Formulation Stategies for Vocational High School in Surabaya (Case Study: SMKS "X")

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Abstract—**This research focuses on strategic planning conducted at one of the private vocational high schools in Surabaya. Vocational school is one of the services in the education sector that aims to prepare students to work in specific fields. At this time, the number of students enrolling has decreased, so the need for proper strategic planning for schools in increasing the number of students. The method used in this study is the formulation of internal and external factors using the IFE and EFE matrices as the input stage and followed by determining the weights for each factor using pair comparison. In the next stage, this study uses the SWOT matrix as a strategy matching stage. The results showed the value of the IFE matrix. Schools had a total rating of 2.5, while the scores on the EFE matrix, schools had a total rating of 2.878. Based on an analysis of internal and external factors using the SWOT matrix, several alternative strategies can be obtained including Development of New Departments; Establish relationships with junior high schools in the same institution; Development of Learning Processes; Increased School Promotion; Maximizing BOS Funds; Collaboration with DU / DI; School Resource Development; School Culture Development and School Program Improvement; Improved School Performance and Quality. For the design of the strategy map obtained from four perspectives, including: (a) Financial Perspectives: Regular Provision of Budgets, Income Levels, Utilization of BOS Funds and School Imagery; (b) Customer Perspective: Number of Students, Customer Satisfaction, and School Quality; (c) Internal Business Perspectives: Marketing Development, Innovation, Process, After Sales Service, and Relationship Enhancement with DU / DI; (d) Learning and Growth Perspectives: Teacher / Staff Satisfaction, School Financial Management Development, Information System Capability, Teacher / Staff Development, and School Culture Development.**

Keywords—**Vocational School, IFE Matrix, EFE Matrix, SWOT Matrix, Pairwise Comparison, Strategy Formulation, Strategy Map.**

I. INTRODUCTION

EDUCATION is a conscious and planned effort to create an atmosphere of learning and learning process so that students actively develop their potential to have religious-spiritual strength, self-control, personality, intelligence, noble character, and the skills needed by themselves, society, nation, and state (UU No. 20 of 2003). In the development of education in 2018 based on the Educational Index, Indonesia has a value of 0.622, ranked 7th in the ASEAN region. However, Indonesia's Educational Index value growth increased by 7% from 2010, amounting to 0.586 [1].

Following the mandate of UUD 1954 article 31 for the education sector, the government has the aim of ensuring the quality of inclusive and equitable education and increasing

lifelong learning opportunities for all. Therefore, the government seeks to increase access to education services in the context of optimizing quality and competitive education services. Also, efforts to improve human resources (HR) are carried out by adding educational facilities, namely vocational schools, which are expected to produce graduates who are ready to work because they are better trained with technical work under their respective fields of interest [2].

The organizers of education are not only from the government, but also involve the community component (private) in accordance with UU 20 of 2003. Community involvement in organizing education, especially vocational schools have a positive impact on the growth of vocational schools (Figure 1) [2]. The role of the government also has a positive influence on the growth of vocational schools, where the government provides bureaucratic facilitation for licensing for opening new vocational schools, especially for districts that do not yet have vocational schools. [2].

"X" PRIVATE VOCATIONAL SCHOOL is one of the providers of education for vocational schools, which was established in 1987. The vision of this school is to educate, train, improve, and develop technology for the productivity of students to become skilled and work-ready personnel based on faith and loyalty as well as a sense of love for the country and the nation, with a motto that is ready to work, polite, independent, creative. At present, the school status has a value of Accreditation B (Good) with programs for the field of Technology and Engineering expertise. It has a study group of 1 for each expertise program.

At present, the school has a number of grade X in the field of Technology and Engineering expertise, specifically the Engineering and Automotive majors, at 1.1% of the total 35 vocational high schools that have similar majors in Surabaya. This school has students who are dominated by male students without female students, with an age range of 16 to 19 years.

Also, the current school operational finance has decreased; this is due to the number of new students has reduced compared to the previous year. This resulted in schools not getting school income because school income was used up until they were used up for school operations. In the new student admission program (PPDB), the number of students enrolling in schools decreased by 29.4% where each number of students enrolled in two skills programs.

The strategy is needed in the competition of educational institutions; this is caused by competition between educational institutions, which is getting tougher. Even though commercialization in the field of education is indeed not right, but professional management needs to be done,
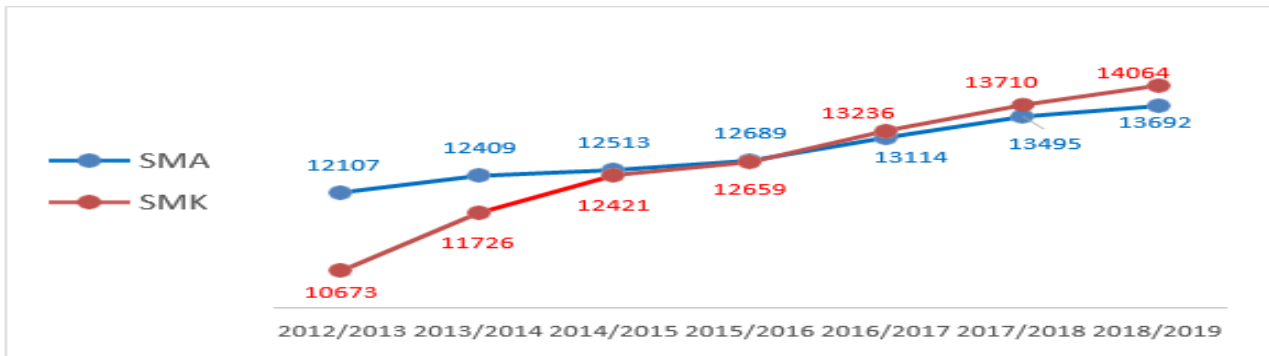
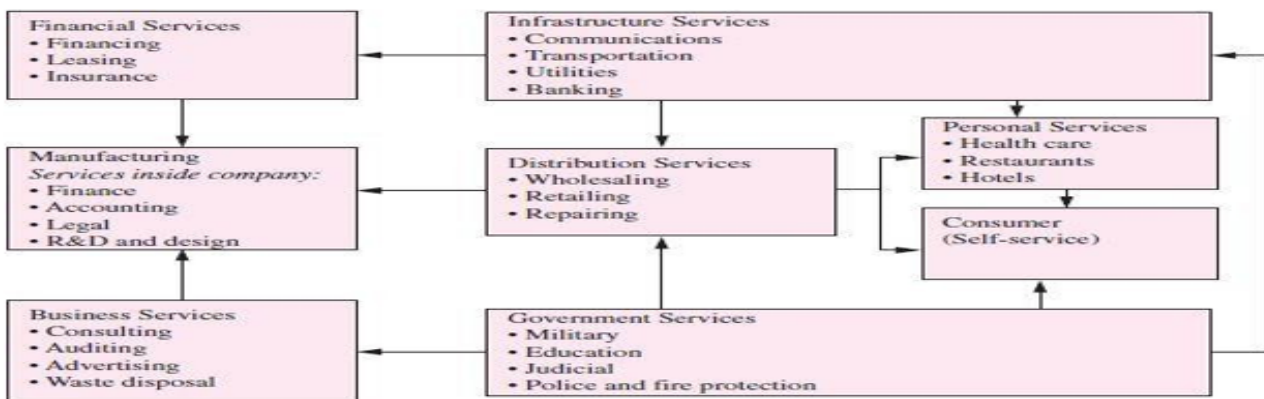Figure 1. Growth Chart for Vocational High Schools in Indonesia.

Figure 2. Role of Services in economic activity.

Table 1.
RI tables by Saaty

n	1	2	3	4	5	6	7	8	9	10
Random Consistency Index (R.I)	0	0	0.52	0.89	1.11	1.25	1.35	1.40	1.45	1.49

unless the institution only wants to survive without motivation to develop and tends to surrender [3].

The formulation of these strategic alternatives can be done by analyzing the environment, both internal and external. Dominant factors that can affect the competitiveness of an educational institution include location, value excellence, and community needs [3]. From the determination of these factors, a SWOT (Strengths Weaknesses Opportunities Threats) matrix is then analyzed to see strengths, weaknesses to internal factors and opportunities, and threats from external factors. Therefore, the need for an appropriate strategy formulation can help the school principal in managing the school so that it can compete with other schools. The main target to be achieved by schools in the future is an increase in the number of new students enrolled in schools. Therefore, the need for an appropriate strategy formulation can help the principal in managing the school.

II. METHOD

A. Educational Services

According to UU No. 20 of 2003, the definition of education is a conscious and planned effort to create an atmosphere of learning and learning process so that students actively develop their potentials, i.e., spiritual strength, self-control, personality, intelligence, noble character.

In Indonesia, according to UU No. 20 of 2003, education is divided into three channels, including formal education, informal education, and non-formal education. Formal education is a structured and tiered education pathway consisting of primary education, secondary education, and higher education. Non-formal education is an educational path outside of formal education that can be implemented in a structured and tiered manner, which aims to develop students' abilities. Non-formal education is a path of family and environmental education.

Service is any action or performance from one party that can be offered to another party, which is intangible and does not result in any ownership [4]. Another definition of services, services are described as actions, processes, and performance. Services can be more defined as economic activities that create added value and provide benefits to customers (consumers or organizations) [5].

Services are the center of economic activity in any community. Infrastructure services, such as transportation and communication, are essential links between all sectors of the economy, including end consumers. In a complex economy, infrastructure and distribution services function as intermediaries and as distribution channels to end consumers. Infrastructure services are a prerequisite for the economy to become an industry; therefore, no developed society can do

Table 2.
Weight Strengths and Weaknesses of Schools

Internal	Internal Weight	Code	Weight	Total Weight	CR
Strength	0,5	S1	0.156	0.078	0.0959
		S2	0.233	0.117	
		S3	0.145	0.073	
		S4	0.157	0.078	
		S5	0.157	0.078	
		S6	0.152	0.076	
Weakness	0,5	W1	0.124	0.062	0.0784
		W2	0.234	0.117	
		W3	0.224	0.112	
		W4	0.196	0.098	
		W5	0.068	0.034	
		W6	0.154	0.077	
			Total =	1,000	

Table 3.
Weight of School Opportunities and Threats

External	External Weight	Code	Weight	Total Weight	CR
Opportunity	0.75	O1	0.302	0.226	0.084
		O2	0.054	0.040	
		O3	0.072	0.054	
		O4	0.089	0.067	
		O5	0.287	0.215	
		O6	0.197	0.148	
Threat	0.25	T1	0.036	0.009	0.099
		T2	0.045	0.011	
		T3	0.181	0.045	
		T4	0.248	0.062	
		T5	0.225	0.056	
		T6	0.265	0.066	
		Total	1.000		

Table 4.
IFE Matrix

Internal Factors	Weight	Rating	Total
S1	0.078	3	0.234
S2	0.117	3	0.350
S3	0.073	3	0.218
S4	0.078	3	0.235
S5	0.078	3	0.235
S6	0.076	3	0.228
W1	0.062	2	0.124
W2	0.117	2	0.234
W3	0.112	2	0.224
W4	0.098	2	0.196
W5	0.034	2	0.068
W6	0.077	2	0.154
	1.000		**2.500**

without this service [6]. Role service in economic activity can see Figure 2 [6].

B. Strategy Management

Strategy management is the art and science of formulating, implementing, and evaluating cross-functional decisions that enable an organization to achieve its objectives. The focus of strategic management is to integrate management, marketing, finance and accounting, production and operations, research and development (R&D), and information systems to achieve organizational success. Strategic management aims to find and create new and different opportunities in the future, namely long-range planning, and try to optimize future trends based on current trends [7].

1) IFE Matrix

In conducting an internal strategic management audit, it can be done by constructing an Internal Factor Evaluation

Matrix (IFE). This IFE matrix can be made with five steps: (1) Making a list of critical internal factors; (2) Determine weights from 0.0 (not necessary) to 1.0 (all-important) for each element; (3) Ranks 1 to 4 are given for each factor that indicates whether those factors represent the main weakness (rank = 1), small weakness (rank = 2), small strength (rank = 3), and major strength (rank = 4). ; (4) The weight of each factor is multiplied by its ranking to determine the weighted score for each variable; (5) The weighted scores for each variable are summed to determine the total weighted score in the organization [7].

2) EFE Matrix

An external factor evaluation (EFE) matrix enables strategists to summarize and evaluate economic, social, cultural, demographic, environmental, political, government, legal, technological, and competitive information. The EFE matrix can be developed in five steps: (1) Make a list of key

Table 5.
EFE Matrix

External Factors	Weight	Rating	Total
O1	0.226	3	0.678
O2	0.040	3	0.121
O3	0.054	3	0.162
O4	0.067	3	0.200
O5	0.215	3	0.645
O6	0.148	3	0.443
T1	0.009	3	0.027
T2	0.011	3	0.034
T3	0.045	3	0.136
T4	0.062	3	0.186
T5	0.056	2	0.112
T6	0.066	2	0.132
	1.000		**2.878**

Table 6.
SWOT Matix

SWOT Matrix	Strength						Weakness						
	S1	S2	S3	S4	S5	S6	W1	W2	W3	W4	W5	W6	W7
Opportunity O1 O2 O3 O4 O5 O6	**Strategy (SO)** 1. (S1) (S3) (S4) (S5) (S6) (O2) (O4) (O5) (O6) Development of New Departments 2. (S2) (S5) (S6) (O1) (O3) (O4) (O6) Establish relationships with junior high schools in the same institution 3. (S4) (S6) (O4) Development of Learning Processes						**Strategy (WO)** 1. (W2) (O4) (O5) Increased School Promotion 2. (W3) (W4) (O1) (O2) Maximizing BOS Funds						
Threat T1 T2 T3 T4 T5 T6	**Strategy (ST)** 1. (S1) (S4) (T5) Collaboration with DU / DI						**Strategy (WT)** 1. (W6) (W7) (T4) School Resource Development. 2. (W1) (W7) (T2) School Culture Development and School Program Improvement. 3. (W1) (W2) (W3) (W5) (W6) (W7) (T2) (T3) (T6) Improved School Performance and Quality						

external key factors as identified in the internal audit process; (2) Give weight to each factor, from the weight value of 0.0 (not important) to 1.0 (very important); (3). Ranks 1 to 4 for each key external factor to indicate how effective the company's current strategy is to respond to that factor; (4) Each factor weight multiplied by its ranking will determine the weighted score. (5) Summing the weighted score on each variable in determining the total weighted score for the organization [7].

3) SWOT Matrix

The SWOT matrix is an essential matching technique to help managers develop four types of strategies, including Strength-opportunity (SO) strategy, weakness-opportunity strategy (WO), strength-threat strategy (ST), and weakness-threat strategy (WT) [7].

C. Pairwise Comparison AHP

Pairwise Comparison can be made with the steps, among others: (1) A problem is broken down into a hierarchy of objectives, criteria, sub-criteria, and alternatives; (2) Data is collected from experts or decision-makers according to the hierarchical structure; (3) Pairwise comparisons of the various criteria produced according to the second step which are then arranged into a square matrix; (4) The main eigenvalues and the corresponding normalization of the related eigenvectors of the comparison matrix give the relative importance of the various criteria being compared. (5) Conduct hierarchical consistency checks. The consistency index, CI, is calculated by CI = (λmax-n) / (n-1). Where λ max is the maximum eigenvalue of the assessment matrix. The value of the consistency ratio (CR) = CI / RI, for the RI table can be seen in Table 1 [9]. Saaty recommends that the CR value be less than 0.1 [8].

D. Strategy Map

Pairwise Comparison can be made with the steps, among others: (1) A problem is broken down into a hierarchy of objectives, criteria, sub-criteria, and alternatives; (2) Data is collected from experts or decision-makers according to the hierarchical structure; (3) Pairwise comparisons of the various criteria produced according to the second step which is then arranged into a square matrix; (4) The main eigenvalues and the corresponding normalization of the related eigenvectors of the comparison matrix give the relative importance of the various criteria being compared.

International Conference on Management of Technology, Innovation, and Project (MOTIP) 2020

July 25th 2020, Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia

Table 7.
Design of the Balanced Scorecard

Perspective	Dimension	Measured aspects
Financial Perspective	Provision of Budget Routinely	Economical Efficiency Effectiveness
	Revenue Optimization	Increased school income per student
	Investment Utilization	Return on investment (ROI)
	School Image	School Imagery Level
	Number of Students	Increasing the Number of Students
Customer Perspective	Customer satisfaction	Quality of Service Customer Satisfaction Level (Parents and Students)
	School Quality	Graduate competence standard
Internal Business Perspectives	Development Marketing	Evaluation of promotional performance carried out Evaluate the use of promotional media
	Innovation	Content Standards
	Process	Process Standards Educator and Education Staff Standards
Perspective	**Dimension**	**Measured aspects**
Learning and Growth Perspectives	After Sales Service	Facilities and Infrastructure Standards Educational Assessment Standards Management Standards School Website Alumni Organization Alumni search data
	Improvement of DU / DI Relationship	Evaluation of the implementation of Internship School collaboration level with DU / DI
	Teacher / Staff Satisfaction	Job Satisfaction Level Financing Standards
	School Financial Management Development	Ability Level
	Information System Capability	The level of implementation of development and training for Teachers / Staff
	Teacher / Staff Development	Development of school culture

(5) Conduct hierarchical consistency checks. The consistency index, CI, is calculated by CI = (λmax-n) / (n-1). Where λ max is the maximum eigenvalue of the assessment matrix. The value of the consistency ratio (CR) = CI / RI, for the RI table can be seen in Table 1. Saaty recommends that the CR value be less than 0.1 [10].

III. RESULT AND DISCUSSION

A. The Weighting of Internal and External Factors in School

In the IFE Matrix, the weighting is done on the Strengths and Weaknesses of the Internal factors. Likewise, in the EFE Matrix, a weighting is also given to the Opportunity and Threat factor. This weight calculation is done using pairwise comparison Saaty with the AHP method approach. The preparation of the AHP framework for internal and external factors is done by filling out a questionnaire sourced from the principal as the school manager.

Validation in the calculation of internal weights by calculating the value of the consistency of opinions from the results of the questionnaire using the CR value must be smaller than 0.1. In Table 2, it can be seen that CR on the Strength and Internal factors also has a CR value lower than 0.1, which means that the answers from the sources are consistent. Internal weight calculation is done using the help of Super Decision software.

Validation in the calculation of external weights is also carried out by calculating the value of the consistency of opinion from the results of the questionnaire by using a CR

value that must be less than 0.1. In Table 3, it can be seen that CR on the Opportunity and Threat factors has a CR value of less than 0.1, which means the answers from the informants are consistent. Weight calculation in the external environment also uses the help of Super Decision software.

B. IFE Matrix Discussions

In the IFE matrix calculation, the total value in the matrix calculation is at one which is the lowest value, and 4 is the highest value, with an average value of 2.5. If the number of matrix values below 2.5 characterizes, the organization is weak internally; however, if the value is above 2.5 indicates that the organization has a robust internal position [7]. From the calculation of the IFE matrix, in Table 4, it can be seen that the total value of the IFE matrix is 2.5, this shows that the internal position in school organizations has average strength. So, schools need improvements in school operations, strategies, policies, and procedures.

C. EFE Matrix Discussions

In the EFE matrix calculation, the highest total value on the matrix is four and the lowest is 1, where the average total value of the matrix is 2.5. If the total value is 4, this shows that an organization can respond in an extraordinary way to the opportunities and threats that exist in its industry. While Jila has a value of 1, this shows that the organization's strategy does not take advantage of opportunities or avoid threats from the external environment [7]. In the calculation of the results of this EFE matrix (Table 5), It can be seen that the total value of the EFE matrix is 2,878, this shows that

Table 8.
School Strategy Map Recommendations
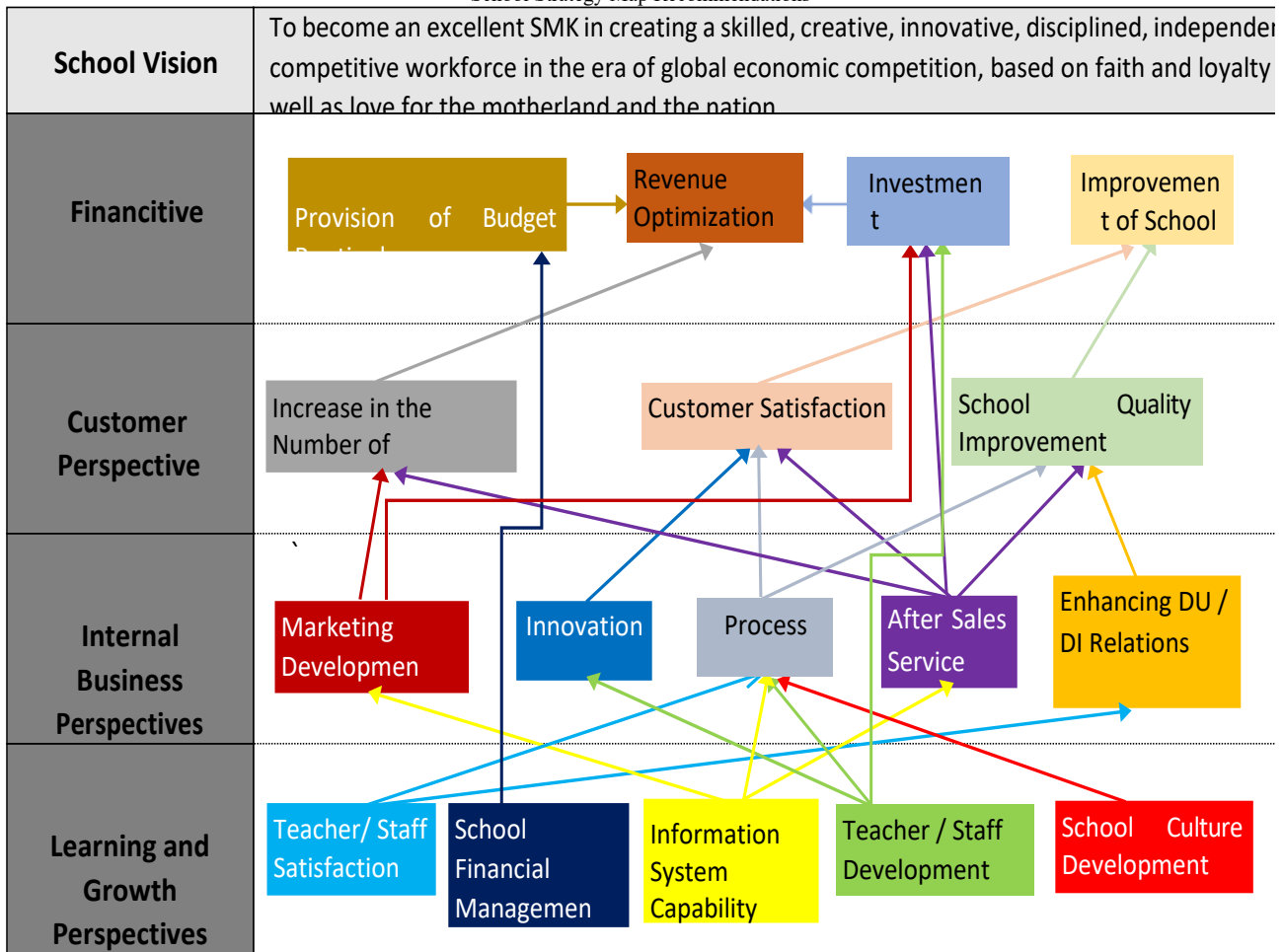
schools have above-average ability to take advantage of opportunities and avoid threats in the school environment. Even so, schools should make changes to deal with the threat to the fact that there is no DU / DI collaboration and measurement of parent and student satisfaction has not been done.

D. SWOT Matrix

The SWOT matrix matching uses all four factors that are school conditions. A right decision from the principal is needed for the development of this matrix. From the results of in-depth discussions with the school principal, the development of alternative strategies was found in accordance with Table 6.

E. Strategy Mapping and KPI School Planning

The format for developing school strategies consists of 2 areas, namely: core areas and support areas. Where the details of these two areas are as follows: (1) Core Area, consisting of curriculum and curriculum management; human resources; student welfare and caring guidance; relations between communities; (2) Supporting Areas include of: management structure; financial resources; data collection on students and marketing, physical/facility resources; monitoring and evaluation [11].

From Table 7, we can see the formulation of the BSC dimensions obtained from 4 perspectives. The design of the

strategy map was carried out with the BSC approach using using previous research, which is then adjusted to school conditions and the formulation of alternative strategies obtained [12] [13] [14] [15], which were then adjusted to school conditions and formulation of alternative strategies obtained. This strategy map is designed to look at the picture between the aspects in each perspective, which makes it easier for schools to improve school performance and the determination of school targets in the future. The recommended strategy map obtained can be seen in Table 8.

F. Managerial Implementation

In the internal factors of the school, the internal position in the school organization shows an average strength. So schools need improvements in school operations, strategies, policies, and procedures. Unlike the external factors of the school, the position of the school has an above-average ability to take advantage of opportunities and avoid threats in the school environment. Even so, schools should make changes to deal with the risk to the fact that there is no DU / DI collaboration and measurement of parent and student satisfaction has not been done.

In school competition, there are three strategies obtained to improve school competitiveness, including: (1) New Department Development Strategy, this is done to get the attention of students for female gender to register in this

department. Nonetheless, schools must determine the right promotion, learn major factors the market and develop school resources; (2) Relationship strategies with junior high schools at the same foundation, this strategy provides its strength for schools to increase the number of new students. Excellent communication and good promotion can increase the number of students who register; (3) Learning Process Development Strategy, this is done to answer the challenges of the changing times. Teachers should be creative and innovative in the process of learning activities. This is beneficial for schools to improve the quality of schools and improve the image of schools.

Schools can develop management using SBM. This can be beneficial for schools including schools can improve teacher welfare; schools can manage resources and can manage community participation and encourage the professionalism of principals in leading schools; teachers in various fields can make innovations to students; schools have a sense of responsiveness to guarantee educational services that are in line with the demands of the community [15].

To improve school performance (KPI), the use of BSC can measure school performance from four perspectives, including financial perspective, customer perspective, internal business process perspective, and learning and growth perspective. From this perspective, schools can design a strategy map that illustrates the relationship between dimensions in each aspect. This can make it easier for schools to determine the target of schools in the future.

IV. CONCLUSION

A. Conclusions

Based on the results of data processing and discussion, there are several conclusions, including:(1) There are several strengths and weaknesses in the school's internal environment. The most influential school strength factors are cheap and competitive education costs, while the shortcomings of the school that most prominent are the image (image) of the school that is still unknown; (2) There are several opportunities and threat factors in the school's external environment. The most influential school opportunity factors are the presence of SMPs under the same foundation, while the most influential school threat is that schools still do not measure the satisfaction of parents and students; (3) The total school IFE matrix score is 2.5; this shows that the internal position in school organizations has average strength. So schools need improvements in school operations, strategies, policies, and procedures; (4) The total value of the EFE matrix is 2,878; this shows that the position of the school has above average ability to take advantage of opportunities and avoid threats in the school environment. Even so, schools should make changes to deal with the risk to the fact that there is no DU / DI collaboration and measurement of parent and student satisfaction has not been done; (5)Based on an analysis of internal and external factors using SWOT, several strategies can be obtained including Development of New Departments; Establish relationships with junior high schools in the same institution; Development of Learning Processes; Increased School Promotion; Maximizing BOS Funds;

Collaboration with DU / DI; School Resource Development; School Culture Development and School Program Improvement; Improved School Performance and Quality; (6)Alternative school strategy map recommendations consist of various dimensions that fit four perspectives, including: (a) Financial Perspectives: Routine Provision of Budgets, Income Levels, Utilization of BOS Funds and School Imagery; (b) Customer Perspective: Number of Students, Customer Satisfaction, and School Quality; (c) Internal Business Perspectives: Marketing Development, Innovation, Process, After Sales Service, and Enhancing DU / DI Relations; (d) Learning and Growth Perspectives: Teacher / Staff Satisfaction, School Financial Management Development, Information System Capability, Teacher / Staff Development, and School Culture Development.

B. Recommendations

From the conclusions obtained, there are several recommendations, including;(1) In general, the internal position of the school organization is still strong, and the school can respond to external factors. Therefore, schools can consider several alternative strategies for school development in the future; (2)This research is still limited due to time and conditions, so that further research development is needed through the perspectives of other stakeholders, such as teachers, parents, students, DU / DI parties, foundations to obtain a broader strategy formulation; (3)The need for evaluation of school performance to see the level of performance (Key Performance Indicator), then the school improvement and development strategies can be developed again. One tool that can be used to measure school performance is to use a Balanced Scored Card.

ACKNOWLEDGMENT

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