

Strategic Role Identification Of Agro-Science Technopark Management In Gorontalo Province

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Abstract: This study aims at determining strategic role groups related to the management of agro-science technopark site based on external conditions (opportunities and threats) and internal condition (strengths and weaknesses). Data were collected through observation and focus group discussion. Data analysis in this study employs SWOT analysis and Analytic Hierarchy Process (AHP). SWOT analysis uses internal and competitiveness factors to reveal that the strategic position of the management is within the first quadrant (Strengths-Opportunities strategy) with the coordinate points of 0.76 and 2.52. Paired comparative evaluation with AHP reveals that the global priority value from strategic role groups is: PS1 (0.419) local government's role, stakeholders, and institutional management; PS2 (0.239) research institutions' role, research and development; PS3 (0.210) community and business world's role; PS5 (0.136) regional condition and availability of raw materials' role; and PS4 (0.131) institutional role and marketing system.

Keywords: Agro-Science Technopark, SWOT Analysis, AHP.

INTRODUCTION

Innovation is critical in economic growth and creation of competitiveness, thus, a helix concept, which is based on the idea that innovation is an interactive result that involves various actors that contribute based on their institutional function in the community is proposed (Praswati, 2017). Taking the *Triple Helix* (TH) concept that involves "government", "university", and "industry", which later grows into a quadruple helix with the addition of "social community" as one of the actors in the helix. The quintuple helix (QuiH), a further development, encompasses political system and natural environment as determinants in sustainable development and provide "manpower" and "natural capital" such as plants, animal variation, etc., (Carayannis and Campbell, 2012). It is expected that in the future industry will keep emerging and cooperation between industry and university in the development of research and innovation will become a necessity (Audretsch *et al.*, 2006). One of the innovation spaces within the helix concept is the science and technopark, which is able to commercialize knowledge and provide service to develop entrepreneurial potential and ensure competitive advantages of a region, including, Gorontalo province. Thus, it becomes urgent to carry out a comprehensive study on the readiness of Gorontalo province in developing a science technopark as an area with economic development dimension as well as the center of knowledge and technology development that support the acceleration of innovation as well as a motor in the development of the region.

Based on its economic growth structure, a potential science technopark to be developed in Gorontalo province should be focused on the development of Agro-Science Technopark site. This is supported by the gross regional domestic product of Gorontalo in the third semester of 2018, which are still dominated by the contribution of agriculture, forestry, fisheries sectors by 39.92%, and highest economic growth rate is 2.46% (Gorontalo Province Central Bureau of Statistics, 2018). To support this effort, several studies on the potential Agro-Science Technopark sites recommended location potential, potential commodity, and potential type of agro-industry that are appropriate to be developed in the Agro-Science Technopark site in Gorontalo province (Tolinggi *et al.*, 2018). Further, a study to formulate the management of the Agro-Science Technopark site is carried out, which initiated by stakeholder analysis as a process to identify individuals, groups, and organizations that are influenced or can influence environment and future generations as well as prioritizing individuals and groups involved (within the decision-making process (Reed *et al.*, 2009). The result of this study by (Tolinggi *et al.*, 2018) has managed to classify 20 stakeholders involved within the study into three categories, which was based on the stakeholders' identification concept by (Grimble, 1998), which has been modified and used by (Mulyaningrum, 2013), those are : *Primary Stakeholder*, *Key Stakeholder*, and *Secondary Stakeholder*. In addition, the study has also managed to classify those twenty stakeholders into four groups based on the interest level and influence level criteria in the management of the plan to establish Agro-Science Technopark site in Gorontalo province (Figure 1), these groups are dominated by key players classification by 9 stakeholders (45%) from the total stakeholders involved, context setter classification by five stakeholders (25%), subject classification by four stakeholders (20%), and crowd classification by two stakeholders (1%).

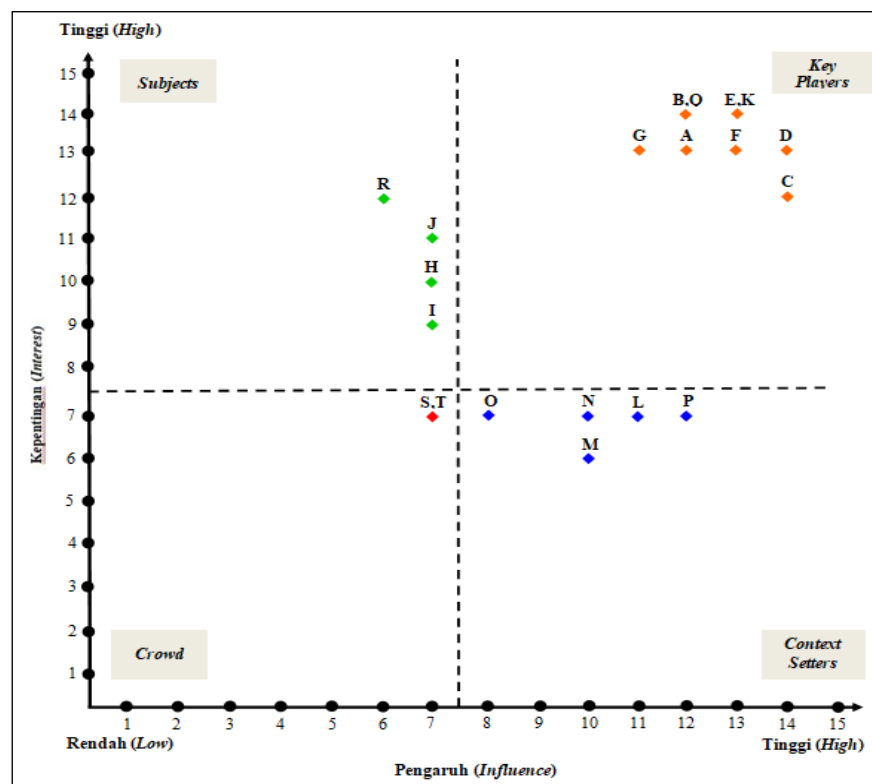


Figure 1. Influence-Interest Matrix of Stakeholders in Management of Agro-Science Technopark Site Plan in Gorontalo Province (Tolinggi *et al.*, 2018)

Based on the result of stakeholders analysis in that study, it becomes necessary to determine the strategic position of those stakeholders in order to identify strategic role groups in relation to the management of Agro-Science Technopark site based on the external condition (opportunities and threats) and internal conditions (strengths and weaknesses). Observation on the internal and external condition are analyzed using the SWOT (strengths, weaknesses, opportunities, and threats) matrix, and is based on the logic to maximize strengths and opportunities and minimize weaknesses and threats (Rangkuti, 2015) to obtain best strategic alternatives, which in its implementation, decision is made to prioritize the strategies with high priority score using the *Analytical Hierarchy Process* (AHP) method.

THEORETICAL REVIEW

Science Techno Park. *International Association of Science Park / IASP* defines science technopark as an organization managed by professionals with the main objective of increasing the economic growth and strengthen the role of science and technology in economic development by promoting innovation culture and competitiveness of the related business, and knowledge-based institutions (Ministry of Technology Research and Higher Education, 2015). Hierarchically, development of Science and Technology Park is directly under the president's control, where the development of National Science and Techno Park, then becomes the umbrella for development of science park in provincial level and a number of technopark in regencies/municipalities level. Science technopark aims at stimulating and managing the knowledge and technology flow in university, research and development institutions and industry in its area; facilitate establishment and development of innovation-based companies through business incubation and spinoff process, and provide services to increase other value-added, through the provision of space and high quality supporting facilities. Based on the outline of the science technopark development model, there are three units in its development process namely: business incubation, technology development unit, and technical service unit; where for each process unit supporting facilities and services are provided for users, and different outputs for each process units (Ministry of National Development Planning: National Development Planning Agency, 2015).

The success in development of science park or technopark, from Stanford research park that becomes the incubator for the growth of Silicon Valley, Science Park in Japan which is able to contribute to the added value for technology-based industries (Fukugawa, 2006), *Techno Park* in Malaysia, which focused on collaborative research and development in automotive, biotechnology, and electronics (Rasiah and Govindaraju, 2009), up to Korea who has succeeded in mapping the innovation cluster based on the established science park (Deog-Seong and Yoem, 2012). On the other hand, the establishment of Science Park and Techno Park are signified by the establishment of Bandung *High Tech Valley* (BHTV) in 2006, established by Institut Teknologi Bandung (ITB), which focused on startup business in the technology field. Later, Solo *Techno Park* is established, where its development zone consists of IT and research zone, training, a business incubator, industry and trade, and several other science parks and technoparks

that are being pioneered in the regions, both at provincial and regencies/municipalities level.

SWOT Analysis. A SWOT analysis is the systematic identification of various factors to formulate the company's strategy. This analysis is based on logic to maximize strengths and opportunities while at the same time try to minimize weaknesses and threats. The strategic decision-making process is always related to attainment of vision, mission, objectives, strategy and company's policy. Therefore, strategic planners should analyze current strategic factors of the company (strengths, weaknesses, opportunities, and threats) (Rangkuti, 2009). Meanwhile, SWOT analysis according to (Kotler, 2009) is overall evaluation toward strengths, weaknesses, opportunities, and threats. A SWOT analysis is one of the popular instruments to analyze the internal and external environments of the company. This analysis is based on the assumption that effective strategy will minimize weaknesses and threats. When it is accurately implemented, this simple assumption will have large impact on the success of the designed strategy.

SWOT analysis serves to collect information from situational analysis and separate into internal problems (strengths and weaknesses) and main external problems (opportunities and threats). A SWOT analysis will describe whether the information will be helpful to assist the company in achieving its objectives or indicates that there is an obstacle that should be faced or mitigated to obtain the desired result (Ferrel and Harline, 2005).

Analytic Hierarchy Process (AHP). The multi-criteria decision-making process, Analytic Hierarchy Process (AHP), is a method that has been known and accepted to provide answer toward various decision-making and provides alternatives (Kazibudzki, 2013). This AHP method is developed by Thomas L. Saaty, a mathematician, as a framework to make an effective decision on complex problems by simplifying and accelerating the decision making the process of this problem through the various arrangements of variables in a hierarchical model. It provides numeric value in subjective development on the importance of each division of the variables group and synthesized various considerations to determine how dependent variable, and which dependent variables which have highest priority score and take action to influence the result in this situation (Saaty, 2008).

METHODOLOGY

Data in this study consist of primary and secondary data. Primary data are collected through observation and interview with selected respondents using purposive sampling method in Focus Group Discussion. Meanwhile, secondary data are collected from the literature review and desk study related to management of Agro-Science Technopark site. The data analysis tool is SWOT-AHP (*Strength Weakness Opportunities Threats – Analytical Hierarchy Process*) with the following stages: (1) conducting SWOT analysis to define internal and external factors, both qualitatively and quantitatively which produces the SWOT matrix on Strategic Position Mapping of the Agro-Science Technopark Site management and the quadrant position to determine type of strategies that will be used in the management of the Agro-Science Technopark site in Gorontalo

province; (2) describing the hierarchically structure of the strategy and the strategic role of SWOT-AHP analysis; (3) developing paired comparison method of each hierarchy, using Saaty scoring scale; and (4) determining the global strategic position of the stakeholders, their ranks and priorities.

The Results Of Statistical Test. Management of the Agro-Science Technopark site in Gorontalo province based on SWOT-AHP analysis refers to the stages developed by (Kangas *et al.*, 2001).

1. SWOT Analysis. A SWOT analysis is started by defining its objective that is to develop a strategy in the management of Agro-Science Technopark site in Gorontalo province. Based on this objective, identification of internal and external factors which suitable to the management principles of Agro-Science Technopark site, through observation and interview with key respondents. Those internal and external factors then classified into six aspects (Table 1), namely: (1) natural resource and geographic environment aspect; (2) human resource aspect; (3) business activities and socio-economic aspect; (4) science and technology and innovation aspect; (5) government and stakeholders support; and (6) institutional aspect.

Table 1. Internal and External Factors of the Management of Agro-Science Technopark Site

Internal And External Factors	S	W	O	T
A. Natural Resource And Geographic Environment Aspect				
1 The Location Of Agro-Science Technopark Site: Strategic	√			
2 Road Infrastructure And Transportation Facilities: Sufficient	√			
3 Availability Of Area And Prominent Raw Materials: Sufficient	√			
4 Marketing Area And Network: Sufficiently Broad			√	
5 Access Toward Resources And Raw Materials: Sufficiently Broad	√			
B. Aspek Sumber Daya Manusia				
1 Community's Level Of Education And Skill In Utilizing Commodity-Based Technology: Low		√		
2 Level Of Income And Welfare Of The Community Surrounding The Agro-Science Technopark Area: Low		√		
3 Managerial And Professional Ability Of The Workers: Available	√			
4 Community And Business World's Motivation In Agribusiness: Available	√			
C. Business And Socio-Economic Aspect				
1 Working Capital: Limited		√		
2 Prominent Commodity-Based Business: Traditional		√		
3 Marketing Institution And Channel: Yet Optimized		√		
4 Regional Economic Endowment For Regional Development: Uneven				√
5 Market Demand For The Processed Product: High			√	
6 Production Continuity: Low		√		
7 Market Growth And Global Competition: High				√

Internal And External Factors		S	W	O	T
D. Science And Technology And Innovation Aspect					
1	A Skill Training System That Encourages The Community To Establish New Business: Less Available		√		
2	Products' Processing Based On Prominent Commodities: Less Innovative And Less Variative		√		
3	Diversification Potentials For The Prominent Commodities Products: Plentiful			√	
4	It Development For Online Marketing: Opportunities Are Open			√	
E. Government And Stakeholders Support Aspect					
1	Regulation And Policy Support From The Government: Available	√			
2	Local Government Readiness In The Implementation Of Programs Related To Agro-Science Technopark Site: In Place	√			
3	Support From Stakeholders For Integrative And Sustainable Management Of The Agro-Science Technopark Site: Available			√	
F. Institutional Aspect					
1	Financial Institutions (Cooperatives And Banks): Available			√	
2	Support From Research Development And Institution In Conducting Market Research Or Product Innovation: Available			√	
3	Support From Educational And Training Institutions To Increase Entrepreneurship Skills: Available			√	
4	Structure And Institutional Working Mechanism In Site Management: In Place	√			

Notes: S = *Strengths*, W = *Weaknesses*, O = *Opportunities*, T = *Threats*
 Source : (Data processed by the researcher, 2018)

Based on the identifications of SWOT factors above, a SWOT matrix is developed using two approaches, quantitative and qualitative approaches. A qualitative approach is made to identify alternative strategy as the result of strategy formulation based on the conversion of internal and external factors, whereas, quantitative approach is made to map the position of Agro-Science Technopark site management based on the analysis of each strategic factors' characteristics.

a. Qualitative Approach

In the SWOT matrix, there are eight boxes. Two most top boxes are for the external environment which consists of opportunities and threats in the management of Agro-Science Technopark site, whereas two boxes in the left are internal factors, strengths, and weaknesses in the management of Agro-Science Technopark site. Meanwhile, the other four boxes are strategic issues from internal and external factors on Agro-Science Technopark site management in Gorontalo province, which consists of SO strategies (strengths-opportunities); strategies to optimize strengths by utilizing opportunities and WO Strategies (weaknesses-opportunities); strategies to minimize weaknesses by utilizing opportunities; ST strategies (strengths-threats) to minimize threats by utilizing opportunities, and WT (weaknesses-threats) that is strategy to minimize weakness and avoiding threats.

Table 2. SWOT Matrix for Formulation of Strategy to Manage Agro-Science Technopark Site

		EXTERNAL FACTORS			
		Strengths	Weakness		
INTERNAL FACTOR	S1	Agro-Science	W1	Community's Level Of	
	S2	Technopark Site:		Education And Skill In	
		Strategic		Utilizing Commodity-	
		Road Infrastructure And		Based Technology:	
	S3	Transportation	W2	Low	
		Facilities: Sufficient		Level Of Income And	
		Availability Of Area		Welfare Of The	
	S4	And Prominent Raw		Community	
		Materials: Sufficient	W3	Surrounding The Agro-	
S5	Marketing Area And	W4	Science Technopark		
	Network: Sufficiently		Area: Low		
	Broad	W5	Working Capital:		
S6	Managerial And		Limited		
	Professional Ability Of	W6	Prominent Commodity-		
	The Workers: Available	W7	Based Business:		
S7	Community And		Traditional Marketing		
	Business World's		Institution And		
	Motivation In		Channel: Yet		
S8	Agribusiness: Available	W8	Optimized		
	Regulation And Policy		Production Continuity:		
	Support From The		Low		
	Government: Available		A Skill Training		
S9	Local Government		System That		
	Readiness In The		Encourages The		
	Implementation Of		Community To		
	Programs Related To		Establish New		
	Agro-Science		Business: Less		
	Technopark Site: In		Available		
	Place Structure And		Products' Processing		
	Institutional Working		Based On Prominent		
	Mechanism In Site		Commodities: Less		
	Management: In Place		Innovative And Less		
			Variative		
<i>Opportunities</i>		<i>SO Strategies</i>		<i>WO Strategies</i>	
O1	Marketing Area And	SO1	Utilizes Support From	WO1	Optimizes Marketing
	Network: Sufficiently		Educational And		Channel And
O2	Broad Market Demand		Training Institutions		Institutions By
	For The Processed		And Research And		Utilizing Openly Wide
O3	Product: High		Development Agencies		Marketing Network To
	Diversification		To Increase Community		Meet The Market
	Potentials For The		And Business World		Demand, Which
O4	Prominent	SO2	Motivation In		Supported By
	Commodities Products:		Agribusiness (S6, O6,	WO2	Opportunities For IT
	Plentiful		O7)		Development For
O5	IT Development For		Utilizes The		Online Marketing
	Online Marketing:		Availability Of Land		System (W5, O1, O2,

O6	Opportunities Open Support From Stakeholders Integrative Sustainable Management Of The Agro-Science Technopark Available Support From Research Development And Institution In Conducting Market Research Or Product Innovation: Available Support From Educational And Training Institutions To Increase Entrepreneurship Skills: Available Financial Institutions (Cooperatives And Banks): Available	Are From For And	SO3	And Important Raw Materials To Fulfill The Market Demand And Increase Diversification Of Products Made From A Prominent Commodity (S3, O2, O3)	WO3	O4) Utilizes Support From Research And Development Institutions To Increase The Community's Education And Skill In The Utilization Of Resources And Prominent Commodity-Based Technology (O6, W1)
O7	Technopark Site: Support From Research Development And Institution In Conducting Market Research Or Product Innovation: Available Support From Educational And Training Institutions To Increase Entrepreneurship Skills: Available Financial Institutions (Cooperatives And Banks): Available	Site: And	SO4	Increase Stakeholders' Support In The Management Of Agro-Science Technopark Site And The Readiness Of Local Government In The Implementation Of Programs Related To The Site Management To Strengthen The Structure, And Institutional Mechanism Of The Site Management, And Managerial Ability And Workers' Professionalism (O5, S5, S8, S10)	WO4	Utilizes Support From Education And Training Institutions To Obtain Skill Training That Supports The Community In The Establishment Of New Modern Businesses (O7, W4, W7)
O8	Technopark Site: Support From Research Development And Institution In Conducting Market Research Or Product Innovation: Available Support From Educational And Training Institutions To Increase Entrepreneurship Skills: Available Financial Institutions (Cooperatives And Banks): Available	Site: And	SO5	Utilizes Strategic Location, Road Infrastructure, And Sufficient Transportation, And Access Toward Resources Or Raw Materials To Broaden And Increase Marketing Network And Area (S1, S2, S4, O1)	WO5	Utilizes The Availability Of Financial Institutions In Overcoming The Problem Related To Limited Agribusiness Working Capital To Increase Income And Welfare (O8, W2, W3) Increase Stakeholder Support In The Utilization Of Diversification Potentials For Prominent Commodity Products To Increase A More Innovative And Varied Product (O3, O5, W8)

Threats	ST Strategies	WT Strategies
T1 Regional Economic Endowment For	ST1 Utilizes Strategic Location, Road	WT1 Increase The Level Of Education And Skill Of

T2	Regional Development: Uneven Market Growth And Global Competition: High	Infrastructure And Available Transportation, Availability, And Access Toward Raw Materials Of The Prominent Commodity To Solve Uneven Economic Endowment Of The Region (S1, S2, S3, S4, T1)	WT2	The Community In Utilizing Commodity- Based Resources And Technology And Ability In Processing The Products And Production Continuity To Solve The High Market Growth And Demanding Global Competition (W1, W8, W6, T2)
ST2		Increase Local Government Readiness In The Implementation Of Programs Related To Agro-Science Technopark Site Management Which Supported By The Availability Of Regulation And Policy To Solve High Market Growth And Demanding Global Competition (S7, S8, T2)	WT3	Optimizes Marketing Channel And Institutions To Solve The Limited Working Capital Issue As An Effort To Increase Regional Economic Endowment In Site Development (W3, W5, T1)
ST3		Increases Community Motivation And Business World In Agribusiness, And Strengthening The Structure And Institutional Mechanism Of The Site Management Which Supported By The Managerial Ability And Workers' Professionalism To Solve Market Growth And Global Competition Issues (S5, S6, S9, T1)		Optimizes Skill Training System Which Encourages The Community To Establish A New Business, With More Modern Commodity- Based Business To Increase Community's Income And Welfare As The Answer For Rapid Market Growth And High Global Competition Issues (W7, W2, W4, T2)

Source : (Data processed by the researcher,2018)

Formulation of various alternative strategies in Table 2 produces 16 alternatives, where SO strategies and WO strategies produce every five alternatives, every three alternatives are produced by ST strategies and WT strategies.

b. Quantitative Approach

Data on analysis of internal and external factor are quantitatively changed through calculation which preceded by scoring and rating for each factor by expert respondents, which in this study are stakeholders identified through stakeholder analysis method which classified into four groups: *Key Player*, *Context Setters*, *Subjects*, and *Crowd* (Tolinggi *et al.*, 2018). Data collection for scoring are taken through focus group discussion method (FGD) using closed-ended questions with answer scale and intensity from highest to lowest (Likert scale), in which, the score recapitulation of all respondents are given in each question. The result of this value, rating, and score for each SWOT factor is presented in Table 3 and 4.

Table 3. Value, Rating, and Score for Internal SWOT Factors in the Management of Agro-Science Technopark Site in Gorontalo province

INTERNAL FACTORS		VALUE	RATING	SCOR
1	Agro-Science Technopark Site : Strategic	0.06	3.25	0.19
2	Road infrastructure and transportation facilities: Sufficient	0.06	3	0.18
3	Availability of area and prominent raw materials: Sufficient	0.05	4	0.20
4	Marketing area and network: sufficiently broad	0.07	2.75	0.18
5	Managerial and professional ability of the workers: available	0.05	3	0.16
6	Community and business world's motivation in agribusiness: Available	0.06	3.75	0.23
7	Regulation and policy support from the government: available	0.06	3.25	0.20
8	Local government readiness in implementation of programs related to Agro-Science Technopark site: in place	0.07	3.75	0.24
9	Structure and institutional working mechanism in site management: in place	0.05	3	0.15
Total Strength Factors		0.52		1.58
1	Community's level of education and skill in utilizing commodity-based technology: low	0.07	1.75	0.11
2	Level of income and welfare of the community surrounding the Agro-Science Technopark area: Low	0.05	2	0.11
3	Working capital: limited	0.05	1.75	0.09
4	Prominent commodity-based business: Traditional	0.06	1.75	0.11
5	Marketing institution and channel: yet optimized	0.06	2	0.12
6	Production continuity: Low	0.06	1.5	0.09
7	A skill training system that encourages the community to establish new business: less available	0.07	1.5	0.10
8	Products' processing based on prominent commodities: less innovative and less variative	0.06	1.5	0.09
Total Weakness Factor		0.48		0.82
TOTAL INTERNAL FACTOR		1.00		2.39

Source : (Data processed by the researcher,2018)

NOTE: Rating Value 4 = Major Strength, 3 = Minor Strength, 2 = Minor Weakness, 1 = Major Weakness

Table 4. Value, Rating, and Score of External Factors for SWOT of Agro-Science Technopark Site Management in Gorontalo Province

	EXTERNAL FACTORS	VALUE	RATING	SCORE
1	Marketing area and network: sufficiently broad	0.12	4	0.48
2	Market demand for the processed product: high	0.11	3.75	0.42
3	Diversification potentials for the prominent commodities products: plentiful	0.12	3	0.36
4	IT development for online marketing: opportunities are open	0.10	3.5	0.37
5	Support from stakeholders for integrative and sustainable management of the Agro-Science Technopark site: available	0.12	4	0.48
6	Support from research development and institution in conducting market research or product innovation: available	0.10	3.75	0.39
7	Support from educational and training institutions to increase entrepreneurship skills: available	0.11	4	0.45
8	Financial institutions (cooperatives and banks): available	0.06	3.25	0.19
Total Opportunity Factors		0.79		2.94
1	Regional economic endowment for regional development: Uneven	0.10	2	0.21
2	Market growth and global competition: High	0.10	2	0.21
Total Weakness Factors		0.21		0.42
TOTAL EXTERNAL FACTORS		1.00		3.36

Source : (Data processed by the researcher, 2018)

NOTE: Rating Value 4 = Major Strength, 3 = Minor Strength, 2 = Minor Weakness, 1 = Major Weakness

Following obtainment of this result of value, rating, and score of internal and external factors of SWOT (Table 3 and 4), then calculation of *Strength Posture* and *Competitive Posture* to determine the coordinates from the quadrant, which showed the strategic position of Management of the Agro-Science Technopark site in Gorontalo province with the following formula:

$$\text{Strength Posture} = \text{Strengths} + (- \text{Weaknesses}) = 1.58 + (- 0.82) = \mathbf{0.76}$$

$$\text{Competitive Posture} = \text{Opportunities} + (- \text{Threats}) = 2.94 + (- 0.42) = \mathbf{2.52}$$

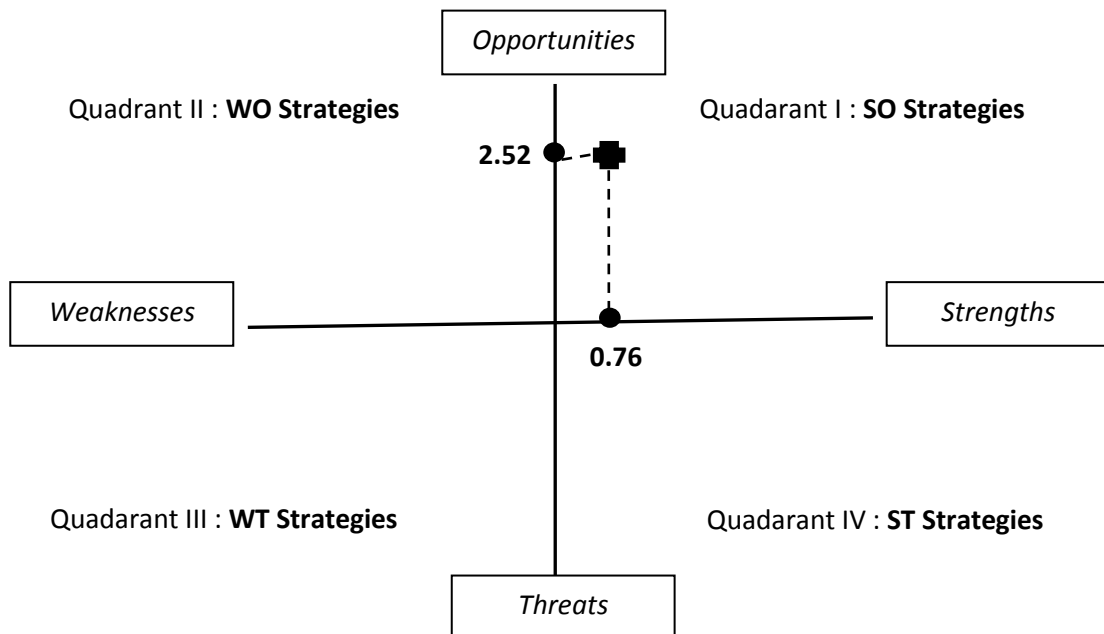


Figure 2. SWOT Matrix Strategic Position Mapping of Agro-Science Technopark Site Management

The coordinate points (0.76, 2.52) in Figure 2 shows that the strategic position of Agro-Science Technopark site management is within Quadrant I (SO Strategy), that is a strategy to optimize strengths to utilize opportunities. The strategies to be optimized to utilize opportunities are:

- SO1. Utilizes support from educational and training institutions and research and development agencies to increase community and business world motivation in agribusiness (S6, O6, and O7)
- SO2. Utilizes the availability of land and important raw materials to fulfill the market demand and increase diversification of products made from a prominent commodity (S3, O2, O3)
- SO3. Increase stakeholders' support in the management of Agro-Science Technopark site and the readiness of local government in the implementation of programs related to the site management to strengthen the structure, and institutional mechanism of the site management, and managerial ability and workers' professionalism (**O5, S5, S8, and S10**)
- SO4. Utilizes strategic location, road infrastructure, and sufficient transportation, and access toward resources or raw materials to broaden and increase marketing network and area (**S1, S2, S4, O1**)
- SO5. Utilizes regulation and institutional support from the local government, financial institution, and IT development potential to broaden online marketing (**S7, S9, O4, O8**)

2. Description of Strategic Hierarchy Structure and Strategic Role of SWOT-AHP Analysis. Based on a number of alternatives provided by the SO strategies, it becomes important to determine priority strategy and strategic roles which can be selected to clarify direction in the implementation of the decision-making process. The strategic

roles agreed by key respondents in this study are presented in Table 5.

Table 5. Strategic Role of Agro-Science Technopark Site Management in Gorontalo Province

Code	Role	Notes
PS1	Role of local government, stakeholder, and management institutions	Optimizes the role of local government and support from related stakeholder to increase managerial capacity and structural strengthening and institutional working mechanism of the site management to support the establishment of the competitive site
PS2	Role of Educational, Research and Development Institutions	Optimizes the role of education, research, and development institution for diversification of a more innovative and variative processed products from prominent commodity
PS3	Role of community and business world	Optimizes capacity (knowledge and skill) of the community and agribusiness actor through prominent commodity-based agribusiness to increase their income and welfare
PS4	Role of marketing institution and system	Optimizes the channel, institution, and marketing system to broaden the network and marketing access to innovative products produced within the site.
PS5	Role of area condition and availability of raw materials	Optimizes the area condition with strategic location, road infrastructure and sufficient transportation, and availability of access and raw material for the uneven economic endowment of the region

Notes: PS= Strategic Role

Source : (Data processed by the researcher,2018)

All five alternatives within SO strategies then mapped into five strategic roles to obtain priority strategy through the Analytical Hierarchy Process (AHP) technique as seen in Figure 3.

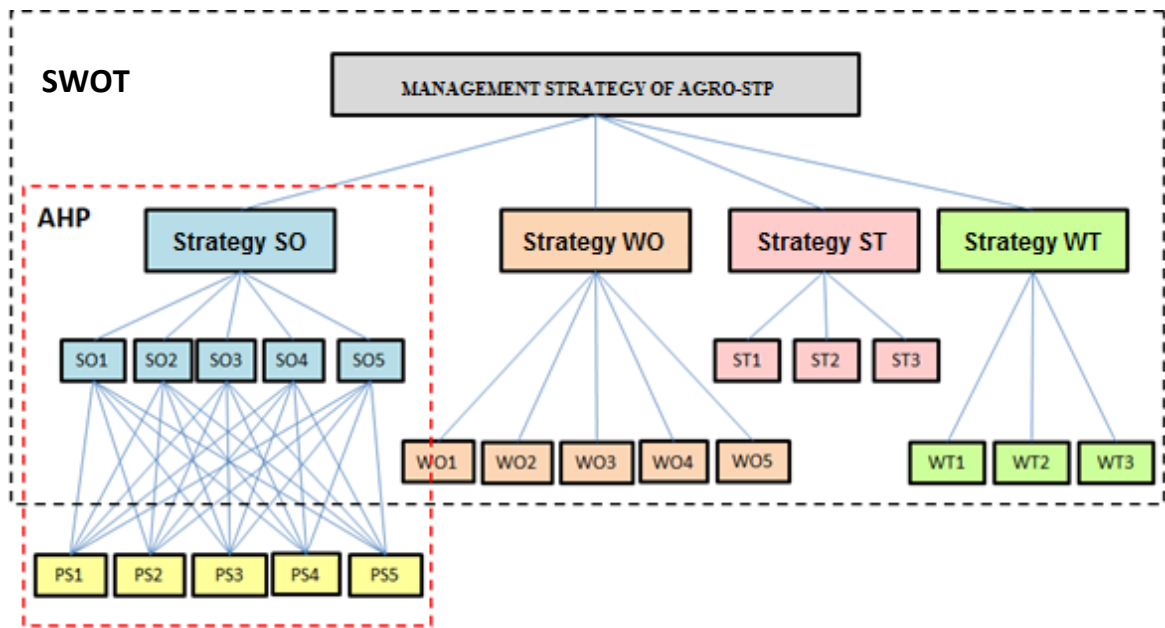


Figure 3. Hierarchy Structure of SWOT-AHP for Strategic Management of Agro-Science Technopark Site

Hierarchy structure of SWOT-AHP for Strategic Management of Agro-Science Technopark site which has been mapped in Figure 3 showed that the highest hierarchy is the objective or focus of the problem, the second hierarchy is the group of SWOT strategies which consists of four groups, namely: So strategies, WO strategies, ST strategies, and WT strategies. The third hierarchy discusses a number of strategies from each group of strategies, and the lowest hierarchy is the role of strategies to the selected SO strategies as priority strategy based on value, rating, and score calculation of internal and external factors which later produced coordinate points within the first quadrant (SO Strategy).

- 3. Paired comparison matrix in each level of the hierarchy.** This paired comparison matrix is developed based on perception or opinion of the respondents by comparing several options or criteria. The markers are expert respondents who are also stakeholders identified through stakeholder analysis and classified into four groups: key player, context setters, subjects, and crowds (Tolinggi *et al.*, 2018). Data collection for this paired comparison matrix in each hierarchy which included into the AHP scheme (Figure 3), were taken using the Focus Group Discussion Method (FGD). The value used to measure the importance of two compared criteria is Saaty scale from 1 to 9, and reflects the expression of assessment of an expert in two criteria level of interest (Table 6).

Table 6. Saaty Assessment Scale

Nilai	Paired Comparison
1	Both criteria are equally important
3	The first criterion is more important than the other
5	First criteria are most important than the other
7	First criteria are clearly more important from the other
9	First criteria are definitely more important than the other

2,4,6,8 A value between the two if there are doubts

(Source, Saaty, 2008)

Below is the result of assessment for paired comparison matrix between strategies in SO strategies group (Table 7).

Table 7. Paired comparison matrix between strategies in SO strategies group

	SO1	SO2	SO3	SO4	SO5
SO1	1	3	5	7	7
SO2	0.33	1	3	5	5
SO3	0.20	0.33	1	1	1
SO4	0.14	0.20	0.33	1	7
SO5	0.14	0.20	0.20	0.33	1
Total	1.82	4.73	9.53	14.33	21.00

Source : (Data processed by the researcher,2018)

Evaluation of paired comparison matrix is manually calculated using the Ms. Excel application, by adding the value of each column. This value is to divide the value of each compared strategy within the SO group hence the *eigenvector* as the value of priority value in that group is obtained (Table 8).

Table 8. Paired comparison matrix evaluation between strategy in SO strategy group

	SO1	SO2	SO3	SO4	SO5	Priority
SO1	0.55	0.63	0.52	0.49	0.33	0.506
SO2	0.18	0.21	0.31	0.35	0.24	0.259
SO3	0.11	0.07	0.10	0.07	0.05	0.081
SO4	0.08	0.04	0.03	0.07	0.33	0.112
SO5	0.08	0.04	0.02	0.02	0.05	0.043
Total	1.00	1.00	1.00	1.00	1.00	1.00

Source : (Data processed by the researcher,2018)

The result of assessment toward decision-making has been checked its value of consistency ratio, where if the value of CR < 10% (CR < 0.1) then the assessment is considered consistent.

The value of CR for consistency between strategy assessments within the SO strategy is obtained through the following steps:

- Weighted sum vector for each obtained eigenvector value is calculated
 $\{1,3,5,7,7\} * 0.51 + \{0.33,1,3, 5,5\} * 0.26 + \{0.20,0,33,1,1,1\} * 0.08$
 $+ \{0.14,0.20,0.33,1,1\} * 0.11 + \{0.14,0.20,0.20,0.33,1\} * 0.04$
 $= \{2.77,1.44, 0.42,0.56,0.22\}$
- Consistency Vector and Lambda Values
 $((2.77/0.51) + (1.44/0.26) + (0.42/0.08) + (0.56/0.11) + (0.22/0.04)) / 5 = 5.29$
- Consistency Index (CI)
 $CI = (\text{Lambda} - n) / (n - 1) = (5.29 - 5) / (5 - 1) = 0.07$

- Consistency Ratio (CR)
 $CR = CI / RI = 0.07 / 1.12 = 0.07$
 The RI value list based on matrix:

2	3	4	5	6	7	8	9	10	And so on
0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49	

The value of CR for consistency assessment between strategies within the SO strategy group is **0.07** which means that the assessment is consistent. Hence, it can be further used to calculate a paired comparison matrix and consistency test for each strategic role (PS).

- Determine the Strategic Priority.** The summary of the evaluation result of the paired comparison is the final global priority of Strategic Role group and their ranks and priority order as presented in Table 9 below.

Table 9. Evaluation between strategies matrix within the SO strategy and Strategic Role

Local SO priority	SO1	SO2	SO3	SO4	SO5	Global PS Priority	PS Priority
SO Rank	1	2	4	3	5		
PS1	0.548	0.233	0.375	0.301	0.406	0.419	1
PS2	0.198	0.233	0.400	0.351	0.175	0.239	2
PS3	0.173	0.300	0.106	0.253	0.192	0.210	3
PS4	0.081	0.233	0.119	0.095	0.227	0.131	5
PS5	0.122	0.178	0.159	0.119	0.052	0.136	4

Source : (Data processed by the researcher,2018)

DISCUSSION

Based on the result of strategy evaluation, it is obtained that the highest local priority from SO strategy group in order are: SO1 (0.506) that is utilizing the support from education and training institution, and research and development institution to increase community and business owners motivation in agribusiness. SO2 (0.259) utilizes the availability of land and important raw materials to fulfill the market demand and increase diversification of products made from the prominent commodity. SO4 (0.112) utilizes strategic location, road infrastructure, and sufficient transportation, and access toward resources or raw materials to broaden and increase marketing network and area. SO3 (0.081) increases stakeholders' support in the management of Agro-Science Technopark site and the readiness of local government in the implementation of programs related to the site management to strengthen the structure, and institutional mechanism of the site management, and managerial ability and workers' professionalism. SO5 (0.043) utilizes regulation and institutional support from the local government, financial institution, and IT development potential to broaden online marketing.

Meanwhile, global priority with the highest score from the Strategic Role group in order are: PS1 (0.419) role of local government, related stakeholder, and management

institutions; PS2 (0.239) role of Educational, Research and Development Institutions; PS3 (0.210) Role of community and business world; PS5 (0.136) role of area condition and availability of raw materials; and PS4 (0.131) role of marketing system and institution

CONCLUSION

Based on this research, it can be concluded that: (1) The strategic position of Agro-Science Technopark site in Gorontalo province is within the first quadrant (SO Strategy) with the coordinates of 0.76 and 2.52. (2) Global priority with the highest value from the strategic role group respectively are: PS1 (0.419) local government role, related stakeholders, and institutional management; PS2 (0.239) the role of educational institution, research and development; PS3 (0.210) the role of community and business world; PS5 (0.136) the role of regional condition and availability of raw material; and PS4 (0.131) the role of institution and marketing system.

The implication of this study for the management of Agro-Science Technopark site is: (1) The readiness of local government such as infrastructure support, regulation, and programs related to the site management; (2) The increase of support from research and development institution in developing research and technology transfer activities that have the potential to adopt, adapt and increase the competitiveness of the site; (3) The support from the business world in increasing the entrepreneurship capacity of the site community; (4) The increase in the motivation of within the site community to do featured commodity processing.

This study has some of its limitations, therefore, several things are recommended for future research, such as a more comprehensive study on the form and pattern of activities of each stakeholders, as an implementation of each strategic role that have been identified in this study, as well as linkage to the recommendation on local potential, commodity, and types of agro-industry, as recommended in previous study, which is also an integrated part of this study.

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