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Alignment Between Val IT And Risk IT for Choosing A Business Strategy By Fuzzy AHP and TOPSIS

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Abstract

Ripen planning is essential for a manager to review the findings and get optimal benefits when yang will invest primarily in the it field. Val it has to review a major role get benefits and return on investment. In business at singer, risks should be managed and be balanced in order not a failure occurred so that the goal can be achieved according business with hope organization as well. Not easy to review harmonize between Val IT and Risk IT. By therefore goal singer research is to help the company leadership in taking a strategic decision to run the business by observing the alignment of the Val IT and risk it, so it hopes will never happen one way in taking a decision / policy primarily related to business strategy. To determine the criteria and alternatives in order to draw up the hierarchy, then began for a business case based on observations and interviews with several experts in the field. From the business case is then developed into several scenarios strategy which will be processed by the method. The method used in this study is Fuzzy AHP (analytical hierarchy process) and TOPSIS, where this method is very careful to make the process of calculation and away from the subjectivity and the solution ideal approach. The final results of this study found that the strategy 5 have high significant value compared with other strategies 0.99218, so that it can be used as a recommendation to be an option, whereas in strategy 3 obtaining the smallest value of 0.007704, so it is advisable to avoid or do not have.

Keywords: Business Strategy, Val IT, Risk IT, F-AHP, TOPSIS.

1. Introduction

To obtain optimal results and benefits for an organization in making an IT investment, we need a careful planning [8][11]. Val IT is here to assist management in understanding the value of the investment IT [4][6], calculate the approximate value of investments and ensure that the organization can obtain an optimal value of IT investments in the context of cost and acceptable risk [2][5][7].

As we all know that Val IT provides the means to clear measurements, to monitor and optimize the realization of business value from investment in IT [4][6]. Val IT consists of guidelines, processes and some practical suggestions to help the management and executives to understand and fulfill their role in IT investment. Besides Val IT is aimed at helping the management to ensure that

organizations realize optimal value from IT investments in the business availability at affordable cost with the level of risk that is known and accepted [2][5][7]. Specifically, Val IT has focus areas on the decision to invest in doing the right thing and the realization of the benefits gained [4][6].

In today's business, risk plays an important role. Almost every business decision that requires executives and managers to balance risk and reward [8][11]. Effectively managing risk is a very important effort for the company's success [2][5][7]. IT risk is mainly associated with the use of IT is often forgotten that to contribute to a failure to achieve strategic objectives [8][11].

This study aims to help company leaders to make strategic decisions in running its business with due regard to the alignment between Val IT and Risk IT, so there is no wrong way in taking a policy / decision is primarily concerned with business strategies. The method used in this study is Fuzzy AHP (Analytical Hierarchy Process) [1][3] and TOPSIS [9][10], where this method is very careful to make the process of calculation and away from the subjectivity and the solution ideal approach.

2. Methodology Research

The methodology of this research starting from literature to gather some relevant references, then make observations, surveys, and interviews with some practice and experts followed by the drafting business case to consider the alignment of Val IT and Risk IT. A business case which has been arranged and then creates a hierarchy of relationship between the alternative criteria (shown in Fig. 1), followed by processing and counted using the F-AHP [1][3] and TOPSIS [9][10]. The final result of the calculation is what will serve as a recommendation to determine the choice of business strategy. The relationship between Val IT with IT Risk as the basic constituent and consideration in making the business case. In making this business case must go through several processes in order to obtain an optimal result closer to a truth that ideally suits business purposes [8][11]. By involving several specialists and experts in their field and relevant literature supported the business case is made. The next step, to design a business strategy that is by making strategic scenarios. Scenario strategies that made attention to external and internal factors, the needs of both current and future based on the experience and input of several experts.

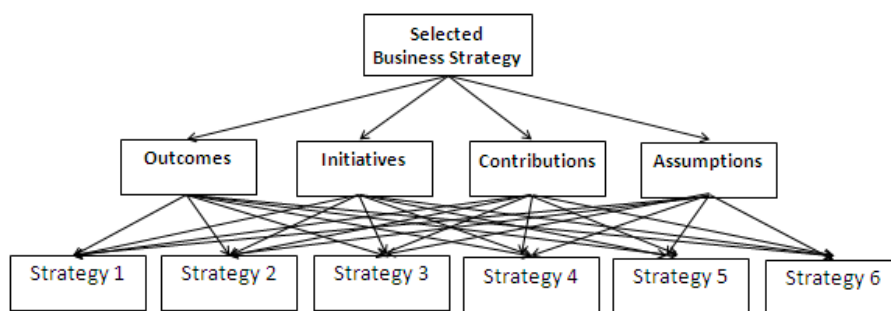


Fig 1. Model hierarchy among the criteria in alternatives (strategies)

Figure 1 above describes the hierarchical model of the relationship between the criteria and alternatives which will be processed and calculated using the F-AHP and TOPSIS. Criteria took into account four components of the business case, ie outcomes, initiatives, contributions and assumption. Of criteria is then translated into a strategy of alternative scenarios as shown in Table 1.

Table 1. Scenario Strategy Designed

Strategy Components	S1	S2	S3	S4	S5	S6
a. Steering committee formed	a	d	g	a	d	g
b. Shaping Organizational Committee	b	e	h	b	e	h
c. Develop Gap Analysis	c	f	i	c	f	i
d. Develop Road Map Implementation	d	g	a	g	a	d
e. Develop database management policy	e	h	b	h	b	e
f. Develop Business Line	f	i	c	i	c	f
g. Developing Classification of assets	g	a	d	d	g	a
h. Increasing Competence HR	h	b	e	e	h	b
i. Procurement Consultant Risk Management & IT	i	c	f	f	i	c

3. Result

Table 2. Comparison Pair Matrix

	Outcomes	Initiatives	Contributions	Assumptions
Outcomes	1,1,1	1,1.5,2	0.75,1.25,1.75	0.5,1,1.5
Initiatives	0.5,0.67,1	1,1,1	0.5,1,1.5	0.5,1,1.5
Contributions	0.57,0.8,1.33	0.67,1,2	1,1,1	0.5,1,1.5
Assumptions	0.67,1,2	0.67,1,2	0.67,1,2	1,1,1

Table 3. Fuzzy Synthetic Extent

	l	m	u
Outcomes	0.135	0.292	0.544
Initiatives	0.104	0.226	0.435
Contributions	0.114	0.234	0.508
Assumptions	0.125	0.247	0.609

The above data obtained (Table. 2). from the survey results that explain the fuzzy scale level / inverse scale fuzzy wherein, the ratio of the same two criteria (1,1,1); two elements have the same interests (0.5,1, 1.5); one element of a little more important than others (1,1.5, 2); one element is more important than the others (1.5, 2,2.50); the elements much more important than others (2,2.5,3); one element is absolutely more important than others (2.5,3,3.5). The formula to get Table 3 :

$$S_i = \sum_{j=1}^m M_i^j \times \frac{1}{\sum_{i=1}^n \sum_{j=1}^m M_i^j} \quad (1)$$

Table 4. Vector Weight Among Criteria

	Outcomes	Initiatives	Contributions	Assumptions	Total
W'	1	0.818	0.864	0.911	3.593

$$W' = (d'(A_1), d'(A_2), \dots, d'(A_n))^T \quad (2)$$

Table 5. Weight Vector Normalization Between Criteria

	Outcomes	Initiatives	Contributions	Assumptions
W	0.278	0.228	0.24	0.253

$$W = (d(A_1), d(A_2), \dots, d(A_n))^T \quad (3)$$

Table 6. Pair Matrix Among The Criteria (Base Case) With Alternative (Strategy)

Alternatif	Outcomes	Initiatives	Contributions	Assumptions
Strategy 1	4	4	4	4
Strategy 2	5	4	5	4
Strategy 3	3	3	4	3
Strategy 4	4	3	4	4
Strategy 5	5	5	5	4
Strategy 6	3	4	4	3

The results of the above matrix R, then multiplied by the calculation of Normalized Vectors FAHP the weights between criteria for getting normalization weighted decision matrix:

0.040	0.044	0.035	0.049	
0.050	0.044	0.044	0.049	
0.030	0.033	0.035	0.037	X 0,278; 0.228; 0.24; 0.253
0.040	0.033	0.035	0.049	
0.050	0.055	0.044	0.049	
0.030	0.044	0.035	0.037	

The result of the calculation of the weighted normalized decision matrix :

0.011	0.010	0.008	0.012	
0.014	0.010	0.011	0.012	Ideal solution Positive (A ⁺) = {0.014; 0.013; 0.011; 0.012}
0.008	0.008	0.008	0.009	Ideal solution Negative (A ⁻) = {0.008; 0.008; 0.008; 0.009}
0.011	0.008	0.008	0.012	
0.014	0.013	0.011	0.012	
0.008	0.010	0.008	0.009	

The distance between the weighted value of each alternative to the positive ideal solution.

Table 7. Positive ideal solution.

S1 ⁺	S2 ⁺	S3 ⁺	S4 ⁺	S5 ⁺	S6 ⁺
0.000024	0.000009	0.000076	0.000045	0.000001	0.000055

$$Si^+ = \sqrt{\sum_{j=1}^n (V_{ij} - V_j^+)^2} \tag{4}$$

The distance between the weighted value of each alternative to the negative ideal solution.

Table 8. Negative Ideal Solution.

S1 ⁻	S2 ⁻	S3 ⁻	S4 ⁻	S5 ⁻	S6 ⁻
0.000025	0.000056	0.000001	0.000021	0.000073	0.000004

$$Si^- = \sqrt{\sum_{j=1}^n (V_{ij} - V_j^-)^2} \tag{5}$$

The proximity of each alternative against the ideal solution.

Table 9. Result Of The Final Rank Strategy.

S1	S2	S3	S4	S5	S6
0.512576	0.859598	0.007704	0.320745	0.99218	0.074698

$$Si = \frac{Si^-}{Si^+ + Si^-} \tag{6}$$

From the results of the final calculation, 5 strategies were getting the highest value among the other strategies which 0.99218. This means it can be used as a recommendation for corporate leaders to make decisions or policies in determining a strategy to be executed. For three strategies to get at least the value of 0.007704, for the three strategies should be avoided or do not have. To get a clearer picture, it can be seen in Figure 5 as below.

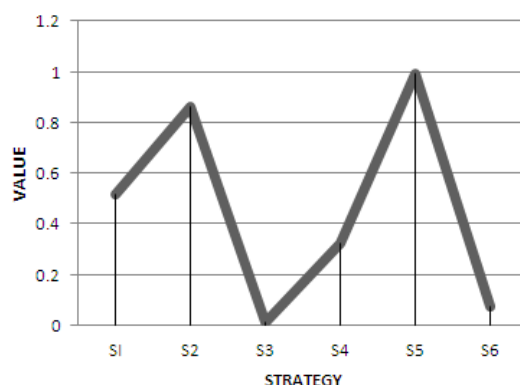


Fig 2. Graph the final calculation.

Figure 2. Graph of providing information or a complete picture of all the strategies offered and can compare the strategy with other strategies. Here are two strategies that stand out Strategies 5 and 2, but the strategy five more prominent. On the strategy of 6 and 3 has a low value, especially on strategies 3 has a smaller value.

4. CONCLUSION

In taking a strategic decision to run the business of the leaders should pay attention to the alignment of the Val IT and Risk IT, hope it will never happen one way in taking a decision / policy primarily related to business strategy. A business case as a tool to formulate a strategy preceded by observation and interviews with several experts in their field. Fuzzy AHP (Analytical Hierarchy Process) and TOPSIS is one method that is very accurate in the calculation process and away from the subjectivity and the solution ideal approach. The final results of this study found that the Strategy 5 have high significant value compared with other strategies 0.99218, so that it can be used as a recommendation to be an option, whereas in strategy 3 obtaining the smallest value of 0.007704, so it is advisable to avoid or do not have. Recommendations for future research needs to involve many stakeholders, especially users and experts to get a complete and valid information.

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REFERENCES

1. [Chang, D. Y. Application of the Extent Analysis Method on Fuzzy AHP. European Journal of Operational Research 95, 649-655. \(1996\).](#)
2. D. Cooper, S. Grey, G. Raymond and P. Walker, Project Risk Management Guidelines:

Managing Risk in Large Projects and Complex Procurements, Chichester, West Sussex: John Wiley & Sons Ltd., (2004).

3. Dashti, Zeinab., Pedram, Mir Moshen., Shanbehzadeh, Jamshid. *Multi-Criteria Decision Making Based Method for Ranking Sequential Patterns*. Proceeding of International MultiConference of Engineers and Computer Scientist Vol I. Hong Kong : IMECS. (2010).
4. ITGI. Enterprise Value: Governance of IT Investments, The Val IT Framework 2.0. United States of America: IT Governance Institute. (2008).
5. P. Hopkin. *Fundamentals of Risk Management: Understanding, Evaluating, and Implementing Effective Risk Management*, London: Kogan Page. (2010).
6. Symons, Craig. Measuring The Business Value of IT. www.forrester.com. (2006).
7. Symantec, IT Risk Management Report, Cupertino, CA: Symantec, (2007).
8. Student Book, 2nd Edition. IT Governance Using CobiT and Val IT. (2014).
9. Yudatama, U., Sarno, R. Evaluation Maturity Index and Risk Management For It Governance Using Fuzzy AHP and Fuzzy TOPSIS, International Seminar on Intelligent Technology and Its Applications, <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=7220000>. (2015).
10. Yudatama, U., Sarno, R. Priority Determination for Higher Education Strategic Planning Using Balanced Scorecard, FAHP, and TOPSIS, <http://iopscience.iop.org/article/10.1088/1757899X/105/1/012040/pdf>. (2016).
11. Van Grembergen, W., & De Haes, S. Enterprise Governance of Information Technology. New York: Springer. (2009).