

Designing Performance Evaluation Pattern of Islamic Azad University Branches based on Excellence Organizational Indexes by Using Method of Data Envelopment Analysis

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ABSTRACT— This study has been done in order to explain dimensions and components of performance evaluation in higher education and provide a proper performance in Islamic Azad University. The research method is descriptive survey method. In this study, after studying international standard models of organizational excellence, common factors to evaluate these models were extracted by Delphi methods. These factors include six input and four output with 64 components which the main factors included: Consequentialism, customer orientation, leadership and consistency in objectives, management based on processes and facts, people involvement, continuous innovation and improvement, mutual partnerships and social responsibility; In order to assess academic units by this evaluation factors; the factors were done in the form of a Likert-scale questionnaire after determining validity and reliability on 8 academic units of Islamic Azad University region fourteen. Then data were analyzed based on data envelopment analysis methods; The results showed that some fourteen region Islamic Azad University units are efficient and other inefficient, also Anderson and Peterson method was used to determine efficient unit priorities. And finally by making virtual units and reference set, Weak points of inefficient units were identified and were presented proposals for their efficiency.

KEYWORDS: performance evaluation, Excellence organizational, Data envelopment analysis, Islamic Azad University

Introduction

Produce specific product as training people according to society need and under existing rules and regulations in the every country is the aim of higher education. (Zaker Salehi, 2001). In the future universities to survive constantly will be face with many internal and external Competitors. They have to accept this fact that there are so many options for attracting customers, and in order to obtain a set of values, attempt to provide service with best quality and customer's expectations has increased due to increasing global competition and communications Improve (Abili, 2002). By pursuing this result, today's in most organizations including educational systems are used Business excellence models to identify problems and performance measurement. Because these models are specified in the inputs and outputs, the outputs and outputs indexes interaction impact consider in addition to emphasizing both quantitative and qualitative indicators. Growing and promote an organization in all its dimensions can be known as Organizational excellence (Razani, 2003). Business excellence models Has systematical and all-round Looking to universities' performance with an emphasis on fundamental values such as pragmatism, customer orientation, leadership and destination and purpose stability, management based on facts and processes, participation and human resources development, learning, innovation and improvement, partnership development and organization social responsibility. But the main problem in use of organizational excellence models (which so far consists of 10 models in different countries of the world) is That all these models, has been predetermined before the criteria's weight, and is preferred to use relative valuation rather than an absolute valuation. (Jahanshahlo et al, 2009). By conducted studies can be used Data envelopment analysis mathematical programming method to solve this matter. In addition can be used Inputs and outputs of business excellence models as well as in inputs and outputs of data envelopment analysis. (Safari, 2007). By Using Data envelopment analysis in addition to being identified inefficient units, the units development is determined at the specified interval time And allows to inefficient unit, Compensates output deficiency or weakness by other output or Compensates Additional consumption in some inputs by saving in other inputs and in each unit be happen Optimum resource allocation (Jahanshahlo et al., 2009). So what is intended in this study, is a step In this regard, to declare The dimensions and components of university units performance evaluation and presenting proper pattern based on organizational Excellence Criteria by using Data envelopment analysis methods in Higher Education.

Research background

A study was done, as "European organizational Excellence Model self-assessment by using questionnaires Approach in the university's educational services section" The results showed that this model can Strengthened well university's strategy by determining strengths and weaknesses in higher education institutions. This model evaluates universities performance systematically and all-round and cause to promote universities quality (Josetari, 2007). A study was done as "Implementation of the Organizational Excellence Model in higher education institutions". Researcher has paid to compare both academic and non-academic sector by using the self-assessment approach. And has concluded that in academic sections that previously has been used other models of universities quality Assessing except Organizational excellence models, has not been attended to important principles of customer orientation means pay attentions to other Higher education institutions and competition .but Using this model shows important noting higher education institutions to above issues .(Hides ,2006). A study was done as "Using the Enablers in European organizational Excellence Model to management of higher education institutions". The results, examined two aspects; First, the possibility of using quality management in the field of education and second effectiveness of this approach to improve the management of higher education institutions in areas such as planning, human resources, administration and management of the educational process. (Cavomora, 2007) In the article entitled "Islamic Azad University units Performance evaluation, by using data envelopment analysis and dynamic models development" that has been conducted in South Tehran unit. At the first researcher has identified university's assessment indicators as facilities, human resources, training and research status then by Using AHP method has ranked them and during an 11 years period, has evaluated their effectiveness. (Fathi, 2004). In done research by Safari (2003) as "organizational excellence modeling with Envelopment analysis approach in public companies " the researcher Meanwhile using of business excellence models Indexes has pointed to importance of using Data envelopment analysis approach in its use in evaluation in order to present evolution model. And finally has provided evaluation model based on the quality models indexes with Data Envelopment Analysis. Done Research by Jahanshahlo & Malek as "Calculating efficiency and Estimating return in Country math groups Scale by using Data envelopment analysis" that all public and daily universities math groups was Statistical Society. 34 Mathematics group were selected, solutions to increase their efficiency was presented by using Data envelopment analysis and determining the type of output to scale. (Jahanshah, Malek, 2002).

Research's questions

- Which are the evaluating indexes of fourteen region Islamic Azad University performance according to organizational excellence models Indexes?
- What pattern can be presented by using Data envelopment analysis to evaluate fourteen regions Islamic Azad University Performance?

Research methodology

This study has been done by descriptive survey method, since sampling doesn't mean in using Data envelopment analysis and since Necessarily to Homogeneity decision making units, the fourteen region Azad university Units are slightly population in this study . The number of these units is eight collegiate units According to statistics of Islamic Azad University fourteen region. Also, 300 experts were selected randomly to benefit experts comment in the field of the suitability of evaluation indexes.

Research's tool

In this study have been used two types of tools. One questionnaire to indicate relating evaluate indexes and another questionnaire to assess units performance evaluating by using organizational excellence models indexes , questionnaire to indicate relating evaluate indexes . In Likert scale, including organizational excellence indexes , include 8 main entry index (including 200 sub-index) and 5 main output index (including 85 sub-index) which, these factors decreased ,including 6 input indicator (50 sub indicators) and 4 output index (14 sub-index) by Delphi method. The other evaluating units' performance questionnaire by using business excellence models Indexes; that was designed in order to evaluating the first region Islamic university units about identified indexes and determining their station. For this reason, previous questionnaire was Reviewed and drafted in the 5-item Likert scale (as following).

Option A: There is no approach in this context.

Option B: In this context there is approach,

Option C: in this context is seen significant progress.

Option D: This approach is established in this unit.

And E: in this context has done reviewing. (In approach)

Cranach's alpha coefficient was used to determine the questionnaire reliability, the value of this coefficient was 0.81, Content validity was used to determine the validity of questionnaire that accompanied with 76 percent of experts consensus.

Statistical method

In this study have been used three statistical analysis methods, According to the goals and research's questions.

Delphi method has been chosen to determine framework Credit of assessment Indexes in order to determining Common evaluating indexes derived from business excellence models. Factor analysis method and data envelopment analysis method has been used to evaluate Islamic Azad University units performance.

Research findings

First question:

1. Which are the evaluating indexes of Islamic Azad University performance according to organizational excellence models Indexes? While reviewing the matter literature, identified organizational excellence models that were including 9 international standard models. Among these models, were extracted 8 evaluating input factor (including 200 sub-criteria) and 5 evaluating output factors (including 85 sub-criteria). Those common extracted factors decreased to 6 input's factor (50 sub-indexes) and 4 output's factor (14 sub-indexes) by Delphi method as following:

Table 1-Derived Evaluating factors and components from business excellence models

Row	Main input factors	Number of components of the evaluation
1	Policy and strategy	5
2	Leadership and Management	11
3	Customer and market.	9
4	Human Capital	10
5	Processes and organizing	8
6	Partners and resources	7
Total	6	50
Row	Main output factors	Number of components
1	Human resources Results	4
2	Society Results	3
3	Financial and economic results	4
4	Performance Results	3
Total number	4	14

Second question of research: which are the factor and driven evaluation factors Fitness from organizational excellence models to evaluating University unit's performance and they are how extend?

The expert's comments and factor analyzing method has been used to analyze this question.

A: The results of analyzing experts' opinion regarding with evaluation factors fitness

Table 2- The fitness amount of evaluation main input components (from the experts' point of view)

Main components	Completely Suitable	Suitable	Somewhat Suitable	Unsuitable	Completely Unsuitable	I have no idea	Total
Policy and Strategy	218	76	6	-	-	-	300
Leadership and Management	204	93	3	-	-	-	300
Customer and Market	193	98	9	-	-	-	300
Human Capital	214	83	3	-	-	-	300
Processes and organizing	200	95	5	-	-	-	300
Partners and resources	188	175	7	-	-	-	300

Table 3- The fitness amount of evaluation main output components (from the experts' point of view)

Sub factors	Completely Suitable	Suitable	Somewhat Suitable	Unsuitable	Completely Unsuitable	I have no idea	Total
Human resources Results	232	64	4	-	-	-	300
Results of society	211	76	5	-	-	-	300
financial and economic results	197	96	7	-	-	-	300
Performance Results	209	87	4	-	-	-	300

B: the results of Factor analyzing in relation to evaluation factors fitness

In this section, has presented the results of factor analysis calculations to determine and confirm Indexes of “evaluating the universities units’ performance “. Since the aim of this study is to survey a scope to exploring dimensions and main structures and in relation with it (as a tool for discovery possible rate of remove or reduce or integration of data) . . . has been used Exploratory factor analysis in way Principal Component Analysis. (Respectively the following steps). (Dickson, 2001).

Factor extraction

At this step are extracted factors (input and output) , the basic indexes contains six input index (50 elements) and 4 output index(14 elements) were selected by studying business excellence models and using the Delphi method and experts’ point of view. So, primary factors to factor analyzing (mentioned indexes) were selected to analyzing these recent indexes. (See below table). These factors remain if Eigenvalue be more than one.

Table 4 - Derived Factors from excellence models and amount of Eigenvalue for each factor

Row	Main input factors	Number of indicators Subsidiary	Equity
1	"Main Input indicators "	5	2.03
2	Policy and strategy	11	4.02
3	Leadership and Management	9	3.11
4	Customer and market.	10	4.38
5	Human Capital	8	3.27
6	Processes and organizing	7	2.12
Total	Partners and resources	50	

Row	Main output factors	Number of sub-indicators	Equity
1	"Main output indicators "	4	2.54
2	Human resources Results	3	4.23
3	Society Results	4	3.65
4	Financial and economic results	3	5.26
Total	Performance Results	14	----

Determining data's proportion

Table 5- The results of KMO and Bartlett’s Krouit test about main Input factors (performance evaluation data)

Row	Factors	KMO Kizr-Meyer- Olkin	Bartlett's test
1	(main input indicators)	0.73	965.27 (P=0.000)
2	Policy and strategy	0.71	874.23 (P=0.000)
3	Leadership and Management	0.69	486.01 (P=0.000)
4	Customer and market.	0.75	1021.22 (P=0.000)
5	Human Capital	0.73	942.12 (P=0.000)
6	Processes and organizing	0.70	582.14 (P=0.000)

As can be seen from above table all of the main inputs factors have a higher value of 0.6 and a significance level less than 0.001.

Table 6- The results of KMO and Bartlett's Krouit test tests about main output factors (performance evaluation Output)

Row	Main output factors	KMO Kizr-Meyer- Olkin	Bartlett's test
1	"Main output indicators "	0.79	1324.02 (P=0.000)
2	Human resources Results	0.72	1102.11 (P=0.000)
3	Society Results	0.69	542.41 (P=0.000)
4	Financial and economic results	0.72	1098.09 (P=0.000)

As can be seen from the above table a; the main outputs factors have a higher value of 0.6 and a significance level less than 0.001.

Determining each component loading factor

The least accepting criterion is 0.3 times for components. “Loading factor = correlation of a variable with a load factor.”

The result of this step: unrelated components are removed at this step.

Table 7-Results of loading factor about evaluation component

Factors	Components	Load factor components
Includes 10 factors	(Questions or indicators of each factor)	Load factor components has come in the following tables (Table)

Third question of research: what pattern can be presented based on data envelopment analysis to evaluate Islamic Azad University units' Performance?

To answer this question requires two steps

Model selection

Perform and Conclusion

Choose a pattern based on the philosophy and pattern's goals, theoretical model and conceptual framework have been designed as following:

Philosophy and pattern's goals

- 1- Determine the improvement, Weaknesses points and improvable points in university units
- 2- Improving to university strategy and help to institutionalize of the University Mission

3- Evaluate the university units by systematical and Quality-oriented looking

4- Increase the university units performance quality

5- Modeling of Top university units in performance

6- develop a performance international standards evaluation system with national looking

7- affecting University costs

8- create constructive competition between University units in order to improve performance

9- Facilitate managers' performance in reward system and improving university units.

10- establish a self-control system and self- evaluate in university

11- increase satisfaction and confidence to University

The theoretical foundations of the model:

These principles include: the roles, functions and responsibilities of universities, comprehensive quality approach, organization excellence,

Excellence in higher education, evaluation approaches and arising models from them,

Evaluation in Higher Education, higher education indexes, organizational excellence models, Data envelopment analysis

Model conceptual framework

The following ten factors are common factors derived from academic excellence models that have been used in the conceptual framework model; In order to localize the model, the following factors have been used in choosing the components of the components of the twenty year vision document, national document of the higher education sector development, the document of mentioning condition management and use of the elite, research and technology expanding document and vision of Islamic Azad university.

A: Managing policy and strategy factor

Strategic Plan (Strategic Planning based on the present and future needs of higher education and the opportunities and threats), a strategic plan based on the country vision document and the National Higher Education (creation of Centers of Excellence based on comparative advantage, review unit fields based on region and country future needs and science and technology market and working market virtual training planning and . . . , strategic planning and policy implementation, produce and use of indexes to control and strategic goals measuring .

B- Management and leadership Factor

Identify its values and creation be cultural context that values, in the field of identification the Key Performance with the community (social responsibility unit), in the field of Developing proper standards with that unit (according to internal and external environment changes and the emergence of new expectations).

In the field of auditing and validation programs, and how to set and provide that unit performance program (Unit reports that each year, about the design of communication systems and respond effectively to students about the design of communication systems and respond effectively to the Members of the Board science, about designing communication systems and respond effectively to employees, about the review and identify alternative financing.

J: Customer and market factor

Identify needs, expectations and interests of industry and society, national and international scientific cooperation with that unit and development of joint research units between the executive agencies and that unit , surveying the activities in the field of

increasing centers and technology centers, identify knowledge and awareness of the needs, expectations of faculty, identify knowledge needs, expectations of competitors the same unit, surveying the customer relationship management system

D: human capital Factor

Human resource Planning (based on the current status and Human resource analysis and forecasts the future); identify, develop and retain the knowledge and competence of existing and Retired staff (knowledge management). employee participation program (cultural context making in the field of participation ,offers and encourage System and making Motivation in creation of individual and group participation), staff empowerment (in the framework of the expanding career development route , succession system, job enrichment, job rotation, etc.); employee training program (compliance training needs with unity goals ,training assessment , training effectiveness) The incentive system and attention to staffs mental health

H: processes and organizing factor

Identify unit key processes including educational and research activities, performance, innovation process , business process, quality process, etc. compliance and improvement of unit processes (design or development unit services) with the needs and expectations of students, adaptation and improvement with unit processes (design or development unit processes) by changing the structure and science and technology, adaptation and improvement of unit processes (design or development unit processes) by market changes and science and society Economy , development of unit process measuring indexes to Control and improve the processes, prioritize the key activities of unity Academic groups (in planning and goals policy-making and Academic groups activities associating with unit, Curriculum development and planning in the field of teaching methods and student and professor evaluation.

V: partners and resources factor

Management of external partners (identify opportunities for the units key participation, ensuring cultural compatibility and sharing (sharing) knowledge with partner organizations, relationships with contractors, unit financial resource management, buildings management, equipment and materials, management of comprehensive technology systems (identify and evaluate alternative and emerging technologies with regard to their effect on unit performance and community and plan to use them), knowledge management (optimum access to the information, optimal use of the unseen and open knowledge ,proper protection of intellectual assets, level navigation (compared to Premier units), identify unit suppliers and the development process of new investments.

H: human resource results factor

evaluation Satisfactory of faculty members (satisfaction of leadership, strategies, processes, rights, resources, etc.) assessment the other staff satisfaction (methods of capture, management, organizational position, rights, job security, processes, training and support), assessment of student satisfaction (in service delivery, educational innovation, flexibility, support, transparency, effective impact of education and research, student rights, accountability, consultation, etc) .

T: society results factor

Assess its social and cultural impact in terms of local, regional and national (the unit service satisfaction index process to society, evaluate the effectiveness of its impact on the market and industry (unit services Satisfaction index Process to industry and market), the proper use of unit of public facilities and regard environmental issues

K: financial and economic results factor

Evaluate the investment return (material assets, financial, physical, human, assess the cost - benefit value determination, economic evaluation and project control, evaluation of operational accounting system.

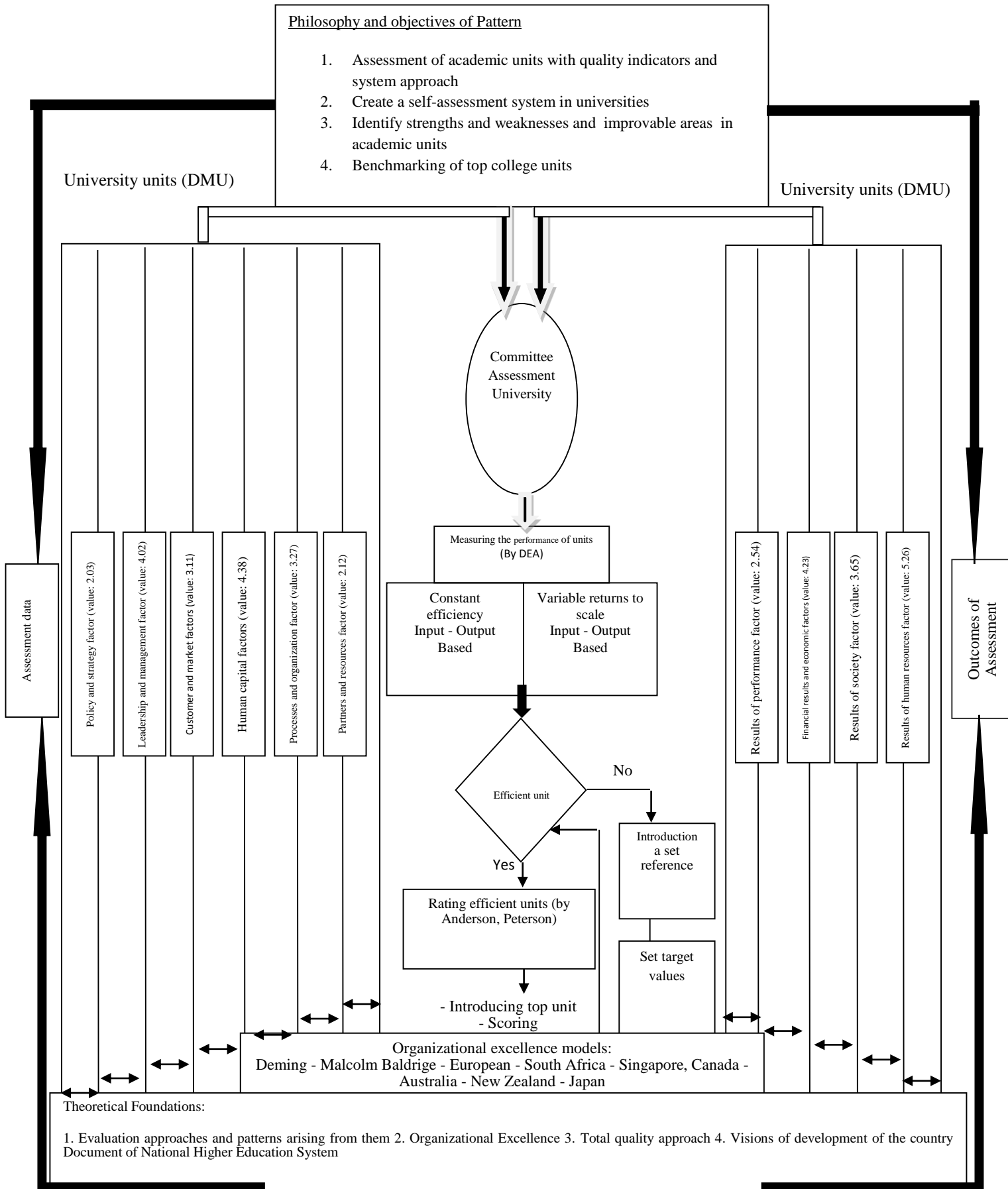
L: performance results factor

Evaluating the effectiveness of faculty (assessment of education indexes improvement, research and executive faculty members), to evaluate the effectiveness of the actions of other employees (evaluation the job indexes description process, innovation indicators, creativity, effectiveness of in-service training courses and other indexes), evaluation the unit processes effectiveness (assessment educational indexes , research and implementation units).

The proposed model:

In the below figure the proposed model has been presented as "the university's units proposed performance evaluation model based on the of university excellence indexes ".

Figure 1- The university's units proposed performance evaluation model based on the excellence organizational indexes by using the data envelopment analysis method



Data evaluation with data envelopment analysis

A: measure inputs and outputs of every eight collegiate unit

Table 8- Inputs value of fourteen region Azad University units (Data are as percentage).

Institutions Academic units	Policy and strategy	Management and Leadership	Customer and market	Human Capital	Processes and organizing	Partners and resources
Zahedan	75	87	70	90	87	92
Science and Research	65	67	75	84	78	86
Iranshahr	65	80	76	87	62	87
Zabul	66	65	80	85	58	82
Saravan	62	60	67	87	52	71
Chabahar	55	52	61	57	42	67
Khash	48	50	41	55	37	55
Nikshahr	41	42	42	50	35	53

Table 9- Outputs value of fourteen region Azad University units (Data are as percentage)

Output Academic units	Human resources Results	Society Results	Economic and Financial Results	Performance Results
Zahedan	80	80	85	98
Science and Research	80	79	80	80
Iranshahr	75	73	80	89
Zabul	72	70.22	71	79
Saravan	73.33	60.45	70	79
Chabahar	69	60	65	72.80
Khash	59.44	58.11	60	72.4
Nikshahr	50	48.5	55	61.5

B: Obtained data Analyzing (pre step) by using data envelopment analysis method.

Require that above tables data (output and input) be analyzed with different methods of Data envelopment analysis (output to steady scale and variable scale) to evaluate University units.

Table 10- The efficiency rate of colleague units according to the Data envelopment analysis models (output to steady scale and variable scale)

Methods of analysis Academic units	CCR constant efficiency (percent)	BCC Return to Scale (Variable (percent)
Zahedan	96.51	94.16
Science and Research	95.72	89.45
Iranshahr	94.21	79.13
Zabul	86.23	74.25
Saravan	75.12	70.29
Chabahar	70	70.24
Khash	61.12	68.36
Nikshahr	52.5	58.17

Conclusion

According to the table above Zahedan Collegiate Unit No, Science and Research and Iranshahr have a relatively high efficiency and other units have lower efficiency;

Since by using CCR and BCC is different the recent units performance, it indicates that in this unit, output is to variable scale .

And that means the increase (or decrease) a unit in input increases (or decreases) more than one unit in output.

In other words, any changes in inputs don't change outputs in the same ratio.

Rating efficient units

The units under investigation divide into "functional units" and "inefficient units "by Data envelopment analysis.

Table 11- Rating the fourteen region collegiate units

Row	Unit Name	Rank
1	Zahedan	1
2	Science and Research	2
3	Iranshahr	3
4	Zabul	4
5	Saravan	5
6	Chabahr	6
7	Khash	7
8	Nikshahr	8

Target values

In general, the target value means that an inefficient unit (according to its reference unit) in the amount of their inputs and outputs should be applied what changes to reach the efficient units boundary.

Are Called reference units, the units that are used to compare inefficient unit, also are target values the obtained values of reference units combining proportions.

For example, reference units for inefficient unit No. 8, are No. 1, 2 and 3 efficient units, which by combination some of these units we reach to target values.

Tables 12 and 13 specify target values for inefficient units. In this tables inputs and outputs target values of inefficient units as well as the reference collection has been shown.

Table 12- Reference collection and target values for inefficient units

Inefficient unit	Reference set	Target values Changes that inefficient units (according to reference set) should be applied in their amount of inputs and .outputs to be reach to efficient units			
		Inputs changes		output changes	
Unit 8	Units of 3 ,2 ,1	Policy and strategy	From 6.6 to 7.1	Human resources Results	From 12 to 13.57
		Management and Leadership	From 2.6 to 3	Society Results	From 14 to 14
		Customer and market	From 3.2 to 3.3	Economic and Financial Results	From 14 to 14.08
		Human Capital	From 2.1 to 2.4	Performance Results	From 9 to 13.59
		Processes and organizing	From 3.2 to 3.3		
		Partners and resources	From 4.4 to 4.5		

Results for table above indicate that the unit No. 8 is an inefficient unit (low efficiency) and to reach efficient point, must be make changes in its incoming and outgoing, for example, this unit should be increase its policy and strategy from 6.6 to 7.1, For other inefficient units also set of the reference and target values, are determined in accordance with the above table.(Note: in above method also reference set and target values was performed for the other inefficient units that the following results are obtained. (Table 13).

Table 13-Weak points of inefficient units (in the entities and outputs) and the introduction of model and superior units to them (the of the reference)

Row	Name of inefficient unit	Reference set	Weak points (star symbol means this unit in using the following factors, appropriate does not action to expression or high (consumption in the data or reduction of output)									
			Policy and strategy	Management and Leadership	Customer and market	Human Capital	Processes and organizing	Partners and resources	Human resources Results	Society Results	Economic and Financial Results	Performance Results
1	Khash	1, 2, 3	*	*	*	*	*	*	*	Suitable	*	*
2	Zabul	1 and 2	*	*	*	*	*	Suitable	Suitable	*	Suitable	*
3	Chabahr	1 and 3	*	Suitable	*	*	*	*	*	*	*	Suitable
4	Saravan	1 and 2	*	*	Suitable	*	Suitable	*	*	Suitable	Suitable	*

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