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SELF-ASSESSMENT PATTERN IN THE SUGGESTIONS SYSTEM USING INTERVAL DATA ENVELOPMENT ANALYSIS

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ABSTRACT

Diagnosis and improvement of suggestions system, quantitative targeting and survey of the goals and ultimately planning and budgeting develop the last three steps of the chain in the processes of suggestions system. Paying attention to these three processes and providing practical conditions for their implementation have been regarded as the necessary conditions for success of suggestions system within an organization. Three specific tasks are fulfilled in the diagnosis process, i.e. survey of stakeholders, benchmarking and reviewing and analyzing. With regard to the findings from these stages, targeting and planning are fulfilled. Creation of practical structure guarantees the cycle of constant improvements in this system. The present research proposes a practical rule for diagnosis using Interval Data Envelopment Analysis. In this study, Interval Data Envelopment Analysis is used to proposed practical approach for self-assessment and optimization and a development is proposed to perform this important process in the recommendation system. This pattern inspired of Business excellence model has developed from the enablers criteria which reflect the results from implementation of this system. These criteria together with the factors such as the facilities used in any organization develop the input and output data in the evaluation problem based on Interval Data Envelopment Analysis. In this study, excellence of Data Envelopment Analysis to measure performance of suggestions system with self-assessment approach for 20 organizational units has been displayed. Further, the effective capabilities of Data Envelopment Analysis in measuring the performance and identification of defects and the approaches to resolve them as well as the extent of improvement for inefficient data and outputs are taken into consideration.

KEYWORDS: Data Envelopment Analysis, suggestions system, assessment indices, self-assessment, excellence model.

INTRODUCTION

Observing the principle of continuous monitoring of processes and results and monitoring of problems and defects and taking action to solve them and modifying or redesigning process are considered as requirements for continuous organizational improvements in Total Quality Management. The problem of inability of organizations to use the potential of employees, especially at professional levels is a relatively comprehensive and important issue. Although the cause of this inability is abundant and Elimination of them all is beyond the capacity of the organizations, but Applying some methods to eliminate these deficiencies is not out of access.implementation the suggestions system is one of the most important and powerful tools to defect this defects and ultimately empower organizations to make changes and improvements in the process and conditions of work. The suggestions review and acceptance system is a part of Total Quality Management to create individual and group spirit of partnership between staff, improve processes and increase efficiency in the organization. Fairbank & Williams (2001) introduced suggestions system as a common solution for exploitation from creativity of staffs.[6] Pluskowski (2002) introduced creativity as one of the major capabilities of the man, yet it cannot oblige people to propose ideas in a civilized society.[13] They have to be volunteer to propose their ideas. According to Richard Wayne Dick and Van Den Ende (2002), suggestions system includes the administrative arrangements and essential infrastructures to collect, judge and pay reward for the ideas that are proposed by the staffs.[17] Indeed, performing suggestions system is an educational and promotional movement to improve activities of organization through aligning the individual aims with organizational aims and increase organizational belonging, commitment and motivation to all the affairs in the organization.[1] With regard to point of view of Phillip Marks berry (2014), the suggestions system is assumed as a way to improve participation by members of organization to help for resolving the problems which are not resolved through traditional organizational methods especially at governmental sector and constant changes of managements.[11] Suggestions System has four components, Management continued support, dynamics of the system management, homogeneous and consistent structure and corporate culture growing. The success of this system is subject to the excellence of these four components. Being active, dynamic, creative besides accountability of the secretariats of the suggestions system are the main factors of prosperity and development of this system.

Furthermore, doing properly monitoring as well as fault finding could be the main source of boom in an organization.

The present research intends to propose an approach to assess performance of recommendation system such that some of the reasons for lack of success of this system which are related to improper assessment are clarified. This research has been conducted in five sections; in the first section, the literature review and related works on models for assessment of suggestions system, use of Analytic Hierarchy Process and Data envelopment analysis and a variety of approaches proposed in exposure with uncertain data have been examined. In the second part of this study, research methodology has been discussed as well as performance evaluation of the suggestions system by enumerating its goals .In this section; the current model which is inspired by the EFQM European model has been reviewed. In the third section, those criteria which are called enabler have been sorted in three groups and indices which are related to the results of performing of the suggestions system have been noticed. Then by consulting with experts using analytical hierarchical process, it has been provided performance results of implementing of the suggestions system in the form of a real number between zero and one. In the following, it has been provided an overview on data envelopment analysis. And then the issue of uncertainty in DEA has been discussed. At the end of this section, "interval data envelopment analysis" has presented as a strategy to deal with the problem of the uncertainty of the data. And also application of this method for evaluating the performance of the suggestions system in 20 organizational units of one of the companies covered by the National Gas Company has been examined. In the fourth section, the proposed model and how to implement it has been explained. Finally, in Section fifth, results from the application of IDEA to assess 20 Mentioned units as well as findings of the research have been discussed.

FIRST SECTION: LITERATURE REVIEW

The term "assessment" has been defined in various forms in literature review and theoretical background. Nelly (1995) has defined performance measurement as the process of quantification of efficiency and effectiveness of activities.[12] According to the definition by Simons (2000), performance assessment system has been defined with four major aims including transfer of information, focus on official affairs and procedures, and design for use of managers, and supervision on maintenance or modification of organizational activity patterns.[14] According to another definition, performance assessment is defined as a

systematic process which plans and organizes the tasks and expectations, monitors the performance constantly, creates the implementation capacity, ranks performance periodically and grants reward to suitable performance.[8] To date, numerous studies have been conducted in the context of design of performance assessment systems. Some have been in the context of basic research, resulted in proposal of various performance assessment systems. Among these performance assessment models, it can refer to Sink and Tuttle Model (1989), performance matrix (1989), the model of results and determinants (1991), the performance pyramid (1991), Balanced Scorecard (1992), stakeholder analysis (2001) and the business excellence model.[10] Performance assessment of recommendation system has been regarded as an issue with wide literature review. These studies have been conducted via various techniques and approaches, attempted to introduce a pattern for performance assessment of this system. In a study by Ehsan Jaffar pour et al. (2012), a framework has been proposed to assess performance of this system using DEA.[7] In another study by Mohammad Hadi et al. (2013), CIPP model has been proposed for this purpose. This study has been designed and performed to assess performance of this system in medical science university of Isfahan.[9] One of the methods to allocate weight to input and output criteria was used in an article by Thompson et al.(1997) entitled "certain area" to select the best place for High-energy physics laboratory. Since numerous zero values raised in optimal weight(u_r^*, v_i^*) in DEA models, it was indicated that some inputs or outputs are poorer than rest of efficient DMUs in some DMUs, thus this defect in DEA method is resolved through invention of trust region method.[16] Another method which was introduced for this purpose refers to the method "Cone ratio envelopment" used by Charles and his colleagues. In another study by Brackets et al. (1998), Cone ratio envelopment has been used to assess performance of banks under the conditions that uncertain aid grant was considered for risk and similar factors.[2] In 1998, trust region method was proposed for transfer of capital in Japan in form of a plan. In this plan, the criteria such as distance from Tokyo, access to an international airport and several other criteria were considered, that the scores were specified for each place. The assessors considered a weight for each of criteria based on Analytic Hierarchy Process and ultimately obtained a trust region for each weight through calculating ratio of weights specified by different assessors.[3] Due to extensive applications of DEA model in the real world problems since the studies by A. Charnes, W. W. Cooper and E. Rhodes, huge efforts have been made to expand DEA models. Encounter with uncertain data has been regarded as an issue drawn into attention by Despotis, D. K., & Smirlis (2002) & Cooper and Park (1999). In ordinary DEA, all the data are assumed as certain numerical values. Yet, the observed values of inputs

and outputs in the real world problems are often uncertain. Uncertain data in DEA models have been examined in the literature in different forms. Some researchers have suggested Fuzzy data envelopment analysis and interval data envelopment analysis in encounter with uncertain data. In more recent period, uncertain data have been expressed by means of two approaches. Interval data envelopment analysis was proposed for the first time by Cooper, W. W., Park, K. S., & Yu, G. (1999) and fuzzy data envelopment analysis was proposed for the first time by Sengupta. Cooper, W. W., Park, K. S., & Yu, G. (1999) have extended an interval approach which allows using a mix of uncertain and certain data by means of transformation of DEA model to an ordinary linear planning form. Assessment of lower and upper limits of DMU efficiencies has been regarded as one of the problems in interval approach.[4] Despite this problem, some researchers have proposed a variety of interval approaches.[5]

The second section-research methodology

The methodology used in this assessment has been taken from the applied realities of the subject under discussion. Two categories of input and output data are detected in assessment of recommendation system based on the proposed criteria grounded on excellence approach. Then, efficiency of recommendation system is assessed using data envelopment analysis. Since the assessment criteria have been qualitative and the data pertaining to inputs and outputs related to these criteria have been given interval value, the approaches are examined which engage in DEA with indefinite data. In this research, we deal with a type of interval data that their limits are indefinite considering this point that assessments are made by different assessors, in which a numerical interval is defined for each input or output. This results in use of the approaches that consider data uncertainty in the problem. The current model of performance assessment in recommendation system is based on a simple form of multi-criteria decision making, in which a score has been determined based on experts' view for each of criteria and sub-criteria. With regard to the investigations on executive coordinates of recommendation system, it seems that such assessment model has huge problems despite its simplicity. The problems include Incomplete and ambiguous evaluation indices, lack of the criteria which ensure alignment between these assessments and ultimate aims of recommendation system, duality of criteria from quantitative and qualitative perspectives, how to score them, ignorance of difference between organizations in terms of their size, organizational structure, missions and so forth. The criteria of model and the scores allocated in the current system are as follow:

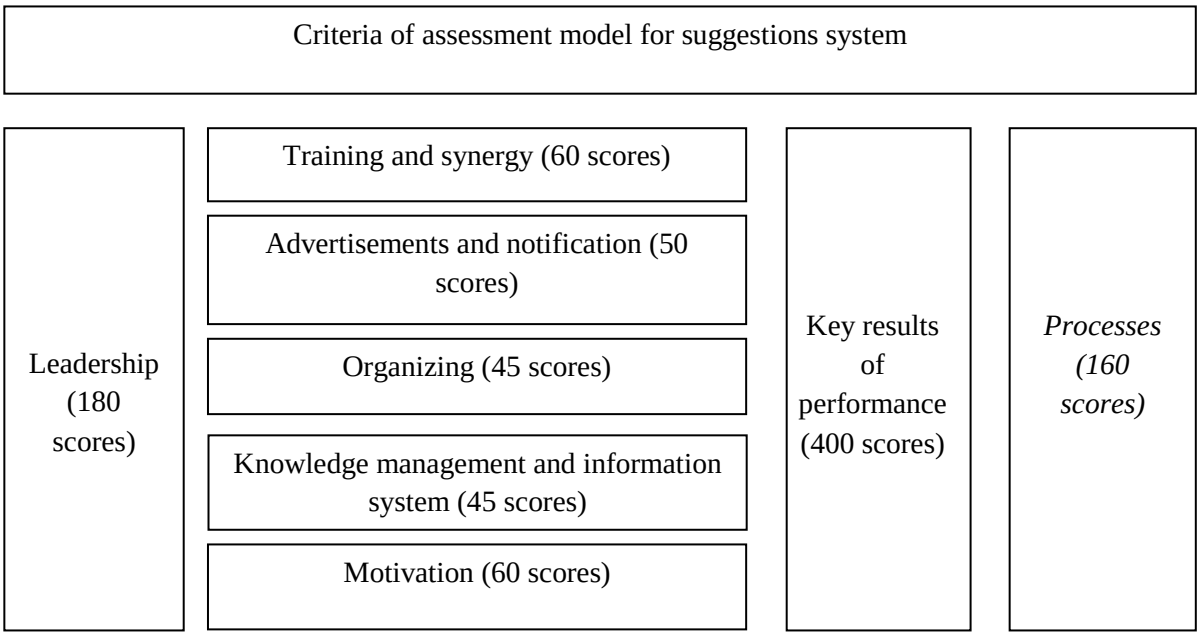

Diagram 1: Criteria and scores related to each of them in the current assessment system.

Since assessment of organizations in the current model is made based on the scores allocated by assessors, conclusion of these views is not without mistake. Allocation of an interval of the values as the score considered for the related criteria might be a logical solution to encounter with this issue. In this state, some input and output data are specified in form of numerical intervals; since the assessments are made by different assessors, several intervals are acquired for each input or output that must be entered into the assessment model (DEA model). In the first section of this research, all the criteria and sub-criteria are listed and categorized and they are reduced in number regardless of their significance. For this, the criteria related to the enablers are qualitative; the criteria related to the results which are quantitative were examined and summarized via two separate approaches. In both approaches, point of view of the experts, specialists and practitioners of recommendation system was considered as the basis for decision making. In this research, the statistical population consists of the practitioners in recommendation system in over 20 organizational complexes in one of the organizations affiliated to National Iranian Gas Company (NIGC).

The third section-Offering model and how to operate it

Offering model for evaluating in this research is using Data Envelopment analysis (DEA) method. Since enabler criteria in proposed model are imprecise, we can use method of' Interval Data Envelopment Analysis'. In addition, this method provides the possibility of

self-assessment for each organization. In this research some of the output data are imprecise and the others are certain. With regard to what mentioned, there are 20 DMUs under study with a number of inputs and outputs. Inputs of problem for jth DMU have been displayed with X_{1j}, X_{2j} and X_{3j} and 3 outputs related to the enablers which are uncertain scores have been displayed with $[y_{rj}^{L}, y_{rj}^{U}]$. The fourth output represents score of results of performance which is calculated via hierarchical method in form of a certain value.

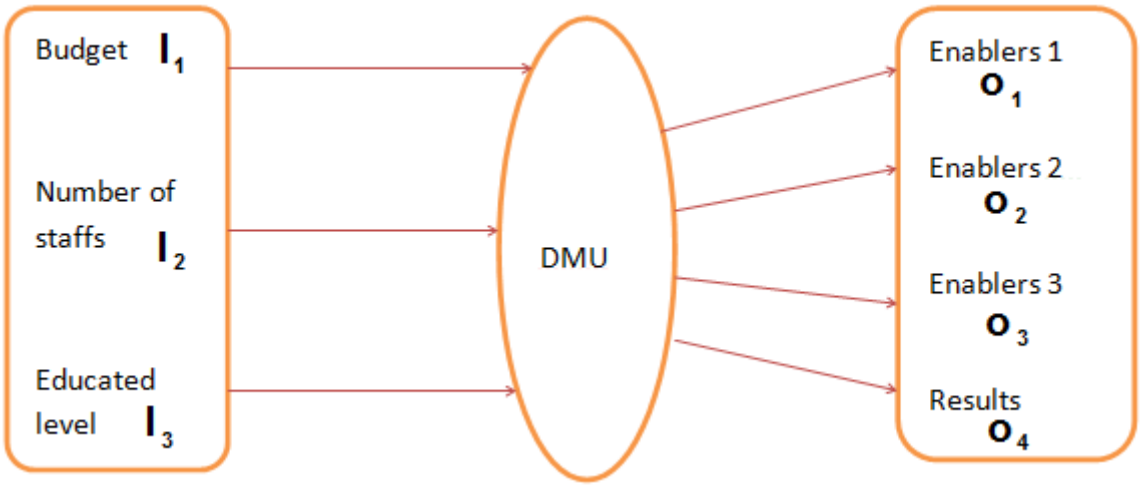

Diagram 2: The diagram representing inputs and outputs to assess suggestions system.

This model can be explained using EFQM model. In assessments, the elements contributed in better performance of this system in the organizations are taken into consideration in addition to the criteria considered with EFQM model. In the proposed model in this research, the weights corresponding to advantages of each of organizations mentioned as the features of DEA method are used instead of use of fixed scores for each group of defined factors and criteria which is mentioned as the most important fault of the current assessment system. The criteria related to three above enablers are assessed by different experts. Each of above criteria includes several sub-criteria to which a value ranging from 0 to 100 is given for trust on assessments.

After that, the mentioned numbers are merged and combined with the ideas of other experts. To review criteria of the first group following phases are there:

Step1) in this phase; in a confined survey (from experts and lecturers), the importance of criteria in evaluation will be questioned. For this, we applied Likert scale with 5 options, no importance, less important, semi importance, important and very important. In the end, those

cases where more than 60 percent of respondents have considered them unimportant or very unimportant are ignored.

Step 2) At this point, the specified criteria are summarized in three general criteria as enablers of type 1, 2 and 3,which explains leadership, politics and training programs respectively.

The criteria related to the results are another important section of the assessment criteria of the units under study drawn into attention with a different approach in this research. Implementation of suggestions system in organizations has four principal components; continued support from the management, dynamics of management element, homogeneous and compatible structure and also corporate culture growing. The success of organizations ceases to excellence in this four components. Evaluating in suggestions system and organizing national and organizational festivals for selecting the best organizations in suggestions systems are mechanisms to guarantee success and making progress into approaching the goals. Being active, dynamic, diligent, and creative and accountability of the Secretariats of the suggestions system and managers of organizations are the important causes of prosperity and development of this system. Doing or abstain from doing the right tasks related to monitoring, motivating ,training, advertising and fault finding task could be the reason and source of recession or boom system in an organization. although, the performance of all stakeholders are more or less affected by the performance of the Secretariat of the suggestions system and the procedures and processes defined in that, Support management and corporate culture, each independently can be effective in strengthening or weakening it. The study is a survey study in order to identify all criteria and sub-criteria evaluation system related to the suggestions system as well as compatibility of criteria with each other as well as with the criteria derived from EFQM model. The most important factors considered in this study, for selection the assessment criteria are: comprehensiveness of defined indices to select the best, ignoring or rejecting those criteria which are not playing roles in increasing partnerships, considering suitable weight for any of indices and also considering the roles of all staff and people who directly or indirectly can affect in increase or decrease of partnerships of staff. In this plan, for getting opinion from people, combination of two models are used, the agreement collective mental model and Delphi model, and finally based on pairwise comparison, the following hierarchy structure is obtained for criterion related to results. By using obtained weighted criteria for each of decision making units in this research,

a score is gained for each of them that are used as a one of the outputs data in Data Envelopment Analysis. The proposed model in this study has created two possibilities for organizations. One of them is the possibility of self-assessment about their performance in suggestions system and the other one is the possibility of comparing their performance with each other and finally their ranking. Proposed models are as below:

A) Self-assessment model

In this model each organization puts itself in the worst and its rivals in the best conditions.

$$\mathbf{E_o\ (Lower) = max}_{u_r, v_i} \sum_{r=1}^{s} u_r y^{L}_{ro}$$

$$\sum_{i=1}^{m} v_i x_{io} = 1$$

s.t.

$$\sum_{r=1}^{s} u_r y^{u}_{rj} - \sum_{i=1}^{m} v_i x_{ij} \leq 0 \quad (j = 1, 2, \dots, n, j \neq o)$$

$$v_r \geq 0, vi \geq 0 \quad (r = 1, 2, \dots, s, i = 1, 2, \dots, m)$$

$$\sum_{r=1}^{s} u_r y^{L}_{ro} - \sum_{i=1}^{m} v_i x_{io} \leq 0$$

B) The Ranking Model

In this model, each organization puts itself and rival organizations in the best conditions, so the common method of Data Envelopment Analysis used for this purpose:

$$\mathbf{E_o = max}_{u_r, v_i} \sum_{r=1}^{s} u_r y^{U}_{ro}$$

s.t.

$$\sum_{i=1}^{m} v_i x_{io} = 1$$

$$\sum_{r=1}^{s} u_r y^{u}_{rj} - \sum_{i=1}^{m} v_i x_{ij} \leq 0 \quad (j = 1, 2, \dots, n)$$

$$v_r \geq 0, vi \geq 0 \quad (r = 1, 2, \dots, s, i = 1, 2, \dots, m)$$

This model has been used for 20 organizational units involved in this research with 3 inputs and 4 outputs data.

Table 1: Input and output data related to secretariats of the suggestions system in organizational units.

Inputs and outputs of DMU j / Unit of	Numbers of employees	University education level	Budget	Empowerments type 1	Empowerments type 2	Empowerments type 3	Results
	I_1	I_2	I_3	O_1	O_2	O_3	O_4
Central Council	**15**	**60**	26	[50,55]	[70,80]	[50,60]	.077
Pipelines of City M	**10**	**20**	190	[60,65]	[20,40]	[25,45]	.046
Pipelines of City B	**14**	**14**	207	[45,55]	[25,30]	[30,40]	.023
Pipelines of City G	**11**	**20**	157	[50,55]	[40,50]	[50,60]	.022
Pipelines of City N	**10**	**30**	160	[50,55]	[40,45]	[55,60]	.025
Pipelines of City Sh	**12**	**25**	170	[60,65]	[50,70]	[35,45]	.022
Boosting gas pressure R	**24**	**25**	130	[45,55]	[40,60]	[55,70]	.035
Boosting gas pressure F	**18**	**22**	136	[50,58]	[60,70]	[50,60]	.033
Transportation	**22**	**10**	155	[50,55]	[50,60]	[10,20]	.032
Automatic valves, rust protection	**16**	**28**	142	[30,40]	[20,30]	[25,35]	.035
Communications and IT, dispatching	**15**	**70**	134	[20,40]	[35,50]	[40,60]	.038
Department of support (financially, goods, contracts, legal)	**18**	**60**	172	[30,35]	[70,80]	[50,60]	.028
Protection	**8**	**40**	176	[40,50]	[40,55]	[55,60]	.016
Deputy of engineering and technical services, technical inspections	**20**	**90**	300	[50,65]	[40,50]	[40,50]	.052
HSE unit	**20**	**80**	138	[40,45]	[40,60]	[35,45]	.080
Overhaul	**25**	**60**	470	[30,50]	[40,50]	[40,60]	.083
Cultural Committee (headquarter, Dar al Quran, prayer, public relations)	**12**	**60**	279	[45,50]	[35,50]	[40,60]	.030
Construction operations	**17**	**30**	222	[20,30]	[70,80]	[50,60]	.012
Human resources	**15**	**50**	155	[30,50]	[40,50]	[40,60]	.050
Potential and harmful factors	**10**	**50**	120	[30,50]	[40,50]	[40,60]	.060

The fourth section-results and research findings

In this research, in the first step the Data Envelopment Analysis (Input oriented CCR model) was used with the self-assessment approach. By using applied Lingo software, the following results that show efficiency of secretariats of the suggestions system in each of units and related information are as below:

Table 2: Units' efficiency and their reference units.

				Lack of output				Input surplus		
Number of DMUs	**Units name**	**Efficiency of CCR G***	**Reference units**	**S_7**	**S_6**	**S_5**	**S_4**	**S_3**	**S_2**	**S_1**
1	Central council	1.00	1	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2	Pipelines of M city	1.00	2	**0**	**0**	**0**	**0**	**0**	**0**	**0**
3	Pipelines of B city	0.87	2,4,9	2.55	**0**	15.44	**0**	51.31	**0**	**0**
4	Pipelines of G city	1.00	4	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5	Pipelines of N city	0.93	2,4,13,20	0.63	**0**	7.29	**0**	**0**	**0**	**0**
6	Pipelines of SH city	0.95	1,2,4,8	14.99	19.88	**0**	**0**	**0**	**0**	**0**
7	Boosting gas pressure R	0.93	1,2,8	**0**	**0**	24.18	14.25	**0**	**0**	6.37
8	Boosting gas pressure F	1.00	8	**0**	**0**	**0**	**0**	**0**	**0**	**0**
9	Transportation	1.00	9	**0**	10.00	10.00	5.00	**0**	**0**	**0**
10	Automatic valves, rust protection	0.68	1,2,9	**0**	3.72	20.56	12.02	**0**	**0**	**0**
11	Communications and IT, dispatching	0.49	1,4,20	4.27	**0**	2.80	14.11	**0**	**0**	**0**
12	Department of support	0.68	1,6,13	12.84	3.06	**0**	27.68	**0**	**0**	**0**
13	Protection	1.00	13	**0**	**0**	**0**	**0**	**0**	**0**	**0**
14	Deputy of engineering and technical services	0.46	2,20	**0**	11.75	3.75	**0**	10.25	2.87	**0**
15	HSE unit	0.76	1,2,20	**0**	34.70	36.41	26.73	**0**	**0**	**0**
16	Overhaul	0.69	2,20	**0**	41.50	31.67	79.24	12.72	**0**	**0**
17	Cultural Committee	0.60	2,13,20	**0**	**0**	0.58**.**	**0**	32.95	12.73	**0**
18	Construction operations	0.81	4,6,8	43.33	**0**	**0**	43.33	17.66	**0**	**0**
19	Human resources	0.66	1,2,20	**0**	4.64	6.95	19.79	**0**	**0**	**0**
20	Potential harmful factors	1.00	20	**0**	**0**	**0**	**0**	**0**	**0**	**0**

The obtained results from implementation of this model prepare the possibility of detecting faults and shortage in outputs and inefficiencies in resource consumption. Table 3 shows the result of fault finding for inefficient units among 20 units that are under analysis.

Table 3: Fault finding on the implementation of the suggestions system related to units investigated.

		Observed faults						
Numbers of DMU	**Names of units**	**observed weaknesses in Participation Results**	**Lack of activities in education**	**Lack of activity in policy making**	**Insufficient guidance and leadership**	**Inadequate participation Despite a lot of budget**	**Inadequate participation Despite acceptable levels of education**	**Existence of surplus employees**
3	Pipelines of N city	2.55	**0**	15.44	**0**	51.31	**0**	**0**
5	Pipelines of SH city	0.63	**0**	7.29	**0**	**0**	**0**	**0**
6	Boosting gas pressure R	14.99	19.88	**0**	**0**	**0**	**0**	**0**
7	Boosting gas pressure F	**0**	**0**	24.18	14.25	**0**	**0**	6.37
9	Transportation	**0**	10.00	10.00	5.00	**0**	**0**	**0**
10	Automatic valves, rust protection	**0**	3.72	20.56	12.02	**0**	**0**	**0**
11	Communications and IT, dispatching	4.27	**0**	2.80	14.11	**0**	**0**	**0**
12	Department of support (financially, goods, contracts, legal)	12.84	3.06	**0**	27.68	**0**	**0**	**0**
14	Protection	**0**	11.75	3.75	**0**	10.25	2.87	**0**
15	Deputy of engineering and technical services, technical inspections	**0**	34.70	36.41	26.73	**0**	**0**	**0**
16	HSE unit	**0**	41.50	31.67	79.24	12.72	**0**	**0**
17	Overhaul	**0**	**0**	0.58**.**	**0**	32.95	12.73	**0**
18	Cultural Committee (headquarter, Dar al Quran, prayer, public relations)	43.33	**0**	**0**	43.33	17.66	**0**	**0**
19	Construction operations	**0**	4.64	6.95	19.79	**0**	**0**	**0**

This table shows defects detected by each unit and also suggests ways to resolve them. For example, in unit of boosting gas pressure (unit R), the number of employees should be reduced to 6 and it should also be noted activities related to guidance and leadership such as participating senior managers in design and establishment of the suggestions system, call for topics by senior managers, managers participation in the implementation process of the suggestions system, spending enough time by managers and proceedings related to policies such as preparing administrative and financial requirements to create healthy competition for participants in the suggestions system, the existence and security of information system for the management of suggestions system and so on. As another example, the above table shows that about 10 units of save in costs, paying more attention to policies and operation processes and staff training can also resolve inefficiencies of the unit of engineering deputy and technical services.

In the second step the Data Envelopment Analysis (Input oriented CCR model) was used with ranking approach to compare units. By using applied Lingo software, the units of 1, 2… 9, 13, 20 were detected as efficient units so that Anderson-Peterson method was used to determine related ranks to these five units. These are the obtained results as follow:

Table 4: Ranking of efficient units using Anderson-Peterson method.

DMU Number	Unit name	Efficiency of Anderson-Peterson method	Rank
1	6.604122	Central Council	1
2	1.639595	Pipelines of City M	3
3	1.094904	Pipelines of City B	10
4	1.290323	Pipelines of City G	6
5	1.018450	Pipelines of City A	11
6	1.227085	Pipelines of City Sh	7
7	1.151192	Pipelines of City R	9
8	1.177051	Pipelines of City F	8
9	1.997441	Transportation	2
13	1.336538	Protection	4
20	1.304918	Potential harmful factors	5

The fifth section -conclusion and results

Data Envelopment Analysis method is an efficient method to measure the performance of the Secretariats of the suggestions system according to standards and regulations. This method, with a lot of effective capabilities, can provide the possibility to measure performance of DMUs accurately. This is the most appropriate and most logical method to measure of productivity. Date Envelopment Analysis gives the possibility to organizations that consider

the best possible weight for defined criteria, considering their relative advantages in Participatory management system. An invaluable advantage that comes with the application of the method is that a set of efficient unit determine for every inefficient decision-making unit that can be used as a pattern to improve performance. According to the DEA model, a DMU is inefficient if there is a unit or combination of units that are able to produce the same output value of the under review unit with a smaller input quantity. This combination is proposed as pattern groups for inefficient decision making units. DEA can also determine the required improved value in each input and output of the inefficient unit. It seems that in future researches the two following topics can attract interested researchers attention to this topic.

First, with regard to all criteria and sub-criteria performance of organizations in suggestions system (not just results) and identifying correlations between them and doing factor analysis, determined their factor structure and possibly by reducing them can assess the performance of organizations in suggestions system more accurately. Criteria and formulas of performance measurement can be monitored and factor analysis should be used to clarify the internal correlation between significant criteria via covariance matrix approximation and detect the major criteria.

Second, in order to avoid neglect of some of the index, it might be gained weight for each of them and also it might be applied DEA method with bound coefficients. Another important issue that can be addressed in future researches is paying to the concept of uncertainty in the measuring data. While in the classic patterns of DEA, the certainty of data is one of the basic assumptions and therefore a small deviation in the data could change the results and thus lead to infeasible solutions .So the results of these evaluations and ranking regardless of the uncertainties in the data, especially when the efficiency of units is close to each other, they can be invalid in many cases. Approaches such as using interval data envelopment analysis, fuzzy data envelopment analysis and robust data envelopment analysis can resolve this problem well. So we can definitely pursue different aspects and below innovations in future researches:

1) Using Data Envelopment Analysis to evaluate the performance of the suggestions system by redefining inputs and outputs and considering the implications and defined criteria in the current evaluation version of this system.

2) Applying the approach uncertain data to consider difference of assessors view in initialization to some of inputs and outputs.
3) Considering unreal amounts (allocation of points) for some of inputs and outputs.

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