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The Application of the Multi-Criteria Decision-Making Method Linmap for the Desirable Prioritization of the Results of the Eclectic Engineering Technique of Value and Risk Management in the Gas and Oil Projects

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Abstract

The engineering of values has been shaped to achieve goals through the modification of the project aims and the means to realize them. While the risk management tries to evaluate the strategies and select them for the return of the capital, the unanimous blend of the risk and value in the operationalization of the projects is a comprehensive instrument for assisting the employers so that such engineering is set in the direction of success with the primary goals. In this study, the risk management and the value engineering will be investigated and the priorities in this regard will be illuminated after viewing some possibilities of defeat and success. This is going to be done in three stages; first the pre-study stage identifies the severity of the risks and their prioritization. Second, the development stage begins when the index of value is determined and using the brainstorming method the identified risk will be at the end of this phase evaluated. In the third stage and phase, using the useful technique for multi-criteria decision-making tasks, the results of the first and second phases are going to be examined along which a mathematical model will be designed with more efficient prioritization.

Keywords: Value engineering, Risk management, Mixing of the multi-criteria decision-making, Oil and gas industries.

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Introduction

In 1947, when the value engineering began, it did not consisted of the risk in the structure method while any suggestion is coupled with some risk. In this condition, a choice is at any rate with some attention to the risk. The implementation of this technique in its early stages brought valuable outcomes. With the extension of the value engineering from the industries to the army projects, larger projects of dam making, oil and gas, and other cases,, the suggestions by the engineering workshop were challenged, so that they tried to eclectically use the risk and value models to solve the problem (Mir Mohammad Sadeghi & TavakoliDarani, 2008).

The risk management is one of the dimensions of the nine cases of the project management with the aim of reducing the likelihood of the unpleasant events. This is in practice contributing to the hidden possible risks in a preemptive mode with the increase in the expense of the safety projects which ultimately leads to high-cost projects. The American knowledge of project management and standard recognizes risks as uncertain conditions which can impact the project if they occur. The project risk includes threats to the project goals and the opportunities for advancement and the management hereby focuses on the maximization of the positive effects. The international association of the value engineers has thus defined it: the systematic employment of the clear and creative methods based on team-work whose aim is the identification and omission of the unnecessary risk and the promotion of the qualities and functionality of a product or service in its lifetime. This is pursued so that the solutions recommended are commensurate with the quality, safety, and environmental criteria. The origin of the value engineering technology is also traced back to the World War Two in this form. It was a time when the upgrade of the traditional services and products was seriously viewed. Mister Henry Orlicher of the US General Electric observed that systematic approaches may improve the phenomena and thus prevent the trial and error cases. At this time, he appointed Lawrence D. Mills (1961) and the result was that the method of value engineering was born. The main difference of this particular branch of management compare with the others is to be found in its functionality. The project environment is the one that experiences rapid changes and for the completion of the projects there are three limitations which are time, cost, and the perceived quality. If the engaging factors are used optimally in a project, success will be seen. The value and risk in the management project is an inseparable link, however, both need to be harmonized in a program transparently and clearly. Akintoy (1997) using a questionnaire analyzed the risk and the management techniques and concluded that the risk management has an important impact on the minimization of the losses and the profitability. Clark (1999) using the value management in the modified employment of the personnel identified the main and effective features.

Furthermore, Tehrani et al., (2008) proposed a method for the better ideas of the mixture of the risk management and value engineering. Also, Tohidi (2011) mentions the rapid movement of the contemporary societies from the realization of the operational projects to the national and organizational level of information technology. This issue is important because there are many high risks in small and large projects. In other words, risks introduce unexpected events with uncertainty. Therefore, the more the level of the lack of confidence, the harder it is to identify the risks. In this analysis, first, the expected functions of the project are known and afterwards innovative methods are used to achieve them and ultimately they are going to be prioritized by means of the LINMAP method. The aim of this paper is the presentation of a usable decision-making solution in the value engineering for the construction projects including the investment risks and the events in the process of making choices other than the operational and financial facets. In the second part of the paper the risk and value eclecticism is viewed in detail. The results for the oil and gas industries are shown in the third part. Finally, the summary and conclusions are viewed in the fourth section.

The combination of the risk management and the value engineering in the construction issues

This section mentions the steps of the eclectic attitude of the risk-engineering in a clear category and clarifies the course of the process:

The pre-study phase

Within the pre-study phase, using a brain-storming session the risks would be identified. The group facilitator must collect these risks in an open questionnaire. The objective of the questionnaire is the two factors of severity of the effect and the possibility of the occurrence of the risks within the domain of engineering studies with emphasis on the experience of the experts in this method.

The workshop of the eclectic method of the risk-management-value engineering

At this stage, each member invites an experienced expert to the workshop, adding to the efficacy and benefits of the workshop. After the distribution of the questionnaires, the respondents are asked to add other risks to the blank areas if there are any. Then, using figures 5 and 90 the occurrence of each risk is determined in percentages. Now, for each risk that is identified, the mean index is used in the questionnaire and the evaluation is made possible. Given the probability matrix and the high risk effects, new ideas are formed. Finally, the value parameters of each idea are calculated based on the normal relation.

The calculation of the risk factor in the relation of the modified value parameter

Given the positive and negative nature of the risk, any new risk can be an opportunity or a threat. If the risk is positive, the evacuation factor is positively scored and if negative it is thus scored. For any superior idea, the sum of the adding is obtained from the table adjusted for this purpose in the positive and negative stages.

The presentation stage

Based on the optimal vale indexes obtained from the combinational prioritization (risk management-value engineering) the superior ideas are given to the employer in the final report.

Post-study

The main goal here is gaining confidence in the implementation of the eclectic ideas and the changes that have been confirmed. The team leader pursues the progress with the suggestions.

The process of the combination of the risk and vale management

A sample of this blended study can be viewed in table 1. The remarkable point here is that the A and H stages in this table are correspondent to the combination stages of the risk and value studies. The staged 1 through 7 have been introduced for the risk and value management given the particular steps of the study and the risk in standards.

Table 1. The eclectic management of risk and value.

Risk	Risk and value	Value
Stage 1-Preparation Stage 2-Identification	Stage A-Preparation and blueprint	Stage 1-Preparation
	Stage B-blueprint workshop, performance analysis	Stage 2-workshop, analysis, blueprint
Stage 3-analysis Stage 4-Evaluation (quality)	Stage C-The recording of the revised risk	
Stage 5-educational planning	Stage D-improving ideas	Stage 3-Innovation
	Stage E-ideas evaluation and choice for development	Stage 4-Evalaution
Stage 4- Evaluation (quantity)	Stage F-the expansion of the suggestions and the quantitative expansion of the risk	Stage 5-Development
Stage 6-presentation and reports	Stage G-recommendations and reports	Stage 6-Presentatio and reporting
Stage 7-Implementation and revision	Stage H-Implementing, revising	Stage 7-Implementation and revision

The evaluation parameters

Given that the risk identified in this research affects the various aspects of the project ends, we need to define precisely the parameters that impact the project. To do this, reviewing the research done inside and outside the country some criteria is mentioned. These have been confirmed by the experts and the knowledgeable people in the form of three parameters influenced by the research risks, which are: time, expense, the safety measure.

Time: this shows the effects of the project risks on the project timetable which is the realization within the time schedule provided and the damage suffered when this is not the case.

Expense: this shows the amount of surplus expense that the project risks may impose upon the whole of the project surpassing the provided budget.

The safety measure: the projects risk can affect the safety standards of the project with respect of the gas transportation networks and the sensitivity that is attached to it.

After determining the above parameters with regard to the effect of each one of them based on the views held by the experts and the LINMAP Method, the weight and importance of each is clarified. These will be the main variables in this study after which the research questions are answered.

Table 2. The evaluation parameters.

The evaluation parameters	Safety	Expense	Time
	A3	A2	A1

The necessities and importance of eclecticism in the construction projects

In the project management, the activities of the project teams must be managed both from the perspective of risk and value. If all the risks are avoided, this does not lead to the maximization of the project. To do so, the risk must be viewed. The usual processes used with care may create and structured course for the project team that controls the risk effectively. A general method for the doing of the value and risk engineering is implementing them distinctly referred to in many journals and books. While it was mentioned in the earlier parts of this article, the two streams are different in details, the new design dictates that they be used simultaneously for the whole project simulation.

Results

Based on the eclectic model proposed, to see the proof for it, a practical study sample has been selected which is very significant in the country. This is the gas company in the province of Kermanshah. The model with respect to the risks identified show brilliant results.

The identification of the project risks (interview with the conductors and the authorities of the project)

The process of identifying the risks is based on the documentation of the risk characteristics. Seventy nine risks were identified during the brainstorming session with the experts and specialists (a total of 20 individuals). The people engaged were interviewed in groups and also individually and they tried to respond to the problems posed within the Kermanshah Gas Company without regard for their official positions in an appropriate place. Then, the risks in four groups and 12 subgroups were categorized and table (30 shows the categorization in the general state:

Table 3. The categorized structure of the main and secondary groups.

Secondary groups	Main groups	The secondary groups	The main groups
7- Contract 8- The contractor evaluation 9- Organizational structure 10- Outside the organizaton	3- Organizational	1-natural-environmental Rules and regulations 3- Financial 4- Socio-economic	1- Evaluation of the possibilities
11- Performance 12- The contactors	4- Operational	5-Planning 6-Expanded design	2- Design

After the identification of the risks, it is time to collect the information concerning the likelihood of the risks and their effects on time, expense, and safety. A questionnaire is provided for this purpose and the effects on each one of the categories mentioned above will be clarified and determined. Two factors would be measured in these questionnaires which are the likelihood and the effect on the project ends. This section of the questionnaire with a five spectrum (very little, little, average, much, very much) aims at the analysis of the possibility of the risks.

Table 4. The table for the likelihood of the risks.

Very Low	Low	Medium	High	Very High
Below 20%	Between 21 and 40	Between 41 and 60	Between 61 and 80	Above 81%

The other factor that was analyzed was the degree of the effect of each risk on the project ends (expense, time, safety). The domain of each group is set by the PMBOK Standard as in table 5.

Table 5. The table of the determination of the effect of each risk on the project ends.

Goals	Very Low	Low	Medium	High	Very High
Time	Affects the time for some activities but not the project completion time	Affects the time of completion less than 2 percent	Affects the time of completion between 3 and 4 percent	Affects the time of completion between 4 and 6 percent	Affects the time of the project completion more than 6%
Cost	No effect on the expenses	Affects the expense of completion less than 2 percent	Affects the expense between 2 and 4 percent	Affects the expense between 4 and 6 percent	Affects the expense of the project completion more than 6%
Safety	No significant effect on the safety	Some parts drop in safety	The safety drops	Some parts are unfinished but no the whole project	Unfinished project

Quantitating the collected information

Using the EXCEL software the information in made numerical. After dealing with over 6000 information records for the questionnaires the tables 4 and 5 contain the mean risks of the likelihood and the effect on expense, time and safety of the projects.

A Grid to Describe Risks

PROBABILITY					
NEAR CERTAIN5	*L*	*M*	*H*	*H*	*HIGH*
HIGHLY LIKELY 4	*L*	*M*	*M*	*H*	*H*
LIKELY 3	*L*	*M*	*MEDIUM*	*M*	*H*
LOW LIKELY 2	*L*	*L*	*L*	*M*	*M*
NOT LIKELY1	*Low*	*L*	*L*	*L*	*M*
IMPACT	1 LOW	2 MINOR	3 MODER-ATE	4 SIGNIFICAT	5 HIGH

Figure 1. The matrix for the risk degree determination of the identified risks.

The weight of the criteria through the multi-criteria decision-making method

We first explain the LINMAP method and then we determine the weight of each objective. In this method, m is the choice and n index of an assumed problem are set in an n-dimensional space, and afterwards the ideal point is determined the one with the least distance from it is selected (Asgharpoor, 2008).

The assumption is that the decision-maker chooses the closet option and the (Di) for the (Ai) is presumed; also the Wj weights are used to transform the scales into similar scales. The distance of the Ai from the ideal is thus:

$$d_i = \{\sum_{j=1}^{n} w_j (r_{ij} - r_{ij}^*)^2\}^{0.5} \quad ; \qquad i = 1,2,\dots,m$$

Or

$$d_i = \{\sum_{j=1}^{n} w_j (r_{ij} - r_{ij}^*)^2\}^{0.5} \quad ; \qquad i = 1,2,\dots,m \tag{1}$$

$$t_i = d_i^2 = \sum_{j=1}^{n} w_j (r_{ij} - r_j^*)^2 \, ; \qquad i = 1,2,\dots,m \tag{2}$$

Generally, r_j^*shows the j ideal parameter.
We assume that S={(k,l)} shows the pairs Al and Ak so that Ak is superior.
The solution (w, r) for the (k, l) ∈ S is compatible with the model if $t_k \leq t_l$.

$$(t_l - t_k)^- = \begin{cases} 0 \rightarrow t_k \leq t_l \\ (t_k - t_l) \rightarrow t_k > t_l \end{cases} = \max\{0, (t_k - t_l)\} \tag{3}$$

Generally, the mistake on the S collection is:

$$p = \sum_{(k,l)\in s} (t_l - t_k)^- \tag{4}$$

P (the incompatibility degree) is not negative and so to determine the p must be minimum. A new value which is G is placed against the P defined below:

$$G = \sum_{(k,l)\in s} (t_l - t_k)^+ \tag{5}$$

Therefore we must have:

$$\begin{cases} G > P \\ G - P = h \end{cases} \tag{6}$$

Generally, h is a desirable fixed degree and the solution (w,r) is obtained from the below relation:

$$\min: P = \sum_{(k,l)\in s} (t_l - t_k)^- \quad (7)$$

$$S.t: \; G - P = \sum_{(k,l)\in s} (t_l - t_k) = h \quad (8)$$

This problem is solved using the new goal determinant $Z_{k,l}$ and the algorithm “mini max” as below:

$$\min: \sum_{(k,l)\in s} Z_{k,l} \quad (9)$$

$$S.t: Z_{k,l} \geq t_k - t_l \qquad (k,l) \in S \quad (10)$$

$$\sum_{(k,l)\in s} (t_k - t_l) = h \quad (11)$$

$$Z_{k,l} \geq 0 \quad (12)$$

On the other side we have:

$$t_l - t_k = \sum_j w_j (r_{ij} - r_j^*)^2 - \sum_j w_j (r_{kj} - r_j^*)^2 \quad (13)$$

$$= \sum_j w_j (r_{lj}^2 - r_{kj}^2) - 2\sum_j w_j . r_j^* (r_{lj} - r_{kj}) \quad (14)$$

Because rj is an unknown fixed amount, we set:

$$w_j . r_j^* = v_j \quad (15)$$

Thus, we will have:

$$\min: \sum_{(k,l)\in s} Z_{k,l} \quad (16)$$

$$S.t: \quad \sum_j w_j (r_{lj}^2 - r_{kj}^2) - 2\sum_j v_j . r_j^* (r_{lj} - r_{kj}) + Z_{k,l} \geq 0 \quad ; \quad (k,l) \in s \quad (17)$$

$$\sum_j w_j \sum_{(k,l)\in s} (r_{lj}^2 - r_{kj}^2) - 2\sum_j v_j \sum_{(k,l)\in s} (r_{lj} - r_{kj}) = h \quad (18)$$

$$Z_{k,l} \geq 0 \quad ; \quad w_j \geq 0 \quad ; \quad v_j : \text{free} \quad (19)$$

By solving the above linear plan, the below states can be derived:

$$1) \xrightarrow{if} w_j > 0 \quad \xrightarrow{then} r_j^* = \frac{v_j^*}{w_j^*} \quad (20)$$

$$2) \xrightarrow{if} w_j^* = 0 \quad \xrightarrow{and} v_j^* = 0 \quad \xrightarrow{define} r_j^* = 0 \quad (21)$$

$$3) \xrightarrow{if} w_j^* = 0 \quad \xrightarrow{and} v_j^* > 0 \quad \xrightarrow{then} r_j^* = +\infty \quad (22)$$

$$4) \xrightarrow{if} w_j^* = 0 \quad \xrightarrow{and} v_j^* < 0 \quad \xrightarrow{then} r_j^* = -\infty \quad (23)$$

Now, owing to the information derived from the questionnaires, the below decision matrix is presumed:

Table 6. The decision-making matrix.

Safety	Expense	Time	The risk title	Row
Average	Too much	Little	Changing the rules and laws outside the organization such as the system of the subsidiaries and the expenses	1
Much	Average	Too much	The weakness of the laws in evaluating the contractor	2
Too much	Much	Much	Access to appropriate resources for providing the materials	3
Too much	Much	Too much	Defining large projects and the possibility of winning for the weak contractors	4
Too much	Much	Much	Selecting the contractor at an inappropriate time and choosing the environmental and seasonal	5
Average	Much	Much	The lack of materials and goods at the proper time	6
Average	Much	Too much	Obstacles created by the organizations through authorization	7
Too much	Much	Average	Action based on personal tastes and lack of authority	8
Average	Average	Too much	The lack of timetables and schedules and lack of commitment	9
Too much	Average	Average	The weakness from the contractor in supplying the materials and the necessary equipment based on standards	10
Much	Average	Much	The absence of the managers	11
Too much	Average	Much	The contractors sometimes do not use the budget for the completion of the project	12

Now, given the decision matrix, and the below scale we have:

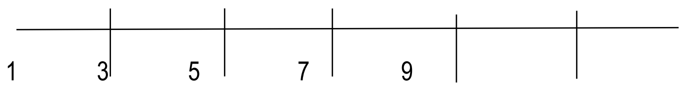

Figure 2. Too much much average weak very weak.

Table 7. The quantitative matrix for decision-making.

Safety	Expense	Time	The risk title	row
5	9	7	Changing the rules and laws outside the organization such as the system of the subsidiaries and the expenses	1
7	5	9	The weakness of the laws in evaluating the contractor	2
9	7	7	Access to appropriate resources for providing the materials	3
9	7	9	Defining large projects and the possibility of winning for the weak contractors	4
9	7	7	Selecting the contractor at an inappropriate time and choosing the environmental and seasonal	5
5	7	7	The lack of materials and goods at the proper time	6
5	7	9	Obstacles created by the organizations through authorization	7
9	7	5	Action based on personal tastes and lack of authority	8
5	5	9	The lack of timetables and schedules and lack of	9

			commitment	
9	5	5	The weakness from the contractor in supplying the materials and the necessary equipment based on standards	10
7	5	7	The absence of the managers	11
9	5	7	The contractors sometimes do not use the budget for the completion of the project	12

First we acquire the S combination from the questionnaires:

S={(4,3),(4,5),(5,6),(3,2),(4,12),(4,8),(6,7),(8,9),(2,11),(10,9),(6,4),(7,8),(2,1),(6,2),(7,2),(9,12),(3,10), 5,12),(4,1)}(

The linear model with respect to the decision-making matrix:

$$\text{Min } Z = X_{4,3} + X_{4,5} + X_{5,6} + X_{3,2} + X_{4,12} + X_{4,8} + X_{6,7} + X_{8,9} + X_{2,11} + X_{10,9} + X_{6,4} + X_{7,8} + X_{2,1} + X_{6,2} + X_{7,2} + X_{9,12} + X_{3,10} + X_{5,12} + X_{4,1} \quad (24)$$

Such that:

$$-32w_1 + 4v_1 + X_{4,3} \geq 0 \quad (25)$$
$$32w_1 + 4v_1 + X_{4,5} \geq 0 \quad (26)$$
$$56w_3 + 8v_3 + X_{5,6} \geq 0 \quad (27)$$
$$24w_2 + 4v_2 + X_{5,12} \geq 0 \quad (28)$$
$$56w_1 + 8v_1 + X_{4,8} \geq 0 \quad (29)$$
$$32w_1 - 4v_1 + X_{6,7} \geq 0 \quad (30)$$
$$32w_1 + 4v_1 + X_{2,11} \geq 0 \quad (31)$$
$$56w_1 - 56w_3 - 8v_1 + 8v_3 + X_{10,9} \geq 0 \quad (32)$$
$$32w_1 + 56w_3 - 4v_1 - 8v_3 + X_{6,4} \geq 0 \quad (33)$$
$$56w_1 + 56w_3 + 8v_1 - 8v_3 + X_{7,8} \geq 0 \quad (34)$$
$$32w_1 - 24w_2 + 4v_1 + 4v_2 + X_{4,12} \geq 0 \quad (35)$$
$$24w_2 + 24w_3 + 4v_2 - 4v_3 + X_{7,2} \geq 0 \quad (36)$$
$$32w_1 + 56w_3 + 4v_1 - 8v_3 + X_{9,12} \geq 0 \quad (37)$$
$$24w_1 - 24w_2 + 4v_1 + 4v_2 + X_{3,10} \geq 0 \quad (38)$$
$$32w_1 - 24w_2 + 24w_3 - 4v_1 + 4v_2 - 4v_3 + X_{6,2} \geq 0 \quad (39)$$
$$56w_1 - 24w_2 - 56w_3 - 8v_1 + 4v_2 + 8v_3 + X_{8,9} \geq 0 \quad (40)$$
$$32w_1 + 56w_2 - 24w_3 + 4v_1 - 8v_2 + 4v_3 + X_{2,1} \geq 0 \quad (41)$$
$$32w_1 + 32w_2 - 56w_3 + 4v_1 - 4v_2 + 8v_3 + X_{4,1} \geq 0 \quad (42)$$
$$32w_1 - 24w_2 - 32w_3 - 4v_1 + 4v_2 + 4v_3 + X_{3,2} \geq 0 \quad (43)$$
$$64w_1 - 112w_2 - 72w_3 + 8v_1 + 20v_2 + 8v_3 = 1 \quad (44)$$
$$_j \geq 0 \;;\quad v_j: \text{free},\quad j = 1,2,3 \quad;\quad X_{k,l} \geq 0 \quad (k,l) \in S \quad (45)$$
$$r_1^* = 0$$

The model acquired from the LINQO Software and the modified amounts are described below:

$w_1^* = 0$

$w_2^* = 0.0454$

$w_3^* = 0.0454$

$v_1^* = 0$

$v_2^* = 0.341$

$v_3^* = 0.318$

$Z^* = 0$

Because the z=0 therefore there are no contradistinctions among the decision-maker's views and now with regard to the relations (20, 21, 22, and 23), we calculate the ideal point:

$r_2^* = 7.511$

Then, the ideal point is (0, 7.511, 7) and considering the relation (1) the Ai option distance from the ideal point is described as below:

$$r_3^* = 7$$

d_1=0.531	d_4=0.439	d_7=0.426	d_{10}=0.683
d_2=0.426	d_5=0.439	d_8=0.439	d_{11}=0.426
d_3=0.439	d_6=0.426	d_9=0.683	d_{12}=0.683

Because the amounts di is a distance type, we should take the scale from the relation below (Asgharpoor, 2008):

$$n_i = 1 - \frac{d_i}{d_i^*} d_i^* = \max d_i \quad (46)$$

As we said, the importance of each risk in degree multiplied by the weight of the criteria is recorded in the final column related to the degree of importance. This column demonstrates the importance of each risk generally in comparison with the main and secondary groups with the very high spectrum. Using the LINMAP METHOD the ranking based on the least distance can be determined.

Table 8. The superior parameters and indexes and the optimized value of the identified risks

Value-based ranking	n_i	The optimized index of the value	The function expenses	The cost of function	The risk title	row
9	0.241428	0.680740	78.95%	28%	Changing the rules and laws outside the organization such as the system of the subsidiaries and the expenses	1
1	0.391428	1.42147	72.63%	36%	The weakness of the laws in evaluating the contractor	2
6	0.372857	0.883138	66.32%	28%	Access to appropriate resources for providing the materials	3
3	0.372857	1.295118	69.47%	20%	Defining large projects and the possibility of winning for the weak contractors	4
8	0.372857	0.763114	73.68%	36%	Selecting the contractor at an inappropriate time and choosing the environmental and seasonal	5
4	0.391428	1.27723	65.26%	20%	The lack of materials and goods at the proper time	6
2	0.391428	1.359625	69.47%	20%	Obstacles created by the organizations through authorization	7
5	0.372857	0.897121	67.37%	28%	Action based on personal tastes and lack of authority	8
12	0.024285	0.076692	63.16%	20%	The lack of timetables and schedules and lack of commitment	9
10	0.024285	0.084353	69.47%	20%	The weakness from the contractor in supplying the materials and the necessary equipment based on standards	10
7	0.391428	0.848094	78.00%	36%	The absence of managers	11
11	0.024285	0.082569	68.00%	20%	The contractors sometimes do not use the budget for the completion of the project	12

The prioritization of the optimal values

Now, we prioritize the superior ideas obtained from the optimal combinational (risk-management- value engineering). These reports and priorities are based on the eclectic risk attitude in the construction project of the Kermanshah Gas Firm. In this direction, the optimal value is used to rank which would have positive outcomes if the risk factor is used judiciously. The Snograss relation has been used as “attempts / (risk factor * performance)=Performance” and the relationship for the value is calculated as “the risk factor* (the function cost, the expenses of function). Table (7) shows the direction for any of the optimal 12 indexes and the superior risk factor.

Conclusion

In this paper, a model and method has been presented for the risk and value through the useful LINMAP software to prioritize the stages in terms of the model accuracy over the sample of the study which is the area of gas and oil. Owing to the simplicity of the afore-mentioned method, this instruction can be used widely by different employers in various projects. On the other hand, the parameters of value calculated in this method are closer to reality and have an important part to play in the decisions. Given the attitudes related to the value management, the value analysis and the engineering, the evaluating factor of any risk is considered very carefully and the present method may in this way harmonize them and finally considering the information derived from this framework the mathematical and logical priorities are shown based on multi-criteria decision-making. This issue and the results of the study may contribute a lot to the managers in this area.

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