Evaluation of performance of Elmi-Karbordi Universities through Data Envelopment Analysis method

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Abstract: The present article aims to evaluate the performance of Elmi-Karbordi universities via data envelopment analysis (DEA) method provide a way for measurement of two technical schools of Imam Ali and Sadoughi in Yazd. Study of non-parametric assessment methods show that choosing measurement method of decision-making unit (DMU) efficiency depends on nature of data (cardinal, ordinal) inside inputs and outputs. In present paper by use of Pearson's correlation coefficient the coefficients of model were determined and specified inputs and outputs based on two inputs (score of professors and accessible space at university) and one output (number of graduated) were computed with DEAP software. Ranking results of two mentioned schools during 6 consecutive years were determined. According to obtained data and using CCR model (output oriented), 12 assessments were performed with DMU method and DEAP software. The data were computed based on VRS DEA method and in form of output oriented. The results for calculation of deficits and excess values of inputs and outputs are presented in following. Additionally, target value of inputs and outputs of the problem for making efficient of inefficient were computed at the end. Consequently, it was concluded that which DMU in which year gained the first rank and the last rank belongs to which DMU. Meanwhile the rank of other DMU was specified as well.
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1. Introduction

The mission of higher education, producing a certain product, is educated individuals in accordance with community need and rules. The main theory of quality movement in higher education is to inject highly educated, knowledgeable, professional and entrepreneurial individuals into labor market and concerning these requirements become as an organization's priority (Abili & Khoda yar, 2001). To keep their survival, in future universities will repeatedly face with domestic and foreign competitors. They need to accept this reality that customers have many various choices to get absorbed to, so they must do their best to acquire some values or serve the best services or quality [1] (Razani, 2002). Thus, the necessity of patterns not only can evaluate present condition of university, advantages and disadvantages as well as points need to be improved but also establish an appropriate basis for planning is more demanding. Today's in most of organizations like education systems these models used to identify problems and measure functions. Since inputs and out puts in these models are clearly observable, in addition to focusing on quantitative and qualitative indicators , the interactional effect of input and output indicators will be taken into consideration [2] (Safari, 2005).

Though, the major problem in current assessment models is that in all of these models the weight if indicators have been determined beforehand which causes other problems. Functional distance of true units especially in developing countries like Iran is outstandingly large. Furthermore, in most of organizations of Iran there is either there is no standard or international standards do not seem logical for organizations. Therefore, the preference is to apply relative evaluation instead of absolute evaluation [3] (Alirezaee et al, 1994). Using previous studies, the DEA mathematical programming method could be useful in solving this problem. Additionally, the inputs and outputs of organizational excellence models may contribute in efficient application of DEA inputs and outputs. Thus, the present paper seeks to explain in details aspects and components of performance evaluation at academic units and providing an appropriate pattern based on utilization of DEA methods in higher education [4]. In following, a review of related literature on DEA, previous studies and significance of this research will be determined.

2. Review of related literature

In this part, theoretical basis, research background and significance of the study will be presented.

2-1-theoretical basis:

Mathematics and related sciences create accurate and verifiable ways to understand the world and the complex relationships that govern different parts. In operation research is identified as one of mathematics branches engaging in modeling of industrial and social structures measure their operation ability and finally present solutions for moderating of methods. DEA is also a branch of in operation research that is involved in evaluation of productivity in similar units. High ability of DEA in measurement of productivity and specific characteristics of this branch can be used in many of areas such as oil and gas industry, hospitals and banks. DEA is a method to additionally evaluate productivity of same decision-making units (DMU) which change some input into a few outputs.

In DEA, the productivity of one DMU is defined based on total ratio of weighted outputs on sum of weighted inputs if the ratio of each DMU does not exceed from a constant value. In this model the weights of outputs and inputs are considered as variable. The purpose in DEA models is to acquire the best weight range accepted for under study unit due to maximizing relative productivity of that unit. At present, there are various and related methods in evaluation of efficiency in DEA. Also, many different methods are utilized in decision –making of information system projects. Decision–tree, game theory, Delphi–technique fuzzy logic, analytical hierarchical process (AHP), goal programming, combination of goal programming and AHP, dynamic programming, dynamic programming, and nonlinear programming are among them. Though, each of these methods possesses certain advantages and disadvantages [5]. One of characteristics of DEA model is identified as structure of return to scale. Return to scale may be fixed or changeable. By return to scale we mean an increase in inputs enhances output as one unit. In variable return the increase of output found to be more or less than increase in input (Imami & Meibodi, 2000). Methods measurement of productivity is mostly based on Farrell method. In his article (1957) on measurement of productivity, Farrell attracted many attentions. He suggested that to be able to measure productivity of a particular firm it should be compared with performance of the best existing firms in an industry. This method contains concepts on frontier production that is utilized for measurement of productivity [8] (Hadian et al, 2004). Farrell defined three principal concepts of productivity from which two concepts are related to measurement productivity of firm and the third for whole industry. Two parts of productivity are useful in firm i.e. technical efficiency (TE) and allocative efficiency (AE). The combination of these two parts shows economic efficiency of firms. As the third concept of efficiency Farrell defined structural efficiency (SE) can be used in measurement of efficiency in industry [9].

To explain his theory, Farrell proposed an example of firms using two production factors of x1 and x2 that produce a product (y) assuming constant return to scale and minimizing of factors. Data associated to Isoquant Curve (*AA'*) is shown in Dig. 1 and makes the measurement of efficiency possible.

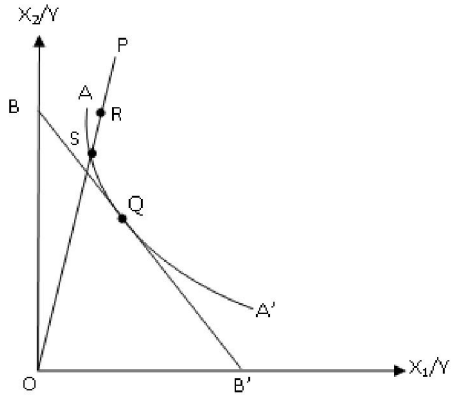

Diagram 1: measurement of technical efficiency

If a firm in point P for production of one unit Y uses specific values x1 and x2, value of technical inefficiency of firm will be shown by RP distance. This value explains value of production factors that is reduced when product level remains fixed. This value can be seen through OR/OP ration that indicates percentage can decrease production factors (with same production level).

Technical efficiency = TE_i = OR / OP

Technical inefficiency 1 – TE_i = 1- (OR / OP)

(Index i shows axial input).

If (TEi) equals 1 it means TE of firm is complete. For instance, S point has efficiency equals to the unit. Since this point is on efficiency curve (Isoquant Curve) . Also, technical efficiency of the firm P equals:

Technical efficiency = AE_i = OS / OR

The above statement shows value of reducing cost (if product is fixed) . This reduction in cost happens when production occurs in point Q (not in point R). Economic efficiency (EF) therefore is defined as following:

Economic efficiency = EE_i = *OS / OP = (OR / OP) * (OS / OR)*

SP distance also shows economic inefficient.

CCR models are among constant return to scale models. A constant return to scale is appropriate only when all of units in scale function efficiently. In evaluation of efficiency of units when imperfect conditions of competitions pose limitations to

investment then it causes to inactivity of unit in efficient scale [6].

CCR model:

$\text{Max } z = \Sigma\, u_r y_{ro} \quad (r = 1 \ldots s)$

$\Sigma\, v_i x_{io} = 1 \quad (i = 1 \ldots m)$

$\Sigma\, u_r y_{rj} - \Sigma\, x_{ij} v_i \leq 0 \quad (r = 1 \ldots s, i = 1 \ldots m)$

$u_r, v_i \geq 0$

In 1984, Bancker, Charmes and Cooper through some changes in CCR model presented a new model named Banker, Charnes, and Cooper (BCC). The BCC model is a model of DEA can be used in evaluation of relative efficiency of units with variable return to scale. The constant returns to scale models in comparison to variable return to scale are found to be more restrictive. The cause could be in separation of constant return to scale from variable return to scale [7].

BCC model:

$\text{Max } E_o = \Sigma\, u_r y_{ro} + u_o \quad (r = 1 \ldots s)$

$\Sigma\, v_i x_{io} = 1 \quad (i = 1 \ldots m)$

$\Sigma\, u_r y_{rj} - \Sigma\, v_i x_{ij} + u_o \leq 0 \quad (j = 1 \ldots n)$

$u_r, v_i \geq 0 \quad (r = 1 \ldots s, i = 1 \ldots m)$

In the model y_{vj} , x_{ij} (all are non-negative) represent i inputs and outputs of DMU and u_r , v_i are weights of inputs and outputs. Therefore, in above model y_{vj} , x_{io} are inputs and outputs of DMU_0. Additionally, sign *w* can show return to scale.

2-2-review of related literature:

Fathi (2003) in an article named "evaluation of efficiency of Islamic Azad University branches by use of DEA method and development of dynamic mode" performed at South Tehran branch, first identified evaluation indicators of university such as facilities, human force, and education and research condition. Then by use of AHP method tried to rate and evaluates their efficiency during a 11-year period [10]. Khorshidi et al (2000) in an investigation titled "evaluated and estimated efficiency of educational system of Iran with DEA method and Malmquist index.

This study aims in estimation of efficiency and productivity of education system of Iranian provinces within academic years of 1995 – 1999. Twenty five provinces were according to independent variables (e.g. number students, classes, schools, teachers, current funds and construction funds) and dependent variables (e.g. ratio of students to number of schools, ratio of students to number of schools, and ratio of current funds to number if students) selected. The DEA method applied to compare the provinces from educational condition point of view [11].

Alirezaeei et al (1994) in 2000 investigated on efficiency of university units of Tarbiat Moallem University. In his study, the major responsibilities of university units were defined in two educational and research areas. For each, the evaluation indexes were determined and after collecting information of related data and every unit outputs as well as using DEA method the efficiency of units were achieved. In following, the obtained results were analyzed and the effect of selected data and outputs on efficiency core of units was assessed [12].

In other study named "estimation of efficiency and return to scale of mathematical departments of Iran through DEA method", Jahanshahloo et al (2001) divided statistical population (here mathematic departments of public universities) into 34 groups.

Then with DEA method and determination of type of return to scale provided solutions for improvement of their efficiency [13].

Adel Azar et al (2005) in the article of evaluation of educational and research performance through DEA method tried to include mathematical model of appropriate DEA , rating of educational departments efficiency, their strengths and drawbacks, and efficient utilization condition from available resources in School of Humanities from DEA point of view [14].

Ibrahimi et al (2011) in their study on " assessment of professors' research performance using DEA method", based on existing documents extracted important indicators in assessment of professor' research performance. After with the help of DEA method measured research performance of professors. in addition to research indexes, a few other indexes like academic rank, teaching experience and taught lessons were considered as well [15].

Torkashvand (2006)) in the article of evaluation of educational and research performance through DEA method tried to include mathematical model of appropriate DEA , rating of educational departments efficiency, their strengths and drawbacks, and efficient utilization condition from available resources in School of Humanities from DEA point of view [16]. Najafi et al (2008) in their paper on assessment of efficiency with synthesizing two measurement systems DEA and BSC concluded that systematic approach of BSC in four aspects are classified in domain of empowering and results are a guide to organizational movement toward a strategic path. The supplementary DEA for evaluation of organization condition in these two areas seems inevitable in appropriately making decisions [17].

Heidari nejad et al (2006) in their article " assessment of physical education departments and faculties of Iranian public universities using mathematical model of DEA " made the conclusion that besides educational and research efficiency in internal environment of departments and faculties ,

the effectiveness of technical services in external environment i.e.in level of university and society could easily observed[18]. In "evaluation of top state universities of Iran through DEA method", Sameti et al (2001) came to this conclusion that by use of AED method the technical efficiency of 36 top universities were measured . Regarding the obtained results, given return to scale becomes constant 14 universities and return to scale becomes variable 16 universities will be efficient [19].

Table 1 shows the comparison between previous studies on evaluation of universities by use of DEA method.

Table 1: comparison of previous studies

Author	Year	Area
Alirezaee et al	1994	Evaluation Tarbiat Moallem university efficiency of units
Jahanshahloo et al	2001	Computation of efficiency and estimation of return to scale of mathematical departments of Iranian universities through DEA method
Fathi Hafshjani	2003	Evaluation of efficiency of Islamic Azad universities branches using DEA method
Khorshidi et al	2004	study and esitmation of efficicny in educational system of iran through DEA method and Malmquist index
Azar et al	2005	Evaluation of educational and research performance with DEA method
Ibrahimi et al	2011	Assessment if research and educational performance of professors through DEA method
Torkashvand et al	2006	Evaluation of research and education performance via DEA method
Najafi et al	2008	Assessment if efficiency through synthesizing of two measurement systems of DEA and BSC
Heidari nejad et al	2006	Evaluation of physical education departments and faculties of state universities through DEA method
Sameti et al	2001	Study of large state universities of Iran with DEA method

2-3-siginificance of the study:

Higher education as an important organization plays a critical role in horizontal and vertical development of a community. Regarding globalization, information technology (a means for transfer of information) and change in universities mission from output oriented mode to quality orientated and excellence of knowledge, current indexes and evaluation methods which are mainly goal and outward –oriented hold necessary efficiency in assessment of universities no longer. Thus, through application of new methods on global evaluation derived from precise mathematical models, good steps could be taken in development of society and university effectiveness in accordance to national and international advances. Evaluation of universities is one of the most salient problems policy-makers and directors are facing with. As a result, the present paper with aim of precise evaluation of one of state universities provides a model for measurement of universities efficient. The following part will discuss the methodology.

3. methodology

The current study is a kind of descriptive-survey method. Since in DEA method sampling has no room and homogeneity of DMU is obligatory, the statistical population consists of academic units of Imam Ali and Sadoughi in Yazd during academic year 2004-2010 (6 years). Based on the mentioned universities, DMU consist of 12 units. Furthermore, in order to benefit from exerts' opinions on appropriateness of evaluation indexes, 35 experts were randomly selected and their comments on designing and moderating of the model were applied. Required data were collected from university's databases.

3-1-data miming:

Studies on university investigations indicated that creating better facilities contribute to better educational conditions of students and finally they demand more facilities. Therefore, not only the number of students but also higher levels of graduates from educational degree view are taken into consideration as output. Number of highly ranked graduates is defined as output and evaluation of professors in addition to accessible.

Environment at university specify inputs. This environment is divided into educational, sports, leisure and official environments. Published articles and books, teaching experience and university degree are criteria for assessment and scoring. To determine inputs two tables of professors and academic environments assessment are designed.

Virtual input $= V_i X_{ij} + \dots V_m X_{mj}$ (i=1...m),

Virtual output $= U_i Y_{ij} + \dots U_n Y_{nj}$ (i=1...n)

Table 2 shows primary inputs of the problem. Here, university degrees of professors have been divided into three main levels. In each level

based on number of professors who are active in teaching, number of published articles and books, annual teaching hours as well as academic rank, the scores are calculated and inserted inside the table. The final score of table is written down on last line. This table is designed for 12 DMUs and computation results for primary inputs are shown in Table 4.

Table 2: determination of primary inputs of the problem DMU1

Description / Degree	No. of masters	No. of proficiency paper	No. of proficiency book	Annual Instruction Hours	Scientific Grade	No. of thesis terminated
	Mark	Mark	Mark	Mark	Mark	Mark
Master	12.654	4.884	1.665	5871.456	0.8658	1.11
					0.7326	
		3.885			0.0999	1.221
					0	
PhD	21.5	17.316	15.5	14964	0	19.647
					3.2	
		11.189			1.2	12.358
					0.6	
Post PhD	2.505	0.999	2.004	871.74	0	1.998
					0	
		0.616			0.5511	0.168
					0.2672	
Total of points	36.659	38.889	19.169	21707.196	7.5166	36.502
First input score	21845.9316					

Table 3 indicates the second inputs of the problem. In this table, the available space of university has been divided into total space (square meter), number of classes, laboratory, sports space and other facilities (e.g. labs, restaurants, etc.). Table 3 is planned for 12 DMUs whose results can be observed in Table 4.

Table 3: determination of second inputs of problem DMU

Variables / Universities	Total area (m²)	No. of Classrooms	Library		Sport facilities		Extra facilities space	
	Mark	Mark	Variable	Mark	Variable	Mark	Variable	Mark
DMU 1	7840	15.6	Floor Area (m²)	6	Floor Area (m²)	62.1	Laboratory (m²)	19.95
			No. of books	97.5	No. of hays	3.6	Number of chairs	3.675
			No. of chairs	1.8	Collegian satisfaction measurement questionnaire	6.03	Club Sport area (m²)	29.4
			Connects. (network)	1.5			Restaurant area (m²)	23.415
			No. of members	10.35			Healthy & Sanitary ware area (m²)	13.65
Total points	7840	15.6	117.15		71.73		1290.09	
Input score	8134.57							

Table 4: comparative results of problem inputs $DMU_1 \ldots DMU_{12}$

Technical & professional faculty of Imam Ali, Yazd						**Technical & professional faculty of Sadough, Yazd**					
DMU1	**DMU2**	**DMU3**	**DMU4**	**DMU5**	**DMU6**	**DMU7**	**DMU8**	**DMU9**	**DMU10**	**DMU11**	**DMU12**
21846	20464	18724	12471	14520	14983	12525	16989	13119	26894	18166	16226
8135	6673	11229	10882	6045	10368	19567	12480	7918	32896	25907	15399

According to the research problem, outputs consist of total number of graduates in 12 DMUs within two 6 year periods and at Technical and vocational school of Imam Ali university (majors including electronics, accounting, computer, graphics, architecture, textile, carpet, painting of building, and official affaires) and Sadoughi university of Yazd (majors such as electronics, accounting, molding, wooden structures, architecture, metallurgy, machineries, auto mechanic, construction, mapping, industry, and metal industry) were computed and got listed in Table 5.

Table 5: comparative results of problem outputs DMU1…DMU12

Technical and professional faculty of Imam Ali, Yazd						Technical and professional faculty of Sadoughi, Yazd					
DMU1	DMU2	DMU3	DMU4	DMU5	DMU6	DMU7	DMU8	DMU9	DMU10	DMU11	DMU12
419	481	380	315	179	311	615	789	641	491	295	317

4. findings

Regarding obtained data in previous parts through CCR (output –oriented) the evaluation of (DMU) 13 was resolved by software DEAP. The data were computed with VRS DEA and Output-Oriented method that results are shown in Table 6.

Table 6: results of ranking of university units

DMU	Input		output	firm	crste	*vrste*	scale	Ranking	Year	University
	Master	Space								
1	21846	8135	419	0.636	0.647	*0.984*	drs	2	83-84	Imam Ali
2	20464	6673	481	0.890	1.000	*0.890*	irs	6	84-85	
3	18724	11229	380	0.418	0.508	*0.823*	drs	8	85-86	
4	12471	10882	315	0.516	1.000	*0.516*	irs	10	86-87	
5	14520	6045	179	0.366	1.000	*0.366*	irs	11	87-88	
6	14983	10368	311	0.425	0.437	*0.973*	drs	3	88-89	
7	12525	19567	615	1.000	1.000	*1.000*	-	1	83-84	Sadoughi
8	16989	12480	789	0.950	1.000	*0.950*	drs	5	84-85	
9	13119	7918	641	1.000	1.000	*1.000*	-	1	85-86	
10	26894	32896	491	0.372	0.622	*0.599*	drs	9	86-87	
11	18166	25907	295	0.331	0.374	*0.885*	drs	7	87-88	
12	16226	15399	317	0.399	0.417	*0.957*	drs	4	88-89	
mean				0.609	0.750	0.829				

crste = technical efficiency from CRS DEA
vrste = technical efficiency from VRS DEA
scale = scale efficiency = crste/vrste
Note also that all subsequent tables refer to VRS results

Table 6 presents efficiency of DMUs. As it can be seen from *vrste* column, the Sadoughi faculty of Yazd during years 2006-2007 and 2004-2005 are pretty efficient. Other ranks belong to Imam Ali faculty within years 2009-2010 and 2004- 2005, Sadoughi faculty of Yazd in 2005-2006 and 2009-2010 , Imam Ali faculty within 2005-2006 , Sadoughi faculty in 2008-2009 , Imam Ali faculty in 2006-2007, Sadoughi faculty in 2007-2008, and Imam Ali in years 2008-2009 and 2007-2008 . The rest are considered ad inefficient units that require determination of appropriate outputs and inputs for each DMU and excess input or output of all units get computed. The average scale for efficiency is 0.829, management performance 0.750 and technical efficiency 0.609. The highest average efficiency belongs to efficiency measure and the lowest to technical efficiency. The results of computed surplus and deficit values of inputs and outputs are shown in Table 7.

Table 7: determination of surplus values of inputs and outputs of the problem

DMU	**Input**		**output**	**Year**	**Univ.**
	Master	**Space**			
1	8542.916	0.000	0.000	83-84	Imam Ali
2	0.000	0.000	0.000	84-85	
3	2796.238	0.000	0.000	85-86	
4	0.000	0.000	0.000	86-87	
5	0.000	0.000	0.000	87-88	
6	0.000	252.696	0.000	88-89	
7	0.000	0.000	0.000	83-84	Sadoughi
8	0.000	0.000	0.000	84-85	
9	0.000	0.000	0.000	85-86	
10	9905	20416	0.000	86-87	
11	1177	13427	0.000	87-88	
12	0.000	3818	0.000	88-89	

As it can be concluded from Table 7, all of outputs for all years and both faculty sound suitable and no surplus output is observed. In input values some surplus values may be evident in few years. Faculty of Imam Ali in years 2006-2007 and 2004-2005 and faculty of Sadoughi in years 2008-2009 and 2007 and 2008 possessed surplus input (professors' input). This surplus value may be due to increase of annual teaching hours. Other issues of the first input are appropriate and the teaching hours only may contain negative surplus value. The university

environment (the second input) for faculty of Imam Ali in years 2009-2010 and faculty of Sadoughi in years 2009-2010 , 2008-2009 and 2007-2008 had surplus input. This excess value is associated to unused classroom space, unused sports space, decrease of library members and a fall in students' satisfaction from academic services.

The target values of inputs and out puts of the problem in order to make the inefficient units efficient are listed in Table 8. In case these values were implemented all units got absolutely efficient.

Table 8: summary of target values of inputs and outputs if the problem

DMU	Old Input		Sugg. Input		Old output	Sugg. output	Year	Univ.
	Master	Space	Master	Space				
1	21846	8135	13303.1	8135	648	419	83-84	Imam Ali
2	20464	6673	20464	6673	481	481	84-85	
3	18724	11229	15927.8	11229	748.4	380	85-86	
4	12471	10882	12471	10882	315	315	86-87	
5	14520	6045	14520	6045	179	179	87-88	
6	14983	10368	14983	10115.3	712.3	311	88-89	
7	12525	19567	12525	19567	615	615	83-84	Sadoughi
8	16989	12480	16989	12480	789	789	84-85	
9	13119	7918	13119	7918	641	641	85-86	
10	26894	32896	16989	12480	789	491	86-87	
11	18166	25907	16989	12480	789	295	87-88	
12	16226	15399	16226	11580.6	759.8	317	88-89	

As the table shows, inputs and outputs values are compared with recommended values in Table8. For instance, the unit 1 (Imam Ali faculty of Yazd in years 2004-2005) whose efficiency in Table 6 holds the second place requires to modify values of inputs up to 8135 and 13303.1 and outputs up to 419 to be able to acquire the first place of efficiency. It could be a matter of question that reduction in output is inappropriate. The answer is that all of needed units are measured with together and to achieve the proper efficiency of decided units, these recommended values for keeping computational efficiency relations of other units will be suggested. Change in recommended values will in no case lead to change of other units ranking.

5.conlcusion and further suggestion:

Conclusion:

Table 2 shows the primary inputs of the problem. Here, the professors' ranking according to university degree is divided into three main levels. In each level based on number of professors who are active in teaching, number of published articles and books, annual teaching hours as well as academic rank, the scores are calculated and inserted inside the table. The final score of table is written down on last line. This table is designed for 12 DMUs and computation results for primary inputs are shown in Table 4.

According to the research problem, outputs consist of total number of graduates in 12 DMUs within two 6 year periods and at Technical and vocational school of Imam Ali university (majors including electronics, accounting, computer, graphics, architecture, textile, carpet, painting of building, and official affaires) and Sadoughi university of Yazd (majors such as electronics, accounting, molding, wooden structures, architecture, metallurgy, machineries, auto mechanic, construction, mapping, industry, and metal industry) were computed and got listed in Table 5. Regarding obtained data in previous parts through CCR (output –oriented) the evaluation of (DMU) 13 was resolved by software DEAP. The data were computed with VRS DEA and Output-Oriented method that results are shown in Table 6. The target values of inputs and out puts of the problem in order to make the inefficient units efficient are listed in Table 8. In case these values were implemented all units got absolutely efficient.

Suggestions:

Since in non-parametric methods it's likely that selection of inputs and outputs and scoring data (ordinal and cardinal) occur with ignorance and qualitative data incorrectly change into quantitative data which it in turn causes error in answering the problem, thus it is highly recommended to:

1. In future researches, investigators review the list of inputs and outputs and monitor qualitative data which are numerical or through mathematical modeling besides other numerical methods define them mathematically.

2-additionally, in designing non-parametric models, all qualitative inputs and outputs will be excluded and the model is defined and assessed according to numerical data. However, this may not be true for all assessed units and they have permission to add to remove inputs concerning the conditions and profits.
3-the main conclusion of the present paper is ranking of Elmi-Karbordi university units presented in Table 6.

Suggestions for future researches:

1-to get sure on accuracy and reliability in future studies in relation to other assessment methods, researchers can use correlation coefficient tests. Then define efficient model of evaluation through regression function and investigate the results via comparison of regression function computation with efficient function.

2-the assessment of related units should be performed in a regular basis and take the evaluation process of each unit into consideration during the time till strengths and weaknesses of every unit get determined to define improvement project.

3-evaluation of DMUs usually faces with disagreement about obtained results. This of course leads to main opposition of DMUs managers in comparison of heterogeneous units' evaluation with together.

Thus, it is recommended that for each DMU a specific assessment method based on nature of the unit data get designed to resolve effect of comparison of results with other heterogeneous units and consequently each unit consider itself independent in process of assessment.

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