.020	0.055
	> Rp. 15,000	-0.145	0.055
Constant		2.853	0.041

Source: Processed data (2025)

Based on Table 3, the analysis results show that consumers prefer a crunchy texture with a value*utility*of 0.641 compared to hard and soft textures. Packaging, standing pouch, preferably with value utility 0.019. The most desired price is Rp. 10,000 with a value of utility: 0,165. Next, there are the results of the conjoint analysis in the form of importance scores used to assess each attribute from highest to lowest, which respondents considered before purchasing O'Bro Stik products. The importance scores from the conjoint analysis are presented in Table 2.

Table 2. Importance values

Attribute	*Importance values*
Texture	59.210
Packaging	14.986
Price	25.894

Source: Processed data (2025)

The results of the conjoint analysis in Table 2 show that the texture attribute is the most important for O'Bro Stik consumers, with an importance value of 59.210, followed by the packaging attribute of 25.894 and the price attribute of 14.986. The significance value in the conjoint analysis is used to determine the presence or absence of a significant relationship, as well as the strength of the relationship between the combination of evaluated attribute levels and consumer preferences observed in the field. The significance values obtained through the conjoint analysis are presented in Table 3.

Table 3. Significance values

	Value	*Significant*
Pearson's R	0.994	0.000
Kendall's tau	1.000	0.000

Source: Processed data (2025)

Based on Table 3, the significance results show that this study is considered significant because the significance value is <0.005, so that it has a positive correlation value between consumer preferences and O'Bro Stik product attributes.

Non-Financial Feasibility Analysis

a. Market and marketing aspects

1. Marketing strategy
   (1) Market segmentation (*Market segmentation*)
      (a) Geographic: consumers in the Sleman area and surrounding areas.
      (b) Demographics: can be consumed by children to adults, aged 6-50 years, both men and women
      (c) Psychographics: people who like snacking with a healthy lifestyle.
   (2) Target market (*Market targeting*)
   The target market for O'Bro Stik products is people who like to snack on cookies, ranging from children to adults aged 6-50 years, both men and women.
   (3) Market position (*Market positioning*)
   The O'bro stick product is positioned as a healthy and practical snack made from broccoli stems with a crunchy and savoury texture without preservatives, synthetic colours, and flavour enhancers.
2. Marketing mix
   (1) *Product* (Product)
   The product is an innovative and nutritious snack stick made from broccoli stems and other ingredients. It's marketed under the brand name O'Bro Stik, which stands for organic broccoli. O'Bro Stik is crunchy and savoury with an original flavour.
   (2) *Price* (Price)
   The price is determined based on the HPP, sold at Rp. 10,000/120 grams.
   (3) *Place* (Place)
   O'Bro sticks will be distributed in collaboration with snack shops and souvenir shops in the Sleman area, and will also be distributed directly through the PII exhibition in Yogyakarta.
   (4) *Promotion* (Promotion)
   Promotions are carried out by the company through two channels, namely promotions offline by selling products directly to consumers and online or indirectly through social media such as Instagram and WhatsApp.

b. Technical Aspects

1. Business location
   The O'Bro Stik production location is at CV Tani Organik Merapi, with a production room area of 3 m x 6 m.
2. Production process
   The production process carried out by the company involves processing broccoli stems (the result of trimming) into sticks involves several important stages to produce quality stick products. The O'Bro Stik production stages start from preparing tools and raw materials, cleaning, steaming and smoothing broccoli stems, mixing raw dough ingredients (flour, eggs, salt, broth, butter, and broccoli), rolling the dough into a flat shape, forming sticks by cutting, frying the sticks until they are yellow, packaging the sticks in standing pouch packaging (120 grams/pcs).
3. Production scheduling
   The company produces O'Bro Stik every Tuesday and Friday with a capacity of 8,400 kg or 70 pcs, while distribution is carried out on Wednesdays and Saturdays with operating hours from 08-16.00 WIB.

c. Management Aspects

Managing the establishment of the O'Bro Stik business unit requires careful planning, including workforce management, *job descriptions*, and *job specifications*. The O'Bro Stik business employs two people, one in production and one in marketing, each receiving a monthly salary of Rp. 400,000.

d. Socio-Economic Environmental Aspects
The social aspect benefits the community by providing job opportunities to reduce unemployment. The economic aspect has a positive impact by increasing the income of the workforce and generating profits for companies. The environmental aspect allows for the transformation of unused waste into value-added products.

Value Added Analysis

Table 4. Calculation of the added value of O'Bro Stik

No	Variables	Unit	Mark
	Output, Input, and Price		
1.	Output	Kg/production	8,4
2.	Input	Kg/production	5
3.	Labor force	CAGE	16
4.	Conversion factor	-	1,68
5.	Labor coefficient	HOK/kg	3,2
6.	Output price	Rp/kg	83.333
7.	The average wage of the workforce	Rp/HOK	3.125
	Revenue and Profit		
8.	Raw material input prices	Rp/kg	5.000
9.	Other input contributions	Rp	68.219
10.	Output Value	Rp/kg	139.999
11.	a. Added value	Rp/kg	66.780
	b. Value added ratio	%	47,70
12.	a. Labour income	Rp	10.000
	b. Labour value added ratio	%	14,97
13.	a. Benefits	Rp/kg	56.780
	b. Profit ratio	%	40,55
	Remuneration for Production Factors		
14.	Margin	Rp/kg	134.999
	Other input contributions	%	50,53
	Labor income	%	7,40
	Profit	%	42,05

Source: Processed data (2025)

Based on the value-added ratio criteria according to Hubeis (1997), the O'Bro Stik production at CV Tani Organik Merapi has a high value-added ratio of >40%, reaching 47.70%. This means that the value-added ratio indicates that the processing of broccoli stems into O'Bro Stik products contributes significantly to the value.

a. Output, Input, and Price
In one day, O'Bro Stik produces 8.4 kg using 5 kg of broccoli stems. Production efficiency is indicated by a conversion factor of 1.68, meaning each kilogram of broccoli produces 1.68 kg of finished product. This product has a selling price of IDR 83,333 per kg. In terms of labour, 16 HOK are required with a wage of IDR 3,125 per hour, and a coefficient of 3.2 HOK per kg to process broccoli into O'Bro Stik products.

b. Revenue and Profit
The input price of broccoli is Rp5,000/kg, plus other input costs of Rp68,219/kg. With a conversion factor of 1.68 and a selling price of Rp83,333/kg, the output value of 1 kg of broccoli stems reaches Rp139,999. This processing results in an added value of Rp66,780/kg of raw material, or 47.70%. Direct labour wages are Rp10,000/kg of broccoli stems, which is 14.97% of the added value. The profit earned is Rp56,780 per kilogram of processed broccoli, with a profit percentage of 40.55%.**%**.

c. Remuneration for Production Factors
Processing 1 kg of broccoli stems into O'Bro Stik yields a margin of Rp134,999. This margin distribution shows that other inputs contribute the largest share at 50.53%, followed by the company owner's profit at 42.05% and labour income at 7.40%.

Financial Feasibility Analysis

a. Investment criteria analysis

Table 5. Results of O'Bro Stik business investment criteria

Investment Criteria	Eligibility Criteria	Results	Assessment
NPV	NPV ≥ 0	86.166.474	Worth it
IRR	IRR ≥ i	102,17%	Worth it
Net B/C	*Net* B/C ≥ 1	4,58	Worth it
Gross B/C	*Gross* ≥ 1	1,40	Worth it
Payback period	≤ business age	2,0	Worth it

Source: Processed data (2025)

Based on Table 5, establishing the O'Bro Stik business unit is deemed feasible. The calculation of investment criteria is attached in Appendix 8, while an explanation of the O'Bro Stik investment criteria is outlined below.

1. NPV (*Net Present Value*)
   Net Present Value (NPV) is an indicator that shows the current value of a project's cash inflows and outflows. For the O'Bro Stik product business, the NPV with a 6% interest rate is Rp86,166,474. A positive NPV indicates that establishing this business unit is feasible and profitable.
2. *Internal Rate of Return* (IRR)
   The IRR is the interest rate that reduces the NPV of a project to zero. For the O'Bro Stik product business, the IRR of 102.17% exceeds the stated interest rate of 3%. This confirms that establishing this business unit is profitable and therefore feasible.
3. *Net Benefit Cost Ratio* (*Net* B/C)
   Net B/C is the ratio between the total profit received and the total costs incurred. A project is considered feasible if Net B/C >1. Value*Net* The B/C for establishing the O'Bro Stik product business unit is 4.58, making it feasible to continue. This means that for every Rp1 spent, a net benefit of Rp4.58 will be generated.
4. *Gross Benefit Cost Ratio (*Gross *B/C)*
   Gross B/C is the ratio of gross profit to costs incurred. O'Bro Stik's business has a ratio of A B/C of 1.40 indicates that the business is worth continuing. This means that every Rp1 spent by the company will generate a gross profit of Rp1.40.
5. *Payback period*
   Payback period: The return on investment from the product business unit is 2 years, meaning the initial investment will be returned once the business is running. The establishment of this business unit can be carried out because it generates a payback *period* shorter than the age of the business, namely, 5 years.

b. Analysis *switching value*

Table 6. Results switching value O'Bro Stik business

Component	Tolerance limit (%)	NPV (Rp)	IRR (%)	*Net* B/C	*Gross* B/C	PP (year)
Decrease in output (production volume and selling price)	30,13	0	3%	1	1	5
Increase in input prices (raw materials)	534,65	0	3%	1	1	5

Source: Processed data (2025)

Based on Table 6, the results of the maximum changes in income and expenses for the O'Bro Stik business are obtained to maintain business feasibility. The establishment of the O'Bro Stik business can tolerate a maximum change limit for a decrease in production or selling price of O'Bro Stik of 30.13% and a maximum change limit for an increase in raw materials of 534.65%.

D. Conclusion

Based on the results of the consumer preference study, it shows that consumers prefer O'Bro Stik products with a combination of attributes, namely crunchy texture, price of IDR 10,000, and packaging, *standing pouch*. Based on the results of the non-financial and financial feasibility aspects, the O'Bro Stik business is feasible to run. NPV value ≥ 0 (Rp 86,166,474), IRR ≥ i (102.17%), *Net* B/C ≥ 1 (4,58), *Gross*B/C ≥ 1 (1.40), and payback *period*≤ business age (2 years). *Switching values shows* that the establishment of the O'Bro Stik business can tolerate the maximum change limit to the decrease in production or selling price of O'Bro Stik of 30.13% and 534.65% to the maximum change to the increase in raw materials. Based on the added value analysis, processing broccoli stems into O'Bro Stik has significant profit potential, with high added value reaching 47.70% (Rp66,780) and profit of 40.55% (Rp56,780).

E. References

Adnyana MI. 2020. Studi Kelayakan Bisnis. Lembaga Penerbitan Universitas Nasional (LPU-UNAS).

Badan Pusat Statistik. 2024. Rata-rata Pengeluaran Perkapita Seminggu Menurut Kelompok Makanan Minuman Jadi per Kabupaten/Kota Yogyakarta. [diunduh 2024 Oktober 2]. https://yogyakarta.bps.go.id/id/statistics-table/2/NDA5IzI=/rata-rata-pengeluaran-perkapita-seminggu-menurut-kelompok-makanan-minuman-jadi-per-kabupaten-kota.html.

Gay LR, Diehl PL. 1992. Research Methods for Business and Management. Machmillan Publishing Company.

Ghazali DO. 2024. Pendirian Unit Bisnis Keripik Pakcoy pada PT Pagi Berkah. [skripsi]. Bogor: Institut Pertanian Bogor.

Hayami Y, Kawagoe T, Marooka Y, Siregar M. 1987. Agricultural Marketing and Processing in Unpland Java: A Perspective From A Sunda Village. Bogor: Indonesia ESCAP-CPGRT Centre.

Hubeis, M. 1997. Menuju Industri Kecil Profesional di Era Globalisasi Melalui Pemberdayaan Manajemen Industri. [orasi ilmiah]. Bogor: Institut Pertanian Bogor.

Kotler P, Keller KL. 2012. Manajemen Pemasaran. Ed ke-12. Jakarta: Erlangga.

Nurhaeni H. 2019. Perbandingan Tepung Sorgum Merah (Sorgum bicolor) dengan Tepung Jagung (Zea mays) dan Ukuran Partikel Tepung terhadap Karakteristik Makaroni. [skripsi]. Bandung: Universitas Pasundan.

Nurmalina R, Sarianti T, Karyadi A. 2023. Studi Kelayakan Bisnis. Ed revisi. Bogor: IPB Press.

Rahayu MK, Rahayu WM. 2021. Sifat Fisikokimia dan Penerimaan Sensoris Cookies Mocaf dengan Penambahan Batang Brokoli (Brassica oleracea L.). In S. Junedi (Ed.), Pemenuhan Kebutuhan Pangan Melalui Ekplorasi Sumber Daya Lokal dan Inovasi Teknologi dalam Rangka Pemberdayaan Ekonomi Masyarakat (pp. 159–168). Fakultas Teknobiologi Universitas Atma Jaya Yogyakarta.

Roeswitawati D, Ningsih YU. 2018. The Effect of Local Microorganism (MOL) Concentration of Banana Hump and Fruit Waste on the Growth and Yield of Broccoli Plants (Brassica oleracea). Advances in Engineering Research, 172, 310–314. https://doi.org/https://doi.org/10.2991/fanres-18.2018.62.

Sayrifuddin. 2020. Kinerja Usahatani Sayuran Organik di Kecamatan Darussalam Kota Banda Aceh. Journal Agriflora, 4(2).

Silalahi YDA, Sitorus AP, Zalianty MW, Shaumy SN, Anugraha A, Sitepu RKK, Luthfiah NF. 2024. Analisis Preferensi Pembayaran Digital Quick Respponse Code Indonesia Standard (QRIS) oleh Mahasiswa Sekolah Vokasi IPB. Jurnal Manajemen Modern, 6(3). https://journalpedia.com/1/index.php/jmm

United States Department of Agriculture. 2024. USDA National Nutrient Database for Standard Reference. [diakses 2025 Maret 5] https://fdc.nal.usda.gov/food-details/2709643/nutrients.