ANALYSIS OF DEVELOPMENT SYSTEM AND MODEL OF COCONUT PLANT-BASED CREATIVE AGRO-INDUSTRIAL PRODUCTS FOR COMMERCIAL SCALE IN SOUTH MINAHASA REGENCY, NORTH SULAWESI, INDONESIA

Herry Frits Pinatik*, Irene A. Longdong, Tineke Marlyn Langi
*Corresponding Author
Faculty of Agriculture, Sam Ratulangi University,
Jl. Kampus Bahu, Manado-95115, North Sulawesi, Indonesia
herry_pinatik@yahoo.com
irene_longdong@yahoo.com

Abstract

The study employed several analyses, i.e. financial, added value, strategy analysis, and SWOT, on coconut-based agro-industrial products in south Minahasa, such as handicrafs (feet doormat), culinary (coconut cake), design and furniture (traditional house miniature and house furniture), and research and development (virgin coconut oil, coconut flour, coconut shell charcoal, coir).Financial analyses found that all 4 coconut-based creative agro-industries had R/C ratio> 1, 3.00 for feet doormat, 2.01 for coconut cake, 4.50 for traditional miniaturedesign,2.14 for furniture,1.47 for virgin coconut oil, 2.98 for coconut flour, 2.50 for coconut shel charcoal, and 1.68 for coir, respectively. The added value obtained by each type of the coconut-based creative agro-industry was: 1. IDR. 3,000 per unit for feet doormat product, IDR. 18,500 per pack for coconut cake product, IDR. 1,800,000 per unit for traditional wooden house, IDR. 1,670,000/unit for furniture, IDR. 3,500/ bottle for virgin coconut oil of IDR. 470,000/kg for flour product, IDR. 873,000/kg for coconut shell charcoal, and IDR. 495,000/kg for coir product, respectively. The appropriate strategy to commercially support the coconut-based creative industries development is the integration of S-O (Strength-Opportunities) and W-O (Weakness-Opportunities) strategies, increased production amount for market demand, increased investment, and marketing development through promotion, partnership and production cost efficiency, and product quality improvement of nutritive food and safe for human health, and good economic value.

***Keywords**: creative agro-industry, coconut plant, financial, added value, development system and model*

1. INTRODUCTION

Based on the Statistic Center Office of Indonesia, Indonesian population of 2017 was about 230 millionor the fourth largest world population, and approximaly 75% of the population do coconut cultivation. Mean coconut production per year is 28,000,000 fruits or about 4.8 million tons of copra indicating that Indonesia is one of the countries yielding coconut fruits and its derivatives in the world. According to Nayar (2017), coconut tree is a plant type for life, in which all parts of the plant can be used to make valuable economic processed products.

On one hand, coconut production is declining every year due to land reduction from land conversion to residential, property or office development. On the other hand, coconut fruit demand continuously occurs in national or international markets as major materials of food, cosmetics, health, and drug industries. However, unstable price of the coconut fruit and its derivatives in local and national markets in Indonesia has made the farmers economically lose due to high production cost and low selling price. These can only be able to cover the production costs and not yield financial benefit.

South Minahasa regency is geographically located in North Sulawesi Province, where it has been well known as Nyiur Melambai Region in the eastern part of Indonesia, since the region is rich in coconut plants, with mean production of 5.5 million tons per year that are distributed in the regencies and towns, one of which is South Minahasa (Statistics of Indonesia, 2017).The potentials of coconut fruits and its derivatives are a local wisdom and the superiority competitiveness of the region, because it can remarkably give economically added value to the farmers and contribute to the regional economic development. These potentials seem to be unclearly apparent, since the coconut fruits are still focused on the copra production and virgin coconut oil, but the selling price is continuously fluctuative, with creative and innovative development suitable for the creation of new economic model that intensifies information, creativity, and knowledge of human resources as production factor, whose concreteness is defined as commercially scaled coconut-based creative agro-industrial development system and model (Hartley et al. 2015), it is expected that the development could give an economic added value for the farmers and increase the regional economic growth.

According to Pangestu, the Trade Minister in the era of President Susilo Bambang Yudhoyono, the growth of creative industries in 2002 – 2006 contributed to mean Gross Domestic Income up to 6.3% or equivalent withIDR. 152.5 trillion, absorption up to 5.4 labors with 5.8% participation, and export of 10.6 % (Ministry of Industry of Indonesia, 2017).The potentials of South Minahasa regency as one of the coconut producing areas have encouraged the people to run the economic activities by integrating the technological information and the creativity to yield creative and innovative products not only to create job opportunity, but can give the economically added value as well, and become the prime mover of Gross Domestic Regional Income.

No information on identification of coconut-based creative agro-industry grouping, financial analysis, added value, strategy, and suitable system and model in commercial scale in South Minahasa Selatan, this study was conducted to give economically added value for the local communities and increase the regional competitiveness. It was aimed at identifying the type and the characteristics of coconut plant-based creative agro-industrial products, analyzing the financial feasibility, calculating the added value of the product, establishing the strategy development, and simulating the implementation of the development system and model of the coconut plant-based creative agroindustry in commercial scale in south Minahasa regency. This study is expected to be able to give practical benefits as scientific recommendation concerning innovative development system and model of the coconut plant-based

creative agro-industrial products in an appropriate commercial scale and can be implemented in South Minahasa regency. In addition, it can also augment the scientific property in the agro-industry and the technological entrepreneurship.

2. METHOD

This study was carried out through survey in the production locations, handicraft, art, and culinary producers. Data were obtained through interviews with the coconut-based creative agro-industrial executors. Secondary data were also taken through literature review. The data were then compiled and analyzed in descriptive and table form. The variables calculated in this study were labor absorption, wages, investment, capital, technology (processing and packing), and production. There were several analyses used in this study, financial analysis, such as cost, revenue, income, B/C ratio, and Break Event Point (Coster and Schaffer, 1982). The added value was calculated using Hayomi (2002) *in*Sudiyono (2009), the SWOT analysis followed Harrison(2010) and Lawrence (2010), while the system and model concept used McLeod(1996) and continued with development modelling concept(Pearch and Turner, 2009).

Total cost was calculated as: TC = TFC + TVC (1)
Where TC = Total Cost, TFC = Total Fixed Cost, and TVC = Total Variable Cost
The revenue amount of the agro-industrial business was obtained as

$$TR = P \cdot Q \quad (2)$$

Where TR = Total Revenue, P = selling price per unit, Q= Quantity.

$$\text{Profit } (\pi) = TR - TC \quad (3)$$

Where TR = Total Revenue and TC = Total Cost
R/C ratio was also estimated to indicate the business condition, in which R/C < 1 means that the business is unprofitable, R/C > 1 means the business is profitable, and R/C = 1 means the business reaches the beak even point (BEP).

$$\text{BEP Unit} = \frac{FC}{P} \quad (4)$$

$$\text{BEP Sales} = \frac{FC}{1 - VC/S} \quad (5)$$

Where FC = Fixed cost, VC = Variable cost, P = selling price
The added value of the innovative products was calculated following Hayomi (2002) *in* Sudiyono (2009). All related formulas are presented in Table 1.

Table 1. Added value calculation.

NO	**Output, Input, price**	**Formula**	**outcome**
1	production (unit/mo)	A	
2	Raw material (m^3/mo)	B	
3	Labora (HOK)	C	
4	Conversion factor (1/2)	A / B = M	1
5	Labor coefficient (3/2)	C / B = N	
6	Product price (IDR/unit)	D	
7	Mean wage (IDR/unit)	E	
Revenue			
8	Raw material price (IDR/m^3)	F	
9	Contribution of other input (IDR/ unit)*	G	
10	Product value (4x6) (IDR/unit)	M X D = K	
11	a. Added value (10-8-9) (IDR/ unit)	K – F – G = L	
	b. added value ratio (11.a / 10) (%)	(L / K) % = H%	
12	a. Labor incentive (5x7) (IDR/ unit)	N X E = P	
	b. Labor (12.a./ 11.a.) (%)	(P / L) % = Q%	
13	a. profit (11.a. – 12.a)**	L – P = R	
	b. profit rate (13.a / 11.a) (%)	(R / L) % = 0 %	
Production Costs			
14	Margin (IDR/unit)	K – F = S	
	• Labor's income value 12a / (14 x 100)	P / (S X 100) = T	
	• other input contribution 9 / (14 x 100)	G / (S X 100) = U	
	• Industry's profit 13a / (14 x 100)	R / (S X 100) = V	

SWOT analysis (Strength, weakness, opportunity, threats) followed Harrison (2010) and Lawrence 2010) in matrix form as shown in Table 2.

Table 2. SWOT analysis

Internal	**Strength (S)**	**Weakness (W)**
External	List 5 – 10 strength factors	List 5 – 10 weakness factors
Opportunity (O)	**S – O Strategi**	**W – O Strategi**
List 5 – 10 opportunity factors	Use the strength to take advantage of the opportunity	Overcome the weakness and take advantage of the opportunity
Threat (T)	**S – T Strategy**	**W –T Strategy**
List 5 – 10 threat factors	Use the strength to avoid the threat	Minimize weakness and avoid threat

The qualitative analysis of development system and modelling of coconut plant-based creative agro-industryin South Minahasa regency was also done employing the development system of McLeod(1996) then continued with Pearch and Hurley(2009).

3. RESULTS AND DISCUSSION

3.1. Identification of the Commercial Scaled Coconut Plant-Based Creative Agro-Industrial Product in South Minahasa Regency.

Creative agro-industry is defined as the empowerment of superior local natural potencies creatively done using certain technology by considering the important development-influencing factors, such as continuous availability of local raw materials in sufficient numbers, appropriate and practical technology selection, availability of suitable locations for production facilities (Downey and Erickson, 1982).

According to Austin(1992),the identification and characterization of the creative industry in a certain area follows 4 factors: 1. Quantity, 2. Quality, 3. Time sensitivity, 4. Cost, and 5.organization. Creative industry derived from agro-industry comes from an idea collaboration, knowledge, and natural and human resources, as factors yielding an added value.

The Ministry of Industry of Republic Indonesia (Tooy and Longdong, 2015) identifies 14 types and characteristics of the creative agro-industries developed in Indonesia, fisheries, architechture, art market, handicraft, design, fashion, film and video, interactive game, music, art shows, publishing and printing, computer service, software, television and radio, culinary, and research and development.

There were 4 characteristic types of coconut-based creative agro-industries developed by the community groups and small-medium enterprises in South Minahasa regency.Table 3 demonstrates the coconut plant-based creative agro-industrial development that has been run since the last 10yearsinsouth Minahasa regency, 34creative agro-industrial businesses, home industry and medium-scaled industry. The highest number of the creative agro-industries are home industries, 27 units, run by the community groups and farmers, two of which are managed by the custody of the Ministry of Law and Human Right Amurang, 7 others are medium-scaled creative agro-industries

Table 3.Identification of the commercial scaled coconut-based creative agro-industries in south Minahsa regency.

No	Identification of commercial scaled types of coconut plant-based creative agro-industries	Scale		Total
		Home Industry	Medium-scaled Industry	
1	Handicraft			
	- Feet doormat	1	-	1
2	*Culinary*			
	- Cookies	16	-	16
	- Fresh cake	8	-	8
3	*Design and Furniture*			
	- Traditional house miniature	1	-	1
	- House furniture	1	-	1
4	*Research and Development*			
	- Virgin coconut oil /VCO	-	1	1
	- Coconut flour	-	4	4
	- Coconut shell charcoal	-	1	1
	- Coir	-	1	1
				34

Source: Field data of July 2018)

The presence of 4 types and characteristics of creative agro-industries in South Minahasa regency have at least implemented and integrated the connectivity, the revenue for the economic added value of the farmers, and increased the regional economic growth (Symons and Hurleey, 2018.)According to Scot (2006), with entrepreneurship principles implementation, the industrial innovation and development of a region is the characteristic of modern civilization society that is independent upon foreign products, but dependent upon the regional geographic potential creativity. These agro-industries have taken advantage of the local wisdom potential, coconut plant, and succeeded to create various sale innovative products and give an economic added value for the farmers, small medium industries, and positive impact on science and technological implementation in the area **t** (Nelwan, 1999).The development of a creative agro-industry needs not only people's innovation and creativity, but simple, easy, and practical technology as well, to produce creative, good quality, and competitive product forms, and acceptable in national or international markets (Rachmayati and Muttadju 2001).

3.2. Coconut Plant-Based Creative Products

The products of coconut plant-based creative agro-industry obtained from the combination of innovation, creativity, and technology since the last 5 years in South Minahasa regency are presented below:

3.2.1. Creative agro-industry of feet doormat product

The creative agro-industry of handicraft in south Minahasa regency is coir-based feet doormat developed byprison residents of Amurang, the Ministry of Law and Human Right. The product is presented in Figure 1.

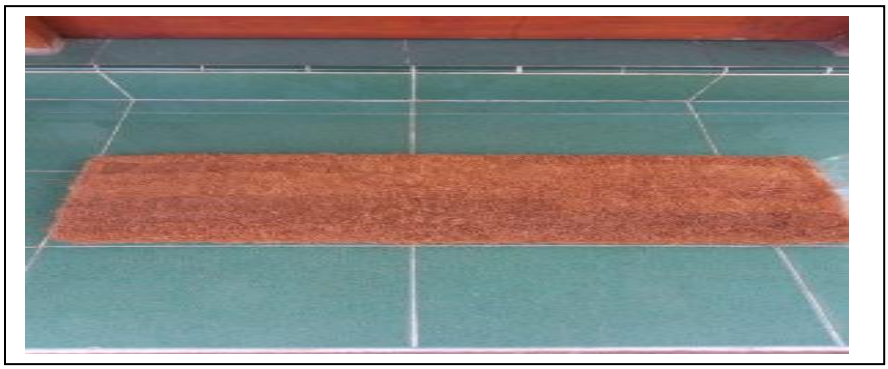

Figure 1. Handicraft of coir-based feet door mat.

This agro-industry employed the prisoner's labors from the House of Custidy Amurang. The feet doormat product had 3 variations andit averagely produced 15 units a week. The marketing system was done through order of shops or local market with the selling price of IDR. 100,000 to IDR. 200,000.

3.2.2.Creative agro-industry of cake production

Figure **2.**Patries "Bagea"

Figure 3. Fresh cake: coconut pandekoekandbakpao with coconut sweetener

3.2.3. Creative agro-industry of traditional house design miniature

This product was made by prisoners of the Costidy House of the Ministry of Law and Human Right. During the costidy, the prisoners develop their creativities to make a miniature of traditional house sample following the order. The products would be sold by the Head of the Costidy House, Amurang, and

the profits were shared as wages and business development capital. Various models of the traditional house miniature are presented in Figure4.

Figure 4. Miniature of coconut wood-based Bong on downess house

3.2.4. Creative agro-industry of house furnitures

The miniature product of coconut-based traditional house sample was made using prisoner's labor from the sustidy house of the Ministry of Law and Human Right Amurang. Various models of coconut-based house furnitures were also developed as shown in Figure 5.

Internal	**Strength (S)**	**Weakness (W)**
External	a. Coconut-based product of the creative agroindustry has good quality. b. Business executor with good experience c. Continuous availability of raw material and supporting materials. d. Maintainable product continuity. e. Coconut-based creative agribusiness with good nutrition and environmental friendly	a. Simple production technology. b. Capital limitation and poorly organized company management. c. Relatively fact production expiration period. d. Lack of promotion outside the area
Opportunity (O)	**Strategy S-O**	**Strategy W-O**
a. Extensivemarket shares. b. Providing job opportunity for surrounding communities c. Inexpensive labor availability	a. Increase the production amounts and promote market extension	a. Increase capital b. Improve production technique

Figure 5. Furniture of living room chair

3.2.5. Creative agro-industry of virgin coconut oil

This creative agro-industries have developed since 2005, and managed by coconut farmer groups in Tumpaan district ledby Robby Mintje. The virgin coconut oil product is presented in Figure 6.

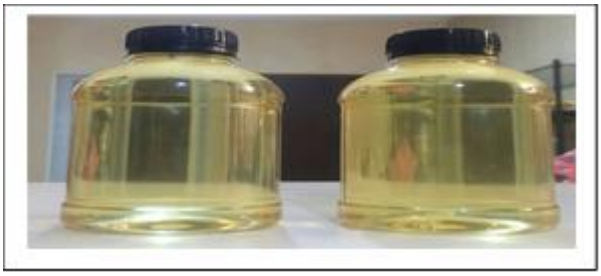

Figure 6. Virgin coconut oil

3.2.6. Creative agro-industry of coconut flour

The creative industry of coconut flour in south Minahasa regency is a medium-scaled industry. The coconut flour production is run by three companies, PT. Tropica Coco Prima, PT Putera Karangetan, and PT Trimustika Cocominaesa. The product is shown in Figure 7.

Figure 7. Coconut flour

3.2.7.Creative agro-industry of coconut shell charcoal

The coconut shell charcoal south Minahasa regency is also a medium-scaled industry. This product is developed by the medium-scaled industries. The product is presented in Figure 8.

Figure 8. Coconut shell charcoal

3.2.8. Creative agro-industry of coir

The creative agro-industry of coir in south Minahasa has long been developed in medium scale activities. The product is only sold in domestic markets, with a production value of IDR. 787,500, 000/mo. The coir product is shown in Figure 9.

Figure9. Coir

3.3. Financial Analysis of Coconut-Based Creative Agro-industrial Development in Commercial Scale

The financial analysis of the commercial coconut-based creative industries in south Minahasa regency is given in Table 4demonstrates that all types of the creative agro-industries is financially profitable with the R/C ratio > 1). The highest R/C Ratio was recorded in the creative agro industry of the traditional house design miniature with the R/C ratio of 4.50, followed by that of feet doormat, 3.00, coir product, 1.68, and the lowest was found in the creative agro-industry of the virgin coconut oil, 1.47.

Table 4. Financial analysis of commercial scale coconut-based creative agro-industry.

Calculation of R/C ratio and BEP of each creative product clearly revealed financial benefits, so tha the coconut plant-based creative agro-industrial development in South Minahasa regency could be continuously done using the entrepreneurship spirit, innovation, and local wisdom based on the community's geography and creativity as suggested by Scott (2006). This benefit, according to Kadarsan (1992) needs R/C ratio >1 and BEP Sales and BEP >1.

3.4. *Added value analysis of coconut plant-based creative agro-industry in commercial scale in south Minahasa regency.*

3.4.1 Creative agro-industry of coir-based feet doormat.

The added value of a feet doormat was IDR. 40,000. This value was obtaining by substracting the product value of IDR. 200,000/unit with raw material price of IDR. 100,000/kg and other inputs of IDR. 60,000.Mean monthly production was 100 units, so that the creative agroindustry could get the added value of IDR. 4,000,000/mo. from the feet doormat selling.

3.4.2 Coconut patries and cake agro-industry.

The added value of coconut patries and cake was IDR. 11,000/pack, that was obtained from subtracting the product value of IDR. 36,000/pack with the raw materials and other inpurs of IDR. 10,000.With mean production volume of 12,000 packs/mo., the monthly added value gained was IDR. 132,000,000.

3.4.3 Coconut wood-based traditional house miniature creative agro-industry.

Traditional house miniature of coconut wood has a product value of IDR. 1,500,000. From this value, the creative agro-industry obtained an added value of IDR. 250,000 that was obtained from subtracting the product value with raw material of IDR.750,000and other inputs of IDR. 500,000. Mean monthly production was 30 units, so that the added value obtained could reach IDR. 7,500,000/mo.

3.4.4 Coconut wood-based house furniture creative agro-industry.

The added value in each unit of house furniture was IDR. 7,950,000. This value was obtained from subtracting the product value of IDR. 19,950,000 with raw material of IDR. 8,000,000 and other inputs of IDR. 4,000,000. With mean monthly production of 20 units, the agro-industry could get an added value of IDR. 159,000,000.

3.4.5 Virgin coconut oil creative agro-industry.

Virgin coconut oil was produced in a 600 ml bottle and had a product value of IDR. 104,166/unit. The production costs consisted of raw material of IDR. 50,000 and other inputs of 25,000, so that the added value obtained was IDR. 29,166/bottle. The agro-industry could have 1,000bottleof the virgin oil/mo., and thus, it could get a monthly added value of IDR.29,166,000.

3.4.6 Coconut flour creative agro-industry.

The added value of coconut flour was IDR. 4,700/kg. This value was obtained from substracting the product value of IDR. 44,200 with the raw material of IDR.20,000 and othe input of IDR. 19,500. The agro-industry could produce 2,630,000,000 kg of coconut flour, so that the added value obtained could reach IDR. 1.236.100.000.000/mo.

3.4.7 Coconut shell charcoal creative agro-industry.

The charcoal in the form of active carbon had an added value of IDR.6,000/kg. This value was obtained from substracting the product value of IDR.31,000/kg with raw material of IDR. 15,000 and other input of IDR. 10,000. With mean production of 50,000,000 kg/mo., the coconut shell charcoal could give an added value of IDR.300,000,000.000/mo.

3.4.8 Coir creative agro-industry.

The added value of coir was IDR. 3,000/kg obtained from substracting the product value of IDR. 15,000/kg with raw material of IDR. 8,000 and other input of IDR. 4,000. The monthly production was 1,600,000 kg, so that the agro-industry obtained the added value of IDR.4. 800,000,000.

Based on the added value of each innovative product, it is obvious that each product has higher added value than a number of production costs meaning that all products of the coconut plant-based

creative agro-inductrial development in the regency have given benefits. It is indicated with lower total production costs than total revenue of the product sales.

3.5. The analysis of strategy and commercial scale coconut-creative agro-industrial development model in South Minahasa regency.

The strategy and development model analysis applied SWOT (Strength, Opportunities, Weakness-Opportunities) as shown in Table5.

Table 5. Commercial scale coconut-based creative agro-industrial strategy and model analysis in South Minahasa regency.

No	Type of Coconut-Based Creative Agroindustry	Financial Analysis				
		Total Production Cost (TC) (IDR)	Total Revenue (TR) (IDR)	Break Event Point (BEP)		R/C Ratio (R/C > 1)
				BEP Unit	Selling BEP (IDR)	
1	Creative Agro-industry of Feet Doormat	1,500,000	4,500,000	5 units	625,000	3.00
2	Creative Agro-industry of Coconut Patries and Cakes	18,000,000	36,250,000	1,280packs	11,940,298	2.01
3	Creative Agro-industry of Traditional House Miniature Design	5,000,000	22,500,000	3 units	2,325,581	4.50
4	Creative Agro-industry of House Furniture	35,000,000	75,000,000	2 units	12,500,000	2.14
5	Creative Agro-industry of Virgin Coconut Oil	8,500,000	12,500,000	60 kg	5,357,142	1.47
6	Creative Agro-industry of Coconut Flour	15,00,000,000	44,710,000,000	294,117,000 kg	6,410,256,000	2.98
7	Creative Agro-industry of Coconut Shell Charcoal	12,00,000,000	30,00,000,000	6,000,000 kg	4,285,714,000	2.50
8	Creative Agro-industry of Coir	12,500,000,000	2,100,000,000	333,330 kg	7,812,500,000	1.68

Table 5 shows that the appropriate atrtegy to commercially develop the coconut plant-based creative agro-industry in south MInahasa regency is to integrate the S-O (*Strength-Opportunities*) and W-O (*Weakness-Opportunities*) strategies by adding more production to fulfil the market demand, increasing the capital, and extending the marketing area through promotion, partnership development, production cost efficiency, and increased product amount and quality (Christhophe, 2015).Through the strategy mentioned above, it is recommended that the appropriate development system and model of the coconut-based creative agro-industries in south Minahasa regency could be done in 4 phases of system and model, Input – Proccess – Output – Outcome, as follows:

The SWOT matrix above, according to Harrison (2010) and Lawrence (2010), could explain the grouping of home industry and medium scale in South Minahasa regency as follows:

1. Home industry:

A. Strength

a) Various types and tastes of patries and cakes

b) Several traditional products are desired

c) Coconut patries and cakes are nutritive and safely consumed

d) Raw materials are easily obtained

e). Producing skills are inheritedly generated.

B. Weakness

a) poor in display and packing

b) poor product commercials.

c) family and business financials are not separated yet.

d) food production without understanding the production and business aspects.

e) Limited production and no future plan for product development.

f) Merely side work, and not serious.

g) No technological optimation for production or distribution.

h) Low management skill.

C. Opportunities

a) People‘s awareness of consuming safe and nutritive local and traditional products is increasing, and thus, the market share of the product is rising.

b) Higher tourism actitivies to the rural areas.

c)More retailersin town enable to have higher market opportunities for the retailers and distributors.

d)Increased government’s programs and financial institutions either bank or non-bank to support the small medium scales enterprises development.

D. Threats

a) Change in taste from time to time.

b) Higher competition with well-pack products that are always available in the stores and restaurants.

c) Maximization of technological implementation in production, distribution, andstock preparations.

d) Increasing income needs.

e) Preparing good quality products in numbers and continuity.

2. Research and Development Agro-industry (Large scale/medium scale)

A. Strength

a) Potentials for export products
b) Modern industry-standardized products
c) Strong and legal institutional structure
d) Good SOP and medium-scaled industrial standard
e) Preparing raw materials for food industries needed by the international markets.
f)Company's financial management system dan independent auditing

B. Weakness

a) Location of the production center.
b) Close processing and marketing, andonly the internal compony knows.
c)The labors of weak work ethic and low productivity were immediately replaced, sometimes they lost the job beyond the contract period.
d) Product and selling price with small scaled/home industry.
e) No movement of creative industrial development for low level society with involvement farmers or coconut industrial farmer group.

C. Opportunity

a) Increased market share of creative industrial products in local, national, or global scale.
b) More and more tendency to accept the creative industrial products.
c) Increased consumer's expectation to the creative industrial products.

D. Threats

a) Globalization and free trade need high competitiveness
b) Increased competition with foreign products and number of competitors
c) Need for better product quality because of technological apparatus implementation
d) Faster technological development
e) Low preference of the community to the domestic products

3.5. System and model determination of coconut plant-based commercial scale creative agro-industrial development in South Minahasa regency

According to McLeod (1996),there are theoretically 4 models, physical model, narrative model, graphic model, and mathematic model. These models will ease the understanding, the communication, and the sustainability of the coconut plant-based creative agro-industrial development. Based on the financial and the development strategy analysis, this study employed physical model consisting of 3 sub systems, input, process, and output. The manager or owner of creative agro-industrial business could alter the input power to become output resources through process that transforms a number of resources (input) owned by the creative agro-industry to yield the output and outcome as a number of products from the collaboration of innovation, creativity, and technology through the utilization of the local wisdom potential raw materials

The development system and model of commercial coconut plant-based creative agroindustrial development recommended are appropriate to be implemented in South Minahasa regency as shown in Figure 10.

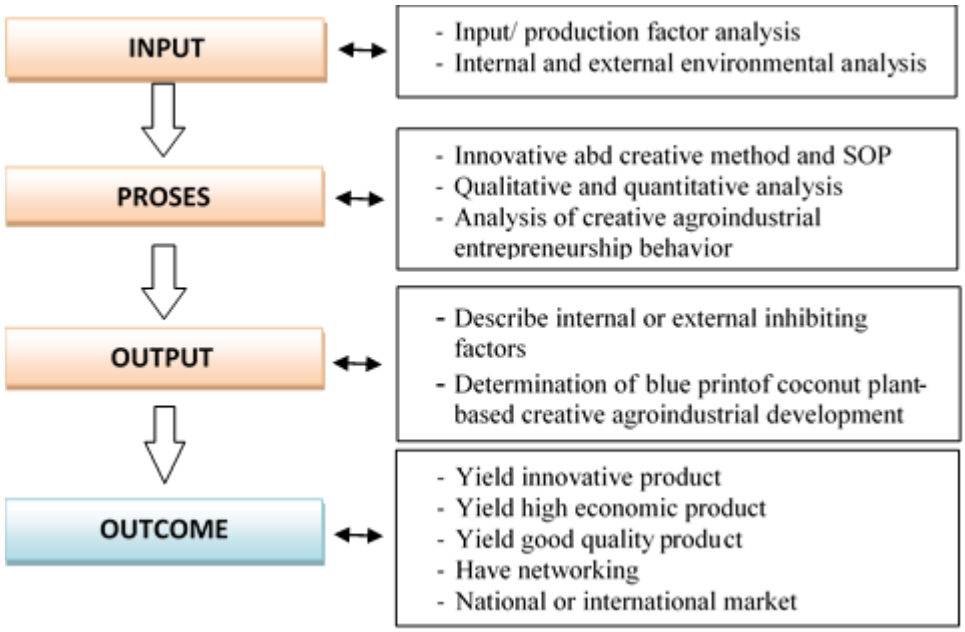

Figure 10. Development system and model of coconut plant-based creative agro-industry in South Minahasa regency

According to Pearch and Hurley (2009),the creative economic development system and model should be able to integrate each subsystem or building components, so that a standard system and model created is easly understood and can also increase the working performance and accelerate the development of the creative agro-industry (Marhadirinand Erizal, 2012).Therefore, the development system and model of coconut plant-based creative agro-industry in South Minahasa regency should use the physical model that connects the input, process, output and outcome that require the synergy between government, business executors, and coconut farmers.

4. CONCLUSION

The present study found 4 types of coconut-based creative agro-industrial characteristics in south Minahasa regency: feet doormat product, coconut-based culinary, house design and furniture, and research and development, such as virgin coconut oil, coconut shell charcoal, coconut flour, and coir. These creative agro-industries were finacially profitable indicated with R/C >1). The added value obtained was IDR.40,000 per unit for feet doormat, IDR. 11,000 per pack for culinary product, IDR. 250,000 per unit traditional house miniature, IDR. 7,500,000 per unit furniture, IDR. 29.166 per bottle of virgin coconut oil, IDR. 4,700/kg coconut flour, IDR. 6,000/kg coconut shell charcoal,and IDR. 3,000/kg coir. The appropriate strategy for commercial development of the coconut-based creative agro-industries in this regency is the integration of S-O (*Strength-Opportunities*) and W-O (*Weakness-Opportunities*) through increased production amounts, enlarged capital and marketing expansion, promotion or partnership development, production cost efficiency, good quality, nutritive, and healthy food products, good economic value. This study recommends that The appropriate development system and model of the coconut plant-based creative agro-industries in commercial scale implemented in south Minahasa regency is input – proscess – output - outcome“ meaning that prepararing a number of input factors obtained from external environmental analysis will ease the processes, quantitative and qualitative analyses and

entrepreneurship behavioral analysis, so that the output is expected to be able to describe various external or internal inhibiting factors and the blue print determination of the creative agro-industrial development that eventually produce the outcomes as various innovative, hygienic, and high quality products.

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